Petroleum Testing Equipment

Koehler
INSTRUMENT COMPANY, INC.

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Worldwide Support

Providing quality testing instrumentation and technical support services for research and testing laboratories has been our specialty since 1925. Meeting your testing needs is the primary focus of our business, which is why Koehler Instrument Company is a leading producer and supplier of petroleum, synfuels and petrochemical instrumentation worldwide.

At Koehler, we pride ourselves in innovation. In a time of continuous technological advancement and transition we are constantly implementing new and improved ways to surpass the needs of an ever-evolving industry.

Koehler products are backed by our staff of technically knowledgeable, trained specialists who are experienced in both petroleum products testing and instrument service, which is carried out either on site or at a Koehler service center.

With this catalog, we are pleased to present our comprehensive line of petroleum laboratory instrumentation, both manual and automatic, as well as standards and accessories conforming to the latest ASTM, ISO, IP and related international specifications. We invite you to look through our extensive product offerings for instrumentation and services to meet your testing needs, or contact us for custom solutions for your specialized requirements.

Committed to providing you with full support for your laboratory testing needs, Koehler Instrument Company is more than just an instrument manufacturer. We take care of you through the whole process. We have many satisfied customers worldwide and continue to build new relationships every day because of our attention to customer needs. Our goal is to be the best and most dependable instrument company in the market place. We invite your comments and input so that we may continue to serve you.

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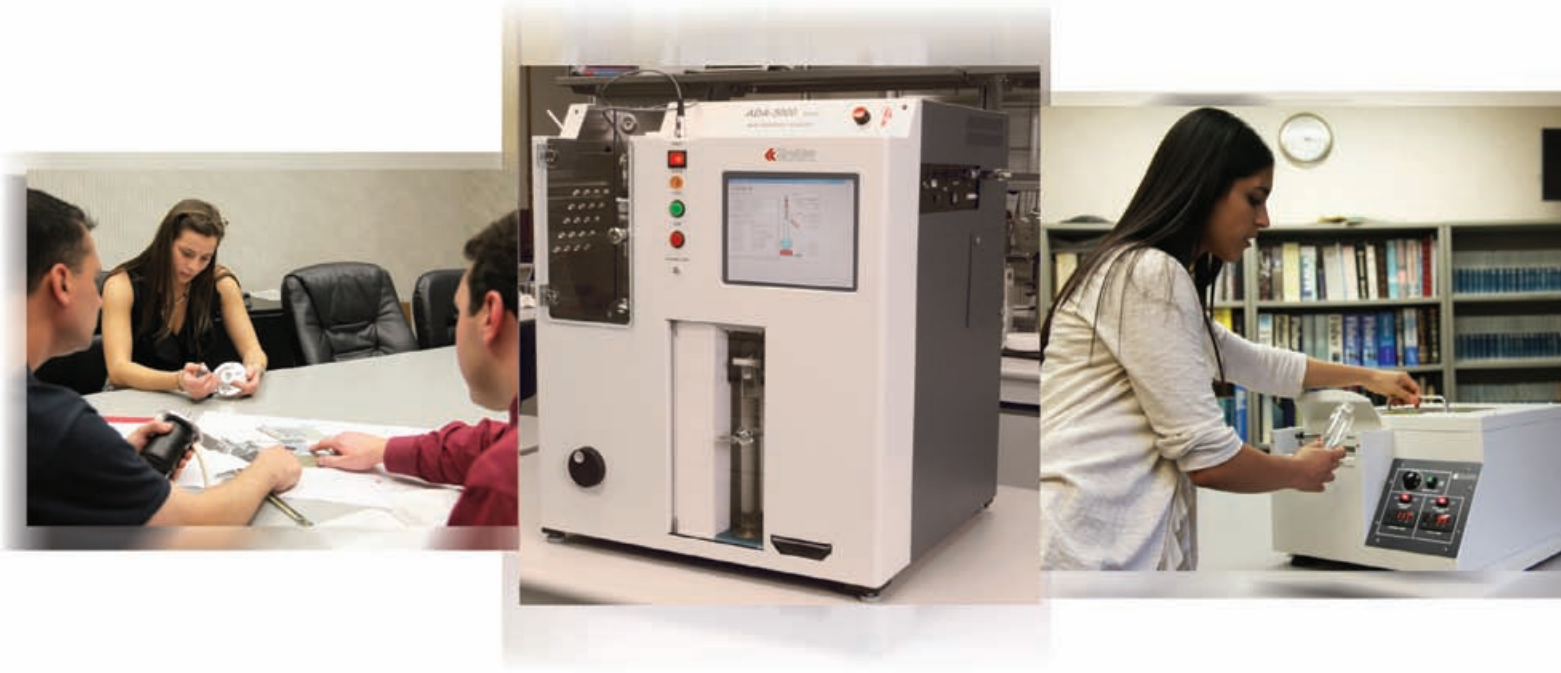

After your instrument is delivered to your laboratory – Our staff will contact you to answer any questions that you may have and to make certain that you have everything you need. Koehler technical service specialists are always just a phone call away to provide you with information and assistance for your testing needs.

Certified Documentation – Koehler provides traceable documentation to support your ISO based quality management system. This includes traceable certificates for viscometer tubes, thermometers, hydrometers, thermo-hydrometers and more.

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Calibration Services and Reference Fluids – Koehler offers a growing variety of ISO 17025 certified petroleum testing materials for your calibration and test method validation requirements. Our Technical Service Department provides calibration services conducted with traceable reference materials and standards.

Testing Services – A complete source for your testing solutions, Koehler offers a wide range of in-house services based on selected standard test methods. Our staff is comprised of technical experts and the best instrumentation for fast, accurate and reliable results. We specialize in all tests for which we offer instrumentation as well as additional test methods. You are invited to send us samples for testing and evaluation at any time. Please contact your Koehler representative for additional information.

Instrument Maintenance and Service – Onsite installation and service visits are available for any instrument. Should an issue arise, our trained technicians work to diagnose and resolve it promptly and efficiently. Detailed service records are kept for each instrument to assist in recommending future maintenance or finding a fast solution to a problem, and an extensive stock of replacement parts is on hand for immediate delivery.

Warranty Coverage – Koehler provides a comprehensive warranty with each purchased instrument. Service contracts and extended warranties are available for all instruments, which can either be carried out on site or at one of our Koehler service centers.

Customer Service – Our fast, friendly, knowledgeable sales team expertly answers any presale or application questions you may have in placing your order. They make sure every aspect of your order goes smoothly.

Worldwide Support – Our global network of qualified distributors provide sales and application support, training, and service assistance. Contact us for the distributor in your area.

Social Media – Koehler is now on Facebook. "Like" our page for weekly updates on our latest products, news, events and tradeshow information. You can find us at facebook.com/KoehlerInstrument

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Koehler INSTRUMENT COMPANY, INC.

How To Order

For most of the ASTM, ISO, FTM and international standards featured in this catalog, you will find a complete offering of the equipment needed to perform the test. Many instruments are available in several different configurations to enable you to tailor your selections to your individual requirements. Certain standard laboratory items have not been listed but are available on special order. Our Customer Service representatives can answer any questions you may have and provide you with information you may require.

Please be sure to use the Koehler catalog number for the instrument model which is compatible with your local power service. Consult individual product listings for complete information on electrical requirements. All of our products listed in this catalog can be ordered by phone, fax or e-mail. Orders may also be placed using your Visa, Mastercard, American Express, or Discover Card.

CALL TOLL FREE IN THE U.S.: 1-800-878-9070
PHONE: +1 631 589 3800 • FAX: +1 631 589 3815
E-MAIL: sales@koehlerinstrument.com

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BOHEMIA, NEW YORK • HOUSTON, TEXAS

Koehler offers laboratory reference standards for our full line of testing equipment. Each test standard comes with original certification listing the ASTM test method, the name and ISO status of each testing laboratory, and the average test result and standard deviation. Please inquire with Koehler's Customer Service Department about ordering these reference standards for your testing needs.

Viscosity

Test Methods	Page
Kinematic Viscosity of Transparent and Opaque Liquids ASTM D445; IP 71; ISO 3104; DIN 51550; FTM 791-305	**2-13**
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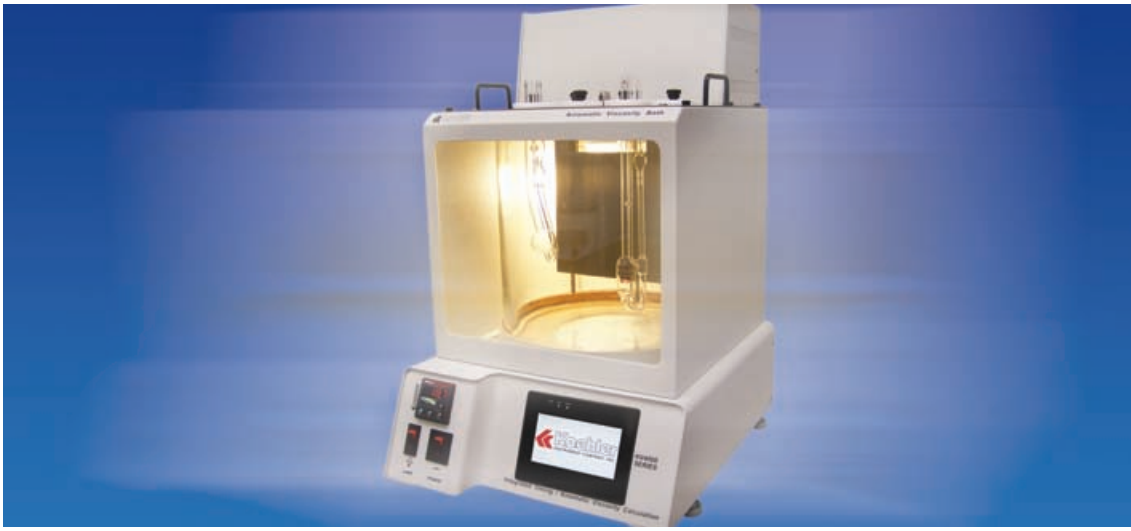


Kinematic Viscosity

K23702 Constant Temperature Kinematic Viscosity Bath (KV4000) - page 4

Kinematic Viscosity of Transparent and Opaque Liquids

Kinematic Viscosity of Asphalts (Bitumens)

Viscosity of Asphalts by Vacuum Capillary Viscometer

Viscosity and Viscosity Change After Standing at Low Temperature of Aircraft Turbine Lubricants

Test Method

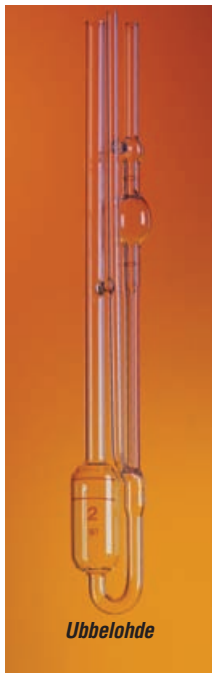
Kinematic viscosity is of primary importance in the design and selection of a wide range of petroleum products. Calibrated capillary viscometers are used to measure flow under gravity or vacuum at precisely controlled temperatures.

Kinematic Viscosity Test Equipment

- Constant temperature baths for the full range of viscosity applications, from low temperature to high temperature
- Calibrated glass capillary kinematic viscometers
- Viscosity standards
- Viscometer cleaning and drying apparatus
- Kinematic viscosity thermometers

Cannon®-Fenske Routine

Cannon®-Fenske Opaque



Ubbelohde

Viscosity Reference Standards - pages 18-19

K23376 Digital Constant Temperature Bath

KV1000 Digital Constant Temperature Kinematic Viscosity Bath

- Accommodates six capillary viscometers
- Variable temperature limit control
- Conforms to ASTM D445 and related specifications

Constant temperature bath for kinematic viscosity testing of petroleum products. Accommodates six round 2" (51mm) dia. viscometer holders. Bath temperature stabilizes within ±0.5°C (±1°F) of setting, and final adjustment to within ±0.01°C (±0.02°F) can be made. Test temperatures of up to 150°C (302°F) can be selected. Temperature limit control permits the operator to select an overtemperature cutoff point to protect against accidental overheating. Control unit includes immersion heater, circulating stirrer and temperature probe. Composition top plate rests on a 12x12" (30.5x30.5cm) or 12x18" (30.5x46cm) Borosilicate Glass jar. Order capillary viscometers, viscometer holders and thermometer separately.

Specifications

Conforms to the specifications of:
ASTM D445, D6074, D6158; IP 71; ISO 3104; DIN 51550; FTM 791-305; NF T 60-100
Capacity: Six (6) glass capillary viscometers
Bath Medium: water or white technical oil

Included Accessories

Port Covers, stainless steel (6)

Ordering Information

Catalog No.	Model	Electrical Requirements CE	Bath Depth	Bath Capacity	Dimensions diaxh,in.(cm)	Net Weight
K23376-00000	KV1000	115V 60Hz, single phase 10.2A	12" (30.5 cm)	5.8 gal (22L)	13½x20 (34.6x50.8)	25 lbs (11.3kg)
K23371-00000	KV1000		18" (46 cm)	8.9 gal (33.7L)	19½x23 (49.5x58.4)	38 lbs (17.2kg)
K23377-00000	KV1000	220-240V 50/60Hz single phase 5.3A	12" (30.5 cm)	5.8 gal (22L)	13½x20 (34.6x50.8)	25 lbs (11.3kg)
K23378-00000	KV1000		18" (46 cm)	8.9 gal (33.7L)	19½x23 (49.5x58.4)	38 lbs (17.2kg)

K23377-01000 Cooling Coil Assembly. Permits circulation of water or refrigerated coolant for operation at near ambient temperatures. Installs in top plate.

KV3000 and KV4000 Constant Temperature Baths with Integrated Digital Timing

- Microprocessor temperature control between ambient and 150°C (302°F)
- Integrated digital timing for easy measurement of sample efflux times
- KV4000 permits entry of viscometer constants for automatic calculation and display in viscosity units or seconds
- Dual digital displays show setpoint and actual bath temperature
- Selectable temperature scale - Fahrenheit or Celsius
- Integrated redundant overtemperature and low liquid level cut-off circuitry
- Conforms to ASTM D445, D2170 and related specifications

Constant temperature bath series with advanced temperature control circuitry and integrated timing features for convenient, accurate glass capillary viscometry determinations. Microprocessor PID circuitry assures precise, reliable temperature control within ASTM specified tolerances throughout the operating range of the bath. Simple push-button controls and dual digital displays permit easy setting and monitoring of bath temperature. Two place calibration offset capability is provided. Baths accommodate seven glass capillary viscometers of various types - see pages 10-13 for complete selection. Viewing the viscometers is made easy by glare-free fluorescent illumination inside the bath and a baffle that provides a background for easy viewing. Temperature control uniformity is assured by means of motorized stirrer which provides complete circulation without turbulence. Connection of the built-in cooling coil to tap water or a recirculating water chiller facilitates temperature control at ambient or below ambient temperatures. *Communications software (RS232, etc.) ramp-to-set, and other enhanced features are available at additional cost. Contact your Koehler representative for additional information.*

Integrated Timing Features - KV3000 incorporates seven digital timers on the front control panel for convenient timing and monitoring of the efflux interval for each viscometer. On KV4000, the user can enter the viscosity constant for each viscometer on the front LCD control/display, and then get the test result in both efflux time and viscosity units automatically after stopping each timer. All timing functions are displayed in 0.01 or 0.1 second resolution and are accurate within 0.01%.

Bath Construction and Safety Features - Bath chamber is a clear borosilicate glass vessel enclosed in a polyester-epoxy finished steel housing. Top working surface has seven 2" (51mm) viscometer ports. Front viewing window assures safe, distortion-free viewing. Microprocessor temperature controller incorporates safety circuitry that interrupts power to the heaters in the event of an overtemperature condition or disconnection of the primary probe. For added safety, an adjustable redundant controller with separate sensor probe interrupts power if an overtemperature situation occurs. An integrated low-liquid sensor prevents operation of the bath if the bath liquid is not filled to the proper level, and cuts off power should it fall below during operation. Both overtemperature and low liquid level circuits will latch and prevent further operation of the bath until the fault is removed.

Dimensions lxwxh,in.(cm)
12" Kinematic Viscosity Bath:
20¼x15¼x24½ (51x39x62)
Net Weight: 78 lbs (35.5kg)
18" Kinematic Viscosity Bath:
20¼x15¼x30½ (51x39x77)
Net Weight: 90 lbs (41kg)

Bath Capacity:
12": 5.8 gal (22L)
18": 8.9 gal (33.7L)

Included Accessories
Port covers, Delrin® (7)
Thermometer holder

Software compatible, inquire with Koehler Customer Service.

K23700 Constant Temperature Kinematic Viscosity Bath (KV3000)

Specifications

Conforms to the specifications of:
ASTM D445, D2170, D6074, D6158; IP 71, 319; ISO 3104; DIN 51550; FTM 791-305; NF T 60-100
Temperature Control
Range: ambient to 150°C (302°F); sub-ambient to 10°C with external cooling
Display: 0.1°C/0.1°F resolution, calibrate to 0.01°C/0.01°F
Control accuracy and uniformity: Exceeds ASTM requirements throughout the operating range
Integrated timing
KV3000: Seven individual start/stop timers with displays to 0.1 seconds, accurate to within 0.01%
KV4000: Integrated LCD microcomputer with start/stop buttons and retention of viscometer tube constants, automatic calculation and display in viscosity units or seconds to 0.1s, within 0.01% accuracy.
Communication: RS232 port included with KV4000 (optional for KV3000)
Viscometer ports: Seven round 2" (51mm) ports
Bath Medium: Water or suitable heat transfer fluid - please refer to page 8

Ordering Information

Catalog No.	Model	Electrical Requirements CE	Bath Depth
K23700	KV3000	115V 60Hz, single phase 12.6A	12" (30.5 cm)
K23702	KV4000		
K23790	KV3000	220-240V 50/60Hz, single phase 7.2A	
K23792	KV4000		
K23706	KV3000	115V 60Hz, single phase 12.6A	18" (46 cm)
K23708	KV4000		
K23796	KV3000	220-240V 50/60Hz, single phase 7.2A	
K23798	KV4000		

KV5000 Kinematic Viscosity Bath

Koehler KV5000 series kinematic viscosity baths with the optical flow detection system provides automatic viscosity measurements of petroleum and petrochemical products. Includes communication and power ports for each optical detection assembly, and can utilize up to five optical assemblies. Two additional positions are available for manual viscosity measurements, and all positions can be used in the manual mode. The interchangeable Ubbelohde, Cannon® Fenske, and Reverse Flow viscometer tubes are quickly installed and removed from the detection assemblies for cleaning and simple tube changes. Allows automatic viscosity measurements and results calculation without an external PC. Motorized stirrer provides complete circulation without turbulence. Microprocessor PID circuitry assures precise, reliable temperature control within ASTM specified tolerances throughout the operating range. Simple push-button controls and dual digital displays permit easy setting and monitoring of temperature. Two place calibration offset capability is provided. Built-in cooling coil facilitates temperature control at ambient or below ambient temperatures.

Viscosity Software

Software automatically downloads test data and calculates final test results from sample efflux times. Also included is a database for storing test data, determining test averages, standard deviations, and ASTM test repeatability as well as providing a method for tracking both instrument and viscometer tube calibrations.

- Complete instrument and data acquisition system exclusively designed for conducting D445, IP71 and related test methods
- Optical sensor detection system accurately measures sample flow and automatically calculates kinematic viscosity results
- Powerful software system for PC platforms operating in Windows®98 SE, 2000, NT, ME, and XP environments
- Option wireless data acquisition package available
- Automatic calculation and display of results in viscosity units or seconds
- Accommodates Ubbelohde, Cannon®Fenske, and Reverse Flow viscometers
- High accuracy temperature control with dual digital displays show setpoint and actual bath temperature with selectable scale (˚C or ˚F)
- Stand alone feature provides for automated testing without an external PC
- Integrated redundant overtemperature and low liquid level cut-off circuitry
- Software exports test data with graphs and test parameters direct to Microsoft®Excel or in ASCII file format for use with LIMS or any other spreadsheet program
- Integrated digital timing for easy measurement of sample efflux times

K23702-OS Kinematic Viscosity Bath (KV5000) with K23780-CF Optical Sensor and CF Routine Tube 378-025-C02-OS

Specifications

Conforms to the specifications of:
ASTM D445, D2170, D6074, D6158; IP 71, 319; ISO 3104; DIN 51550; FTM 791-305; NF T 60-100
Temperature range: Ambient to 150˚C (302˚F); sub-ambient to 10˚C with external cooling
Temperature display: digital with 0.1 ˚C/˚F resolution, calibrate to 0.01 ˚C/˚F
Temperature control accuracy and uniformity: Exceeds ASTM requirements

Fully Automated Viscosity and Houillon Viscosity Instruments Available, Inquire with Koehler Customer Service.

Software compatible, inquire with Koehler Customer Service.

Ordering Information

Catalog No.	Model	Description	Electrical Requirements CE	Order Qty
K23702-OS	KV5000	12" Kinematic Viscosity Bath	115V 60Hz	1
K23792-OS	KV5000	12" Kinematic Viscosity Bath	220-240V 50/60Hz	
K23708-OS	KV5000	18" Kinematic Viscosity Bath	115V 60Hz	
K23798-OS	KV5000	18" Kinematic Viscosity Bath	220-240V 50/60Hz	
K23780-SFW	KV5000	Kinematic Viscosity Software Package		1
K23780-WLS	KV5000	Kinematic Visosity Software Package Wireless		
K23780-CF		Optical Sensor for Cannon®Fenske viscometers		1-5
378-025-C01-OS thru **378-700-C01-OS**		Cannon®Fenske Routine Viscometers Size 25 thru 700 (Specify Size when ordering)		1-5
K23780-RF		Optical Sensor for Opaque Reverse Flow viscometers		1-5
378-025-C02-OS thru **378-700-C02-OS**		Cannon®Fenske Opaque Viscometers Size 25 thru 700 (Specify Size when ordering)		1-5
K23780-UB		Optical Sensor for Ubbelohde viscometers		1-5
378-000-C03-OS thru **378-005-C03-OS**		Ubbelohde Viscometers Size 0 thru 5 (Specify Size when ordering)		1-5

HKV3000 and HKV4000 High Temperature Baths with Integrated Digital Timing

- Microprocessor temperature control between ambient and 232°C (450°F)
- Integrated digital timing for convenient measurement of sample efflux times
- HKV4000 model permits entry of viscometer constants for automatic calculation and display in viscosity units or seconds
- Dual digital displays show setpoint and actual bath temperature
- Selectable temperature scale - Fahrenheit or Celsius
- Integrated redundant overtemperature and low liquid level cut-off circuitry
- Conforms to ASTM D445, D2170 and related specifications

High temperature baths with advanced temperature control circuitry and integrated timing features for convenient, accurate glass capillary viscometry determinations. Microprocessor PID circuitry assures precise, reliable temperature control within ASTM specified tolerances throughout the operating range of the bath. Simple push-button controls and dual digital displays permit easy setting and monitoring of bath temperature. Two place calibration offset capability is provided. Baths accommodate seven glass capillary viscometers of various types - see pages 10-13 for complete selection of viscometers and holders. Viewing the viscometers is made easy by glare-free fluorescent illumination inside the bath and a baffle that provides a background for easy viewing. Temperature control uniformity is assured by means of motorized stirrer which provides complete circulation without turbulence. Connection of the built-in cooling coil to tap water or a recirculating water chiller facilitates temperature control at ambient or below ambient temperatures. *Communications software (RS232, etc.) ramp-to-set, and other enhanced features are available at additional cost. Contact your Koehler representative for additional information.*

Integrated Timing Features - HKV3000 incorporates seven digital timers on the front control panel for convenient timing and monitoring of the efflux interval for each viscometer. On HKV4000, the user can enter the viscosity constant for each viscometer on the front control/display, and then get the test result in both efflux time and viscosity units automatically after stopping each timer. All timing functions are displayed in 0.01 or 0.1 second resolution and are accurate within 0.01%.

Bath Construction and Safety Features - Bath chamber is a clear borosilicate glass vessel enclosed in an insulated polyester-epoxy finished steel housing. Top working surface has seven 2" (51mm) viscometer ports. Front viewing window assures safe, distortion-free viewing. Microprocessor temperature controller incorporates safety circuitry that interrupts power to the heaters in the event of an overtemperature condition or disconnection of the primary probe. For added safety, an adjustable redundant controller with separate sensor probe interrupts power if an overtemperature situation occurs. An integrated low-liquid sensor prevents operation of the bath if the bath liquid is not filled to the proper level and cuts off power should it fall below during operation. Both overtemperature and low liquid level circuits will latch and prevent further operation of the bath until the fault is removed.

K23802 Digital High Temperature Kinematic Viscosity Bath (HKV4000)

Specifications

Conforms to the specifications of:
ASTM D445, D2170, D6074, D6158; IP 71, 319; ISO 3104; DIN 51550; FTM 791-305; NF T 60-100
Temperature Control
Range: ambient to 232°C (450°F); sub-ambient to 10°C with external cooling
Display: 0.1°C/0.1°F resolution, calibrate to 0.01°C/0.01°F
Control accuracy and uniformity: Exceeds ASTM requirements throughout the operating range
Integrated timing
HKV3000: Seven individual start/stop timers with displays to 0.1s, accurate to within 0.01%
HKV4000: Integrated LCD microcomputer with start/stop buttons and retention of viscometer tube constants, automatic calculation and display in viscosity units or seconds to 0.1s, within 0.01% accuracy.
Communication: RS232 port included with HKV4000 (optional for HKV3000)
Viscometer ports: Seven round 2" (51mm) ports
Bath Medium: water or suitable heat transfer fluid - please refer to page 8

Included Accessories

Port covers, Delrin® (7)
Thermometer holder

Software compatible, inquire with Koehler Customer Service.

Ordering Information

Catalog No.	Model	Electrical Requirements CE	Bath Depth	Bath Capacity	Dimensions lxwxh,in.(cm)	Net Weight
K23800	HKV3000	115V 60Hz, single phase 12.7A	12" (30.5 cm)	5.8 gal (22L)	20¼x15¼x24½ (51x39x62)	84 lbs (38kg)
K23802	HKV4000					
K23890	HKV3000	220-240V 50/60Hz, single phase 7.3A				
K23892	HKV4000					

LKV3000 and LKV4000 Refrigerated Constant Temperature Baths

- Improved design with enhanced performance and safety features
- Standard –30°C (–22°F) LKV3000 model, and extended range –70°C (–94°F) LKV4000 model
- Microprocessor PID temperature control with two decimal calibration offset
- Dual digital displays show setpoint and actual bath temperature
- Selectable temperature scale - Fahrenheit or Celsius
- Conformity to ASTM D445 and related specifications

Refrigerated constant temperature bath series with improvements in operating features, safety and cabinetry. Advanced temperature control circuitry includes microprocessor PID design and two decimal calibration offset. Simple push-button controls and dual digital displays permit easy setting and monitoring of bath temperature. Baths accommodate four glass capillary viscometers using 2" (51mm) round holders (rectangular ports are available on special order) - see separate listing on pages 10-13 for complete selection of viscometers and holders. Bath medium is contained in a clear, evacuated Dewar flask, and glare-free fluorescent backlighting provides excellent visibility when working with the viscometers.

Standard and extended range models - Standard LKV3000 model operates at temperatures from ambient to –30°C (–22°F). Extended range LKV4000 model operates at temperatures as low as –70°C (–94°F). Both models exceed ASTM temperature control accuracy and uniformity requirements throughout the operating range. Air-cooled hermetic compressors provide efficient operation with the use of CFC-free refrigerants.

Bath construction and safety features - Insulated steel cabinet has an attractive polyester-epoxy finish and is mounted on adjustable leveling feet. Chemical resistant working (top) surface has four round ports for 2" (51mm) viscometer holders and one port for a thermometer holder. Front viewing window provides clear, distortion-free visibility.

Microprocessor controller incorporates circuitry that interrupts power to the heater in the event of an overtemperature condition or disconnection of the primary probe. A redundant adjustable controller and sensor probe provide added overtemperature protection, and an integrated low liquid level sensor cuts power to the heaters if the bath liquid is not filled to the proper level or falls below during operation. Both overtemperature and low liquid level circuits will latch and prevent further operation of the bath until the fault is removed.

LKV5000 Refrigerated Constant Temperature Baths with Optical Detection

Koehler LKV5000 series kinematic viscosity baths with the optical flow detection system provides automatic viscosity measurements of petroleum and petrochemical products. Includes communication and power ports for each optical detection assembly, and can utilize up to four optical assemblies. Optical sensors and viscometer tubes to be ordered separately.

K22754-OS Digital Refrigerated Kinematic Viscosity Bath

Included Accessories

Four (4) Delrin® viscometer port covers with handles
Thermometer holder

Specifications

Conforms to the specifications of:
ASTM D445, D2532, D6074, D6158; IP 71; ISO 3104; DIN 51550; FTM 791-305; NF T 60-100
Testing Capacity: Four (4) glass capillary viscometers
Viscometer Ports: Four (4) round 2" (51mm) ports
Bath Dimensions: 9½" dia x 12" deep (24x30cm)
Bath Capacity: 3.7 gal (14L)
Temperature Control:
Display: 0.1°C/0.1°F resolution, calibrate to 0.01°C/0.01°F
Control accuracy and uniformity: Exceeds ASTM requirements throughout the operating range

Dimensions lxwxh,in.(cm)
42x35x36 (107x89x91)
Net Weight: 176 lbs (80kg)

Software compatible, inquire with Koehler Customer Service.

Ordering Information

Catalog No.	Model	Temperature Range	Electrical Requirements CE	Net Weight	Shipping Weight
K22753	LKV3000	15 to -30°C (59 to –22°F)	115V 60Hz, Single Phase, 20.1A	176 lbs (80 kg)	300 lbs (136 kg)
K22753-OS	LKV5000	15 to -30°C (59 to –22°F)	115V 60Hz, Single Phase, 20.1A	176 lbs (80 kg)	300 lbs (136 kg)
K22754	LKV3000	15 to -30°C (59 to –22°F)	220-240V 50Hz, Single Phase, 10.6A	176 lbs (80 kg)	300 lbs (136 kg)
K22754-OS	LKV5000	15 to -30°C (59 to –22°F)	220-240V 50Hz, Single Phase, 10.6A	176 lbs (80 kg)	300 lbs (136 kg)
K22751	LKV4000	15 to -70°C (59 to –94°F)	115V 60Hz, Single Phase, 26.9A	176 lbs (80 kg)	300 lbs (136 kg)
K22751-OS	LKV5000	15 to -70°C (59 to –94°F)	115V 60Hz, Single Phase, 26.9A	176 lbs (80 kg)	300 lbs (136 kg)
K22752	LKV4000	15 to -70°C (59 to –94°F)	220-240V 50Hz, Single Phase, 14.5A	176 lbs (80 kg)	300 lbs (136 kg)
K22752-OS	LKV5000	15 to -70°C (59 to –94°F)	220-240V 50Hz, Single Phase, 14.5A	176 lbs (80 kg)	300 lbs (136 kg)

Viscometer Holders

- For use with glass capillary viscometers

Ordering Information

Viscometer Type	Round Holder Catalog No.
Cannon®-Fenske Routine Cannon®-Fenske Opaque Cannon®-Manning Semi-Micro	**K23381**
Ubbelohde	**K23382**
Cannon®-Ubbelohde Cannon®-Ubbelohde Semi-Micro *(Also - Dilution and Semi-Micro Dilution types)*	**K23384**
Cross-Arm	**K23383**
BS/IP/RF U-Tube	**K23387**
Cannon®-Manning Vacuum	**K23388**
Asphalt Institute Modified Koppers	**K23363**

High Temperature Viscometer Holders

- For use with HKV baths for temperature up to 232˚C (450˚F)

Ordering Information

Viscometer Type	Round Holder Catalog No.
Cannon®-Fenske Routine Cannon®-Fenske Opaque Cannon®-Manning Semi-Micro	**K23381-HT**
Ubbelohde	**K23382-HT**

Universal Tube Holders

Can be used interchangeably with Cannon®-Fenske, Cannon®-Manning, Cross-Arm and Ubbelohde type capillary viscometers. Choice of round (2" dia.) plastic holders or rectangular metal holders.

Ordering Information

Catalog No.	
K23351	Universal Viscometer Holder, Round
K23350	Universal Viscometer Holder, Rectangular

Digital Stopwatch

- Accurate to 0.0003%
- Calibration certificate traceable to NIST

Solid-state LCD digital stopwatch with a full range of features, including single action timing, cumulative split, interval split and more. Housed in a rugged high impact case with 40" (102cm) lanyard. Supplied with 4-year battery and calibration certificate traceable to NIST.

Ordering Information

Catalog No.	
K23462	Digital Stopwatch

Bath Oil

- White mineral oil for routine applications
- Silicone fluid for high temperature applications

White Mineral Oil–Highly refined white technical oil for use in constant temperature baths. Contains an oxidation inhibitor to limit clouding at higher temperatures. Suitable for use at temperatures of up to 230°F (110°C).

Silicone Fluid–Clear heat transfer fluid with high oxidation resistance and low volatility. Recommended for constant temperature bath applications above 240°F (116°C).

Specifications

	White Mineral Oil	Silicone Fluid
Nominal Viscosity	14.2-17.0 cSt @ 40°C	100 cSt @ 25°C
Minimum Flash Point	248°F (120°C)	392°F (200°C)
Specific Gravity @ 25°C	0.839-0.855	0.964

Shipped in 1 gal (3.785L) or 5 gal (18.925L) containers

Ordering Information

Catalog No.	
355-001-001	White Mineral Oil, 1 Gallon Container
355-001-003	White Mineral Oil, 5 Gallon Container
355-001-002	Silicone Heat Transfer Fluid, 1 Gallon Container
355-001-004	Silicone Heat Transfer Fluid, 5 Gallon Container

Kinematic Viscosity

Viscometer Cleaning and Drying Apparatus

- Six tube capacity
- For all types of capillary viscometers

Cleans and dries glass capillary viscometers using solvent and pressurized filtered air. Use for all types of kinematic viscometers. Cleans as many as six tubes at a time. Place tubes on solvent/air jets and open the valve for each jet. Turn selector dial to 'solvent' to rinse tubes, and then to 'air' to evaporate any remaining solvent. Use adjustable drainage rack to drain excess sample oil from tubes prior to cleaning. Drainage trough connects to a suitable waste container or chemical drain for removal of waste oil and solvent. Built-in air filter removes particles from the air stream. Available solvent tank has tubing with fittings for connection to apparatus. Requires pressurized air source (150psi maximum).

Dimensions: lxwxh,in.(cm)
without solvent tank
16x7x12½
(40.6x17.8x31.7)
Net Weight: K34000: 34 lbs (15.4kg)
K34010: 15 lbs (6.8kg)

Shipping Information:
Shipping Weight:
K34000: 44 lbs (20kg)
K34010: 18 lbs (8.2kg)
Dimensions:
K34000: 8.2 Cu. ft.
K34010: 2.6 Cu. ft.


K34010 Cleaning and Drying Apparatus

Ordering Information

Catalog No.	
K34000	Viscometer Cleaning and Drying Apparatus with Solvent Tank
K34010	Viscometer Cleaning and Drying Apparatus without Solvent Tank

Kinematic Viscosity Thermometers

Catalog No.	Thermometer	Test Temperature °F	Test Temperature °C	IP Reference
250-000-74F	ASTM 74F	–65°F	—	69F
250-000-74C	ASTM 74C	—	–53.9°C	69C
250-000-43F	ASTM 43F	–61 to –29°F	—	65F
250-000-43C	ASTM 43C	—	–51 to –34°C	65C
250-000-73F	ASTM 73F	–40°F	—	68F
250-000-73C	ASTM 73C	—	–40°C	68C
250-000-126F	ASTM 126F	–15°F	—	71F
250-000-126C	ASTM 126C	—	–26°C	71C
250-000-127C	ASTM 127C	—	–20°C	99C
250-000-72F	ASTM 72F	0°F	—	67F
250-000-72C	ASTM 72C	—	–17.8°C	67C
250-000-128F	ASTM 128F	32°F	—	33F
250-000-128C	ASTM 128C	—	0°C	33C
250-000-44F	ASTM 44F	68°F	—	29F
250-000-44C	ASTM 44C	—	20°C	29C
250-000-45F	ASTM 45F	77°F	—	30F
250-000-45C	ASTM 45C	—	25°C	30C
250-000-118F	ASTM 118F	86°F	—	—
250-000-118C	ASTM 118C	—	30°C	—

Catalog No.	Thermometer	Test Temperature °F	Test Temperature °C	IP Reference
250-000-28F	ASTM 28F	100°F	—	31F
250-000-28C	ASTM 28C	—	37.8°C	31C
250-000-120C	ASTM 120C	—	40°C	92C
250-000-46F	ASTM 46F	122°F	—	66F
250-000-46C	ASTM 46C	—	50°C	66C
250-000-29F	ASTM 29F	130°F	—	—
250-000-29C	ASTM 29C	—	54.4°C	34C
250-000-47F	ASTM 47F	140°F	—	35F
250-000-47C	ASTM 47C	—	60°C	35C
250-000-48F	ASTM 48F	180°F	—	90F
250-000-48C	ASTM 48C	—	82.2°C	90C
250-000-129F	ASTM 129F	200°F	—	36F
250-000-129C	ASTM 129C	—	93.3°C	36C
250-000-30F	ASTM 30F	210°F	—	32F
250-000-121C	ASTM 121C	—	100°C	32C
250-000-110F	ASTM 110F	275°F	—	—
250-000-110C	ASTM 110C	—	135°C	93C

Please note: ASTM D445 recommends calibrated kinematic viscosity thermometers.
Please refer to the ASTM thermometer section on pages 184 through 191.

Koehler INSTRUMENT COMPANY, INC.

Calibrated Glass Capillary Kinematic Viscometers

Koehler offers a full selection of glass capillary viscometers for measuring kinematic viscosity of liquid petroleum products in accordance with ASTM D445 and related standard test methods. All types of viscometers conform to ASTM D446 and related standard specifications for glass capillary kinematic viscometers. Each viscometer is supplied with a calibration certificate, and holders should be ordered separately. Please refer to the following brief descriptions for determining which viscometer is best suited for your particular application.

Cannon®-Fenske Routine Viscometers

The Cannon®-Fenske Routine viscometer is a rugged and inexpensive viscometer that works well if the sample is transparent or translucent. Other viscometers for transparent samples in this catalog include the Cross Arm and BS/U-Tube viscometers.

Ubbelohde Viscometers

The Ubbelohde viscometer and other suspended level viscometers are used to measure transparent liquids. Unlike the Cannon®-Fenske Routine viscometer, suspended level viscometers maintain the same viscometer constant at all temperatures, advantageous when samples are to be measured at different temperatures. Other suspended level viscometers in this catalog include the BS/IP/SL, BP/IP/SL(S), and BP/IP/MSL viscometers.

Reverse Flow Viscometers

The Cannon®-Fenske Opaque, Cross Arm, and BS/IP/RF U-Tube viscometers have been designed for testing opaque liquids. These viscometers wet the timing section of the viscometer capillary only during the actual measurement and must be cleaned, dried and refilled before a repeat measurement can be made. By contrast, other viscometer types commonly used to measure transparent liquids allow the sample to be repeatedly drawn up into the capillary, permitting duplicate measurements.

Small Volume Viscometers

Several semi-micro viscometers have been designed which require one milliliter or less of liquid, which include the Cannon®-Manning Semi-Micro, Cannon®-Manning Semi-Micro Extra Low Charge, and Cannon®-Ubbelohde Semi-Micro viscometers.

Dilution Viscometers

Estimates of the molecular size and shape of large polymers molecules can be obtained from kinematic viscosity measurements of dilute solutions. The Cannon®-Ubbelohde Dilution viscometer has an extra large reservoir which allows polymer solutions to be diluted several times and measures viscosities at four different shear rates. Dilute polymer solutions frequently appear to exhibit changes in kinematic viscosity when the shear rate is changed.

Vacuum Viscometers

In most glass capillary viscometers, the samples flow under gravity. When liquids are too viscous to flow readily under gravity, vacuum viscometers may be used to measure viscosity. A vacuum is applied to one end of the viscometer to pull the liquid through the capillary into the timing bulb. Koehler offers the Cannon®-Manning Vacuum, the Asphalt Institute Vacuum, and the Modified Koppers Vacuum reverse flow viscometer tubes. These vacuum viscometers require an accurately controlled vacuum regulator for proper measurement. Please refer to page 13 for information about the Koehler Vacuum Regulator.


Cannon®-Fenske Routine

Cannon®-Fenske Opaque


Ubbelohde

Cannon®-Fenske Routine

For kinematic viscosity of transparent liquids up to 100,000cSt. Requires a sample of approximately 7mL. Use with K23310 and K23350 rectangular metal holders or K23381 and K23351 round plastic holders. Length: 250mm

Catalog No.	Size	Approximate Constant, cSt/s	Kinematic Viscosity Range, cSt
378-025-C01	25	0.002	0.5 to 2
378-050-C01	50	0.004	0.8 to 4
378-075-C01	75	0.008	1.6 to 8
378-100-C01	100	0.015	3 to 15
378-150-C01	150	0.035	7 to 35
378-200-C01	200	0.1	20 to 100
378-300-C01	300	0.25	50 to 250
378-350-C01	350	0.5	100 to 500
378-400-C01	400	1.2	240 to 1,200
378-450-C01	450	2.5	500 to 2,500
378-500-C01	500	8.0	1,600 to 8,000
378-600-C01	600	20.0	4,000 to 20,000
378-650-C01	650	45.0	9,000 to 45,000
378-700-C01	700	100.0	20,000 to 100,000

Koehler supplies a wide range of viscosity reference standards used for calibration and verification of kinematic and dynamic viscosity test equipment. Please refer to pages 18-19 or contact Koehler Customer Service for additional information.

Kinematic Viscosity

Cannon®-Fenske Opaque

Reverse-flow viscometer for measurement of transparent and dark liquids having kinematic viscosities of up to 100,000cSt. Requires a sample of approximately 12mL. Allows timing of samples whose thin films are opaque and are thus not suitable for modified Ostwald and suspended-level type viscometers. Can be used for kinematic viscosities of asphalts by ASTM D2170 method. Use with K23310 and K23350 rectangular metal holders or K23381 and K23351 round plastic holders. Length: 295mm

Catalog No.	Size	Approximate Constant, cSt/s	Kinematic Viscosity Range, cSt
378-025-C02	25	0.002	0.4 to 2
378-050-C02	50	0.004	0.8 to 4
378-075-C02	75	0.008	1.6 to 8
378-100-C02	100	0.015	3 to 15
378-150-C02	150	0.035	7 to 35
378-200-C02	200	0.1	20 to 100
378-300-C02	300	0.25	50 to 250
378-350-C02	350	0.5	100 to 500
378-400-C02	400	1.2	240 to 1,200
378-450-C02	450	2.5	500 to 2,500
378-500-C02	500	8.0	1,600 to 8,000
378-600-C02	600	20.0	4,000 to 20,000
378-650-C02	650	45.0	9,000 to 45,000
378-700-C02	700	100.0	20,000 to 100,000

Ubbelohde

Suspended-level type viscometer for kinematic viscosities of transparent liquids of up to 100,000cSt. Requires a sample volume of approximately 11mL. Use with K23320 and K23350 rectangular metal holders or K23382 and K23351 round plastic holders. Length: 283mm

Catalog No.	Size	Approximate Constant, cSt/s	Kinematic Viscosity Range, cSt
378-000-C03	0	0.001	0.3 to 1
378-00C-C03	0C	0.003	0.6 to 3
378-00B-C03	0B	0.005	1 to 5
378-001-C03	1	0.01	2 to 10
378-01C-C03	1C	0.03	6 to 30
378-01B-C03	1B	0.05	10 to 50
378-002-C03	2	0.1	20 to 100
378-02C-C03	2C	0.3	60 to 300
378-02B-C03	2B	0.5	100 to 500
378-003-C03	3	1.0	200 to 1,000
378-03C-C03	3C	3.0	600 to 3,000
378-03B-C03	3B	5.0	1,000 to 5,000
378-004-C03	4	10.0	2,000 to 10,000
378-04C-C03	4C	30.0	6,000 to 30,000
378-04B-C03	4B	50.0	10,000 to 50,000
378-005-C03	5	100.0	20,000 to 100,000

Cannon®-Ubbelohde Four-Bulb Shear Dilution

Suspended level viscometer for the measurement of intrinsic viscosity extrapolated to zero shear rate. Provides five-fold range of shear rates. Requires approximately 20mL of sample. Use with K23361 rectangular holder or K23384 round holder. Length: 280 mm

Catalog No.	Size	Approximate Constant, cSt/s	Kinematic Viscosity Range, cSt
378-025-C16	25	0.002	0.5 to 2
378-050-C16	50	0.004	0.8 to 4
378-075-C16	75	0.008	1.6 to 8
378-100-C16	100	0.015	3 to 15
378-150-C16	150	0.035	7 to 35

Cannon®-Ubbelohde

Suspended level viscometer for transparent liquids. Requires approximately 11mL of sample. Use with K23361 rectangular holder or K23384 round holder. Length: 335mm

Catalog No.	Size	Approximate Constant, cSt/s	Kinematic Viscosity Range, cSt
378-025-C11	25	0.002	0.5 to 2
378-050-C11	50	0.004	0.8 to 4
378-075-C11	75	0.008	1.6 to 8
378-100-C11	100	0.015	3 to 15
378-150-C11	150	0.035	7 to 35
378-200-C11	200	0.1	20 to 100
378-300-C11	300	0.25	50 to 200
378-350-C11	350	0.5	100 to 500
378-400-C11	400	1.2	240 to 1,200
378-450-C11	450	2.5	500 to 2,500
378-500-C11	500	8.0	1,600 to 8,000
378-600-C11	600	20.0	4,000 to 20,000
378-650-C11	650	45.0	9,000 to 45,000
378-700-C11	700	100.0	20,000 to 100,000

Cannon®-Ubbelohde Dilution

Suspended level viscometer for the measurement of intrinsic viscosity of transparent liquids. Requires approximately 8mL of sample. Use with K23361 rectangular holder or K23384 round holder. Length: 385mm. Note: 18" Depth bath required to accommodate tubes.

Catalog No.	Size	Approximate Constant, cSt/s	Kinematic Viscosity Range, cSt
378-025-C15	25	0.002	0.5 to 2
378-050-C15	50	0.004	0.8 to 4
378-075-C15	75	0.008	1.6 to 8
378-100-C15	100	0.015	3 to 15
378-150-C15	150	0.035	7 to 35
378-200-C15	200	0.1	20 to 100
378-300-C15	300	0.25	50 to 200
378-350-C15	350	0.5	100 to 500
378-400-C15	400	1.2	240 to 1,200
378-450-C15	450	2.5	500 to 2,500
378-500-C15	500	8.0	1,600 to 8,000
378-600-C15	600	20.0	4,000 to 20,000

Cannon®-Ubbelohde Semi-Micro

For transparent liquids. Requires approximately 1.0mL of sample. Use with K23361 rectangular holder or K23384 round holder. Length: 335mm

Catalog No.	Size	Approximate Constant, cSt/s	Kinematic Viscosity Range, cSt
378-025-C12	25	0.002	0.5 to 2
378-050-C12	50	0.004	0.8 to 4
378-075-C12	75	0.008	1.6 to 8
378-100-C12	100	0.015	3 to 15
378-150-C12	150	0.035	7 to 35
378-200-C12	200	0.1	20 to 100
378-300-C12	300	0.25	50 to 200
378-350-C12	350	0.5	100 to 500
378-400-C12	400	1.2	240 to 1,200
378-450-C12	450	2.5	500 to 2,500
378-500-C12	500	8.0	1,600 to 8,000
378-600-C12	600	20.0	4,000 to 20,000

Koehler Instrument Company, Inc.

Kinematic Viscosity

Cannon®-Manning Semi-Micro

For transparent liquids. Requires a sample of approximately 1.0mL. Use with K23310 and K23350 rectangular holders or K23381 and K23351 round holders. Length: 275mm

Catalog No.	Size	Approximate Constant, cSt/s	Kinematic Viscosity Range, cSt
378-025-C10	25	0.002	0.5 to 2
378-050-C10	50	0.004	0.8 to 4
378-075-C10	75	0.008	1.6 to 8
378-100-C10	100	0.015	3 to 15
378-150-C10	150	0.035	7 to 35
378-200-C10	200	0.1	20 to 100
378-300-C10	300	0.25	50 to 200
378-350-C10	350	0.5	100 to 500
378-400-C10	400	1.2	240 to 1,200
378-450-C10	450	2.5	500 to 2,500
378-500-C10	500	8.0	1,600 to 8,000
378-600-C10	600	20.0	4,000 to 20,000

Cannon®-Manning Semi-Micro Extra Low Charge

For transparent liquids. Requires a sample of approximately 0.5mL. Use with K23350 rectangular holders or K23351 round holders. Length: 200mm

Catalog No.	Size	Approximate Constant, cSt/s	Kinematic Viscosity Range, cSt
378-025-C17	25	0.002	0.5 to 2
378-050-C17	50	0.004	0.8 to 4
378-075-C17	75	0.008	1.6 to 8
378-100-C17	100	0.015	3 to 15
378-150-C17	150	0.035	7 to 35
378-200-C17	200	0.1	20 to 100
378-300-C17	300	0.25	50 to 200
378-350-C17	350	0.5	100 to 500
378-400-C17	400	1.2	240 to 1,200
378-450-C17	450	2.5	500 to 2,500
378-500-C17	500	8.0	1,600 to 8,000
378-600-C17	600	20.0	4,000 to 20,000

Cross-Arm

Reverse-flow type viscometer for transparent and dark liquids having kinematic viscosities of up to 100,000cSt. Requires a sample of approximately 1-3mL. Use with K23362 and K23350 rectangular metal holders or K23383 and K23351 round plastic holders. Length: 305mm

Catalog No.	Size	Approximate Constant, cSt/s	Kinematic Viscosity Range, cSt
378-001-C09	1	0.003	0.6 to 3
378-002-C09	2	0.01	2 to 10
378-003-C09	3	0.03	6 to 30
378-004-C09	4	0.1	20 to 100
378-005-C09	5	0.3	60 to 300
378-006-C09	6	1.0	200 to 1,000
378-007-C09	7	3.0	600 to 3,000
378-008-C09	8	10.0	2,000 to 10,000
378-009-C09	9	30.0	6,000 to 30,000
378-010-C09	10	100.0	20,000 to 100,000

Koehler supplies a wide range of viscosity reference standards used for calibration and verification of kinematic and dynamic viscosity test equipment. Please refer to pages 18-19 or contact Koehler Customer Service for additional information.

BS/IP/RF U-Tube Opaque

Reverse-flow viscometer for opaque liquids having kinematic viscosities of up to 300,000cSt. Requires a sample of 12-25mL. Use with K23330 rectangular metal holders or K23387 round plastic holders. Length: 275mm

Catalog No.	Size	Approximate Constant, cSt/s	Kinematic Viscosity Range, cSt
378-001-C08	1	0.003	0.6 to 3
378-002-C08	2	0.01	2 to 10
378-003-C08	3	0.03	6 to 30
378-004-C08	4	0.1	20 to 100
378-005-C08	5	0.3	60 to 300
378-006-C08	6	1.0	200 to 1,000
378-007-C08	7	3.0	600 to 3,000
378-008-C08	8	10.0	2,000 to 10,000
378-009-C08	9	30.0	6,000 to 30,000
378-010-C08	10	100.0	20,000 to 100,000
378-011-C08	11	300.0	60,000 to 300,000

BS/U-Tube Transparent

U-Tube viscometer for transparent liquids having kinematic viscosities of up to 10,000cSt. Requires a sample of 7-23mL. Length: 300mm

Catalog No.	Size	Approximate Constant, cSt/s	Kinematic Viscosity Range, cSt
378-00A-C08	A	0.003	0.9 to 3
378-00B-C08	B	0.01	2.0 to 10
378-00C-C08	C	0.03	6 to 30
378-00D-C08	D	0.1	20 to 100
378-00E-C08	E	0.3	60 to 300
378-00F-C08	F	1.0	200 to 1,000
378-00G-C08	G	3.0	600 to 3,000
378-00H-C08	H	10.0	2,000 to 10,000

BS/U/M Miniature U-Tube

Miniature U-Tube viscometer for transparent liquids having kinematic viscosities of up to 100cSt. Requires a sample of 2mL. Length: 250mm

Catalog No.	Size	Approximate Constant, cSt/s	Kinematic Viscosity Range, cSt
378-0M1-C18	M1	0.001	0.2 to 1
378-0M2-C18	M2	0.005	1 to 5
378-0M3-C18	M3	0.015	3 to 15
378-0M4-C18	M4	0.04	8 to 40
378-0M5-C18	M5	0.1	20 to 100

Vacuum Manifold

Designed for use with Koehler capillary-type viscometer tube baths and vacuum regulator. Manifold includes seven position valves and tubing for applying vacuum or pressure as per ASTM D2171.

Ordering Information

Catalog No.	
K23467	Vacuum Manifold

Kinematic Viscosity

BS/IP/MSL Miniature Suspended Level

Miniature suspended level viscometer for transparent liquids having kinematic viscosities of up to 3,000cSt. Requires a sample of 4mL. Length: 345mm

Catalog No.	Size	Approximate Constant, cSt/s	Kinematic Viscosity Range, cSt
378-001-C19	1	0.003	0.6 to 3
378-002-C19	2	0.01	2 to 10
378-003-C19	3	0.03	6 to 30
378-004-C19	4	0.1	20 to 100
378-005-C19	5	0.3	60 to 300
378-006-C19	6	1.0	200 to 1,000
378-007-C19	7	3.0	600 to 3,000

BS/IP/SL Suspended Level

Suspended level viscometer for transparent liquids having kinematic viscosities of up to 100,000cSt. Requires a sample of 11mL. Length: 250mm

Catalog No.	Size	Approximate Constant, cSt/s	Kinematic Viscosity Range, cSt
378-001-C20	1	0.01	3.5 to 10
378-01A-C20	1A	0.03	6 to 30
378-002-C20	2	0.1	20 to 100
378-02A-C20	2A	0.3	60 to 300
378-003-C20	3	1.0	200 to 1,000
378-03A-C20	3A	3.0	600 to 3,000
378-004-C20	4	10.0	2,000 to 10,000
378-04A-C20	4A	30.0	6,000 to 30,000
378-005-C20	5	100.0	20,000 to 100,000

BS/IP/SL(S) Suspended Level

Shortened suspended level viscometer for transparent liquids having kinematic viscosities of up to 100,000cSt. Requires a sample of 10mL. Length: 255mm

Catalog No.	Size	Approximate Constant, cSt/s	Kinematic Viscosity Range, cSt
378-001-C21	1	0.0008	3.5 to 10
378-002-C21	2	0.003	6 to 30
378-003-C21	3	0.01	20 to 100
378-004-C21	4	0.03	60 to 300
378-005-C21	5	0.1	200 to 1,000
378-006-C21	6	0.3	600 to 3,000
378-007-C21	7	1.0	2,000 to 10,000
378-008-C21	8	3.0	6,000 to 30,000
378-009-C21	9	10.0	20,000 to 100,000

Cannon®-Manning Vacuum

For highly viscous materials, including asphalt cement at 140°F (60°C) in accordance with ASTM D2171. Requires approximately 6mL of sample. Use with K23360 rectangular holder or K23388 round holder. Length: 230-260mm

		Approximate Constant at 300mm Hg vacuum, poise/second		
Catalog No.	Size	Bulb B	Bulb C	Viscosity Range, Poise
378-004-C13	4	0.0002	0.0006	0.36 to 0.8
378-005-C13	5	0.006	0.002	0.12 to 2.4
378-006-C13	6	0.02	0.006	0.36 to 8
378-007-C13	7	0.06	0.02	1.2 to 24
378-008-C13	8	0.2	0.06	3.6 to 80
378-009-C13	9	0.6	0.2	12 to 240
378-010-C13	10	2	0.6	36 to 800
378-011-C13	11	6	2	120 to 2,400
378-012-C13	12	20	6	360 to 8,000
378-013-C13	13	60	20	1,200 to 24,000
378-014-C13	14	200	60	3,600 to 80,000

Asphalt Institute Vacuum

Similar to Cannon®-Manning Vacuum type, but with graduated capillary instead of two timing bulbs. Requires a sample of approximately 4mL. Use with K23360 rectangular holder or K23388 round holder. Length: 230-260mm

		Approximate Constant at 300mm Hg vacuum, poise/second			
Catalog No.	Size	Bulb B	Bulb C	Bulb D	Viscosity Range, Poise
378-025-C14	25	2	1	0.7	42 to 800
378-050-C14	50	8	4	3	180 to 3,200
378-100-C14	100	32	16	10	600 to 12,800
378-200-C14	200	128	64	40	2,400 to 52,000
378-400-C14	400	500	250	160	9,600 to 200,000

Modified Koppers Vacuum

For highly viscous materials in accordance with ASTM D2171. Requires a sample of 2mL. Use with K23364 rectangular holder or K23363 round holder. Length: 270mm

		Approximate Constant at 300mm Hg vacuum, poise/second			
Catalog No.	Size	Bulb B	Bulb C	Bulb D	Viscosity Range, Poise
378-025-C06	25	2	1	0.7	42 to 800
378-050-C06	50	8	4	3	180 to 3,200
378-100-C06	100	32	16	10	600 to 12,800
378-200-C06	200	128	64	40	2,400 to 52,000
378-400-C06	400	500	250	160	9,600 to 200,000

Vacuum Regulator

Vacuum Regulator

For ASTM D2171, "Viscosity of Asphalts by Vacuum Capillary Viscometers." Precisely controls vacuum from 28 to 411 mm Hg below atmospheric pressure to an accuracy of ±0.5 mm Hg. Recommended for use with Cannon®-Manning, Asphalt Institute or Modified Koppers vacuum viscometers. All solid-state—contains no mercury. Amount of vacuum is shown on digital display. Ten different units of vacuum measurement may be selected through keypad on the meter.

Ordering Information	
Catalog No.	
K23463	Vacuum Regulator (vertical orientation), 115V 60Hz
K23464	Vacuum Regulator (vertical orientation), 220-240V 50/60Hz
K23465	Vacuum Regulator (horizontal orientation), 115V 60Hz
K23466	Vacuum Regulator (horizontal orientation), 220-240V 50/60Hz

Koehler INSTRUMENT COMPANY, INC.

Low Temperature Viscosity Measured by Rotational Viscometer

K34702 Brookfield Viscosity Air Bath System (BVS4000)

New BVS3000 Brookfield Viscosity Liquid Bath System

- Permits viscosity measurements without the risk of temperature increase
- 10 sample turntable
- Mechanically refrigerated with digital indicating temperature control
- Operating range to –55°C

Constant temperature liquid bath permits testing of samples without the risk of sample temperature rise. After cooling in the air bath, the sample must be transferred to the balsa cell carrier for testing with the Rotational viscometer. If the sample is not tested quickly, there is the risk of sample temperature rise. The Brookfield Viscosity Liquid Bath System eliminates this risk by permitting the sample to be tested in a constant temperature environment. The Rotational viscometer mounts directly on the bath and the samples are rotated into position under the spindle by means of a built-in turntable. Cooling system maintains temperature with ±0.05°C stability in the range of +10°C to –55°C. Bath temperature is displayed in digital format.

Specifications

Conforms to the specifications of: ASTM D2983
Sample Capacity: 10 samples
Temperature Range: +10°C to –55°C
Temperature Control Stability: ±0.05°C
Electrical Requirements: CE
115V 60Hz, Single Phase, 16A
220-240V 50 or 60Hz, Single Phase, 12A

Dimensions: lxwxh,in.(cm)

17x24x25(43x61x25)
Net Weight: 265 lbs (120kg)

Shipping Information

Shipping Weight: 300 lbs (136kg)
Dimensions: 13.9 Cu. ft.

Test Method

Determines the low temperature, low shear rate viscosities of gear oils, automatic transmission fluids, hydraulic oils and other fluid lubricants by use of a rotational viscometer.

New BVS4000 Brookfield Viscosity Air Bath System

- Conforms to ASTM D2983 and related specifications
- Mechanically refrigerated with digital indicating temperature control
- Operating range to –50°C
- Sixteen sample capacity

Mechanically refrigerated cold cabinet prepares samples for dynamic viscosity determinations on petroleum lubricants. A built-in turntable rotates the samples at 4rpm per specifications. Cooling system maintains cabinet temperature within ±0.1°C at temperatures as low as –50°C. Cabinet temperature is displayed in digital format on the front panel. Cabinet accommodates sixteen (16) sample cells with cell carriers. Includes insulated cover.

Specifications

Conforms to the specifications of:
ASTM D2983; IP 267 Method A; ISO 9262; CEC-L-18A
Capacity: 16 sample cells with cell carriers
Temperature Range: +10°C to –50°C
Temperature control accuracy: ± 0.1°C
Sample Rotation: 4rpm
Electrical Requirements: CE
115V 60Hz, Single Phase, 16A
220-240V 50 or 60Hz, Single Phase, 12A

Dimensions: lxwxh,in.(cm)

36x28x43 (91x71x109)
Net Weight: 315 lbs (143kg)

Shipping Information

Shipping Weight: 380 lbs (172kg)
Dimensions: 38.9 Cu. ft.

Ordering Information

Catalog No.	
K34710	BVS3000 Brookfield Viscosity Liquid Bath System 115V 60Hz
K34711	BVS3000 Brookfield Viscosity Liquid Bath System 220-240V 50Hz
K34712	BVS3000 Brookfield Viscosity Liquid Bath System 220-240V 60Hz
K34700	BVS4000 Brookfield Viscosity Air Bath System 115V 60Hz
K34701	BVS4000 Brookfield Viscosity Air Bath System 220-240V 50Hz
K34702	BVS4000 Brookfield Viscosity Air Bath System 220-240V 60Hz

Software compatible, inquire with Koehler Customer Service.

BVS5000 Programmable Brookfield Viscosity Liquid Bath System

- Sample soaking and testing in a single bath, eliminating the need for an air bath and the risk of sample temperature rise during transfer
- Redesigned for improved control of sample movement and handling during testing
- Microprocessor PID temperature control duplicates the sample cooling rates in ASTM D2983
- Up to 40 cooling/testing temperature profiles can be stored in memory

Redesigned programmable baths with improved features for sample handling and testing. Bath accommodates 10 samples for Dynamic Viscosity testing. Sample cells are immersed in a liquid bath for the entire soaking and testing period, eliminating the need to transfer cells from an air bath to a liquid bath with insulated balsa wood carriers. Also eliminated is the inherent risk of sample temperature rise during transfer. The programmable microprocessor PID controller stores up to 40 temperature profiles that duplicate the sample cooling rates found in ASTM D2983. Steady state temperature accuracy and uniformity exceed ASTM requirements throughout the operating range from ambient to -55°C. Air-cooled hermetic compressors provide efficient operation with the use of CFC-free refrigerants.

The mounting position for the Rotational Viscometer has been changed to permit easier access to the samples and viscometer controls. Cabinet has a front window and glare-free fluorescent lighting for distortion free viewing of the sample cells. Cabinet construction is polyester-epoxy finished steel with a chemical-resistant composite top surface. A removable insulated cover with handle is included. Bath rests on adjustable leveling feet. Safety features include a probe fault detection circuit in the primary temperature controller and a redundant latching controller and probe for temperature fault protection.

Specifications

Conforms to the specifications of:
ASTM D2983 - Note 2 and Note 10; IP 267 Method B; CEC-L-18A-30; ISO 9262
Sample capacity: 10 samples
Temperature control: Microprocessor PID digital-indicating programmable controller with ±0.05°C steady state stability
Operating Range: ambient to –55°C
Electrical Requirements: CE
220-240V 50 or 60Hz, Single Phase, 12.6A

Dimensions: lxwxh,in.(cm)
41x34x38 (104x86.5x96.5)
Net Weight: 327 lbs (148.5kg)

Shipping Information

Shipping Weight: 497 lbs (226kg)
Dimensions: 41.5 Cu. ft.

Ordering Information	
Catalog No.	
K34715	BVS5000 Programmable Brookfield Viscosity Liquid Bath System, 220-240V 50Hz
K34716	BVS5000 Programmable Brookfield Viscosity Liquid Bath System, 220-240V 60Hz

Software compatible, inquire with Koehler Customer Service.

K34715 Programmable Brookfield Viscosity Liquid Bath System

Accessories		
Catalog No.		**Order Qty**
K447-BL	Rotational Viscometer, Bold Series L 100-240V 50/60Hz	1
K447-PL	Rotational Viscometer, Power Series L 100-240V 50/60Hz	1
K34706	Insulated Spindle No.4B2	1
K447-SP-L4	L4 Spindle	1
K2983-2	Cell Stopper (For K34706 Only)	1
K34707	Cell Stopper	12
K34779	Spindle Support Clips	12
K34708	Insulated Cell Carrier (for Air Bath)	1
K34709	Test Cell - Round Bottom (pack of 12)	1
K34770	Test Cell - Flat Bottom (pack of 12)	1
250-000-122C	ASTM 122C/IP94C Thermometer Range –45 to –35°C	1
250-000-123C	ASTM 123C/IP95C Thermometer Range –35 to –25°C	1
250-000-124C	ASTM 124C/IP96C Thermometer Range –25 to –15°C	1
250-000-125C	ASTM 125C/IP97C Thermometer Range –15 to –5°C	1
355-005-027	Viscosity Standard N27B Viscosities in centipoise at –40, –30, –20, –15, –10, 0°F	1
355-005-115	Viscosity Standard N115B Viscosity in centipoise at –20, –15, –10, 0, +10, 20°F	1

Saybolt Viscosity

K21414 Saybolt Viscosity Bath (SV4000) with K21404 Auto Viscosity Timers

Ordering Information

Catalog No.		Order Qty
SV3000 Saybolt Viscosity Bath		
K21410	SV3000 Saybolt Viscosity Bath, 115V 60Hz	1
K21420	SV3000 Saybolt Viscosity Bath, 220-240V 50/60Hz	
SV4000 Saybolt Viscosity Bath for Automatic Viscosity Timing		
K21414	SV4000 Saybolt Viscosity Bath, 115V 60Hz	1
K21424	SV4000 Saybolt Viscosity Bath, 220-240V 50/60Hz	
Automatic Saybolt Viscosity Timing Sensor		
K21404	Automatic Saybolt Viscosity Timing Sensor, 115V 60Hz	1-4
K21494	Automatic Saybolt Viscosity Timing Sensor, 220-240V 50/60Hz *Each port can accommodate one sensor for automatic timing operation on SV4000 Saybolt Viscosity Baths.*	1-4
Accessories		
355-001-002	Silicone Heat Transfer Fluid, 1 Gallon Container	5
355-001-004	Silicone Heat Transfer Fluid, 5 Gallon Container minimum flash point 620°F (326°C)	1

Please refer to separate listing on page 8 for specifications.

Please contact Koehler Customer Service about the retrofitting of SV3000 Series Saybolt Viscosity Baths with the new K21404 Automatic Saybolt Viscosity Timing Sensors.

Software compatible, inquire with Koehler Customer Service.

Test Method

Determines the time required for 60mL of sample to flow through a calibrated orifice under precisely controlled conditions. Saybolt Universal Seconds (SUS) is the standard measurement for lubricants, insulating oils and lighter fuel grades, and Saybolt Furol Seconds (SFS) is used for heavier oils and bitumens.

SV3000 Saybolt Viscosity Bath and *New* SV4000 Saybolt Viscosity Bath for Automatic Viscosity Timing

- Microprocessor control of temperature between ambient and 240°C (464°F)
- Four tube capacity
- Dual digital displays show setpoint and actual temperature
- Selectable temperature scale - Celsius or Fahrenheit
- Automatic timing option for simplified, accurate measurement of efflux times
- Conforms to ASTM D88, D244, E102, and related specifications

Constant temperature bath with available automatic timing feature for viscosity determinations using Saybolt viscometer tubes and orifices. Microprocessor PID circuitry assures precise temperature control within ASTM specified tolerances throughout the operating range of the bath. Simple push-button controls and dual digital displays permit easy setting and monitoring of bath temperature. Two place calibration offset is provided. Accommodates four viscometers and four 60mL receiving flasks. Sliding draft shields and a chemical-resistant alignment plate facilitate handling of the flasks, and glare-free fluorescent backlighting is provided for easy viewing of the samples. *Communications software (RS232, etc.) ramp-to-set, and other enhanced features are available at additional cost. Contact your Koehler representative for additional information.*

Automatic Timing Option – At the push of a button, the automatic timer starts the sample flow, senses the 60mL end point, and digitally records and displays the efflux time in 0.1 seconds resolution with an accuracy of 0.05%. Automatic timing improves testing accuracy and convenience, eliminating the chain and cork assembly and the need to manually time each sample. Timer installation is available in any configuration from 1 to 4 positions.

Bath Construction and Safety Features – Insulated bath interior is constructed entirely of heavy gauge stainless steel. A built-in overflow pipe and drain valve simplifies filling of the bath fluid to the proper level. Chemical resistant top plate provides excellent insulation and is easily removed to allow for cleaning of the bath interior. A cooling coil for tap water or refrigerated coolant is provided for operation at near-ambient temperatures. Steel cabinet has leveling feet and a chemical resistant polyurethane-epoxy finish.

Specifications

Conforms to the specifications of:
ASTM D88, D244, E102; AASHTO T72; FTM 791-304
Capacity: 4 viscometer tubes
Temperature Range: ambient to 464°F (240°C)
Temperature Stability: ±0.05°F (±0.03°C)
Bath Capacity: 5 gal (19L)
Recommended Bath Medium: water or suitable heat transfer fluid
Electrical Requirements: CE
115V 60Hz, single phase, 12.3A
220-240V 50/60Hz, single phase, 6.4A

Included Accessories

Cleaning Plunger
Oil Strainer
Tube Nut Wrench
Port Closures
Thermometer Supports
Chained Corks
Withdrawal Tube
Orifice Wrench
Port Covers

Dimensions

lxwxh,in.(cm)
29x25x33 (74x63½x84)
Net Weight: 65 lbs (29½kg)

Shipping Information

Shipping Weight: 82 lbs (37kg)
Dimensions: 10 Cu. ft.

Saybolt Viscosity

Saybolt Viscometer Tubes and Orifices

- Conforming to ASTM D88, E102 and related specifications
- Choice of brass or stainless steel tubes

Viscometer Tubes–Precisely machined brass and stainless steel tubes meeting ASTM requirements. Tubes mount vertically in Saybolt Viscometer Baths and accommodate stainless steel orifices interchangeably. Supplied with mounting hardware.

Orifices–Stainless Steel Universal and Furol Orifices meeting ASTM specifications. Orifices insert in viscometer tubes using K22030 Orifice Wrench (supplied with viscometer baths). Also available - Kansas Road Oil Orifice (requires K22039 wrench). Universal and Furol Orifices are available with a calibration certificate.

Ordering Information

Catalog No.	
Viscometer Tubes	
K22009	Saybolt Viscometer Tube, Brass
K22309	Saybolt Viscometer Tube, Stainless Steel
Orifices	
K22010	Saybolt Universal Orifice
K22010-C/F	Saybolt Universal Orifice with calibration certificate
K22020	Furol Orifice
K22020-C/F	Saybolt Furol Orifice with calibration certificate
K22029	Kansas Road Oil Orifice
Accessories	
332-003-003	Borosilicate Glass Receiving Flask, 60mL for SV3000
332-003-014	Borosilicate Glass Receiving Flask, 60mL for SV4000
K22030	Orifice Wrench for Universal and Furol Orifices
K22039	Orifice Wrench for Kansas Road Oil Orifices
K22050	Socket Wrench
K22060	Oil Strainer
K22070	Cleaning Plunger
K22080	Displacement Ring. Insert in viscometer tube galley for bituminous materials testing. Meets ASTM E102 specifications.
K22090	Withdrawal Tube
K22011	Thermometer Support

Saybolt Viscosity Thermometers

Catalog Number	Thermometer	Test Temperature °F	Test Temperature °C	Range
250-000-17F	ASTM 17F	66 to 80°F	—	66 to 80°F
250-000-17C	ASTM 17C	—	19 to 27°C	19 to 27°C
250-000-18F	ASTM 18F	100°F	—	94 to 108°F
250-000-18C	ASTM 18C	—	34 to 42°C	34 to 42°C
250-000-19F	ASTM 19F	122 and 130°F	—	120 to 134°F
250-000-19C	ASTM 19C	—	50 and 54.4°C	49 to 57°C
250-000-20F	ASTM 20F	140°F	—	134 to 148°F
250-000-20C	ASTM 20C	—	60°C	57 to 65°C
250-000-21F	ASTM 21F	180°F	—	174 to 188°F
250-000-21C	ASTM 21C	—	82.2°C	79 to 87°C

Catalog Number	Thermometer	Test Temperature °F	Test Temperature °C	Range
250-000-22F	ASTM 22F	210°F	—	204 to 218°F
250-000-22C	ASTM 22C	—	98.9°C	95 to 103°C
250-000-77F	ASTM 77F	250°F	121°C	245 to 265°F
250-000-108F	ASTM 108F	275°F	135°C	270 to 290°F
250-000-78F	ASTM 78F	300°F	149°C	295 to 315°F
250-000-109F	ASTM 109F	325°F	163°C	320 to 340°F
250-000-79F	ASTM 79F	350°F	177°C	345 to 365°F
250-000-80F	ASTM 80F	400°F	204°C	395 to 415°F
250-000-81F	ASTM 81F	450°F	232°C	445 to 465°F

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Test apparatus for lubricants, insulating oils, and heater fuel grades:

Catalog No.		*Order Qty*
K21410	*Saybolt Viscometer Bath*	*1*
K22009	*Viscometer Tube*	*4*
K22010	*Universal Orifice*	*4*
332-003-003	*ReceivIng Flask (SV3000)*	*4*
332-003-014	*Borosilicate Glass Receiving Flask, 60mL for SV4000*	
355-001-001	*White Technical Oil*	*5*
250-000-17F	*Series ASTM Thermometers or*	
250-000-17C	*Series ASTM Thermometers*	

Test apparatus for bituminous materials:

Catalog No.		*Order Qty*
K21410	*Saybolt Viscometer Bath*	*1*
K22009	*Viscometer Tube*	*4*
K22020	*Furol Orifice*	*4*
K22080	*Displacement Ring*	*4*
332-003-003	*Receiving Flask (SV3000)*	*4*
332-003-014	*Borosilicate GlassReceiving Flask, 60mL for SV4000*	
355-001-002	*High Temperature Heat Transfer Fluid*	*5*
250-000-17F	*Series ASTM Thermometers or*	
250-000-17C	*Series ASTM Thermometers*	

Viscosity Standards

Viscosity Reference Standards

- Manufactured and certified according to ASTM D2162, the primary method for viscosity reference standards
- Supplied with an *ISO/IEC 17025 Certification Report*
- Fully compliant to ASTM and related test procedures
- Custom standards available

Koehler viscosity reference standards are used for calibration and verification of kinematic and dynamic viscosity test equipment, both manual and automatic. All viscosity standards are based upon the National Institute of Standards and Technology (NIST) value of 1.0034 cSt (Centistokes) for water at 20°C (68°F). All standards are traceable to National Standards and are manufactured and certified according to ASTM D2162, the internationally recognized *primary* method for viscosity reference standards, under *ISO/IEC 17025* guidelines. Standards are calibrated to a precision of ±0.2% for the viscosity and kinematic viscosity. Nominal or approximate values are listed in the following tables. With each standard, actual certified values for kinematic viscosity (cSt), dynamic viscosity (cP), and density (g/mL) according to ASTM D1480 are provided at each temperature point of calibration along with uncertainty measurements. Each standard is calibrated at a minimum of five temperatures and supplied in a 500mL quantity in an amber-colored bottle complete with full certification and a Material Data Safety Sheet (MSDS).

In addition to the many viscosity standards described in this catalog, we can supply custom viscosity standards made specifically to meet your individual needs including high volume supply used for Statistical Quality Check and Statistical Process Control (SQC/SPC) applications.

Viscosity Reference Standards

Viscosity Standards Conforming to ASTM Standards

		Approximate Kinematic Viscosity in mm²/s (Centistokes)								Saybolt Viscosity		
Catalog No.	Viscosity Standard	20°C 68°F	25°C 77°F	37.8°C 100°F	40°C 104°F	50°C 122°F	60°C 140°F	98.9°C 210°F	100°C 212°F	SUS 100°F	SUS 210°F	SFS 122°F
355-004-004	N.4	0.47	0.45	0.41	0.40	—	—	—	—	—	—	—
355-004-008	N.8	0.95	0.89	0.77	0.75	—	—	—	—	—	—	—
355-004-001	N1.0	1.3	1.2	1.0	0.97	—	—	—	—	—	—	—
355-002-003	S3	4.6	4.0	3.0	2.9	2.4	—	1.2	1.2	—	—	—
355-003-005	D5	7.0	6.1	—	4.2	3.4	—	—	1.5	—	—	—
355-002-006	S6	10	8.7	6.0	5.7	4.5	—	1.9	1.9	—	—	—
355-003-010	D10	14	12	8.0	7.5	5.8	—	2.3	2.3	—	—	—
355-004-010	N10	21	17	11	10	7.3	—	2.7	2.7	—	—	—
355-002-020	S20	43	34	20	18	13	—	4.0	3.9	96.6	—	—
355-004-035	N35	77	59	35	29	20	—	5.3	5.2	152.1	—	—
355-002-060	S60	165	121	60	54	35	—	7.7	7.5	281	—	—
355-004-100	N100	372	268	128	114	70	—	13	13	592	—	—
355-002-200	S200	672	468	200	181	107	—	18	17	955	88.2	—
355-003-500	D500	825	578	—	226	133	—	—	21	—	—	—
355-004-350	N350	1,255	865	371	324	186	—	28	27	—	131.5	—
355-003-103	D1000	1,689	1,151	—	418	236	—	—	32	—	—	—
355-002-600	S600	2,184	1,472	600	518	286	—	37	36	—	174	135.2
355-004-103	N1000	4,678	3,089	—	1020	542	350	—	57	—	—	—
355-002-203	S2000	8,323	5,422	2,000	1,719	889	—	87	83.3	—	405	—
355-003-503	D5000	8,800	5,700	2,150	1,850	950	—	—	88	—	—	—
355-003-752	D7500	13,296	8,609	2,681	—	1,365	—	—	118	—	—	—
355-004-403	N4000	17,889	11,470	—	3,448	1,720	850	—	137	—	—	—
355-002-803	S8000	34,931	22,383	8,000	6,710	3,317	—	—	242	—	—	—
355-004-153	N15000	79,423	49,714	—	13,994	6,650	3,000	—	406	—	—	—
355-002-304	S30000	—	84,687	28,079	23,570	11,058	—	—	628	—	—	—

Viscosity Standards

Important Information About Viscosity Standards

All Koehler certified viscosity standards are Newtonian fluids manufactured from high stability base oils and polybutenes. The standards have an expiration date on the label at least twelve months or longer from the date of purchase. With time, changes resulting from slow oxidation or loss of volatiles may occur. These changes can be minimized by storing the standard in the closed bottle at ambient laboratory temperatures and out of sunlight. The expiration date on the label is part of Koehler's program of total quality control and is intended to ensure that the standard will be utilized while the certified viscosity data remains valid.

Cold-Cranking Simulator Viscosity Standards

		Approximate Kinematic Viscosity in mPa•s (Centipoise)						
Catalog No.	Viscosity Standard	–5°C 23°F	–10°C 14°F	–15°C 5°F	–20°C –4°F	–25°C –13°F	–30°C –22°F	–35°C –31°F
355-005-010	CL10	—	—	—	—	—	—	1,700
355-005-012	CL12	—	—	—	—	800	1,600	3,200
355-005-014	CL14	—	—	—	—	1,600	3,250	7,000
355-005-016	CL16	—	—	—	—	2,500	5,500	11,000
355-005-019	CL19	—	—	—	1,800	3,500	7,400	17,000
355-005-022	CL22	—	—	1,300	2,500	5,100	11,100	—
355-005-025	CL25	—	—	1,800	3,500	7,400	17,200	—
355-005-028	CL28	—	1,200	2,500	5,000	9,300	—	—
355-005-032	CL32	—	1,800	3,500	7,300	15,900	—	—
355-005-038	CL38	—	2,900	5,800	13,000	—	—	—
355-005-048	CL48	2,300	4,500	9,500	21,000	—	—	—
355-005-060	CL60	3,700	7,400	15,600	—	—	—	—
355-005-074	CL74	6,000	11,600	—	—	—	—	—

Low Temperature Viscosity Standards

Catalog No.	Viscosity Standard	
355-005-027	N27B	Viscosities in centipoise at –40,–30, –20, –15, –10, 0°F
355-005-115	N115B	Viscosities in centipoise at –20,–15, –10, 0, +10, 20°F

High Viscosity Standards (for asphalts and polymers)

		Approximate Viscosity			Kinematic Viscosity	
Catalog No.	Viscosity Standard	20°C 68°F Centipoise	25°C 77°F Centipoise	60°C 140°F Centipoise	60°C 140°F Centistokes	135°C 275°F Centistokes
355-004-600	N600	—	1,400	140	160	12
355-004-103	N1000	—	2,000	280	350	—
355-004-203	N2000	—	4,900	380	440	26
355-004-403	N4000	—	11,000	730	850	—
355-004-803	N8000	—	20,000	1,400	1,600	—
355-004-153	N15000	—	41,000	2,600	3,000	—
355-004-304	N30000	130,000	80,000	4,700	5,400	—
355-004-623	N62000	—	200,000	13,000	—	—
355-004-154	N150000	—	420,000	24,000	—	—
355-004-194	N190000	900,000	520,000	33,000	—	—
355-004-454	N450000	—	1,600,000	100,000	—	—
355-004-275	N2700000	—	5,300,000	340,000	—	—

Koehler INSTRUMENT COMPANY, INC.

Dynamic Viscosity by Rotational Viscometer

Test Method

Determines the dynamic viscosity of a substance by the rotation of a specified spindle within the sample at the speed giving the maximum torque reading on the viscometer. The resulting torque reading is used to calculate the viscosity of the substance

Master Series Rotational Viscometer

- Master Series viscometers, monitored by Master Series Rotational Viscometer Software, offer a wider and unique range of rheological applications.
- Touch key board with 12 keys
- Direct readout on a graphic display
- Data displayed
  - Selected speed: r.p.m.
  - Selected spindle: SP
  - Viscosity Reading: cP (mPa·s) or cSt
  - Percentage of full scale: %
  - Sample temperature: °C or °F
  - Shear Rate (with coaxial spindles): SR (s-1)
  - Shear Stress (with coaxial spindles): SS (N/m2)
  - Density (introduced by the user): g/cm3
  - Step Program Status
  - Analyze & visual characteristics (flow curves)
- Viscosity reading: dynamic viscosity (cP or mPa·s) or kinematic viscosity (cSt)
- Program features:
  - Time to torque: target torque pre-setting device
  - Time to stop: target time pre-setting device
  - 10 working memories
  - Customizable options
  - Programmable
  - Multistep
  - Ramp
- AUTO-TEST with sound and visual malfunction alarm
- AUTO-RANGE function
- Temperature reading by PT100
- User-enabled viscosity and temperature calibration
- 10 language options
- AISI 316 stainless steel spindles
- Speed:0.01 - 250 r.p.m.
- Number of speeds: 2,600

Specifications (for all Series)

Precision: ±1% of full scale
Resolution:
With low viscosity adapter: 0.01
For lower than 10,000 viscosity cP: 0.1
For viscosity equal to or above 10,000 cP: 1
Repeatability: 0.2%
Thermometer features: (Not Applicable to Bold Series)
Temperature margins: 0°C to +100°C
32°F to 212.0°F
Resolution: 0.1°C/0.1722°F
Precision: +/- 0.1°C
Type of Probe: PT100
Electrical Requirements: 100-240V, 50/60Hz CE
Measuring Range:
Series L: 20-2,000,000 cP
Series R: 100-13,000,000 cP
Series H: 200-106,000,000 cP

K447-ML Master Series

Master Series Rotational Viscosity Software

- Complete viscometer control
- Easy to use. All programs eliminate user errors when programming the instrument to collect data.
- Provides instantaneous viscosity flow curves when performing new experiments, with definable parameters
- Clear view of program options using flanges
- Definable graphics and zoom function
- Different types of experiments can be programmed: simple curves, ramps, and multi-step
- All experiments are recorded in different databases to be able to consult them anytime
- Experiment documentation with name, number, and additional data
- In order to compare different flow curves, up to 4 experiments can be plotted simultaneously
- Over 12 different charts can be obtained

The Master Series Rotational Viscosity Software is designed to program the Master Series Viscometer and is a powerful key to document and study the viscosity behavior of fluids. The Master Series Rotational Viscosity Software is capable of graphing simple curves, ramps and “multi-step” curves allowing the user to study trends and the behavior of different materials. A powerful graph key assists the user to easily design flow curves required.

Included Accessories (for all Series)

Standard Spindles (4 for L model, 6 for R and H model)
Viscometer Stand
Spindle Protector
Carrying Case (Not Applicable to Bold Series)
USB Cable (Not Applicable to Bold Series)
Datalogger Software (Not Applicable to Bold Series)

Dynamic Viscosity by Rotational Viscometer

Sharp Series Rotational Viscometer

- Indispensable in QC and R&D laboratories.
- Touch key board with 6 keys
- Direct readout on graphic display
- Data displayed
  - Selected speed: r.p.m.
  - Selected spindle: SP
  - Viscosity reading: cP (mPa·s) or cSt
  - Percentage of full scale: %
  - Sample temperature: °C or °F (optional)
  - Shear rate (with coaxial spindles): SR (s-1)
  - Shear stress (with coaxial spindles): SS (N/m2)
  - Density (introduced by the user): g/cm3
- Viscosity reading: dynamic viscosity (cP or mPa·s) or kinematic viscosity (cSt)
- Unit converter SI to CGS
- Program features:
  - Time to torque: target torque pre-setting device
  - Time to stop: target time pre-setting device
  - 10 working memories
- AUTO-TEST with sound and visual malfunction alarm
- AUTO-RANGE function
- Temperature reading by PT100 (optional)
- User-enabled viscosity and temperature (optional) calibration
- 10 language options
- Interface: USB
- Datalogger Software: USB allows data transfer to a PC Excel format
- AISI 316 stainless steel spindles
- Speed: 0.3 - 100 r.p.m
- Number of speeds: 18

Ordering Information

Catalog No.	
K447-ML	Master Series L Rotational Viscometer
K447-MR	Master Series R Rotational Viscometer
K447-MH	Master Series H Rotational Viscometer
K447-ML-SFW	Master Series L Rotational Viscometer with Software
K447-MR-SFW	Master Series R Rotational Viscometer with Software
K447-MH-SFW	Master Series H Rotational Viscometer with Software
K447-PL	Power Series L Rotational Viscometer
K447-PR	Power Series R Rotational Viscometer
K447-PH	Power Series H Rotational Viscometer
K447-SL	Sharp Series L Rotational Viscometer
K447-SR	Sharp Series R Rotational Viscometer
K447-SH	Sharp Series H Rotational Viscometer
K447-SL-PT	Sharp Series L Rotational Viscometer with PT100 Probe
K447-SR-PT	Sharp Series R Rotational Viscometer with PT100 Probe
K447-SH-PT	Sharp Series H Rotational Viscometer with PT100 Probe
K447-BL	Bold Series L Rotational Viscometer
K447-BR	Bold Series R Rotational Viscometer
K447-BH	Bold Series H Rotational Viscometer

Accessories

K447-SSA-CJ	Small Sample Adapter w/circulation jacket (without spindles)
K447-SSA	Small Sample Adapter without circulation jacket (without spindles)
K447-SSP-SETL	Set of special spindles (L5, L6, L7) for small sample adapters (L Model)
K447-SSP-SETRH	Set of special spindles (RH8, RH9, RH10, RH11) for small sample adapters (R & H Models)
K447-LVA-CJ	Low Viscosity Adapter w/circulation jacket
K447-LVA	Low Viscosity Adapter without circulation jacket
K447-SP-LVA	Spindle for Low Viscosity Adapter
K447-HDU	Helix Drive Unit, Heldal

Power Series Rotational Viscometer

- Touch key board with 12 keys
- Direct readout on a graphic display
- Data displayed
  - Selected speed: r.p.m.
  - Selected spindle: SP
  - Viscosity reading: cP (mPa·s) or cSt
  - Percentage of full scale: %
  - Sample temperature: °C or °F
  - Shear Rate (with coaxial spindles): SR (s-1)
  - Shear Stress (with coaxial spindles): SS (N/m2)
  - Density (introduced by the user): g/cm3
- Unit converter SI to CGS
- Program features:
  - Time to torque: target torque pre-setting device
  - Time to stop: target time pre-setting device
  - 10 working memories
  - Customizable options
  - Programmable
  - Multistep
  - Ramp
- AUTO-TEST with sound and visual malfunction alarm
- AUTO-RANGE function
- Temperature reading by PT100
- User-enabled viscosity and temperature calibration
- 10 language options
- Interface: USB
- Datalogger Software: USB allows data transfer to a PC Excel format
- AISI 316 Stainless steel spindles
- Speed: 0.01 - 200 r.p.m.
- Number of speeds: 54

Bold Series Rotational Viscometer

- Bold series viscometers allow fast and accurate viscosity readings.
- They are low budget and easy to use.
- Data Displayed
  - Selected speed: r.p.m.
  - Selected spindle: SP
  - Viscosity Reading: cP (mPa·s)
  - Percentage of full scale: %
- Relative and absolute viscosity
- Unit converter SI to CGS
- AUTO-TEST with sound and visual malfunction alarm
- AUTO-RANGE function
- User-enabled calibration
- 10 language options
- AISI 316 stainless steel spindles
- Speed: 0.3 - 100 r.p.m.
- Number of speeds: 18

Koehler INSTRUMENT COMPANY, INC.

Additional Accessories

Additional equipment, materials and/or reagents are required to perform some of the test procedures in the preceding pages. Please refer to the applicable test method for further information, or contact Koehler for assistance.

Kinematic Viscosity . . . . . **Pages 2-13**

ASTM D445, D2170, D6074, D6158; IP 71, 319; ISO 3104; DIN 51550; FTM 791-305

Petroleum Ether
Chromic Acid
Petroleum Spirit
Toluene
Plumb Line or Spirit Level
Petroleum Naphtha
Xylene
Acetone
Distilled Water

Saybolt Viscosity . . . . . **Pages 16-17**

ASTM D88, D244, E102; AASHTO T72; FTM 791-304

Balance
No. 50 (300-µm) Sieve
Condenser – Water Cooled Reflex Glass-tube
Xylol
No. 20 (850-µm) Sieve
Filter Funnel
Hot Plate (E102)

Penetration

Test Methods

Penetration of Bituminous Materials ASTM D5; IP 49; DIN 52010

Cone Penetration of Lubricating Grease ASTM D217; IP 50; ISO 2137; DIN 51804; FTM 791-311, FTM 791-313

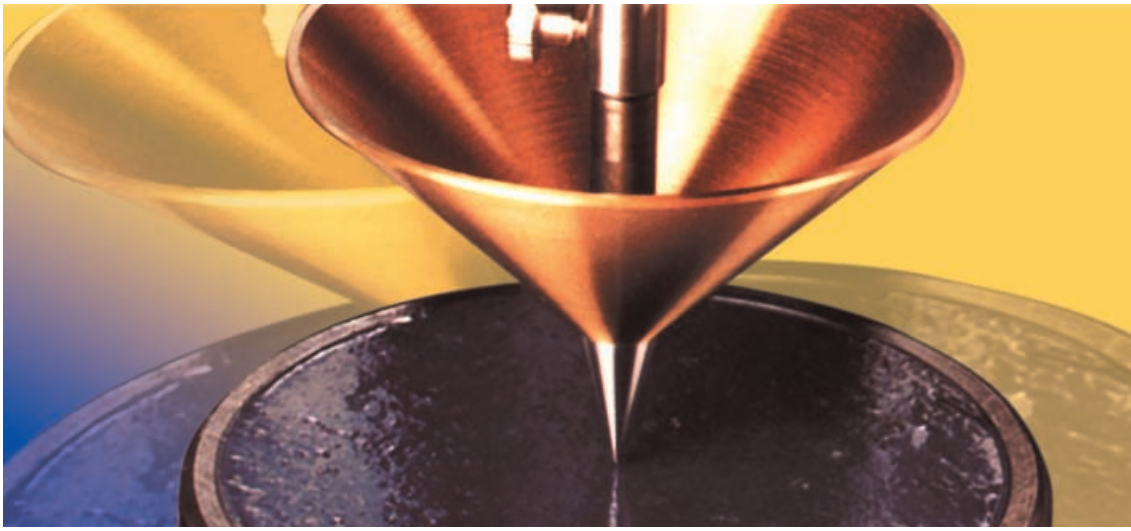
Cone Penetration of Petrolatum ASTM D937; IP 179; ISO 2137; DIN 51580

Needle Penetration of Petroleum Waxes ASTM D1321; IP 376; DIN 51579

Cone Penetration of Lubricating Grease Using One-Quarter and One-Half Scale Cone Equipment ASTM D1403; IP 310; ISO 2137; DIN 51804

Yield Stress of Heterogeneous Propellants by Cone Penetration Method ASTM D2884

Roll Stability of Lubricating Grease ASTM D1831



K19500 Penetrometer with K20800 Penetration Cone

Ordering Information

Catalog No.	
K19500	Penetrometer
	Accessories
K19552	Calibration Kit Consists of 0.500, 1.000 and 2.000" gauge blocks with calibration certificate traceable to NIST
K19553	Calibration Kit, Metric Consists of 12.5mm, 25mm and 45mm gauge blocks with calibration certificate traceable to NIST
K19520	Plunger, 15g For use with K20200, K19800 and K20300 Cones
K20910	Plunger, 6.9g For use with K20900 Cone
K19525	Plunger, 47.5g
K19510	Auxiliary Weight Set Includes one each 2.5g, 5g and 10g weights and two 20g weights
K19535	Loading Weight, 50g
K19536	Loading Weight, 100g

Penetration of Bituminous Materials

Cone Penetration of Lubricating Grease

Cone Penetration of Petrolatum

Needle Penetration of Petroleum Waxes

Cone Penetration of Lubricating Grease Using One-Quarter and One-Half Scale Cone Equipment

Yield Stress of Heterogeneous Propellants by Cone Penetration Method

Test Method

Penetration tests are performed on petroleum products to determine consistency and shear stability (lubricating greases) for design, quality control and identification purposes. A standard cone or needle is released from a penetrometer and allowed to drop freely into the sample for 5 seconds (or a different specified interval) at constant temperature. The depth of penetration of the cone or needle into the sample is measured in tenths of a millimeter by the penetrometer.

Penetrometer

- Conforms to ASTM and related specifications for penetrometers
- Suitable for laboratory or field use

Designed for ASTM penetration tests on petroleum products and for consistency tests on a wide range of food products, cosmetics, pastes and other solid to semi-solid products. Precision machined and assembled to exacting specifications, and ruggedly constructed to insure long service life in both laboratory and field applications. Features a full penetration range of 0-62.0mm with 1/10mm subdivisions (0-620 penetration scale). Accommodates cones and needles to perform all of the ASTM tests on lubricating greases, asphalts, petroleum waxes and petrolatums. Compact design facilitates transport for field use. Head assembly adjusts for accurate placement of the tip of the needle or cone on the surface of the sample. Sturdy cast iron base provides excellent support and has a built-in spirit level and leveling screws to insure proper alignment of the penetrometer during testing. Supplied with 50 and 100 gram weights and standard 47.5g plunger assembly. Order test cones, needles and lightweight plunger (where applicable) separately.

Specifications

Conforms to the specifications of:

ASTM D5, D217, D937, D1321, D1403, D2884, D4950, D5329; IP 49, 50, 179, 310; ISO 2137; DIN 51579, 51580, 51804; FTM 791-311, 791-312, 791-313; AOCS Cc 16-60; AACC 58-14; NFT 60-119, 60-123, 60-132, 66-004

Included Accessories

Plunger, 47.5g
Weights, 50 and 100g

Dimensions lxwxh,in.(cm)

6x6x18 (15x15x46)
Net Weight: 12 lbs (5.4kg)

Shipping Information

Shipping Weight: 15 lbs (6.8kg)
Dimensions: 1.7 Cu. ft.

Microprocessor Based Digital Penetrometer

- Tests the consistency of lubricating greases, petroleum waxes, bitumens, pastes, creams and other solid to semi-solid products
- Automatically timed operator programmable penetration measurements
- Motorized placement of penetrator on sample surface
- Large LCD to display all functions
- RS232 port for data transfer
- Full measurement range of 0-620 in 1/10mm scale or 1/100mm scale
- Rechargeable battery or AC operation
- Large, removable base accommodates grease worker cups and other ASTM and non-standard sample containers
- Complete selection of penetrometer cones, needles and accessories for petroleum products testing and for a wide range of other applications
- Conforms to all ASTM, IP, ISO 9001 and related specifications for penetrometers

Microprocessor based penetrometer loaded with advanced features to provide ease of operation and highly reproducible consistency measurements of petroleum products. Microprocessor control provides a full range of measurement and reporting options, and operation is simplified by four user programmable presets that facilitate lowering the penetrator tip to the sample surface.

Automatically timed penetrations—The penetrometer defaults to the standard ASTM interval of 5.0 seconds, or the operator may conveniently program a different interval in the range between 0.1 and 9999.9 seconds (in 0.1 second increments). A curing or temperature stabilization period may also be programmed by the operator (to delay the release of the penetrator into the sample) and for added convenience all selected parameters are retained in memory and automatically repeated in subsequent tests until changed by the operator. Separate keypad controls for each parameter simplify operation. Penetration and delay intervals count down on a large, easy to read LCD on the head of the unit.

Convenient measurement and reporting options—Penetration measurements in the full range of 0 - 620 in 1/10mm scale are reported in either 1/10mm or 1/100mm increments at the operator's option. For quality control testing, a penetration range can be entered into memory prior to testing. If a test result falls outside of the programmed range, an audible signal and visual error message alert the operator of a failed sample. Test results are displayed in digital format on a large LCD readout on the head of the penetrometer and can be communicated to a printer or computer via a built-in RS232 interface.

Simplified penetrator tip placement—Correct placement of the penetrator tip on the sample surface is essential for accurate penetration test results. The Koehler Digital Penetrometer has four operator programmable presets that lower the penetrator to the sample surface height at the touch of a button, greatly simplifying the process to ensure reproducibility. A fine adjustment button permits slight adjustments as needed. Full manual operation is also available with the use of coarse and fine push button controls and built-in magnifier and illuminator arms. When testing electrically conductive samples, a built-in circuit senses the sample surface for automatic placement. After testing, the penetrometer head returns to a raised position at the touch of a button to facilitate cleaning of the penetrator and changing of the sample.

More convenience features—The detachable machined base provides a large platform to accommodate a wide range of sample containers and constant temperature cylinders. It removes easily to permit the head assembly to be reversed (for use with a constant temperature bath) or mounted directly to a bath housing or other location. A built-in rechargeable battery pack permits field operation and provides back-up in the event of power interruption. Battery recharges automatically during operation of the penetrometer on standard AC electrical service.

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Software compatible, inquire with Koehler Customer Service.

K95500 Digital Penetrometer

Specifications

Conforms to the specifications of: ASTM D5, D217, D937, D1321, D1403, D2884, D4950, D5329; IP 49, 50, 179, 310; ISO 2137; DIN 51579, 51580, 51804; FTM 791-311, 791-312, 791-313; AOCS Cc 16-60; AACC 58-14; NFT 60-119, 60-123, 60-132, 66-004

Penetration Range: 0-62.0mm (0-620 penetration scale) in 1/10mm or 1/100mm
Penetration Interval: Operator variable from 0.1 to 9999.9 seconds with automatic repeat function and 5.0 second default

Electrical Requirements: CE
115V 60Hz
220-240V 50/60Hz

Dimensions lxwxh,in.(cm)
Base: 12½x14 (31.7x35.6)
Overall: 12½x14x18 (31.7x35.6x45.7)
Net Weight: 21 lbs (9.5kg)

Included Accessories

Standard Plunger, 47.5g
Weights, 50 and 100g

Shipping Information

Shipping Weight: 27 lbs (12.3kg)
Dimensions: 2 Cu. ft.

Ordering Information

Catalog No.		Order Qty
K95500-00000	Digital Penetrometer, 115V, 60Hz	1
K95590-00000	Digital Penetrometer, 220-240V, 50/60Hz	

Accessories

K19552	Calibration Kit - Consists of 0.500, 1.000 and 2.000" gauge blocks with calibration certificate traceable to NIST
K19553	Calibration Kit, Metric - Consists of 12.5mm, 25mm and 45mm gauge blocks with calibration certificate traceable to NIST
K95573-00000	Plunger, 15g - For use with K20200, K19800 and K20300 Cones
K95519-00000	Plunger, 6.9g - For use with K20900 Cone
K95577	Standard Plunger, 47.5g
K19587	Loading Weight, 50g
K19588	Loading Weight, 100g

Penetration

Penetrometer Cones, Needles and Accessories

- Precision machined cones and needles for ASTM and related methods
- Sample containers
- Constant temperature baths
- Grease workers and accessories
- Roll stability testers
- USDA and AOCS penetrometer cones

Use together with K19500 and K95500 series penetrometers to determine the consistency of petroleum products. Please call or write for information on non-petroleum test applications.

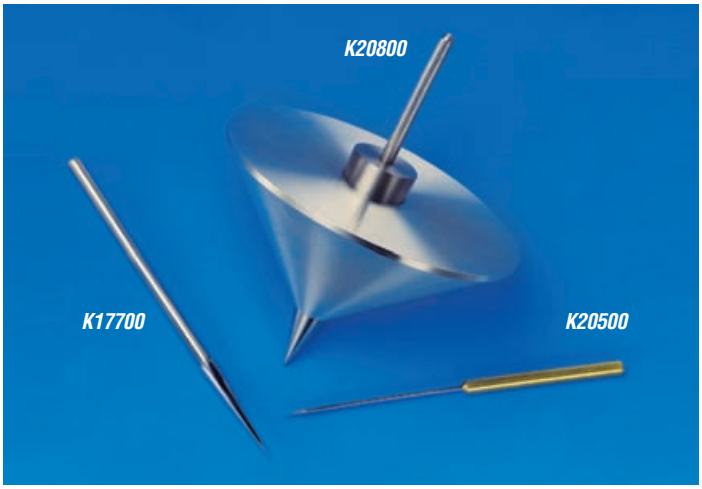
Needle Penetration of Petroleum Waxes

Test Method Standards

ASTM D1321; IP 376; DIN 51579

K17700	Needle, Stainless Steel, 2.5g
K17770	Needle, Stainless Steel, 2.5g, NIST Certified
K17710	Wax Specimen Container Brass cylinder with base plate conforming to ASTM D1321 specifications
K95600	Penetration Bath, 115V, 60Hz
K95690	Penetration Bath, 230V, 50/60Hz

K20000 Brass Cone



K20090 Aluminum Cone

Penetration of Bituminous Materials

Test Method Standards

ASTM D5; IP 49; DIN 52010

K20500-00000	Needle. Stainless steel with brass ferrule, 2.5g
K20570-00000	Needle. Similar to K20500, NIST certified, 2.5g
K20600-00000	Needle. Stainless steel with stainless steel ferrule, 2.5g
K20670-00000	Needle. Similar to K20600, NIST certified, 2.5g
388-001-003	Sample Container, 55mm dia. x 35mm depth for penetrations below 200
388-001-006	Sample Container, 70mm dia. x 45mm depth for penetrations between 200 to 350
357-000-001	Transfer Dish Submerges sample container per ASTM specifications
K95600	Penetration Bath, 115V, 60Hz
K95690	Penetration Bath, 230V, 50/60Hz

Cone Penetration of Lubricating Greases

Test Method Standards

ASTM D217; IP 50; ISO 2137; DIN 51804; FTM 791-311, FTM 791-313

K20800	Cone, Magnesium With hardened stainless steel tip, 102.5g Standard cone per ASTM D217
K20000	Cone, Brass With hardened stainless steel tip, 102.5g Optional cone per ASTM D217
K18100	Grease Worker series. Refer to page 28 for specifications and ordering information
K19100	Grease Cutter For 'block penetration' tests
K95600	Penetration Bath, 115V, 60Hz
K95690	Penetration Bath, 230V, 50/60Hz

Please inquire with Koehler Customer Service about accessories for food, cosmetics, paints, soaps, and other consistency measurement applications utilizing the Penetrometer.

Cone Penetration of Petrolatum

Test Method Standards

ASTM D937; IP 179; ISO 2137; DIN 51580

K20800	Cone, Magnesium With hardened stainless steel tip, 102.5g
K20700	Sample Container With cover, conforms to ASTM D937 specifications
K95600	Penetration Bath, 115V, 60Hz
K95690	Penetration Bath, 230V, 50/60Hz

Roll Stability of Lubricating Grease

Test Method Standard

ASTM D1831

K18300	Roll Stability Tester series (page 156)
K20900	Cone Penetration Test Equipment, One-Quarter or One-Half Scale series

Additional Penetration Cones

K19800	Magnesium Cone, 15g For ASTM D2884 testing of Heterogeneous Propellants
K19900	Aluminum Cone, 45g For AOCS CC 16-60 testing of fats, butter, margarine
K20090	Aluminum Cone, 35g For USDA testing of pastes
K20300	Aluminum Micro-Cone, 5g For lubricating greases, cosmetic creams. Use together with K20310 Sample Cup and Collar

Cone Penetration of Lubricating Grease Using One-Quarter and One-Half Scale Cone Equipment

Test Method Standards

ASTM D1403; IP 310; ISO 2137; DIN 51804

K20900	Quarter-Scale Cone, Aluminum, 2.48g
K95519-00000	Plunger, 6.9g For use with K95500 series Digital Penetrometer
K20910	Plunger, 6.9g For use with K19500 series Penetrometer
K21000	Quarter-Scale Grease Worker Consists of cup and cover assembly with plunger plate, shaft, handle and valve
K21002	Retaining Base Plate Mounts on bench or wall to retain Quarter-Scale Grease Worker when working heavy greases.
K21001	Blank Lid With seal, for Quarter-Scale Grease Worker. Use when heating samples prior to test.
K20200	Half-Scale Cone. Stainless Steel, 22.5g
K95573-00000	Plunger, 15g For use with K95500 series Digital Penetrometer
K19520	Plunger, 15g For use with K19500 Penetrometer
K20210	Half-Scale Grease Worker
K95600	Penetration Bath, 115V, 60Hz
K95690	Penetration Bath, 230V, 50/60Hz


K20300 Aluminum Micro Cone


K19900 Aluminum Cone

K18190 Mechanical Grease Worker

Ordering Information

Catalog No.

Mechanical Grease Workers

K18100	Single-Unit Model, 115V 60Hz
K18110	Single-Unit Model, 220-240V 50Hz
K18119	Single-Unit Model, 220-240V 60Hz
K18190	Double-Unit Model, 115V 60Hz
K18191	Double-Unit Model, 220-240V 50Hz
K18192	Double-Unit Model, 220-240V 60Hz

Manually Operated Model

K18000	Grease Working Machine

For Quarter-Scale and Half-Scale Grease Workers, refer to page 27.

Accessories

K18022	Dial Thermometer Inserts in petcock of steel grease worker. Supplied with adapter.
K18021	Overflow Ring Collects displaced grease during penetration measurements.
K18020	Steel Grease Worker Complete per ASTM specifications. Consists of cup, cover, plunger and vent cock.
K18030	Steel Grease Worker Similar to K18020 above, but with 270-hole plunger plate per FTM 791-313 (AN-G-15) specifications.
K18028	Cover Assembly Replacement cover assembly for steel grease worker. Includes vent cock, plunger plate, shaft and handle.
K18029	Grease Cup
K18023	Blank Lid, with seal For ASTM Steel Grease Worker. Use when heating samples prior to test.

Grease Workers

- Conform to ASTM D217 and related specifications
- Mechanical and manually operated types
- Single and double-unit models

Mechanical Grease Workers–For "worked penetration" and "prolonged worked penetration" tests to determine consistency of lubricating greases. Consists of single or dual steel ASTM grease workers mounted on a sturdy base and driven by a powerful gear reduction motor. Meets ASTM specifications for stroke length and rate. Equipped with a presetting electronic counter that automatically shuts off the drive motor after any desired number of strokes up to 99,999. Steel grease workers have threaded cup and cover, and steel plunger plate with shaft and handle that connects to eccentric cam on drive unit. Accessory dial thermometer inserts in plated vent cock. Spring loaded tightening clamps hold grease workers securely on base, and steel pins in base facilitate disassembly of grease workers after testing.

Manually Operated Grease Worker–Hand lever operated grease working machine designed for short duration "worked penetration" tests on lubricating greases. Consists of one steel ASTM grease worker with hand lever mechanism mounted on a sturdy steel base. Spring loaded tightening clamps hold grease worker securely on base, and steel pins in hand lever upright support facilitate disassembly of grease worker. Base plate is drilled at corners to allow for bolting to table top.

Specifications

Conforms to the specifications of:
ASTM D217, D4950; IP 50; ISO 2137; DIN 51804; FTM 791-311, 791-313*
*Requires substitution of 270-hole grease worker (K18030)
Drive Motor: fan cooled gear reduction type, ⅛hp (single-unit model)
or ½ hp (dual-unit model)
Electrical Requirements: CE
Mechanical Grease Workers:
115V 60Hz, Single Phase, 3A
220-240V 50/60Hz, Single Phase, 1.5A

Included Accessories

Mechanical ASTM Steel Grease Worker (1 or 2)

Dimensions lxwxh,in.(cm)

Mechanical Grease Workers:
Single-Unit: 10x13½x14¾ (25x34x37)
Double-Unit: 14x13½x14¾ (36x34x37)
Manually Operated Grease Worker: 30x10x15½ (76x25x39)
Net Weight:
Mechanical Single-Unit: 106 lbs (48.1kg)
Mechanical Double-Unit: 139½ lbs (63.3kg)
Manual: 21 lbs (9.6kg)

Shipping Information

Shipping Weight: Single-Unit: 141 lbs (64.0kg)
Mechanical Double-Unit: 171 lbs (77.6kg)
Manual: 28 lbs (12.7kg)
Dimensions: Mechanical: 4.2 Cu. ft.; Manual: 2.7 Cu. ft.

K95600 Penetrometer Bath

Penetrometer Bath

- Conforms to ASTM and related specifications
- Conditions petroleum samples and others requiring close temperature control prior to or during testing
- For use with manual and microprocessor penetrometer models
- Digital temperature control with low-liquid and overtemperature safety cut off

Constant temperature water bath for conditioning samples prior to a penetration test. Full visibility bath has a large shelf to accommodate a wide range of sample containers, including all containers used in ASTM tests. Sample containers can be left in the bath during the penetration test if required. The base of the Koehler manual penetrometer can be placed directly on the shelf of the bath, or the head assembly of the digital automatic model can be reversed to overhang the bath. Microprocessor digital temperature control maintains bath liquid temperature with ±0.05°C stability throughout the operating range. A large LED provides bath temperature readout in switchable °C/°F format and a dual-speed circulating pump assures temperature uniformity. The bath is protected by a separate adjustable overtemperature thermostat and a low liquid cut-off. A built-in cooling coil is provided for circulating a refrigerated coolant or tap water if needed.

Specifications

Conforms to the specifications of:
ASTM D5, D217, D937, D1321, D1403, D2884, D5329
Temperature Range: Ambient to 70°C
Temperature Stability: 0.05°C (0.1°F)
Electrical Requirements: CE
115V 60Hz, Single Phase, 9A
220-240V 50/60Hz, Single Phase, 4.5A

Dimensions lxwxh,in.(cm)

18x13⅛x8½ (45.7x33x21.6)
Net Weight: 6 lbs (2.7kg)

Shipping Information

Shipping Weight: 10 lbs (4.5kg)
Dimensions: 1.2 Cu. ft.

Ordering Information

Catalog No.	
K95600	Penetrometer Bath, 115V 60Hz
K95690	Penetrometer Bath, 230V 50/60Hz

Accessories

250-000-17F	ASTM 17F Thermometer Range: 66 to 80°F
250-000-17C	ASTM 17C Thermometer Range: 19 to 27°C
250-000-63F	ASTM 63F Thermometer Range: 18 to 89°F
250-000-63C	ASTM 63C Thermometer Range: –8 to +32°C
250-000-64F	ASTM 64F Thermometer Range: 77 to 131°F
250-000-64C	ASTM 64C Thermometer Range: 25 to 55°C

Please inquire with Koehler Customer Service about Stainless Steel Bath option.

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Additional Accessories

Additional equipment, materials and/or reagents are required to perform some of the test procedures in the preceding pages. Please refer to the applicable test method for further information, or contact Koehler for assistance.

Cone Penetration of Lubricating Grease ..... **Page 26**

ASTM D217; IP 50; ISO 2137; DIN 51804; FTM 791-311, FTM 791-313

Spatula
Paper
Light Petroleum Naphtha

Needle Penetration of Petroleum Waxes ..... **Page 26**

ASTM D1321; IP 376; DIN 51579

Glycerin

Cone Penetration of Petrolatum ..... **Page 27**

ASTM D937; IP 179; ISO 2137; DIN 51580

Laboratory Oven

Cone Penetration of Lubricating Grease Using One-Quarter and One-Half Scale Cone Equipment ..... **Page 27**

ASTM D1403; IP 310; ISO 2137; DIN 51804

Spatula

Flash Point

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Automated Flash Point Testers

Automated Pensky-Martens Flash Point Tester

Automatic Abel Flash Point Tester

- Conforms to IP 170 and related specifications
- Simple automation routine for easy operation

The automated Abel flash point tester is used primarily to test flammable and combustible materials for shipping and safety regulations. The flash tester provides an increased temperature range of operation as compared with other testers, allowing greater flexibility in testing samples according to the Abel test method. The unit provides a test range to 110°C and can be extended to –30°C by any appropriate external chiller. The flash point tests are simply conducted by mounting the flash cup filled with sample into the test position and selecting a pre- or user-programmed test method. Automation routines provide accurate test results. A quick search method is available to determine the flash point of unknown samples. The dual detection system (thermal and ionization) allows for testing all types of products. Ignition by gas flame or electrical ignitor is included, along with safety cut-off devices. Test results are automatically corrected to standard pressure (101.3 kPa). The system is equipped with a differential Pt-100 RTD probe designed to duplicate the response time of a mercury-in-glass thermometer and with multiple sensors that continually monitor instrument function, displaying an error message if a problem is detected. Supervision software is included.

Temperature range of Flash Tester can be extended. Please contact Koehler Customer Service for additional information.

Specifications

Conforms to the specifications of:
IP 170; ISO 1523, 13736;
NF M 07-011; NF T 66-009
Electrical Requirements: CE
115V 60Hz, Single Phase
230V 50/60Hz, Single Phase

Dimensions lxwxh,in.(cm)

10.25 x21x19.75 (26x5.53x50)
Net Weight:
44 lbs (20kg)

Auto Pensky-Martens Closed Cup Flash Point Tester

- Conforms to ASTM D93 and related specifications
- Dual flash point detection system (thermal and ionization) for measurement of samples containing water and/or silicone
- Gas or electric ignition
- Flash point operation range between 0 and 400°C
- Simple automation routine for easy operation
- Large viewing screen for observing test status at a distance from the unit
- Automatic barometric correction

The automated Pensky-Martens flash point tester accurately determines the lowest flash point temperature of fuels, lubricating oils, and homogenous liquids (ASTM D93 A), or liquids containing suspended solids as well as liquids that tend to form a surface film during testing (ASTM D93 B). Flash point tests are simply conducted by mounting the flash cup filled with sample into the test position and selecting a pre- or user-programmed test method. A quick search method allows for determination of flash points for unknown samples and a method for asphalts is also included. The automation routines provide accurate test results, even with users inexperienced in flash point test methods. The flash point test result is automatically corrected to standard pressure (101.3 kPa). The unit is equipped with a differential Pt-100 RTD probe designed to duplicate the response time of a mercury-in-glass thermometer as per ASTM D93-02a and E1-03a. The system features multiple sensors for continually monitoring of instrument function and displaying an error message if a problem is detected. The performance of the electrical ignitor is continuously checked, and the user is notified upon the need of replacement due to either damage or the end of its useful life. The system is easily interfaced with an external PC for operation and method updates. When performing a test, the system will display the stirring speed, temperature curve (also printed out), and current test status. The system alerts the user if the first application of the ignitor results in a flash or if no flash point is detected at the end of the test program. If a flash is not detected 30°C above the expected flash point or at 400°C, then the test is automatically aborted for safety. An easy connection to the air ventilation system or external water connection provides a quick cool down between test runs for operational efficiency.

Specifications

Conforms to the specifications of:
ASTM D93; IP 34; ISO 2719; DIN EN 22719;
NF M 07-019; JIS K2265
Electrical Requirements: CE
115V 60Hz 1000W
230V 50/60Hz 1000W

Dimensions lxwxh,in.(cm)

10.25 x21x19.75(26x5.53x50)
Net Weight:
44 lbs (20kg)

Automated Flash Point Testers

Automatic Tag Closed Cup Flash Point Tester

- Conforms to ASTM D56 and related specifications
- Simple automation routine for easy operation

The automated Tag Closed Cup flash point tester ensures the accuracy and precision required according to the ASTM D56 and related test methods. The test sample is heated at a prescribed rate of temperature increase throughout the standard temperature test range to 100°C. The flash point tests are simply conducted by mounting the flash cup filled with sample into the test position and selecting a pre-programmed test method or the search mode to determine an approximate flash point. The automation routines provide accurate test results. Ignition by gas flame or electrical ignitor is included, along with safety cut-off devices. The measurement range can be extended to –30°C by any appropriate external chiller. Supervision software is included.

Temperature range of Flash Tester can be extended. Please contact Koehler Customer Service for additional information.

Specifications
Conforms to the specifications of:
ASTM D56; IP 304
Electrical Requirements: CE
115V 60Hz, Single Phase
230V 50/60Hz, Single Phase

Dimensions lxwxh,in.(cm)
21x10.5x19.75 (53.5x26x50)
Net Weight:
44 lbs (20kg)

Automated Tag closed Cup Flash Point Tester

Automatic Cleveland Open Cup Flash Point Tester

- Conforms to ASTM D92 and related specifications
- Simple automation routine for easy operation
- Flash point operation between ambient and 400°C
- Gas or electric ignition

The automated Cleveland Open Cup flash point tester accurately determines flash and fire point temperatures of viscous petroleum products including oils and bitumens over an extended temperature range. When examining highly viscous specimens, a preheating time and temperature are set in order to liquefy the sample for testing. The surface skin from bituminous samples can be removed with a skimmer. The flash/fire point tests are simply conducted by mounting the flash cup filled with sample into the test position and selecting a pre-programmed test method or the search mode to determine an approximate flash point. The test results are automatically corrected to standard pressure (101.3 kPa). Equipped with a differential Pt-100 RTD probe, the system is designed to duplicate the response time of a mercury-in-glass thermometer. Multiple sensors continually monitor instrument function, displaying an error message if a problem is detected. The performance of the ionization sensor which detects the flash and fire points is continuously monitored, and the user is notified upon the need of replacement. If a flash is not detected 20°C above the expected flash point or at 420°C, then the test is automatically aborted for safety. The system is easily interfaced with an external PC for operation and method updates. When performing a test, the system will display the stirring speed, temperature curve (also printed out), and current test status. The system alerts the user if the first application of the ignitor results in a flash or if no flash point is detected at the end of the test program. If a flash is not detected 30°C above the expected flash point or at 400°C, then the test is automatically aborted for safety.

Specifications
Conforms to the specifications of:
ASTM D92; IP 36; ISO 2592
Electrical Requirements: CE
115V 60Hz 1000W
230V 50/60Hz 1000W

Dimensions lxwxh,in.(cm)
21x10.5x19.75 (53.5x26x50)
Net Weight:
44 lbs (20kg)

Ordering Information

Catalog No.		Order Qty
Automatic Abel Flash Point Tester		1
K87300	Automatic Abel Flash Point Tester, 115V 60Hz	
K87390	Automatic Abel Flash Point Tester, 230V 50/60Hz	
Automatic Pensky-Martens Closed Cup Flash Point Tester		1
K87100	Automatic Pensky-Martens Closed Cup Flash Point Tester, 115V 60Hz	
K87190	Automatic Pensky-Martens Closed Cup Flash Point Tester, 230V 50/60Hz	
Automatic Tag Closed Cup Flash Point Tester		1
K87700	Automatic Tag Closed Cup Flash Point Tester, 115V 60Hz	
K87790	Automatic Tag Closed Cup Flash Point Tester, 230V 50/60Hz	
Automatic Cleveland Open Cup Flash Point Tester		1
K87400	Automatic Cleveland Open Cup Flash Point Tester, 115V 60Hz	
K87490	Automatic Cleveland Open Cup Flash Point Tester, 230V 50/60Hz	

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Flash Point by Pensky-Martens Closed Cup Tester

K16200 Pensky-Martens Flash Tester with K16220 Accessory Stirrer Motor (Sold Separately)

Specifications

Conforms to the specifications of:
ASTM D93; AASHTO T73-811; IP 34; ISO 2719; DIN 51758; FTM 791-1102; NF M 07-019
Electrical Requirements: CE
115V 60Hz, Single Phase, 6.5A
220-240V 50/60Hz, Single Phase, 3.4A

Included Accessories

Brass Test Cup with Handle
Thermometer Holder
Cover Assembly

Dimensions lxwxh,in.(cm)

9½x8x22½(24x20x57) with optional stirrer motor installed
Net Weight:
K16000: 21 lbs (9.5kg)
K16200/K16270: 24 lbs (10.9kg)

Shipping Information

Shipping Weight: 30 lbs (13.6kg)
Dimensions: 3.1 Cu. ft.

Please refer to page 32 about our automated Pensky-Martens Closed Cup Flash Point Tester or inquire by contacting Koehler Customer Service.

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Test Method

For flash point determinations of fuels, lubricating oils, liquids containing suspended solids and liquids that tend to form a surface film during testing.

Pensky-Martens Closed Cup Flash Tester

- Conforms to ASTM D93 and related specifications
- Choice of electric or gas heating

Determines flash points of a wide range of products by a closed cup method with two option speed stirring of the sample. Extensively used in shipping and safety regulations for detection of contamination by volatile and flammable materials in fuel oils and lubricating oils, and for characterization of hazardous waste samples.

Smooth operating cover mechanism slides shutter open and applies test flame at the turn of a knob. Cover fits over brass test cup and includes pilot flame, test flame reference bead, built-in stirrer and plated brass thermometer ferrule.

Electrically heated model is equipped with a 1000W nickel-chromium heater with stepless variable control for accurate, repeatable temperature rate of rise settings per specifications. Heater unit is enclosed in a stainless steel housing with cooling vents. Includes line cord receptacle and switch for accessory slow speed stirrer.

Gas heated model has a built-in nickel plated brass natural gas burner, or can be supplied with an artificial gas burner or liquid propane burner (specify when ordering). Both models are mounted on a sturdy cast iron base.

Ordering Information

Catalog No.		Order Qty
Pensky-Martens Closed Cup Flash Tester		1
K16200	Electrically Heated Model, 115V 60Hz	
K16270	Electrically Heated Model, 220-240V 50/60Hz	
K16000	Gas Heated Model	
	Accessories	
K16220	Stirrer Motor, 115V 60Hz Slow speed gear motor rotates stirrer of Pensky-Martens Tester at 115rpm for Procedure A and at 250rpm for Procedure B. Includes adjustable support bracket and mounting rod. Installs in base of flash tester.	1
K16228	Stirrer Motor, 220-240V 60Hz	
K16229	Stirrer Motor, 220-240V 50Hz	
250-000-09F	ASTM 9F Thermometer Range: 20 to 230°F	
250-000-09C	ASTM 9C Thermometer Range: –5 to +110°C	1
250-000-10F	ASTM 10F Thermometer Range: 200 to 700°F	
250-000-10C	ASTM 10C Thermometer Range: 90 to 370°C	1
K16010	Cover Assembly Complete assembly. Includes shutter, flame exposure device, stirrer and thermometer ferrule.	
K16020	Brass Test Cup With heat resistant handle.	
K16020-NI	Nickel Plated Test Cup With heat resistant handle	

Flash Point by Tag Closed Tester

Test Method

For flash point determinations of liquids with a viscosity of below 5.5 centistokes (cSt) at 104°F (40°C) or below 9.5cSt at 77°F (25°C), and a flash point below 200°F (93°C) except cut-back asphalts, those liquids which tend to form a surface film under test conditions and materials which contain suspended solids.

Tag Closed Cup Flash Tester

- Conforms to ASTM D56 and related specifications
- Gas or electrical heating

Determines flash points of liquid products by the Tag Closed Cup method. Features stepless variable heat control with reference dial for accurate repeat setting of temperature rate of rise per specifications. Also available with gas burner instead of electric heater. Precision machined cover mechanism simultaneously opens slide shutter and applies test flame to sample at the turn of a knob. Includes liquid bath with constant level overflow, brass test cup, plated brass thermometer ferrules and test flame reference bead. Bath and cover mechanism are constructed of plated brass. Heater is enclosed in a cast aluminum base assembly.

Please refer to page 33 about our automated Tag Closed Cup Flash Point Tester or inquire by contacting Koehler Customer Service.

Ordering Information

Catalog No.		Order Qty
Tag Closed Cup Flash Tester		1
K14600	Electrically Heated Model, 115V 60Hz	
K14670	Electrically Heated Model, 220-240V 50/60Hz	
K14690	Gas Heated Model	
	Accessories	
250-000-09F	ASTM 9F Thermometer Range: 20 to 230°F	2
250-000-09C	ASTM 9C Thermometer Range: –5 to +110°C	
250-000-57F	ASTM 57F Thermometer Range: –4 to +122°F	2
250-000-57C	ASTM 57C Thermometer Range: –20 to +50°C	
K14510	Cover Assembly Includes slide shutter burner and thermometer ferrules	
K14520	Brass Test Cup	

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

K14600 Tag Closed Cup Flash Tester

Specifications

Conforms to the specifications of:
ASTM D56; IP 304; FTM 791-1101
Electrical Requirements: CE
115V 60Hz, Single Phase, 1.3A
220-240V 50/60Hz, Single Phase, 0.6A

Included Accessories

Brass Test Cup
Cover Assembly (includes Slide Shutter, Burner and Thermometer Ferrules)

Dimensions lxwxh,*in.(cm)

5x5x16 (13x13x41)
*with thermometers inserted
Net Weight: 7 lbs (3.2kg)

Shipping Information

Shipping Weight: 8 lbs (3.6kg)
Dimensions: 0.76 Cu. ft.

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Flash and Fire Points by Cleveland Open Cup

K13900 Cleveland Open Cup Flash Tester

Specifications

Conforms to the specifications of:
ASTM D92, D6074, D6158; AASHTO T48; ANS Z-11.6; IP 36; ISO 2592; DIN 51376; FTM 791-1103, FTM 141-4294
Electrical Requirements: CE
115V 60Hz, Single Phase, 6.5A
220-240V, 50/60Hz, Single Phase, 3.4A

Included Accessories

Brass Test Cup

Dimensions lxwxh,in.(cm)

10x5½x14 (25x14x36)
Net Weight: 8½ lbs (3.9kg)

Shipping Information

Shipping Weight: 12 lbs (5.4kg)
Dimensions: 1.5 Cu. ft.

Test Method

For flash and fire points of all petroleum products, except fuel oils and those having an open cup flash below 79°C (175°F).

Cleveland Open-Cup Flash Tester

- Conforms to ASTM D92 and related specifications
- For flash points above 79°C (175°F)

Determines flash and fire points by the Cleveland Open-Cup method. Consists of test flame applicator, brass test cup, thermometer support, heating plate and electric heater. Applicator is precisely aligned per specifications and pivots for test flame application at specified temperature intervals. Hinged thermometer support raises to facilitate placement and removal of test cup. Adjust flame size using built-in needle valve and comparison bead.

Equipped with a 1000W nickel-chromium heater with stepless variable heat control for accurate repeat setting of temperature rate of rise per specifications.

Heater unit is enclosed in a stainless steel housing with cooling vents. Test flame applicator and thermometer support are constructed of machined nickel plated brass.

Please refer to page 33 about our automated Cleveland Open Cup Flash Point Tester or inquire by contacting Koehler Customer Service.

Ordering Information

Catalog No.		Order Qty
Cleveland Open-Cup Flash Tester		1
K13900	Electrically Heated Model, 115V 60Hz	
K13990	Electrically Heated Model, 220-240V 50/60Hz	
	Accessories	
250-000-11F	ASTM 11F Thermometer Range: 20 to 760°F	1
250-000-11C	ASTM 11C Thermometer Range: –6 to +400°C	
K14000	Cleveland Open Flash Cup Precision machined brass with heat resistant handle	

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Flash Point by Tag Open-Cup Apparatus

Flash Point and Fire Point of Liquids by Tag Open-Cup Apparatus

Flash Point of Cutback Asphalt with Tag Open-Cup Apparatus

Test Method

For determination of flash and fire points of liquids at temperatures of up to 325°F (163°C) and flash points of cutback asphalts at temperatures of less than 200°F (93°C).

Tag Open-Cup Flash Tester

- Conforms to ASTM D1310, D3143 specifications
- Choice of gas or electrically heated

Determines Tag Open-Cup flash point of liquid products and cutback asphalts. Includes sample test cup, plated brass liquid bath with constant level overflow, pivoting ignition taper with pilot light and reference bead, pivoting thermometer holder, heater and cast aluminum base.

Electrically heated model is equipped with stepless variable heat control for accurate control of temperature rate of rise per specifications. Gas heated model also available.

K15600 Tag Open-Cup Flash Tester

Ordering Information

Catalog No.		Order Qty
Tag Open-Cup Flash Tester		
K15600	Electrically Heated Model, 115V 60Hz	1
K15670	Electrically Heated Model, 220-240V 50/60Hz	
K15690	Gas Heated Model	
	Accessories	
250-000-33F	ASTM 33F Thermometer Range: –36.5 to +107.5°F	1
250-000-33C	ASTM 33C Thermometer Range: –38 to +42°C	
250-000-09F	ASTM 9F Thermometer Range: 20 to 230°F	1
250-000-09C	ASTM 9C Thermometer Range: –5 to +110°C	
250-000-35F	ASTM 35F Thermometer Range: 194 to 338°F	
250-000-35C	ASTM 35C Thermometer Range 90 to 170°C	1
K15610	Leveling Device For proper adjustment of sample level in test cup. Meets ASTM specifications. Polished aluminum	
K15620	Draft Shield	1
K15520	Sample Cup	

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Specifications

Conforms to the specifications of:
ASTM D1310, D3143
Electrical Requirements: CE
115V 60Hz, Single Phase, 13A
220-240V 50/60Hz, Single Phase, 0.6A

Included Accessories

Borosilicate Glass Sample Cup

Dimensions lxwxh,*in.(cm)

10x7x17 (25x18x43)
*with thermometer inserted
Net Weight: 7½ lbs (3.4kg)

Shipping Information

Shipping Weight: 9½ lbs (4.3kg)
Dimensions: 1.3 Cu. ft.

Flash Point and Sustained Burning of Liquids

K16500 Rapid Flash Tester, Closed Cup

Ordering Information

Catalog No.	
K16500	Rapid Flash Tester, Closed Cup, 115V Aluminum Test Cup/Brass Lid & Shutter
K16591	Rapid Flash Tester, Closed Cup, 220-240V Aluminum Test Cup/Brass Lid & Shutter
K16502	Rapid Flash Tester, Closed Cup, 115V Stainless Steel Test Cup, Lid & Shutter
K16592	Rapid Tester, Closed Cup, 220-240V Stainless Steel Test Cup, Lid & Shutter
K16503	Rapid Flash Tester, Open-Cup, 115V Aluminum Test Cup
K16593	Rapid Flash Tester, Open-Cup, 220-240V Aluminum Test Cup
K16504	Rapid Flash Tester, Open-Cup, 115V Stainless Steel Test Cup
K16594	Rapid Flash Tester, Open-Cup, 220-240V Stainless Steel Test Cup

Accessories

K16506	Fuel Cylinder Valve
K16507	Heat Transfer Compound for thermometer
K16508	Metal Cooling Block to facilitate cooling of the sample cup between tests
K16509	Refrigerant Charged Cooling Block to hold cooling mixture for subambient testing
K16510	Syringe 2mL/4mL
K16511	Thermometer, range 32 to 572˚F/0 to 300˚C
K16512	Thermometer, range 32 to 230˚F
K16513	Thermometer, range 212 to 572˚F
K16514	Thermometer, range 0 to 110˚C
K16515	Thermometer, range 100 to 300˚C
K16516	Thermometer, range –36 to +105˚F
K16517	Thermometer, range –38 to +40˚C

Flash Point of Liquids by Small Scale Closed Cup Apparatus

Flash Point by Small Scale Closed Tester

Sustained Burning of Liquid Mixtures by Setaflash Tester (Open-Cup)

Test Method

Verifies the flash point or the sustained burning qualities of small samples in the range of –30˚C to +300˚C.

Rapid Flash Tester

- Conforms to ASTM D3278, D3828, D4206; DOT CFR 49-173.115; IATA; ISO 9038 and related specifications
- One minute test with a 2mL sample
- Simple to operate

Rapid Tester® provides rapid determinations of flash point or sustained burning qualities by using a small sample. A flash/no flash test result is achieved in one minute for flash points below 212˚F (100˚C) with a 2mL sample. Ideally suited for quality assurance and environmental compliance testing as well as actual flash point for paints, fragrances, hydrocarbons and other liquids. Open cup models are used for determining sustained burning qualities characteristics of mixtures of flammable and nonflammable liquids or liquids with widely different flash points when assessing flammability characteristics. Features convenient semi-automatic operation for flash/no flash tests. Set the test temperature on the digital display and inject a 2mL or 4mL sample into the sample cup. The tester quickly stabilizes itself at the desired value, permitting the test flame to be applied and the result to be observed by the operator. Unit also performs conventional determinations of actual flash temperature by the small scale closed tester method.

Two models are offered: the Closed Cup Model is for routine flash point tests in the range from –30 to +300˚C (–22 to +572˚F); the Open-Cup Model is for sustained burning tests in the range from ambient to 212˚F (100˚C). Both models include automatic temperature control with ˚C/˚F selector switch, syringe, electronic timer, integral NIST traceable thermometer, and an external fuel cylinder valve for connection to a customer-supplied fuel cylinder or other fuel source.

Specifications

Conforms to the specifications of:
ASTM D3278, D3828, D4206; IP 303; ISO 3679, ISO 3680, ISO 9038; DOT CFR 49-173.115; IATA
Electrical Requirements:
115V 60Hz
220-240V 50/60Hz

Included Accessories

Thermometer, range 32 to 572˚F (0 to 300˚C)
Syringe

Dimensions: lxwxh,in.(cm)
15x23.4x6.3 (38.1x8.6x16.2)
Net Weight: 10 lbs (4.6kg)

Shipping Information

Shipping Weight: 16 lbs (7.26kg)
Dimensions: 2.3 Cu. ft.

Autoignition Temperature of Liquid Chemicals

Test Method

Determines the lowest temperature at which the vapors of a liquid or solid chemical sample will self-ignite under prescribed laboratory conditions. The temperatures at which 'cool flame' and 'hot flame' ignitions occur, as evidenced by sudden temperature increases in the sample flask, are measured and recorded, and the delay time between introduction of the sample and ignition is timed.

Autoignition Apparatus

- Conforms to ASTM E659 specifications
- Digital furnace temperature control
- Digital flask temperature display

Modified crucible furnace with digital thermocouple readout of flask temperature at prescribed points per ASTM specifications. Linearized analog output permits connection to a strip chart recorder or datalogging instrument. Furnace provides rapid response and ±1°C stability throughout the operating range from Ambient to 750°C. Cylindrical heating chamber provides excellent radial temperature uniformity. Furnace cover has ports for flask exterior thermocouples, and a borosilicate glass thermocouple tube is provided to assure correct positioning of the gas temperature thermocouple inside the test flask. Thermocouples plug directly into the furnace control unit for quick disconnection when removing the flask. A hinged holder in the cover facilitates handling of the test flask. Adjustable mirror permits safe viewing of the flask interior during testing. Control panel has temperature controls and digital thermocouple readout with four-position selector switch.

Specifications

Conforms to the specifications of:
ASTM E659
Temperature Range: Ambient to 750°C
Temperature Control: digital setpoint solid state controller
accurate to within ±1°C
Flask Temperature Display: 0-750°C, with four position selector switch
Electrical Requirements: 220-240V 50/60Hz, Single Phase, 7.7A CE

Included Accessories

Borosilicate Test Flask, 500mL
Thermocouples (4)

Dimensions lxwxh,in.(cm)

Furnace: 15x15x22 (38x38x56)
Control Cabinet: 22x10x14 (56x25x36)
Net Weight: 72 lbs (32.8kg)

Shipping Information

Shipping Weight: 98 lbs (44.5kg)
Dimensions: 16.3 Cu. ft.

K47000 Autoignition Apparatus

Special apparatus for performing the Autoignition Test according to the ASTM D2155 test method is available. Please contact Koehler Customer Service for additional and ordering information.

Ordering Information

Catalog No.		
K47000	Autoignition Apparatus, 220-240V 50/60Hz	1
	Accessories	
362-001-000	Syringe, 1mL	1
K470-0-1-14	Needle, 6", stainless steel	1
K70015-1A	Recorder, 115V/230V 50/60Hz	1
374-115-001	Hot Air Gun, 115V 60Hz For purging product gases between tests	1
374-230-001	Hot Air Gun, 220-240 50/60Hz For purging product gases between tests	
332-003-008	Quartz Test Flask, 500mL For high temperature testing over 600˚C	
K470-0-1-8	Quartz Thermocouple Guide	

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Additional Accessories

Additional equipment, materials and/or reagents are required to perform some of the test procedures in the preceding pages. Please refer to the applicable test method for further information, or contact Koehler for assistance.

Flash Point by Pensky-Martens Closed Tester.....**Pages 32, 34**

ASTM D93, AASHTO T73-811, IP 34, ISO 2719, DIN 51758, FTM 791-1102

Propane
Toluene
Acetone
Calcium Chloride
Barometer

Flash Point by Tag Closed Tester.....**Pages 33, 35**

ASTM D56, IP 304, FTM 791-1101

Ethylene Glycol
Propane
Barometer
Water

Flash and Fire Points by Cleveland Open-Cup.....**Pages 33, 36**

ASTM D92, AASHTO T48, ANS Z-11.6. IP 36, ISO 2592, DIN 51376, FTM 791-1103, FTM 141-4294

Barometer

Flash Point of Cutback Asphalt with Tag Open-Cup Apparatus.....**Page 33**

ASTM D3143

Ethylene Glycol
Distilled Water

Flash Point and Fire Point of Liquids by Tag Open-Cup Apparatus.....**Page 37**

ASTM D1310

Flasks, 500mL (2)
Distilled Water
Solid Carbon Dioxide
Acetone
n-Heptane
p-Xylenol
Isopropanol
Diethylene Glycol

Autoignition Temperature of Liquid Chemicals.....**Page 39**

ASTM E659

Laboratory Balance
Powder Funnel

General Test Equipment

Test Methods	Page
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Saybolt Color of Petroleum Products ASTM D156; DIN 51411; FTM 791-101	**44, 46-47**
ASTM Color of Petroleum Products ASTM D1500, D6074; IP 196; ISO 2049; FTM 791-102	**45-46**
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Aniline Point and Mixed Aniline Point of Petroleum Products

K10200 Automatic Aniline Point Apparatus

Ordering Information

Catalog No.		Order Qty
K10200	Automatic Aniline Point Apparatus, 115V 60Hz	1
K10290	Automatic Aniline Point Apparatus, 220-240V 50/60Hz	

Accessories

250-000-33F	ASTM 33F Thermometer Range: –36.5 to +107.5°F	1
250-000-33C	ASTM 33C Thermometer Range: –38 to +42°C	
250-000-34F	ASTM 34F Thermometer Range: 77 to 221°F	1
250-000-34C	ASTM 34C Thermometer Range: 25 to 105°C	
250-000-35F	ASTM 35F Thermometer Range: 194 to 338°F	1
250-000-35C	ASTM 35C Thermometer Range: 90 to 170°C	
K10210	Borosilicate Glass Test Cell with drain	
K10220	Heating-Cooling Tube with platinum element	

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Aniline Point and Mixed Aniline Point of Petroleum Products and Hydrocarbon Solvents

Test Method

Aniline point is used to characterize pure hydrocarbons and to indicate the aromatic content of hydrocarbon mixtures. Equal volumes of aniline and sample or sample plus *n*-heptane are stirred together while being heated at a controlled rate. After the two phases become miscible, the mixture is cooled at a controlled rate and the temperature at which the two phases separate is the aniline point or mixed aniline point of the sample.

Automatic Aniline Point Apparatus

- Conforms to ASTM D611 and related specifications
- For samples ranging from clear to very dark
- Temperature range 0°C to 150°C (32°F to 302°F)
- Digital temperature display

Performs aniline point and mixed aniline point determinations automatically by means of a modified thin film technique (ASTM D611 Method E). The sample-aniline mixture is directly heated by a platinum immersion heater and the aniline point is detected photoelectrically. Temperature is displayed on a large LED indicator. Built-in pressure regulator and solenoid valve permit the use of cooling air for quicker cooling cycles or to determine subambient aniline point temperatures. Aniline points as low as 0°C (32°F) can be determined with the use of refrigerated cooling air. Equipped with variable controls for heater, light source and stirrer speed. Cabinet exterior surfaces have a chemical resistant polyurethane enamel finish.

Specifications

Conforms to the specifications of:
ASTM D611; IP 2; ISO 2977; DIN 51775; FTM 791-3601; NF M 07-021
Testing Range: 0 to 150°C (32 to 302°F)
Temperature Display: 0-999.9°C
Electrical Requirements: CE
115V 60Hz, Single Phase, 0.4A
220-240V 50/60Hz, Single Phase, 0.2A

Included Accessories

Standard Borosilicate Glass Test Cell with drain

Dimensions lxwxh,in.(cm)

14½x8½x20¾ (37x22x53)
Net Weight: 32½ lbs (14.7kg)

Shipping Information

Shipping Weight: 46 lbs (21kg)
Dimensions: 8.2 Cu. ft.

Thin Film Aniline Point Apparatus

• Conforms to ASTM D611 and related specifications

For aniline point and mixed aniline point determinations according to Method B. Stirs aniline-sample mixture in a borosilicate glass thin film tube suspended in a heating bath. Thin film of mixture flows over a light well illuminated by a variable 6V lamp. Adjust heating rate per specifications using accessory Powertrol Heater. When lamp filament brightens inside well, allow mixture to cool until the two phases separate as indicated by obscuring of the lamp filament. Consists of thin film tube; 400mL Borosilicate Glass beaker; cover assembly with bath stirrer; sample pump rotor and cooling coil; 6V lamp with line cord; and drive motor. Positive drive pulley system rotates sample and bath stirrers. Accessory Powertrol Heater has variable stepless control and a reference dial for repeatable control of heating rate. Porcelain refractory top plate shields 1000W heater and has a positioning well for the Borosilicate Glass bath. Low voltage receptacle in heater housing accepts line cord of 6V lamp.

Specifications

Conforms to the specifications of: ASTM D611; IP 2; ISO 2977;
DIN 51775; FTM 791-3601; NF M 07-021
Bath Medium: 400mL of heat transfer fluid
(355-001-001 mineral oil is suitable for this application)
Electrical Requirements: CE
115V 60Hz, Single Phase, 6.5A
220-240V 50/60Hz, Single Phase, 13.4A

Included Accessories

Thermometer Ferrules (2)
Clamps and Support Rod

Dimensions lxwxh,in.(cm)
14½x18½x20¾ (37x22x53)
Net Weight: 24 lbs (10.9kg)

Shipping Information
Shipping Weight: 42 lbs (19.1kg)
Dimensions: 5.7 Cu. ft.

Ordering Information

Catalog No.		Order Qty
K10190	Thin Film Aniline Point Apparatus, 115V 60Hz	1
K10191	Thin Film Aniline Point Apparatus, 220-240V 50/60Hz	
K10020	Powertrol Heater, 115V 60Hz	1
K10029	Powertrol Heater, 220-240V 50/60Hz	
	Accessories	
250-000-33F	ASTM 33F Thermometer Range: –36.5 to +107.5°F	2
250-000-33C	ASTM 33C Thermometer Range: –38 to +42°C	
250-000-34F	ASTM 34F Thermometer Range: 77 to 221°F	2
250-000-34C	ASTM 34C Thermometer Range: 25 to 105°C	
250-000-35F	ASTM 35F Thermometer Range: 194 to 338°F	2
250-000-35C	ASTM 35C Thermometer Range: 90 to 170°C	

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

K10190 Thin Film Aniline Point Apparatus

U-Tube Aniline Point Apparatus

• Developed by Standard Inspection Laboratories

Similar to the Thin Film Aniline Point Apparatus but with 'U-Tube' aniline-sample tube and stirrer as developed by Standard Inspection Laboratories. Suitable for samples having 6.5 or lighter ASTM D1500 color. As illustrated in IP2-56, Method D. Consists of U-tube; 400mL Borosilicate Glass beaker; cover assembly with bath stirrer; sample stirrer and cooling coil; 6V lamp with line cord; and drive motor. Thermometer ferrules and mounting hardware are included. Accessory Powertrol Heater provides variable stepless control of heating rate and 6V tap for lamp.

Ordering Information

Catalog No.		Order Qty
K10090	U-Tube Aniline Point Apparatus 115V 60Hz	
K10091	U-Tube Aniline Point Apparatus 220-240V 50/60Hz	1
K10020	Powertrol Heater, 115V 60Hz	
K10029	Powertrol Heater, 220-240V 50/60Hz	1

Koehler INSTRUMENT COMPANY, INC.

Saybolt Color of Petroleum Products

K13009 Saybolt Chromometer

Test Method

The Saybolt Color test is used for quality control and product identification purposes on refined products having an ASTM Color of 0.5 or less. Products in this range include undyed motor and aviation gasolines, jet propulsion fuels, naphthas, kerosene and petroleum waxes. Color is an important quality characteristic for many products, and can also be used to detect product contamination. The Saybolt Chromometer measures color by comparing a column of sample against standard color discs. The Saybolt Wax Chromometer measures color of non-fluid waxes by heating the samples during the test.

Saybolt and Saybolt Wax Chromometers

- Conforms to ASTM D156 and related specifications
- Three-position color standard turret
- Tests non-fluid waxes and liquid petroleum products

Determines Saybolt Color of highly refined petroleum products. Consists of a matched set of sample and standard tube assemblies with optical viewer. Compares a sample of the product to be tested against standard color discs under a uniform light source. Reduce column height until the sample field is lighter than the color standard and convert height to Saybolt Color using chart on instrument. Three-position turret on standard tube permits convenient changing of color disc combinations. Accessory Daylight Lamp (Cat. No. K13010) provides standard light source per ASTM specifications.

For petroleum waxes, the Saybolt Wax Chromometer is equipped with heaters to keep waxes that are not fluid at ambient temperature molten during testing. Sample tube has a 200W chrome steel strip heater and a hinged cover to maintain even heat distribution. An aluminum block heater with 50W cartridge element keeps wax molten in the draincock assembly. Accessory variable transformer may be used to regulate the sample temperature. Optical viewer and stand are fully insulated from the heaters. Sample tube assembly has heat resistant fiber handles.

Specifications

Conforms to the specifications of:
ASTM D156; DIN 51411; FTM 791-101; NF M 07-003
Electrical Requirements: CE
115V 60Hz
220-240V 50/60Hz

Included Accessories

Whole Color Standards (3)
Half Color Standard (1)
Engraved Conversion Chart

Dimensions lxwxh,in.(cm)

5½x5½x26½ (14x14x67)
Net Weight: 15½ lbs (7kg)

Shipping Information

Shipping Weight: 31 lbs (14.1kg)
Dimensions: 4.0 Cu. ft.
Includes accessory lamp

Ordering Information

Catalog No.		
K13009	Saybolt Chromometer	1
K13100	Saybolt Wax Chromometer, 115V 60Hz	1
K13190	Saybolt Wax Chromometer, 220-240V 50/60Hz	
	Accessories	
K13010	Daylight Lamp Meets ASTM D156 and related test specifications for illumination of Saybolt Chromometers. Adjustable for correct positioning. Standard 60W bulb not included.	1
K13020	Whole Color Standard	
K13029	Half Color Standard	
K13032	Matched Set of Tubes with Turret Assembly for K13009 Saybolt Chromometer	
K13033	Matched Set of Tubes with Turret and Draincock Assembly for K13100/K13190 Saybolt Wax Chromometer	
279-115-005	Frosted Bulb, 60W, 115V	1
279-230-002	Frosted Bulb, 60W, 220-240V	

ASTM Color of Petroleum Products

Test Method

The ASTM color of petroleum products applies to products having an ASTM color of 0.5 or darker, including lubricating oils, heating oils and diesel fuel oils. (For products having an ASTM color lighter than 0.5, use the Saybolt Chromometer.) To determine ASTM color, the sample is compared against standard color discs in the Petroleum Colorimeter.

Petroleum Colorimeter

- Conforms to ASTM D1500 specifications

Single scale, 3-field petroleum comparator designed for visual color grading by direct comparison between the sample and colored glass filters housed in test discs conforming to the chromaticity coordinates of ASTM D1500. The sample and two consecutive glasses on the color scale are viewed simultaneously, making it easier to achieve the optimum color match. For rapid color grading within predetermined color limits, the glass standards can be set to the two limiting colors so that it is easy to check that the sample is within tolerance. The tungsten halogen light source is color corrected to CIE Standard Illuminant C, giving constant lighting conditions for color grading, regardless of ambient lighting. A prism brings the three fields together to aid color grading.

Specifications

Conforms to the specifications of:
ASTM D1500, D6074; IP 196; ISO 2049; FTM 791-102
Electrical Requirements: CE
115V 60Hz
220-240V 50/60Hz

Included Accessories

Glass Color Discs (2) Sample Container (3) Calibration Certificate

Dimensions dxwxh,in.(cm)

10.5x9x5 (25x27x18)
Net Weight: 3.5 lbs (1.6kg)

Shipping Information

Shipping Weight: 5.5 lbs (2.5kg)
Dimensions: 2.5 Cu. ft.

K13200 Petroleum Colorimeter with K13210 Sample Containers (3 Included)

Ordering Information

Catalog No.		Order Qty
K13200	Petroleum Colorimeter, 115V 60Hz	1
K13290	Petroleum Colorimeter, 220-240V 50/60Hz	
	Accessories	
K13210	Sample Container	
K13223	Replacement Tungsten Halogen Lamp, 12V 20W	

Visual Examination of Used Electrical Insulating Oils

Visual Examination of Used Electrical Insulating Oils of Petroleum Origin in the Field

Test Method

Provides an estimate of the color and condition of in-service oils by visual observation and comparison with ASTM color standards in an oil comparator.

Oil Comparator

- Conforms to ASTM D1524 specifications
- Yields results equivalent to ASTM D1500

Complete ASTM oil color test outfit for comparison of oils against ASTM color standards. Includes two color discs, ranging from 0.5 to 5.0 in 10 steps and 5.0 to 8.0 in 7 steps. Magnifying prism brings the sample and standard color fields together for side by side comparison. Portable unit is suitable for laboratory or field use. Supplied with two precision 33mm rectangular glass cells, carrying case and instructions.

Shipping Information

Shipping Weight: 10 lbs (4.5kg)
Dimensions: 1 Cu. ft.

Ordering Information

Catalog No.		Order Qty
K13203	Oil Comparator	1
	Accessories	
K13204	Daylight Illuminator, 115V Provides uniform lighting for Oil Comparator	1
K13294	Daylight Illuminator, 220-240V	
K13205	Rectangular Glass Cell	

Portable Automated Colorimeter

K13260 Portable Automatic Colorimeter with
K13351 Cylindrical Cuvette and K13353 Rectangular Cuvettes (Both Sold Separately)

Portable Automated Colorimeter

- Conforms to ASTM D156, D1544, D1209, DIN 6162, and related international test specifications
- Measures the 4 most important color scales used for liquid chemicals, resins, oils, fuels, and fats for liquid color measurement
- Portable design for remote applications

Single-beam filter colorimeter system utilizes reference beam path technology to measure samples over eight spectral wavelengths ranged between 400 and 700nm in comparison to 4 standard color scales. Provides photometric high precision color measurements that are objective, accurate, and consistent over a wide variety of samples required for quality control programs. Measurements are initiated by just a single key press and require less than one minute to complete. The test results can be either displayed on the LCD screen or sent to an external printer. Please contact Koehler Customer Support for assistance on additional accessories required for your application.

Color Ranges

- Saybolt Color (ASTM D156, NF M 07-003)
- Iodine Color (DIN 6162)
- Hazen Color, APHA Color, Pt/Co Color (ASTM D1209, ISO 6271)
- Gardner Color (ASTM D1544, ISO 4630)

Specifications

Conforms to the specifications of:
ASTM D156, D1209, D1544, D6045; ISO 4630, 6271; DIN 6162; NF M 07-003; NF T 60-104; JIS K2580
Reproducibility: ±0.2% T (referenced to distilled water)
Reference Standard: distilled water
Data Output: RS232/printer
Light Source: krypton lamp

Dimensions lxwxh,in.(cm)

7.9x10x3.5 (20x26x90)
Net Weight: 2.9 lbs (1.3kg)

Shipping Information

Shipping Weight: 10 lbs (4.5kg)

Electrical Requirements

115-240V 50/60Hz CE

Ordering Information	
Catalog No.	
K13260	Portable Automatic Colorimeter
	Accessories
K13551	Starter Kit – Consists of Addista Color Standards; 50 x 10 Rectangular Cuvettes, Pk/10; Cuvette Set, 10 x 11mm round glass cuvettes
K13550-1	Thermal Printer with USB Connection

Automated Colorimeter for Saybolt and ASTM Color

K13150 Automated Colorimeter

Saybolt and Mineral Oil Colorimeter

- Conforms to ASTM D156, D1500, D6045, and related test specifications
- Designed for color measurement of waxes and other petroleum products

High precision spectrophotometer for objective color analysis of petroleum fuels, oils, waxes and petrochemicals according to the Saybolt and ASTM Color scales. Test results can also be displayed in terms of CIE values and spectral data. The colorimeter is rugged with a fabricated steel housing which is designed to function equally as a QC instrument within the laboratory or on 24 hour operation in a production environment. A diagnostic test routine allows users to conduct periodic checks on the instrument or to identify faults. Direct access of the precision filament lamp from outside the instrument allows for easy replacement. The colorimeter is also supplied with a colored glass filter of known Saybolt value for regular conformance testing. Equipped with integrated heater unit for melting solid samples such as fats and waxes and preventing from solidification within the cell during testing.

Specifications

Conforms to the specifications of:
ASTM D156, D1500, D6045, E 308; JIS K2580; ISO 2049; NF M 07-003
Reproducibility: ±0.25% T, ±1 Saybolt value
Spectral Range: 410-710 nm
Data Output: RS232/printer
Light Source: tungsten halogen lamp
Illuminant: CIE Illuminant C
Observer: 2°

Electrical Requirements

115-240V 50/60Hz CE

Dimensions lxwxh,in.(cm)

7.7x20.3x6.7 (19.5x51.5x17)
Net Weight: 17 lbs (7.75kg)

Shipping Information

Shipping Weight: 23 lbs (10.5kg)

Ordering Information	
Catalog No.	
K13150	Automatic Saybolt and ASTM Colorimeter, 115-240V 50/60 Hz

Automated Colorimeter

- Touch-screen TFT-Color Display
- Automatic cuvette recognition
- Data log for 500 color values, 50 color reference values, 500 photometric readings, 20 wavelength scans, 20 time scans
- Automatic zero calibration program
- Reference Beam Technology
- Password protection, GLP documentation
- USB-Ports: 1 x Type A and 1 x Type B

High performance, microprocessor controlled spectrophotometer with a wavelength range from 380 to 720 nm for color measurement or 320 nm up to 1100 nm for routine analysis. The K13550 can carry out an exact colorimetric evaluation in conformity with several ISO/ASTM standards with just a single measurement and display the result in terms of traditional color systems such as Iodine, Hazen/APHA or Gardner color numbers as well as in modern CIE-L*a*b* color values. Besides the over 20 color indexes, transmittance and absorbance can be measured at individual wavelengths, so that the K13550 can be used universally for analytical purposes in the laboratory.

Color measurement methods:

- Iodine, Hazen, APHA, Pt/Co, Gardner-Color
- Saybolt, Klett-color
- Hess-Ives, ADMI, Yellowness-index
- AOCS-Red/Yellow, Chlorophyll A
- CIE-Lab, Hunter-Lab, XYZ
- European and US Pharmacopoeia

Photometer methods:

- Wavelength Scan 320-1100nm incl. Difference Mode
- Time Course Mode
- Single and Multi Wavelength Mode

Ordering Information

Catalog No.

K13550	Automatic Colorimeter 115-240V, 50/60 Hz

Accessories

K13551	Starter Kit Consists of Addista Color Standards; 50 x 10 Rectangular Cuvettes, Pk/10; Cuvette Set, 10 x 11mm round glass cuvettes
K13552	USB-Barcode Scanner (hand-held scanner)
K13553	Test filter set for stray light, absorbance and wavelength check
K13554	USB-Keyboard (keyboard layout: US)
K13253	Certified Testing solution set “Addista-Color”
K13351	Round cuvettes 11mm, glass, disposable, pk/500
K13353	Rectangular cuvette 50 x 10mm, plastic, disposable, pk/50
K13349	Rectangular cuvette 50 x 10mm with caps, plastic, disposable, pk/10
K13250-1	Rectangular cuvette 50 x 10, glass, pk/1
K13500-3	Rectangular cuvette 10 x 10, glass, pk/3
K13550-1	Printer for K13550
K13356	Rack for 7 50x10 cuvettes

Please use the K13250-1 Rectangular cuvette 50 x 10, glass, pk/1 or K13500-3 Rectangular cuvette 10 x 10, glass, pk/3 when testing hydrocarbons for color measurements. The disposable polycarbonate cuvettes are made for aqueous samples. Please ask you Koehler Sales Representative for details.

K13550 Automatic Colorimeter with K13351 Cylindrical Cuvettes and K13353 Rectangular Cuvette (Both Sold Separately)

Included Accessories:

- Universal power supply 100-240V, 50-60 Hz, with exchangeable plug adapters for EU, GB, US, China
- Dust Cover
- User Manual

Specifications

Conforms to the specifications of:
ASTM D156, D1209, D1544, D1925, D5386, D6045, D6166; ISO 4630, 6271; DIN 5033, 6162, 6174; AOCS Cc 13e; USP Ch 631, 1061; Ph EUR; NF M 07-003; NF T 60-104
Spectral Bandwidth: 5 nm
Wavelength Reproducibility: 0.1nm
Wavelength Resolution: 1nm
Scanning Speed: 12 nm/s (in steps of 1 nm)
Stray Light: < 0.1% T at 340 nm with NaNO2
Color Measurement: 380-720nm in steps of 10nm
Wavelength Range: 320-1100nm in steps of 1nm
Wavelength Accuracy: +/- 1.5 nm (wavelength range 340-900 nm)
Photometric Measuring Range: +/- 3.5 Abs (wavelength range 340-900 nm)
Photometric Accuracy: 5 m Abs at 0.0 to 0.5 Abs
1% at 0.50 to 2.0 Abs
Photometric linearity: < 0.5% to 2 Abs
1% at > 2 Abs with neutral glass at 546 nm
Light Source: Gas-filled Tungsten (visible)

Dimensions lxwxh,in.(cm)

14.5 x 14.1 x 5.7 (36.8 x 35.9 x 14.4)
Net Weight: 14.11 lbs (6.4 kg)

Shipping Information

Shipping Weight: 18 lbs (8.2 kg)
Dimensions:20x16x16in.

Electrical Requirements

115-240V, 50/60 Hz CE

Koehler INSTRUMENT COMPANY, INC.

Density, Relative Density (Specific Gravity), or API Gravity

Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method

ASTM Hydrometers

For density, relative density (specific gravity) or API gravity determination of crude petroleum, liquid petroleum products and mixtures of petroleum and non-petroleum products. For density of LPG and light hydrocarbons refer to page 103.

Specifications

Conforming to the specifications of: ASTM E100

Applicable Test Method Standards:

ASTM D287, D1298, D6074, D6158;
API MPMS Chapter 9.1; IP 160; ISO 3675; DIN 51757

API Gravity Hydrometers

Standard temperature 60°F, subdivisions 0.1° API, length 330mm

Catalog No.	ASTM Hydrometer No.	Nominal API Gravity Range, deg.
251-000-01H	1H	–1 to +11
251-000-02H	2H	9 to 21
251-000-03H	3H	19 to 31
251-000-04H	4H	29 to 41
251-000-05H	5H	39 to 51
251-000-06H	6H	49 to 61
251-000-07H	7H	59 to 71
251-000-08H	8H	69 to 81
251-000-09H	9H	79 to 91
251-000-10H	10H	89 to 101

Specific Gravity Hydrometers

Standard temperature 60/60°F, subdivisions 0.0005, length 330mm

Catalog No.	ASTM Hydrometer No.	Nominal Specific Gravity Range
251-000-82H	82H	0.650 to 0.700
251-000-83H	83H	0.700 to 0.750
251-000-84H	84H	0.750 to 0.800
251-000-85H	85H	0.800 to 0.850
251-000-86H	86H	0.850 to 0.900
251-000-87H	87H	0.900 to 0.950
251-000-88H	88H	0.950 to 1.000
251-000-89H	89H	1.000 to 1.050
251-000-90H	90H	1.050 to 1.100

Calibrated hydrometers and thermohydrometers are available from Koehler with an ISO/IEC 17025 and ANSI/NCSL Z-540-1 Report of Calibration.

When inquiring about calibrated hydrometers and thermohydrometers, please refer to the catalog number for the corresponding hydrometer/ thermohydrometer and replace the middle three zeros in the catalog number with 004. Example: 251-000-01H API Gravity Hydrometer would be 251-004-01H Certified API Gravity Hydrometer.

API Gravity Hydrometers

Standard temperature 60°F, subdivisions, 0.1° API, length 330mm

Catalog No.	ASTM Hydrometer No.	Nominal API Gravity Range, deg.
251-000-21H	21H	0 to 6
251-000-22H	22H	5 to 11
251-000-23H	23H	10 to 16
251-000-24H	24H	15 to 21
251-000-25H	25H	20 to 26
251-000-26H	26H	25 to 31
251-000-27H	27H	30 to 36
251-000-28H	28H	35 to 41
251-000-29H	29H	40 to 46
251-000-30H	30H	45 to 51
251-000-31H	31H	50 to 56
251-000-32H	32H	55 to 61
251-000-33H	33H	60 to 66
251-000-34H	34H	65 to 71
251-000-35H	35H	70 to 76
251-000-36H	36H	75 to 81
251-000-37H	37H	80 to 86
251-000-38H	38H	85 to 91
251-000-39H	39H	90 to 96
251-000-40H	40H	95 to 101

API Gravity Thermohydrometers - Thermometer in Body

Standard temperature 60°F, subdivisions 0.1° API, length 380mm, thermometer scale °F 0-150 (designation L), 30 to 180 (designation M), 60 to 220 (designation H)

Catalog No.	ASTM Thermohydrometer No.	Nominal API Gravity Range, deg.
251-000-51HH	51HH	–1 to 11
251-000-51HL	51HL	–1 to 11
251-000-52HH	52HH	9 to 21
251-000-52HL	52HL	9 to 21
251-000-53HM	53HM	19 to 31
251-000-53HL	53HL	19 to 31
251-000-54HM	54HM	29 to 41
251-000-54HL	54HL	29 to 41
251-000-55HL	55HL	39 to 51
251-000-56HL	56HL	49 to 61
251-000-57HL	57HL	59 to 71
251-000-58HL	58HL	69 to 81
251-000-59HL	59HL	79 to 91
251-000-60HL	60HL	89 to 101

API Gravity Thermohydrometers - Thermometer in Stem

Standard temperature 60°F, subdivisions 0.1° API, length 380mm, temperature scale °F 30-220

Catalog No.	ASTM Thermohydrometer No.	Nominal API Gravity Range, deg.
251-000-71H	71H	–1 to 11
251-000-72H	72H	9 to 21
251-000-73H	73H	19 to 31
251-000-74H	74H	29 to 41

Density, Relative Density (Specific Gravity), or API Gravity

Specific Gravity Hydrometers

Standard temperature 60/60°F, subdivisions 0.001 length 260mm

Catalog No.	ASTM Hydrometer No.	Nominal Specific Gravity Range
251-000-102H	102H	0.650 to 0.700
251-000-103H	103H	0.700 to 0.750
251-000-104H	104H	0.750 to 0.800
251-000-105H	105H	0.800 to 0.850
251-000-106H	106H	0.850 to 0.900
251-000-107H	107H	0.900 to 0.950
251-000-108H	108H	0.950 to 1.000
251-000-125H	125H	1.000 to 1.050
251-000-126H	126H	1.050 to 1.100
251-000-127H	127H	1.100 to 1.150
251-000-128H	128H	1.150 to 1.200
251-000-129H	129H	1.200 to 1.250
251-000-130H	130H	1.250 to 1.300
251-000-131H	131H	1.300 to 1.350
251-000-132H	132H	1.350 to 1.400
251-000-133H	133H	1.400 to 1.450
251-000-134H	134H	1.450 to 1.500
251-000-135H	135H	1.500 to 1.550
251-000-136H	136H	1.550 to 1.600
251-000-137H	137H	1.600 to 1.650
251-000-138H	138H	1.650 to 1.700
251-000-139H	139H	1.700 to 1.750
251-000-140H	140H	1.750 to 1.800
251-000-141H	141H	1.800 to 1.850

ASTM Metric Thermohydrometers

Standard temperature 15°C, subdivisions 0.5kg/m^3, length 380mm, thermometer scale °C: –20 to +65 (designation L), 0 to 85 (designation M), 20 to 105 (designation H).

Catalog No.	ASTM Thermohydrometer No.	Density, Range kg/m^3
251-000-300HL	300HL	600 to 650
251-000-301HL	301HL	650 to 700
251-000-302HL	302HL	700 to 750
251-000-302HM	302HM	700 to 750
251-000-303HL	303HL	750 to 800
251-000-303HM	303HM	750 to 800
251-000-304HL	304HL	800 to 850
251-000-304HM	304HM	800 to 850
251-000-305HL	305HL	850 to 900
251-000-305HM	305HM	850 to 900
251-000-306HL	306HL	900 to 950
251-000-306HM	306HM	900 to 950
251-000-307HL	307HL	950 to 1000
251-000-307HH	307HH	950 to 1000
251-000-308HH	308HH	1000 to 1050
251-000-308HL	308HL	1000 to 1050
251-000-309HH	309HH	1050 to 1100
251-000-309HL	309HL	1050 to 1100

Hydrometer Cylinders*

- Wide base for maximum stability
- Convenient pour-out lip
- Choice of glass or metal construction

K26300 Brass Hydrometer Cylinder

Ordering Information

Catalog No.	Construction	Dimensions dia.xh.
K26300	Brass	2½x12" (64x305mm)
K26390	Brass	2x15" (51x381mm)
332-002-011	Glass	2x15½" (51x394mm)

**Not suitable for use with K26400 series baths*

Calibrated hydrometers and thermohydrometers are available from Koehler with an ISO/IEC 17025 and ANSI/NCSL Z-540-1 Report of Calibration.

When inquiring about calibrated hydrometers and thermohydrometers, please refer to the catalog number for the corresponding hydrometer/thermohydrometer and replace the middle three zeros in the catalog number with 004. Example: 251-000-01H API Gravity Hydrometer would be 251-004-01H Certified API Gravity Hydrometer.

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Density, Relative Density (Specific Gravity), or API Gravity

Constant Temperature Hydrometer Bath

- Holds 12 hydrometer cylinders
- Can be used for Reid Vapor Pressure immersion type cylinders
- Conforms to ASTM D323, D1298, D6074, D6158 and related specifications

A versatile constant temperature bath designed for density/gravity determinations of petroleum products at temperatures of up to 195°F (90°C), and also for Reid Vapor Pressure determinations using immersion bombs. Microprocessor PID control provides quick temperature stabilization without overshoot and the unit is protected by an overtemperature control circuit that interrupts power should bath temperature exceed a programmed cut-off point. Dual LED displays provide actual and setpoint temperature values in °C/°F. *Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. Contact your Koehler representative for information.*

Also available–Special bath to accommodate both ASTM D323 (Vapor Pressure of Petroleum Products–Reid Method listed on page 93) and D942 (Oxidation Stability of Lubricating Greases by the Oxygen Bomb Method listed on pages 152-153), as well as D525 (Oxidation Stability of Gasoline–Induction Method listed on pages 81-82). Please contact a Koehler Customer Service representative for additional information.

Dimensions lxwxh,in.(cm)
30x14x28 (76x36x71)
Net Weight: 64 Lbs (29.0kg)

Shipping Information
Shipping Weight: 118 lbs (53.5kg)
Dimensions: 11.4 Cu. ft.

Specifications

Capacity: twelve (12) hydrometer cylinders (without base)
or Reid Vapor Pressure one-opening type bombs
Temperature Range: ambient to 250°F (121°C)
Temperature Control Stability: ±0.2°F (±0.17°C)
Heater Range: 0-2500W
Bath Medium: 19 gal (71.9L) water
Electrical Requirements: CE
115V 60Hz, Single Phase, 22A
230V 50/60Hz, Single Phase, 11A

Ordering Information

Catalog No.		Order Qty
K26400	Constant Temperature Hydrometer Bath, 115V 60Hz	1
K26490	Constant Temperature Hydrometer Bath, 230V 50/60Hz	

Accessories

K26410	Hydrometer Cylinder Borosilicate glass, 15½"lx2"dia. with 2½" lip	12
250-000-61F	ASTM 61F Thermometer Range: 90 to 260°F	1
250-000-61C	ASTM 61C Thermometer Range: 32 to 127°C	

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Density, Relative Density (Specific Gravity), or API Gravity

Constant Temperature Hydrometer Bath

- Accommodates one standard 2"x15" (51x380mm) hydrometer cylinder with base
- Compact design saves space

Thermostatically controlled water bath with 500W copper immersion heater and hydraulic thermoregulator for operation at temperatures of up to 210 ±2°F (99±1°C). Holds one 2"x15" (51x381mm) hydrometer jar — top of jar extends 1½" (38mm) above the top of the bath for easy viewing of the hydrometer. Insulated double-wall construction with stainless steel tank and shelf and finished steel exterior. Has variable speed control for magnetic stirrer, temperature control dial, and on/off switches for motor and power.

Specifications

Temperature Range: Ambient to 210°F (99°C)
Temperature Control Stability: ±2°F (±1°C)
Bath Medium: 2 gal (7.57L) water
Electrical Requirements: CE
115V 60Hz, Single Phase, 4.3A
230V 50/60Hz, Single Phase, 2.2A

Dimensions dia.xh.(cm)
Bath Interior: 6x16½ (15x42)
Overall: 9x22 (23x56)
Net Weight: 20 lbs (9.1kg)

Shipping Information
Shipping Weight: 35 lbs (15.9kg)
Dimensions: 5 Cu. ft.

Ordering Information

Catalog No.	
K26200	Constant Temperature Hydrometer Bath, 115V 60Hz
K26290	Constant Temperature Hydrometer Bath, 230V 50/60Hz

K26200 Hydrometer Bath

Coulometric Karl Fischer Titrator

Test Method

Determines low concentrations of water in a wide range of liquid, gas and powder samples. Used for assessing water content in petroleum and petrochemical products including oils, gasolines, solvents, and fluids as well as other products such as pharmaceuticals and cosmetics.

Coulometric Karl Fischer Titrator

- ASTM D 1533, D4928, D6304, IP 386, IP 438, API MPMS Chap. 10.9, BS 60814, ISO 10101-3, ISO 10337, ISO 12937
- Simple operation
- Multi-language display and print out
- Integral high-speed thermal printer
- Small footprint
- Automatic Compensation of Errors

The AKF5000 offers new standards in versatility and ease of operation. Providing fast, accurate and reproducible determinations of water content in liquids, gases and powders. This easy to use titrator incorporates many state-of-the-art features. Designed to be equally suitable for meeting the routine needs of the Quality Control laboratory or the more demanding and varied requirements of research applications. Hard copies of results are provided by the built in high-speed thermal printer, along with statistics, data input parameters, sample ID numbers and time/date of analysis.

Ordering Information

Catalog No.	
K90365	AKF5000 Compact Coulometric Karl Fischer Titrator, 115-240V 50/60Hz

Included Accessories

Glassware pack comprising twin port titration vessel, detector electrode, generator electrode, dessicant tube, molecular seive, stirrer bar, injection septa, funnel & 1ml glass syringe with luer needle.

Accessories

K90365-7	Gas Analysis Kit (Comprised of gas inlet, gas outlet, seal ring & cap)
K90365-8	Carry Case
K90365-20	Formula Reagent Kit (Pack of 8 x 100ml anode reagent, 8 x 5ml cathode reagent)
K90365-35	Water Standard, 0.1 mg/ml, 5ml, pk/10
K90365-36	Water Standard, 1.0 mg/ml, 5ml, pk/10

Specifications and Features

Titration method: Coulometric Karl Fischer titration
End point detection: AC polarisation
End point indication: Visual display/print out/acoustic beep
Display: 40 character alphanumeric backlit LCD
Measuring range (possible): 1µg – 100mg water
Measuring range (typical): 1µg – 10mg water
Moisture range: 1 ppm – 100%
Max. sensitivity: 0.1 µg
Max. titration speed: 2.0 mg per minute
Max. current: 400 ma
Drift compensation: Automatically controlled
Start delay time: 0 - 30 minutes, user selectable
End delay time: 0 - 30 minutes, user selectable
Power supply: 90-264VAC, 47-63Hz Universal input CE
Precision: 10-100µg ±3µg, 100µg-1mg ±5µg, above 1mg ±0.5%
Calculation modes: Weight/weight, user programmable
Weight/dilution ratio, user programmable
Volume/density, user programmable
Volume/volume, user programmable
Display format: µg, mg/kg, ppm, %
Print format: µg, mg/kg, ppm, %
Statistics: max, mean, min values upto 99 runs
Method storage: 10 user programmable methods
Sample ID number: user programmable
Printer: 42 character high-speed thermal printer
Stirrer speed: Microprocessor controlled
Dimensions: 250 x 245 x 120 mm
Weight: 3 kg
Language: English, Francais, Espanol, Portugues, Deutsch and Magyar
Calendar/clock: Analysis time and date print out

Automatic Flocculation Titrimeter

Test Method

Samples of asphalt or heavy oil, or residuum are dissolved in toluene at various concentrations and titrated with iso-octane or n-heptane at controlled temperatures to determine the point of flocculation (asphaltene precipitation) and calculate the Heithaus compatibility parameters. These results are intended primarily as a laboratory diagnostic tool for estimating the colloidal stability or compatibility of asphalt, asphalt cross blends, aged asphalt, pyrolyzed asphalt, crudes, and heavy oil (residuum). The stability values will allow the refiner to increase yields by allowing longer retention time in process. The compatibility values will allow blending of crudes so as to prevent asphaltene formation during blending and storage. Both of these parameters are of utmost importance when we consider the price of crude in today's market.

Automated Flocculation Titrimeter

- Complete instrument and data acquisition system
- Rapid, accurate and highly reproducible
- Determines blending insolubility and solubility numbers
- Generates the data to calculate the WRI Coking Index (patent pending) to predict the proximity to coke formation during heavy oil distillation and improve distillate yield

The Automated Flocculation Titrimeter (AFT) is a highly automated, computerized instrument that acquires oil stability and compatibility parameters directly. The AFT can be used to perform ASTM D6703 test method for Automated Heithaus Titrimetry. The instrument operates as a closed system with accurately controlled temperatures between 20-100°C, important for properly determining Heithaus compatibility parameters. The flocculation point is determined spectroscopically and the results are analyzed by the data acquisition system, virtually eliminating operator error in the interpretation of endpoints. A key benefit to the user is the fact that the asphaltene concentration can be calculated by the software much faster that tradition methods and with more accuracy. The utility of the original Heithaus method has been expanded by developing multiple titration schemes. The software uses the data from the expanded method to predict the proximity to coke formation during heavy oil distillation. Many refiners stop distillation short of coke formation to avoid fouling in distillation equipment, tanks and transfer lines. The expanded AFT methodology allows the refiner to recover additional distillate without the fear of fouling. This attribute of the instrument should allow up to a 1-2% increase in yields if applied to a process. Conversely, the added benefit of being able to predict coking tendency, would prevent fouling of the process and thus decrease the use of energy in production as well as reduce down time due to having to clean vessels after fouling.

One of the primary uses of Heithaus values is to predict the compatibility (P Index) of which oils and petroleum residua or asphalts can be mixed together for shipping, processing, or in formulations without causing phase separation. This is valuable to the refiner, researcher, or asphalt jobber who supplies petroleum asphalts for highway and roofing applications because it ensures that compatible asphalt blends are supplied. Incompatible asphalts show early failure in both applications.

Coking Index (US Patent 6,773,921)-Stability also influences coke formation in the refining process. Another major use for the AFT is to acquire the data needed to employ the Coking Index. The Coking Index is a quantitative measure of the proximity to coking (fouling) during visbreaking, distillation, transfer and storage of heavy oil. This allows the petroleum refiner to optimize heavy oil processing and to recover the maximum amount of distillate, and to stop the processing before fouling occurs.

Solubility Parameter-The solubility parameter at which asphaltenes begin to precipitate and the solubility parameter of the whole oil can be calculated from the AFT data.

K47100 Automated Flocculation Titrimeter

Specifications

Conforms to the specifications of:
ASTM D6703
Temperature Range: 20 to 100°C
Electrical Requirements: CE
115V 60Hz
220-240V 50/60Hz

Included Accessories

External Desktop PC with Data Acquisition Software
Fiber Optic Spectrometer with Multi-Bandpass Detector
High and Low Flow Rate Metering Pumps
Magnetic Stirring Plates
Programmable Circulator with External Probe to Monitor Jacket Temperature of the Sample
Reaction Vessels
Quartz Flow Cell with Temperature Stability Feature
Glassware
Thermometer Probes
Digital Variable Sample Circulator with Built in Reverse

Shipping Information

Shipping Weight: 40 lbs (18.1kg)
Dimensions: 11 Cu. ft.

Dimensions lxwxh,in.(cm)

Base/Support Assembly: 12x24x36 (30.5x61x91.4)

Ordering Information

Catalog No.	
K47100	Automated Flocculation Titrimeter, 115V 60Hz
K47190	Automated Flocculation Titrimeter, 230V 50/60Hz

In collaboration with Western Research Institute

Distillation of Petroleum Products at Reduced Pressure

Test Method

Determines the range of boiling points for petroleum products that can be partially or completely vaporized at a maximum liquid temperature of 400°C at reduced pressures. The sample is distilled at a controlled, reduced pressure under conditions that are designed to provide approximately one theoretical plate fractionation. Initial and final boiling point is measured and a distillation curve relating volume percent distilled and the atmospheric equivalent boiling point temperature can be prepared.

VDS3000 Manual Vacuum Distillation System

- Conforms to ASTM D1160 and related specifications
- Comes standard with glassware set and accessories kit for "Turn-Key" set up and operation
- Sturdy cabinet composed of aluminum frame and cold rolled steel walls
- Control Unit can easily attach and detach from the main unit offering versatility for laboratory workspace
- Clear protective door provides added safety while allowing the operator full view of the system during testing
- Equipped with digital temperature and vacuum displays for improved measurement reading and accuracy
- Upgrade to glassware set composed entirely of quartz available upon request

The Koehler VDS3000 Manual Vacuum Distillation System is the latest design for determining, at reduced pressures, the range of boiling points for petroleum products according to ASTM D1160 and related specifications. The main body of the system or cabinet is composed of an aluminum frame and cold rolled steel walls. The base of the cabinet houses a 5 Liter Stainless Steel Surge Tank to reduce pressure fluctuations during testing. The control unit of the system features a versatile, compact, modern design. Dual temperature displays independently show both the overhead and flask temperature of the system. Built in cooling fan rapidly cools the distilling flask allowing the user to handle glassware and shorten turnaround time in between test runs. Equipped with complete glassware set and accessories kit for "Turn-Key" installation and operation of the Vacuum Distillation System.

The Standard Glassware Set consists of 500mL quartz distilling flask with thermowell, vacuum jacketed distilling column and condenser assembly, water jacketed receiving cylinder, 90° elbow adapter tube, Dewar-Type Cold Trap with 10mL graduated receiver and stopcock drain, PT100 probe adapter, PT100 vapor temperature probe and PT100 flask temperature probe. The system also includes an adjustable scissor jack, heating mantle, retaining springs, ball joint clamps, connection tubing, hose clamps, quick connect adapters and fittings for easy connection of jacketed glassware and tubing and vacuum grease.

Specifications

Conforms to the specifications of:
ASTM D1160; ISO 6616; JIS K2254
Temperature Range: Ambient to 425°C (797°F)
Temperature Display: 0.1°C resolution
Temperature Accuracy: ±0.5°C
Vacuum Range: 0.1 Torr to Atmospheric Pressure (760 Torr)
Vacuum Display: 0.1 Torr resolution
Vacuum Accuracy: ± 0.2 Torr
External Circulator Temperature Range: Ambient +5°C to 150°C
Electrical Requirements: CE
115V 60Hz
220-240V 50/60Hz

K80300 VDS3000 Vacuum Distillation System

Vacuum Pump and Refrigerated Constant Temperature Circulation Bath are not included with the VDS3000 System but are available from Koehler Instrument Company, Inc. Please refer to Recommended Accessories in the Ordering Information Section for details. Side shelf for housing the Vacuum Pump and Circulation bath is also available upon request.

Shipping Information

Shipping Weight: 120 lbs
Dimensions: 15 Cu.ft.

Dimensions wxdxh,in.(cm)

Cabinet: 29½x 9¼ x 32½ (75 x 23.5 x 82.6)
Control Box: 7¾ x 9¼ x 9¾ (19.7 x 23.5 24.7)
Net Weight:
Cabinet: 62 lbs (28.2 kg)
Control Box: 21 lbs (9.6 kg)

Ordering Information

Catalog No.		Order Qty
K80300	VDS3000 Manual Vacuum Distillation System 115V 60Hz	1
K80390	VDS3000 Manual Vacuum Distillation System 220-240V 50/60Hz	
	Accessories	
K80320	VDS Vacuum Pump with Kit Consists of Vacuum Pump, Hose Nozzle, Centering O-Ring, Hinged Clamp, Outlet Filter, Filter O-Ring, Filter Clamp, 1 Liter Vacuum Oil, Connection Tubing, Hose Clamp (2)	1
K33062	Standard Constant Temperature Circulation Bath, 115V 60Hz	
K33063	Standard Constant Temperature Circulation Bath, 220-240V 50/60Hz	

Koehler INSTRUMENT COMPANY, INC.

Automatic and Semi-Automatic Vacuum Distillation of Petroleum Products

Test Method

Determines the range of boiling points for petroleum products that can be partially or completely vaporized at a maximum liquid temperature of 400°C at reduced pressures. The sample is distilled at a controlled, reduced pressure under conditions that are designed to provide approximately one theoretical plate fractionation. Initial and final boiling point is measured and a distillation curve relating volume percent distilled and the atmospheric equivalent boiling point temperature can be prepared.

Automatic Vacuum Distillation System

- Fully Automatic Operation
- Simple to Operate and Maintain
- Vacuum Step Down Inhibits Foaming
- Easy Access to all Components
- Safety Shields & Doors Protect Operator
- Turn Key System
- High Precision and Accuracy
- Automatic Cleaning Cycle
- Receiver is Easy to Remove
- PC Control

The Automatic Vacuum Distillation System is designed to make vacuum distillation easy, safe and affordable. The self contained unit is controlled by a standard PC. Fully automatic function minimizes the amount of operator time needed for the test.

The latest Windows® operating system is included along with a state of the art PC. The Windows®-based software is intuitive and guides you through the distillation step by step. All data is saved to the hard drive in standard format that can be easily opened by spread sheets or exported to LIMS. Files can be accessed through portable USB drives, Ethernet connection or written to a CD/DVD. A color printer is provided to print hard copies of the reports. Process diagrams clearly show the current equipment status. Results can be viewed as the distillation proceeds in both tables and graphs. Distillation parameters can be modified at any time during the distillation.

Semi-Automatic Vacuum Distillation System

- Automatic Vacuum Control
- Automatic Heat Control
- Vapor Temperature Display
- Pot Temperature Display
- Automatic shutdown for high pot or vapor temperature

The Semi-Automatic Vacuum Distillation System features standard ASTM D1160 glassware enhanced with microprocessor control. The vacuum level, bath temperature and heating rates are programmable with up to 50 stored programs. Vapor temperature, distilling flask temperature and vacuum level are digitally displayed. Optional PC interface allows the distillation to be controlled from a PC and for data to be stored on the PC.

Specifications

Conforms to the Specifications of:
ASTM D1160; ISO 6616
Distillation Temperature Range:
Ambient to 400°C (752°F)
Condenser Temperature Range:
Ambient +5°C to 150°C
Vacuum Range:
1.00 mmHg to 50 mmHg (0.13 to 6.7 kPa)
Electrical Requirements:
220-240V 50/60Hz

Ordering Information

Catalog No.	
K87170	Automatic Vacuum Distillation System, 220-240V 50/60Hz
K87180	Semi-Automatic Vacuum Distillation System, 220-240V 50/60Hz

Automatic and Semi-Automatic Vacuum Distillation of Crude Oil

Test Method

ASTM D2892 covers the procedure for the distillation of stabilized crude petroleum (see Note 1) to a final cut temperature of 400°C Atmospheric Equivalent Temperature (AET). This test method employs a fractionating column having an efficiency of 14 to 18 theoretical plates operated at a reflux ratio of 5:1.

ASTM D5236 covers the procedure for the distillation of heavy hydrocarbon mixtures having initial boiling points greater than 150°C (300°F), such as heavy crude oils, petroleum distillates, residues, and synthetic mixtures. It employs a potstill with a low pressure drop entrainment separator operated under total takeoff conditions. Distillation conditions and equipment performance criteria are specified and typical apparatus is illustrated.

Automatic Crude Oil Vacuum Distillation System

- Ergonomic Design makes the distillation system easy to use with easy access to all components
- The Windows®-based software is intuitive and guides you through the distillation process in a logical step-by-step fashion

The Automatic Crude Oil Vacuum Distillation System is a fully automatic crude oil distillation system that complies with ASTM D2892 and D5236. The distillation process is automated from beginning to end, minimizing the time needed to operate the equipment. Its fully customizable modular design allows for multiple configurations and easy switching from ASTM D2892 and D5236. Please contact your Koehler representative for required method and corresponding flask size and type.

Semi-Automatic Crude Oil Vacuum Distillation System

- Highly Automated - Minimizes operator time and makes test easier to perform
- Complete System - Includes all equipment needed to perform a distillation

Fully Automatic Functions include Vacuum Control, Fraction Collector, Condenser Bath Temperature, Heat Control of Column Heated Jacket, Shut Down at End of Distillation, Reflux Ratio and AET Vapor Temperature Calculation. Semi-Automatic Functions include Heat Control for Boiling Flask. Manually Controlled Functions include Measurement of Receiver Volume and Creation of Volume vs. Temperature Distillation Curve.

The Semi-Automatic Crude Oil Vacuum Distillation system can come in a wide variety of configurations with single or multiple distillation columns. Please contact your Koehler representative for required test method and configuration.

Test Method

The sample is evaporated and condensed under controlled conditions, and observations are made of the temperatures at which various percentages are recovered and/or the percentages recovered at specified temperatures.

Front View Distillation Apparatus

- Conforms to ASTM D86, E133 and related ASTM and international standards
- Choice of three different models

Front View Distillation Apparatus, Groups 1, 2 and 3–Meets all ASTM and related specifications for distillation of motor and aviation gasolines, aviation turbine fuels, naphthas, kerosenes, distillate fuels, natural gasoline, liquid hydrocarbon mixtures and other petroleum products. Consists of fully insulated stainless steel condenser and heater units. Heater unit includes flask support platform, viewing window, 1250W heater with stepless variable control, and rack and pinion heater elevation mechanism with push-turn control knob. *Please inquire about higher wattage heaters.* White receiving flask background facilitates viewing of fractions during test. Available with right-hand or left-hand heater unit for convenient pairing. Includes graduate support block and flask support boards.

Group 4 Front View Distillation Apparatus–Front View Distillation apparatus designed for testing of Grade No. 2 fuel oil, Grade No. 2-D diesel fuel oil, gas oils and other distillates requiring condenser bath temperatures of up to 140°F (60°C). Also suitable for gasolines, aviation turbine fuels, naphthas, kerosenes and other liquid petroleum products. Similar in features and construction to the standard Front View Distillation Apparatus, but equipped with a 300W copper immersion condenser heater with stepless electronic control. Available with right or left-hand heater unit. *Note: The Group 4 Apparatus can also run distillations for petroleum products categorized as Groups 1, 2 and 3.*

Specifications

Conforms to the specifications of:
ASTM D86, D216, D233, D447, D850, D1078, E133; IP 123, 195; ISO 3405; DIN 51751; FTM 791-1001, 791-1015; NF M 07-002
Electrical Requirements: CE
115V 60Hz
220-240V 50/60Hz

Included Accessories

Flask Support Boards A and C
Graduate Cylinder Support Block

Shipping Information

Shipping Weight: 65 lbs (29.5kg)
Dimensions: 13.3 Cu. ft.

Dimensions lxwxh,in.(cm)

15¼x18¼x19½ (39x46x50)

K45090 Front View Distillation Apparatus

Ordering Information

Catalog No.	
Front View Distillation Apparatus	
K45000	Right-Hand Model, 115V 60Hz
K45100	Left-Hand Model, 115V 60Hz
K45090	Right-Hand Model, 220-240V 50/60Hz
K45190	Left-Hand Model, 220-240V 50/60Hz
Group 4 Front View Distillation Apparatus	
K45200	Right-Hand Model, 115V 60Hz
K45300	Left-Hand Model, 115V 60Hz
K45290	Right-Hand Model, 220-240V 50/60Hz
K45390	Left-Hand Model, 220-240V 50/60Hz

ASTM Distillation Thermometers

Catalog No.	Thermometer	Range
250-000-02C	ASTM 2C Partial Immersion	–5 to +300°C
250-000-07F	ASTM 7F Low Distillation	30 to 580°F
250-000-07C	ASTM 7C Low Distillation	–2 to +300°C
250-000-08F	ASTM 8F High Distillation	30 to 760°F
250-000-08C	ASTM 8C High Distillation	–2 to +400°C
250-000-37C	ASTM 37C Solvents Distillation	–2 to +52°C
250-000-38C	ASTM 38C Solvents Distillation	24 to 78°C
250-000-39C	ASTM 39C Solvents Distillation	48 to 102°C
250-000-40C	ASTM 40C Solvents Distillation	72 to 126°C
250-000-41C	ASTM 41C Solvents Distillation	98 to 152°C
250-000-42C	ASTM 42C Solvents Distillation	95 to 255°C
250-000-102C	ASTM 102C Solvents Distillation	123 to 177°C
250-000-103C	ASTM 103C Solvents Distillation	148 to 202°C
250-000-104C	ASTM 104C Solvents Distillation	173 to 227°C
250-000-105C	ASTM 105C Solvents Distillation	198 to 252°C
250-000-106C	ASTM 106C Solvents Distillation	223 to 277°C
250-000-107C	ASTM 107C Solvents Distillation	248 to 302°C

Accessories

Catalog No.	Type	Capacity, mL
Flasks		
332-003-006	A	100
332-003-001	B	125
332-003-002	C	200
332-003-005	D	250
Graduates		
332-002-013	A	25
332-002-003	B	100
332-002-014	C	200
Flask Support Boards		
K45410	A	1¼" (3.18)
K45420	B	1½"(3.81)
K45430	C	2" (5.1)
K45440	D	2¾"(6.98)
Miscellaneous		
K45540	Receiver Cooling Bath Jar	
334-002-001	Top Silicone Plug, For Type A, B, & D Flasks	pk/10
334-002-002	Side Silicone Plug	pk/10
334-002-003	Top Silicone Plug, For Type C Flask	pk/10

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Koehler INSTRUMENT COMPANY, INC.

Automatic Distillation of Petroleum Products

K45603 Automatic Distillation Analyzer with Optional External PC

Specifications

Conforms to the specifications of:
ASTM D86, D285, D850, D1078, D4737; D189 Section 10; DIN 51751; ISO 3405; IP 123; IP 195; JIS K2254l; NF M 07-002

Electrical Requirements: CE
120V 60Hz 20A
230V 50/60Hz 10A

Temperature

Distillation Range:	0 to 450°C (±0.1°C accuracy)
Condenser:	-5 to 60°C (±0.1°C accuracy); closed loop system
Receiver Chamber:	0 to 60°C (±0.1°C accuracy)

Distillation Parameters:

Distillation Rate:	2 to 15mL/min in 0.1mL increments, user selectable
Receiver Volume:	0 to 100mL (±0.01mL accuracy) by photoelectric infrared detection of meniscus by level following system utilizing a precision stepper motor and a special calibrated glass receiver; automatic calibration of evaporated loss volume and automatic volume calibration system ensures highest accuracy
Barometic Pressure:	Automatic barometric correction utility with automatic sensor, range 550 to 900 mm Hg (±1 mm Hg accuracy)
Dry Point Detection:	Automatic dry point detection board is included with standard equipment and only requires a dry point sensor, 200mL flask and PTFE plug for ASTM D850 and D1078 tests.
Environment:	Operates at 0 to 25°C (113°F)

Dimensions lxwxh,in.(cm)
21x21.5x27.75 (53.3x54.6x70.5)
Net Weight: 230 lbs (91kg)

Shipping Information
Shipping Weight: 260 lbs (95 kg)
Dimensions: 28 Cu. ft.

Test Method

The sample is evaporated and condensed under controlled conditions, and observations are made of the temperatures at which various percentages are recovered and/or the percentages recovered at specific temperatures.

Automatic Distillation Analyzer 5000 Series

- Conforms to ASTM D86, D285, D4737 and related international specifications
- Pt-100 RTD probe with **automatic temperature calibration system** (°C or °F)
- Windows®-based software package for PC control with LIMS export capabilities
- Automatic determination of initial boiling point (IBP), final boiling point (FPB), dry point and barometric and residue corrections
- Diagnostic system continuously ensures proper unit performance and user safety
- Automatic temperature and volume calibration
- Programmable distillation rate (2-15mL/min)
- Ready for distillation groups 1 - 4
- Networking for up to 32 units
- Powerful CFC-free cooling and heating system
- Receiver chamber heating system up to 60°C
- Precision level follower system with optical meniscus detector
- Integrated automatic fire extinguishing system with manual operation override

The Koehler Automatic Distillation Analyzer is designed to perform optimal distillation analyses of gasolines, fuels, oils, solvents, aromatics, napthas, kerosenes, hydrocarbons, and other volatile products to ensure conformity to rigid quality control standards. The analyzer automatically performs tests, processes results, and produces standard reports according to ASTM, ISO, and related specifications.

Two Models are Available-The Automatic Distillation Analyzer 5000 Series may be ordered for operation with an external PC (purchased separately) or may be ordered with a built-in PC, internal touch screen monitor, virtual keyboard and mouse. An easy-to-use Windows®-based PC communication software expands user capabilities for data analysis and unit control. Distillation methods and parameters can be easily created or modified. Software calculates repeatability and reproducibility as per ASTM D86 as well as standard and deviation against reference materials. Test results are displayed in real-time and can include distillation curve and temperature with or without barometric compensation and/or evaporation correction, distillation rate, heating power curve, master curve comparison, and zoom function for high resolution of heating and temperature curves. The heater compartment is rapidly cooled at the completion of a distillation run to reduce operator downtime. The analyzers are of rugged construction for instrument longevity with a modular design for easy routine maintenance.

Receiver Chamber Heating System-The receiver chamber heating system is ideal for samples that form waxes or other solids during distillation.

Automatic Distillation of Petroleum Products

Dry Point Detection as Standard Feature- Dry point can be detected visually or by automatic detection for ASTM D850 and D1078 test methods. The unit is delivered ready with the PC board components already included as standard to perform the dry point analysis. Simply order the Automatic Dry Point Detection Kit for Solvents (see Ordering Information at right) which includes dry point thermocouple, 200mL flask and PTFE plug to perform dry point detection analysis automatically.

Ready for Groups 1 - 4 and more-Each Koehler Automatic Distillation Analyzer 5000 Series comes ready with the equipment, accessories and features as standard to properly run distillation groups 1 to 4 per ASTM D86 and related test specifications. No additional accessories are required. The Windows®-based software package allows simple operator selection of the programmed settings for each distillation protocol. No complicated routines are needed to set up the unit. User defined programs are easily created for customization of the analyzer.

Calculated Cetane Index-Calculated cetane index is a useful tool for estimating ASTM D4737 cetane number where a test engine is not available for determining this properly. It may be conveniently employed for approximating cetane number where the quantity of sample is too small for an engine rating. In cases where the cetane number of a fuel has been initially established, the index is useful as a cetane number check on subsequent samples of that fuel, provided its source and mode of manufacture remain unchanged. The Cetane index is automatically calculated at the end of the test if all the necessary variables are entered and is a component of the Windows®-based software which comes standard with the unit.

Carbon Residue on 10% Distillation Residue-As per section 10, ASTM D189 the procedure for carbon residue of light distillate oils can be performed.

Included Accessories

Distillation Flask, 125mL with Markings
Ceran Plate, 25mm dia. hole
Ceran Plate, 38mm dia. hole
Ceran Plate, 50mm dia. hole
3 Point Calibrated PT100 Thermometer with Cable and Plug
Special Graduated Receiver Cylinder with Base
Wiper for Condenser Tube
Dropping Plate
Teflon Plug for 125mL Flask
Silicone Plug for Flask Side Arm
Dry Point Detection Board
Windows®-based Automatic Distillation Software

K45703-TS Automatic Distillation Analyzer with Touch Screen Display and Integrated PC

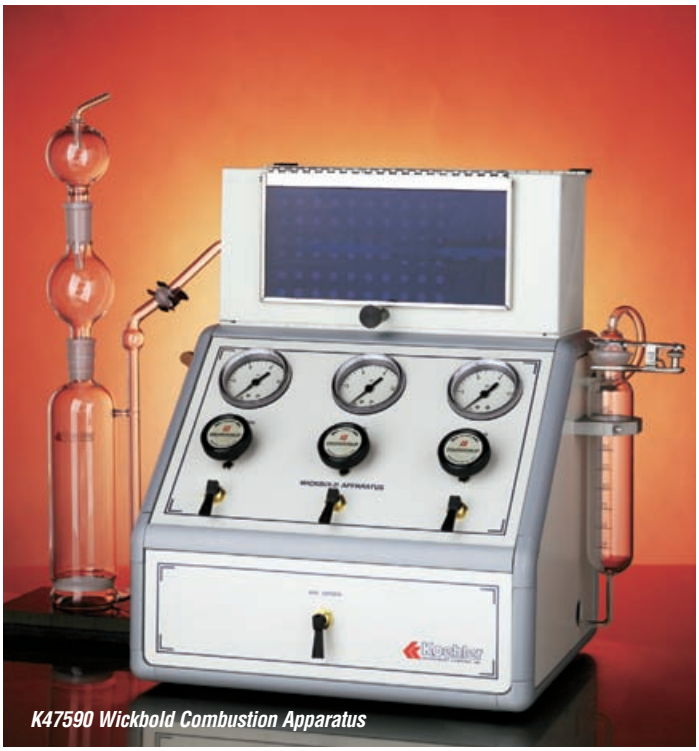
Ordering Information

Automatic Distillation Analyzer 5000 Series

Catalog No.	
K45603	Automatic Distillation Analyzer, 120V 60Hz
K45604	Automatic Distillation Analyzer, 230V 50/60Hz
K45703-TS	Automatic Distillation Analyzer with Touch Screen Display and Integrated PC, 120V 60Hz
K45704-TS	Automatic Distillation Analyzer with Touch Screen Display and Integrated PC, 230V 50/60Hz

Accessories

K45634	Distillation Flask, 125mL with Markings
K45635	PTFE Centering Stopper for 125mL Flask
K45655	Ceran Plate, 32mm dia. hole
K45656	Ceran Plate, 38mm dia. hole
K45657	Ceran Plate, 50mm dia. hole
K45656-A	Ceran Plate, 25mm dia. hole
K45650	PT100 Thermometer with Cable and Plug
K45651-E	Special Graduated Receiver Cylinder (with base)
K45651-B	Special Graduated Receiver Cylinder (without base)
K45601-03014	Condenser Tube Cleaning Assembly
K45668	Dropping Plate
K45654-A	Flask 200mL with Silicon Plug
K45652-C	Silicone Plug
K45654	Automatic Dry Point Detection Kit for D850 and D1078


K47590 Wickbold Combustion Apparatus

Sulfur in Liquefied Petroleum Gases (Oxy-Hydrogen Burner)

Traces of Volatile Chlorides in Butane-Butene Mixtures

Trace Quantities of Total Sulfur (Wickbold Apparatus)

Sulfur in Petroleum Products (Wickbold Apparatus)

Test Method

Determines total sulfur in liquefied petroleum (LP) gases and in liquid petroleum products by the Wickbold oxy-hydrogen burner method. Also suitable for burning butane-butene mixtures to determine trace amounts of volatile chlorides.

Wickbold Combustion Apparatus

- Conforms to ASTM D2384, D2784 and related specifications

Burns samples in a stainless steel oxy-hydrogen burner to determine total sulfur in petroleum products in the 0.1 to 300ppm range. Tests samples which are viscous, highly aromatic or of high sulfur content with the use of appropriate solvents.

Combustion chamber and stainless steel burner are housed in an insulated chamber with hinged heat-resistant and glare-proof shield for viewing burner flame. To ignite flame, depress electronic spark ignitor handle at side of unit. Ignitor shuts off when handle is released. Built-in pressure regulators with gauges allow for accurate adjustment and monitoring of hydrogen, oxygen and nitrogen pressure. Burner is easily disassembled for cleaning.

Supplied with a complete set of Borosilicate Glass and quartz glassware, including 200mL sample reservoir, sample capillary, combustion chamber, absorber, spray trap and cooling bulb, and compression-type gas connection fittings for ¼" (6mm) O.D. tubing. Housed in a finished aluminum cabinet. For LPG, natural gas and refinery gas samples, order accessory sample adapter.

Specifications

Conforms to the specifications of:
ASTM D2384, D2747 (Withdrawn 1985), D2784, D2785 (Withdrawn 1987); GPA 2140; IP 243; ISO 4260; DIN EN 41; NF T 60-142
Electrical Requirements: CE
115V 60Hz
220-240V 50/60Hz

Included Accessories

Complete Glassware Set
Sample Capillary
Sample Reservoir
Combustion Chamber
Absorber
Spray Trap
Cooling Bulb
Stainless Steel Burner

Dimensions lxwxh,in.(cm)

Cabinet only: 15x13x18½(38x33x47)
Net Weight: 40 lbs (18.1kg)

Shipping Information

Shipping Weight: 62 lbs (28.1kg)
Dimensions: 11.9 Cu. ft.

Ordering Information

Catalog No.		Order Qty
K47500	Wickbold Apparatus, 115V 60Hz	1
K47590	Wickbold Apparatus, 220-240V 50/60Hz	
	Accessories	
K47580	Gas Sample Adapter For burning liquefied petroleum, natural and refinery gases in the Wickbold Apparatus. Constructed entirely of stainless steel, with 150mL sample cylinder, connecting tubing and all necessary valves and couplings	1
K47510	Sample Capillary	
K47520	Sample Reservoir	
K47530	Combustion Chamber	
K47540	Absorber	
K47550	Spray Trap	
K47560	Cooling Bulb	
K47570	Stainless Steel Burner	

Ramsbottom Carbon Residue of Petroleum Products

Test Method

Determines the 'carbon residue' left after evaporation and pyrolysis of a sample oil in the Ramsbottom furnace, providing an indication of the deposit forming tendencies of fuels and guidelines for the processing of refinery products.

Ramsbottom Carbon Residue Apparatus

- Conforms to ASTM D524 and related specifications
- Microprocessor temperature control with digital display and overtemperature cut-off

Thermostatically controlled coking furnace for five samples. Cast-iron block type furnace reaches the standard test temperature of 550°C (1022°F) rapidly and controls with ±1°C stability. Microprocessor temperature control has °C/°F switchable digital setpoint and display. Operator and equipment are protected by an overtemperature control circuit which automatically interrupts power to the unit should block temperature exceed the programmed cut-off point. *Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. Contact your Koehler representative for information.* Heavily insulated stainless steel cabinet with three-layer refractory top provides excellent heat retention.

Ordering Information

Catalog No.		Order Qty
K27100	Ramsbottom Carbon Residue Apparatus, 115V 60Hz	1
K27190	Ramsbottom Carbon Residue Apparatus, 220-240V 50/60Hz	
	Accessories	
332-007-001	Coking Bulb Borosilicate Glass, with capillary Conforms to ASTM D524 specifications	5
362-010-001	Sample Charging Syringe	1
382-018-001	Needle, 18 gauge, 2"	1
K27320	Coking Bulb Filling Device Convenient time saving device fills up to five coking bulbs at a time. Ideal for viscous fluids that are difficult to handle at room temperature.	1
K27200	Control Bulb Stainless steel, with IC thermocouple. May be used with a thermocouple pyrometer* to verify compliance of the furnace with ASTM performance requirements.	1
K29310	Digital Thermometer, 115V	
K29319	Digital Thermometer, 220-240V **The K29310 Digital Thermometer is suitable for this purpose.*	

K27100 Ramsbottom Carbon Residue Apparatus

Specifications

Conforms to the specifications of:
ASTM D524, D6074; IP 14; ISO 4262; FTM 791-5002; NF T 60-117
Furnace Type: Cast iron block
Capacity: 5 coking bulbs
Maximum Temperature: 650°C (1200°F)
Controller Sensitivity: ±1°C (± 2°F)
Heater: 0-2400W, ceramic band heater
Electrical Requirements: CE
115V 60Hz, Single Phase, 20.8A
220-240V 50/60Hz, Single Phase, 10.9A

Dimensions lxwxh,in.(cm)

16x21½x14½(41x55x37)
Net Weight: 64 lbs (29kg)

Shipping Information

Shipping Weight: 78 lbs (35kg)
Dimensions: 8.2 Cu. ft.

Software compatible, inquire with Koehler Customer Service.

Koehler INSTRUMENT COMPANY, INC.

Lead in Gasoline, Acidity, Salt Content

K46600
Dual Extraction Apparatus

Lead in Gasoline by Volumetric Chromate Method

Acidity (Inorganic) of Petroleum Products by Color Indicator Titration Method

Salt Content of Crude Petroleum and Products

Test Method

Determines lead, acid or salt content of crude petroleum and products by extraction.

Dual Extraction Apparatus

• Conforms to ASTM D2547, IP 77, 182, 248 and ISO 2083 specifications

Consists of two sets of glassware mounted on a sturdy base/upright assembly with separate line switches, rheostats and condenser water control valves for each. Each glassware set includes 500mL boiling flask with heating tube, Hopkins reflux condenser with aspirator, thistle tube, 250W heating coil and 400mL Borosilicate Glass beaker.

Specifications

Conforms to the specifications of:
ASTM D2547 (Withdrawn 1989);
IP 77, 182, 248; ISO 2083;
NF M 07-014, 07-023
Electrical Requirements: CE
115V 60Hz
220-240V 50/60Hz

Dimensions lxwxh,in.(cm)

17x11x36½ (43x28x93)
Net Weight: 46 lbs (21kg)

Shipping Information

Shipping Weight: 66 lbs (30kg)

Ordering Information

Catalog No.		Order Qty
K46600	Dual Extraction Apparatus, 115V 60Hz	1
K46690	Dual Extraction Apparatus, 220-240V 50/60Hz	

Conradson Carbon Residue of Petroleum Products

Test Method

Provides an indication of relative coke forming properties of petroleum oils. The residue remaining after a specified period of evaporation and pyrolysis is calculated as a percentage of the original sample.

Conradson Carbon Residue Apparatus

• Conforms to ASTM D189 specifications

A weighed quantity of sample is placed in a crucible and heated to a high temperature for a fixed period. The crucible and the carbonaceous residue is cooled in a desiccator and weighed. The residue remaining is calculated as a percentage of the original sample and reported as conradson carbon residue.

Ordering Information

Catalog No.		Order Qty
K80030	Conradson Carbon Residue Apparatus	1
	Accessories	
K80031	Porcelain Crucible	
K80032	Skidmore Crucible, with Iron Cover	
K80033	Iron Crucible, with cover	
K80034	Iron Hood, with bridge	
K80034-WT	Nickel-Chrome Triangle Wire Support	
K80035	Refractory Block	
K80036	Tripod	
K80039	Burner	

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

K80030
Conradson Carbon Residue Apparatus

Specifications

Conforms to the specifications of:
ASTM D189, D6074; ANS Z-11.25;
IP 13; ISO 6615; DIN 51551;
FTM 791-5001; NF T 60-116

Shipping Information

Shipping Weight: 7 lbs (3.2kg)

Included Accessories

Porcelain Crucible
Skidmore Crucible, with Iron Cover
Iron Crucible, with Cover
Iron Hood, with Bridge
Refractory Block
Nickel-Chrome Triangle Wire Support
Tripod
Burner

Sediment in Crude Oils and Fuel Oils by the Extraction Method

Test Method

Determines sediment content of crude oil and fuel oils by extraction with toluene.

Sediment Extraction Apparatus

- Conforms to ASTM D473 and related specifications

A test portion of the sample is placed in a refractory thimble. Toluene is gently boiled and its vapors condensed and allowed to drip into the sample funnel. The toluene washes out all of the crude oil or fuel oil leaving the insoluble residue only in the thimble. The mass of the residue is calculated as a percentage and is referred to as the sediment by extraction. Includes condenser thimble basket, water cup and extraction thimble.

Ordering Information

Catalog No.		Order Qty
K48300	Sediment Extraction Apparatus	1
	Accessories	
K42000	Powertrol Heater, 115V 60Hz	1
K42090	Powertrol Heater, 220-240V 50/60Hz	
K48400	Condenser	
K48500	Thimble Basket	
K48600	Water Cup	
K48700	Extraction Thimble	

K48300 Sediment Extraction Apparatus

Specifications

Conforms to the specifications of:
ASTM D473; IP 53; ISO 3735; DIN 51789; FTM 791-3002; NF M 07-010

Salts in Crude Analyzer

Test Method

Salt content is determined by measuring the conductivity of a solution of crude oil in a polar solvent when subjected to an alternating electrical current and is obtained by comparison of the resulting conductance to a calibration curve of known salt mixtures.

Electrometric Salt Determinator

- Conforms to ASTM D3230 and IP 265 test specifications
- GOST certified
- Measures salt content, conductance, and temperature of crude oil samples, and pH measurements of aqueous samples
- Measures Salts Concentration in the range of 0 to 150 PTB (lb/1000 bbl)
- Portable for field or laboratory testing with up to 8 hours of continuous operation from internal Ni-Cd rechargeable batteries
- 18-bit analog-to-digital converter for high precision
- 24Kb RAM dedicated for data storage (about 500 test results)
- Data can be uploaded in a comma delimited format to a PC with easy to use Windows® 2000/XP/Vista – based software via an RS232 serial data port

Determines the salt content, conductance, and temperature of crude oil samples according to ASTM D3230 and IP 265 specifications. Utilizes the latest low-voltage, synchronous detection technology for conductivity measurements and a high-accuracy thermistor array to measure sample temperature. Automatically calculates salt concentration directly from acquired temperature and conductivity values. Measures conductivity over four ranges 0-2, 2-20, 20-200, and 200-1500 mS with automatic range selection. Self-calibration feature allows operator to adjust for any drift without re-entering standard temperature curves. Complete data storage of test results which is limited only by the hard drive capacity of external PC. Easy-to-read alpha-numeric display shows any four of the following parameters at one time as chosen by the operator: salts, conductance, conductance @ 25°C, pH, pH millivolts, temperature (°C or °F), internal and external battery voltages, date, time, logging ID, and ID increment value.

K23050
Salt in Crude Analyzer

Electrical Requirements CE

115V 60Hz
220-240V 50/60Hz

Shipping Information

Shipping Weight: 6 lbs (2.75kg)
Dimensions: 1.5 Cu. ft.

Dimensions lxwxh,in.(cm)
9x4.25x2.5 (23x10.8x6.5)
Net Weight: 2 lbs (1kg)

Ordering Information

Catalog No.		
K23050	Salt in Crude Analyzer, 115/230V 50/60Hz	
	Accessories	
K23050-9	Mixed Salts Solution, 100ml	
K23050-10	Mixed Salts Solution, 500ml	

Koehler INSTRUMENT COMPANY, INC.

Water and Sediment Determination by Automatic Centrifuge

Test Method

Centrifugation provides a convenient means of determining sediment and water content in crude oil, fuel oils, middle distillate fuels, and biodiesel. Also used in determining the precipitation number, demulsibility characteristics, trace sediments, and insolubles in used lubricating oils.

Automatic Heated Oil Test Centrifuge

- Choice of long, short, pear, or finger rotor assembly to accommodate corresponding centrifuge tubes
- Accommodates four (4) centrifuge tubes of 6 or 8" conical ASTM types, long, short, pear or finger tubes
- Automatic control of acceleration ramp, centrifugation speed, and timing functions.
- 4½" LCD Touch Screen Control Panel
- Substantial Insulation for Reduced Heat Loss
- Precise balancing, Quiet Operation
- Large, clear, top opening lid
- Class 1, Division 2 explosion resistant rating

Fully automatic bench top centrifuge designed expressly for petroleum testing applications. Features a 4½" LCD touch screen control panel. This integrated touch screen can be used to turn the heat on and off, set the duration of the test, set the RCF/RPM values and choose the type of rotor assembly and corresponding glassware to be used during the test. The motor speed mechanism allows the user to simply set the desired speed and the instrument will attain that speed. This mechanism calculates RPM based on the given RCF and type of Rotor selected. The large, clear, top opening lid provides for easy access to the rotor and tube holders and for cleaning of the unit. The lid has a 18½" diameter viewing window allowing the operator to view inside the chamber for checking the status of the rotor and checking for possible spillage of the centrifuge tubes. Molded PTFE cushions provide for maximum protection and easy positioning of the tubes.

Safety Features

The Centrifuge comes equipped with a Safety Lockout Mechanism. Upon emergency shutdown the door is locked and cannot be unlocked until the unit comes to a complete stop, the unit is turned back on, and the stop/unlock key is pressed on the touch screen display. Furthermore, the centrifuge cannot start while the door of the chamber is open and the latch is not engaged. The "Nitrogen Purge" feature allows for a slow release of Nitrogen into the bowl of the centrifuge. This feature requires an external Nitrogen Gas source and can easily connect to an Inlet port located at the back of the unit

Specifications

Conforms to the specifications of:
ASTM D91, D96, D893, D1796, D1966 , D2273, D2709, D2711, D4007, D5546; IP 75, 145, 359; API MPMS Chapter 10.4, API 2542, 2548; ISO 3734; DIN 51793; NF M 07-020
Capacity: Four (4) oil test centrifuge tubes: long (100mL), short (100mL), pear (100mL), or finger tubes (12.5mL)
Maximum Speed: 2200 RPM
Maximum RCF: 1327 (long); 1170 (short); 865 (pear-shaped)
Timer: 0 to 999 min
Set Speed: 200 - 2200 RPM
Speed Readout: 0 - 2200 RPM
Temperature Control: ambient to 93°C (200°F)
Temperature Readout: Digital
Brake: Automatic Dynamic

Electrical Requirements CE

115V 60Hz, 10A — 230V 50/60Hz, 5A

Dimensions lxwxh,in.(cm)

23x30x13½ (51x76x34) — Net Weight: 93 lbs (42 kg)

Shipping Information

Shipping Weight: 110 lbs (50 kg) — Dimensions: 11.2 Cu. ft.

K60002 Automatic Heated Oil Test Centrifuge

Ordering Information

Catalog No.	
K60002	Automatic Heated Oil Test Centrifuge, 115V 60Hz with Long Tube Rotor Assembly
K60092	Automatic Heated Oil Test Centrifuge, 230V 50/60Hz with Long Tube (RA*)
K60002-ST	Automatic Heated Oil Test Centrifuge, 115V 60Hz, Short Tube (RA*)
K60092-ST	Automatic Heated Oil Test Centrifuge, 230V 50/60Hz with Short Tube (RA*)
K60002-PT	Automatic Heated Oil Test Centrifuge, 115V 60Hz , Pear Tube (RA*)
K60092-PT	Automatic Heated Oil Test Centrifuge, 230V 50/60Hz with Pear Tube (RA*)
K60002-FT	Automatic Heated Oil Test Centrifuge, 115V 60Hz , Finger Tube (RA*)
K60092-FT	Automatic Heated Oil Test Centrifuge, 230V 50/60Hz with Finger Tube (RA*)

*Rotor Assembly

Accessories

K60002-LT-1	Rotor Assembly for Long Tubes
K61101	Centrifuge Tube, Long, 100mL, 8", marked in mL (ASTM D91, D96, D893, D1796, D4007)
K61106	Centrifuge Tube, Long, 100mL, 8", marked in 200 parts (ASTM D96)
K61110	Centrifuge Tube, Long, 100mL, 8", marked in mL every 1mL above 10mi (ASTM D96, D4007)
K61112	Centrifuge Tube, Long, 100mL, 8", marked in 200 parts every 2 parts above 20 parts (ASTM D96)
K61109	Centrifuge Tube, Cone-Shaped, 100mL with capillary tip capable of measuring 0.01 mL and readable by estimation to 0.005% (ASTM D2273, D2709) (K61153 cushion required for each tube)
K61153	PTFE cushion for Long Tubes w/capillary tip (Req. for K61109 tubes)
K60002-ST-1	Rotor Assembly for Short Tubes
K61102	Centrifuge Tube, Short, 100mL, 6", marked in 200 parts every 4 parts above 20mL (ASTM D96)
K61105	Centrifuge Tube, Short, 100mL, 6", marked in mL (ASTM D96)
K61107	Centrifuge Tube, Short, 100mL, 6", marked in mL every 2mL above 10mL (ASTM D96)
K61108	Centrifuge Tube, Short, 100mL, 6", marked in 200 parts (ASTM D96)
K60002-PT-1	Rotor Assembly for Pear Tubes
K61104	Centrifuge Tube, Pear, 100mL, marked in mL (ASTM D1966)
K61152	Centrifuge Tube, Pear, 100mL, with tube tip having graduations of 0.01mL over the range 0 to 0.2mL (ASTM D2709)
K61111	Cork Stopper for Centrifuge Tubes
K60002-FT-1	Rotor Assembly for Finger Tubes
K61141	Centrifuge Tube, Finger Tube (API 2542)

Water and Sediment Determination in Crude Oil by Centrifuge

Test Method

For the determination of water and sediment of crude oil by centrifuge method during field custody transfers. This test method is considered the most practical method for field determination of sediment and water.

Portable Oil Test Centrifuge

- Two Models Available: Two (2) place 12VDC & Four (4) place 115/230VAC
- Accommodates either two 6" conical centrifuge short tubes or four short cone / finger centrifuge tubes, model dependent
- Integrated Tube Holder / Pre-heater / Timer. Model Dependent
- Switchable Temperature Display between °C and °F
- Opening in Top Lid for Speed Calibration by Portable Laser Tachometer

Specifications

Conforms to the specifications of: ASTM D96; API MPMS Chapter 10.4, API 2542
Test Capacity: K60094: Two (2) short cone centrifuge tubes
K600X5/K600X6: Four (4) short cone or finger centrifuge tubes
Speed Range: 300 – 1800 RPM RCF Range: 20 - 700
Temperature Control: Ambient to 160°F (71.1°C)
Electrical Requirements: 12V DC 40, 115VAC 60HZ , 220-240VAC 50/60Hz CE

Ordering Information

Catalog No.

Accessories

K61102	Centrifuge Tube, Short, 100mL, 6", marked in 200 parts every 4 parts above 20mL
K61105	Centrifuge Tube, Short, 100mL, 6", marked in mL
K61107	Centrifuge Tube, Short, 100mL, 6", marked in mL every 2mL above 10mL
K61108	Centrifuge Tube, Short, 100ml, 6", marked in 200 parts
K61141	Centrifuge Tube, Finger Tube, 12.5mL
K61111	Cork Stopper

K60094
Portable Heated Oil Test Centrifuge

Ordering Information

Catalog No.

K60094	Portable Heated Oil Test Centrifuge, 12V DC 40A
K60005	Heated Oil Test Centrifuge, 4-Place, 115V 60Hz
K60095	Heated Oil Test Centrifuge, 4-Place, 220-240V 50/60Hz
K60005-FT	Heated Oil Test Centrifuge, 4-Place, Finger Tube RA, 115V 60Hz
K60095-FT	Heated Oil Test Centrifuge, 4-Place, Finger Tube RA, 220-240V 50/60Hz
K60005-FT8	Heated Oil Test Centrifuge, 8-Place, Finger Tube RA, 115V 60Hz
K60095-FT8	Heated Oil Test Centrifuge, 8-Place, Finger Tube RA, 220-240V 50/60Hz
K60006	Heated Oil Test Centrifuge, 4-Place, w/Timer, 115V 60Hz
K60096	Heated Oil Test Centrifuge, 4-Place, w/Timer, 220-240V 50/60Hz
K60006-FT	Heated Oil Test Centrifuge, 4-Place, Finger Tube, w/Timer, 115V 60Hz
K60096-FT	Heated Oil Test Centrifuge, 4-Place, Finger Tube, w/Timer, 220-240V 50/60Hz

Ash from Petroleum Products

Test Method

Determines the amount of ash in distillate and residual fuels, gas turbine fuels, crude oils, lubricating oils, waxes, and other petroleum products.

Programmable Ashing Furnace

- Six Complete Air Exchanges per Minute
- Incoming air preheated for enhanced temperature uniformity
- Digital PID Temperature Control
- Integrated Timer
- Store up to 9 different programs
- Maximum Temperature of 1100°C

Specifications

Conforms to the Specifications of: ASTM D482, D874, D3174, D4422, D5184; IP4, IP163, ISO 3987, ISO 6245; NF M 07-045; DIN 51352, DIN 51575
Temperature Range: Ambient - 1100°C Temperature Accuracy: ± 3°C

Oven Volume:
- 0.07 cu. ft. model: 3 L
- 0.16 cu. ft. model: 5 L
- 0.33 cu. ft. model: 9 L
- 0.47 cu. ft. model: 15 L

Power:
- 0.07 cu. ft. model: 1.2 kW
- 0.16 cu. ft. model: 2.4 kW
- 0.33 cu. ft. model: 3.0 kW
- 0.47 cu. ft. model: 3.6 kW

Ordering Information

Catalog No.

K24305	Programmable Ashing Furnace, 0.07 cu.ft. 208V 50/60Hz
K24306	Programmable Ashing Furnace, 0.16 cu.ft. 208V 50/60Hz
K24307	Programmable Ashing Furnace, 0.33 cu.ft. 208V 50/60Hz
K24308	Programmable Ashing Furnace, 0.47 cu.ft. 208V 50/60Hz
K24395	Programmable Ashing Furnace, 0.07 cu.ft. 240V 50/60Hz
K24396	Programmable Ashing Furnace, 0.16 cu.ft. 240V 50/60Hz
K24397	Programmable Ashing Furnace, 0.33 cu.ft. 240V 50/60Hz
K24398	Programmable Ashing Furnace, 0.47 cu.ft. 240V 50/60Hz

K24308
Programmable Ashing Furnace

Electrical Requirements: CE
208V, 50/60Hz, Single Phase 240V, 50/60Hz, Single Phase

Dimensions wxdxh,in.(cm) Net Weight: lbs (kg)
0.07 cu. ft. model: 14.96x14.57x29.53 (38x37x75) Net Weight: 44.1 (20)
0.16 cu. ft. model: 17.33x18.50x33.46 (44x47x85) Net Weight: 77.2 (35)
0.33 cu. ft. model: 18.90x21.66x35.44 (48x55x90) Net Weight: 99.3 (45)
0.47 cu. ft. model: 18.90x25.59x35.44 (48x65x90) Net Weight: 121.3 (55)

Koehler INSTRUMENT COMPANY, INC.

Automatic Density Meter

Test Method

Density is a fundamental physical property that can be used in conjunction with other properties to characterize the quality of crude oils, light and heavy fractions of petroleum and petroleum products. The test method covers the determination of the density or relative density of crude oils, petroleum distillates and viscous oils that can be handled in a normal fashion as liquids at test temperatures between 15 and 35°C.

Specifications

Conforms to the specifications of:
ASTM D1250, D4052, D5002, D5931; DIN 51757
Measurement Ranges:
Density: 0 to 3 g/cm3
Temperature: 0°C to 90°C
Pressure: 0 to 10 bars
Measurement Modes: Continuous, Single, Multiple
Accuracy:
K86200: Density: 0.00005 g/cm3
Temperature: 0.03°C
K86201: Density: 0.0001 g/cm3
Temperature: 0.05°C
Repeatability:
K86200: Density: 0.00001 g/cm3
Temperature: 0.01°C
K86201: Density: 0.00005 g/cm3
Temperature: 0.02°C
Resolution: Density: 0.00001 g/cm3
Temperature: 0.01°C
Minimum Sample Volume: 1 ml, approximately
Wetted Materials: Borosilicate glass, Teflon (PTFE, ECTFE)
Display: 10.4 inch diagonal, 800-600 pixels, color, Flat Panel Monitor with Resistant Touch Screen Interface, 200 bit brightness, gasketted for spill protection.
Communication Interface:
K86200: Touch Screen User Interface
3 – USB Ports
2 – RS232 Ports
Ethernet Port for Network Connection
Keyboard, Bar Code Scanner,
Mouse, Network Capabilities
K86201: Touch Screen User Interface
3 – USB Ports
1 – Cat. 5 Port
2 – RS232 Ports
Keyboard, Bar Code Scanner,
Mouse, Network Capabilities
Video and Magnification: Video assisted view of cell, capable of approximately 10X magnification
Internal Memory: 2 GB Non-removable Compact Flash
Electrical Requirements: CE
85 to 260 VAC; 48 to 62 Hz
150- 200 Watts

Included Accessories

Quick Start Guide
Desiccant
Filling Nozzles
NIST Standards
IQ/OQ/PQ Documentation
Luer Syringes
Connecting Fittings & Tubing
Manual

K86200 Automatic Density Meter

Dimensions lxwxh,in.(cm)

91.44cm (L) x 48.26 cm (W) x 45.72 cm (H)

Shipping Information

Shipping Weight: 70 lbs. (31.75 kg)

Ordering Information

Catalog No.		Order Qty
K86200	Automatic Density Meter, Model A	1
K86201	Automatic Density Meter, Model B	1

Accessories

K86202	21 CFR Part 11 Option
K86203	Refractometer Control Module
K86204	Heated Interface Attachment
K86206	Bar Code Scanner - USB
K86207	Fluke Hart Thermometer Kit Consists of Handheld Digital Thermometer, Temperature Probe, and Calibration Certificate
K86208	Inkjet USB Printer Kit Includes Inkjet Printer and USB communication cable
K86209	Laser USB Printer Kit Includes Laser printer and USB communication cable
K86210	40 Column Serial Printer Kit Includes 40 Column Serial (RS232) Printer, Null Modern Cable, and Adapter

Rust Protection by Metal Preservatives in the Humidity Cabinet

Test Method

Tests the ability of metal preservatives to prevent steel panels from rusting under conditions of high humidity. Polished steel panels are immersed in the sample oil and then suspended in the humidity cabinet for a specified test period.

Humidity Cabinet

- Conforms to ASTM D1748 and FTM 791-5310 specifications

Produces a moisture saturated atmosphere with continuous condensation at a constant 120°F (48.9°C) for 33 steel test specimens. Test panels are suspended on a ⅛rpm rotating stage. Air flow and water level control systems maintain required conditions inside the cabinet per Mil. Spec. and ASTM specifications. Air temperature is maintained at 120 ±2°F (48.9 ±1.1°C) by a digital LCD electronic controller. A continuous heater circuit assists the control heater in bringing the cabinet up to temperature prior to testing. Overtemperature protection is provided by an adjustable digital thermostat which cuts off power to the cabinet in case of overheating.

Cabinet interior is stainless steel lined and all interior components are of stainless steel or chrome plated steel construction. Hinged cover consists of two layers of desized cotton cloth mounted on a metal frame. Oil and condensate dripping from the specimens are collected in a drip pan and piped to an external drain.

Ordering Information

Catalog No.		Order Qty
Humidity Cabinet		
K35200	Humidity Cabinet, 115V 60Hz	1
K35295	Humidity Cabinet, 220-240V 50Hz	
K35296	Humidity Cabinet, 220-240V 60Hz	
	Accessories	
K35210	Steel Test Panels Soft temper low carbon cold rolled steel, surface ground on both faces to a 10-20 micro-inch finish. 2x4x⅛"(51x102x3.2mm)	33
380-240-002	Aluminum Oxide Cloth, 240-grit For test panel preparation. Pack of 50	1
250-000-09F	ASTM 9F Thermometer Range: 20 to 230°F	1
250-000-09C	ASTM 9C Thermometer Range: –5 to +110°C	

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Digital Flowmeter option is available for this unit.

K35200 Humidity Cabinet

Specifications

Conforms to the specifications of:
ASTM D1748; FTM 791-5310
Capacity: 33 rust test specimens
Water Level Control: 8 in. (203mm)
Temperature Control Stability: ±2°F (± 1.1°C) (air temperature)
Heater Range: 0-1500W
Air Metering: 0.878±0.02832m³/h at standard temperature and pressure (31±1 ft³/h)
Air Distribution: 20-diffuser manifold
Rotating Stage: ⅛rpm
Electrical Requirements: CE
115V 60Hz, Single Phase, 13.0A
220-240V 50Hz or 60Hz, Single Phase, 6.8A

Included Accessories

Monel Test Specimen Hooks (33 sets)

Dimensions lxwxh,in.(cm)

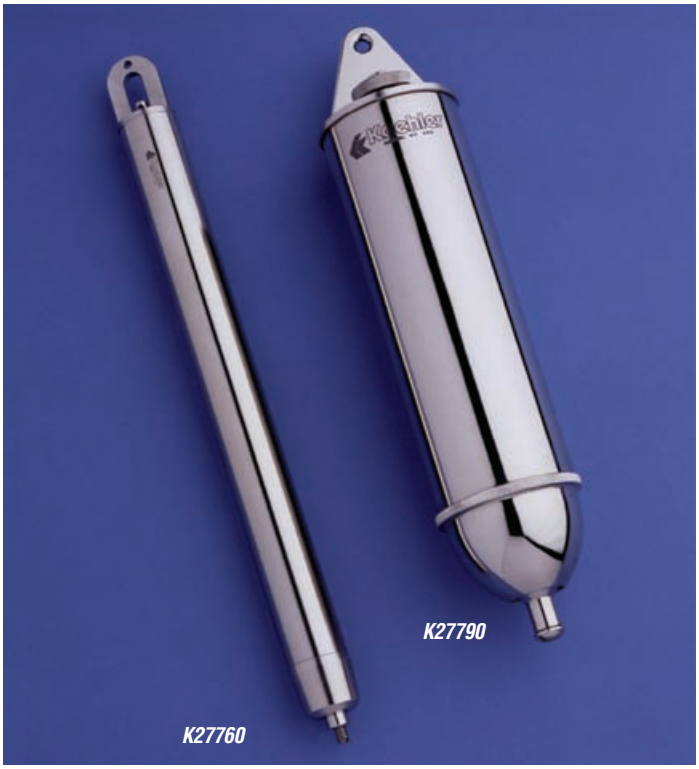
32x28x41½ (81x71x105)
Net Weight: 206 lbs (93.4kg)

Shipping Information

Shipping Weight: 279 lbs (126.6kg)
Dimensions: 41 Cu. ft.

Koehler INSTRUMENT COMPANY, INC.

Sampling of Petroleum and Petroleum Products and LP Gases



Sampling of Petroleum and Petroleum Products

Sampling Liquefied Petroleum (LP) Gases

Test Method Standards

All samplers conform to ASTM D4057 (formerly ASTM D270), D6074 or ASTM D1265 specifications.

Sample Thief (Bacon Bomb)

- Obtains bottom samples or samples from any level
- Four different capacities
- Plated brass, stainless steel or acrylic construction
- Standard Viton O-ring seal
- Optional metal-to-metal seal

Obtains samples from storage tanks, tank cars and drums. When the thief strikes the bottom of the tank, a plunger assembly opens to admit the sample. The plunger closes again when the bomb is withdrawn, forming a tight seal. Samples can be taken at any depth with the use of a secondary trip line, or extension rods may be added for obtaining samples at levels of up to 18"(46cm) off the bottom. Equipped with plunger locking cam for tight closure during transport (except for 4 oz 1⅛" dia. model). Special models include a 4 oz (118mL) 'pencil' model for sampling through small diameter pipes and openings, and clear acrylic samplers with plated brass plunger and end pieces. Modified samplers can be supplied for special applications – we invite your inquiries.

Specifications and Ordering Information

Catalog No.	Capacity oz(mL)	Construction	Seal	Outside Diameter (O.D.)in.(cm.)	Overall Length in.(cm)	Shipping Weight lbs(kg)
K27700	32 (946)	plated brass	Viton O-ring	3⅜ (8.6)	15 5/32 (38.5)	13 (5.9)
K27701	32 (946)	stainless steel	Viton O-ring	3⅜ (8.6)	15 5/32 (38.5)	13 (5.9)
K27790	16 (473)	plated brass	Viton O-ring	2¾ (7)	12 1/32 (30.6)	9 (4.1)
K27795	16 (473)	plated brass	Metal Seat	2¾ (7)	12 1/32 (30.6)	9 (4.1)
K27791	16 (473)	stainless steel	Viton O-ring	2¾ (7)	12 1/32 (30.6)	8 (3.6)
K27792	16 (473)	acrylic	Viton O-ring	2¾ (7)	12 1/32 (30.6)	8 (3.6)
K27780	8 (237)	plated brass	Viton O-ring	2 5/16 (5.9)	10 5/32 (25.8)	5 (2.3)
K27785	8 (237)	plated brass	Metal Seat	2 5/16 (5.9)	10 5/32 (25.8)	5 (2.3)
K27781	8 (237)	stainless steel	Viton O-ring	2 5/16 (5.9)	10 5/32 (25.8)	5 (2.3)
K27782	8 (237)	acrylic	Viton O-ring	2 5/16 (5.9)	10 5/32 (25.8)	5 (2.3)
K27770	4 (118)	plated brass	Viton O-ring	1⅞ (4.7)	9 1/16 (24.6)	4 (1.8)
K27771	4 (118)	stainless steel	Viton-O-ring	1⅞ (4.7)	9 1/16 (24.6)	4 (1.8)
K27772	4 (118)	plexiglass	Buna N O-ring	1⅝ (4.01)	9 1/16 (24.6)	3 (1.4)
K27760	4 (118)	plated brass	Viton O-ring	1⅛ (2.8)	13¼ (33.7)	3 (1.4)
K27761	4 (118)	stainless steel	Viton O-ring	1⅛ (2.8)	13¼ (33.7)	3 (1.4)
K27762	4 (118)	acrylic	Viton O-ring	1⅛ (2.8)	13¼ (33.7)	3 (1.4)

Sample Thief Extension Rods

Installs in sample thief plunger assembly. Stainless steel with threaded end.

Catalog No.	Length in. (cm)	Application
K277-EXT1	1 (2.5)	
K277-EXT2	2 (5.1)	
K277-EXT3	3 (7.6)	32,16 and
K277-EXT6	6 (15.2)	8 oz models
K277-EXT12	12 (30.5)	
K277-EXT18	18 (45.7)	
K277C-EXT1	1 (2.5)	
K277C-EXT2	2 (5.1)	
K277C-EXT3	3 (7.6)	4 oz models
K277C-EXT6	6 (15.2)	
K277C-EXT12	12 (30.5)	
K277C-EXT18	18 (45.7)	

All-Levels Sample Thief

Similar to the standard 16 oz (473mL) Sample Thief (Bacon Bomb), but equipped with an adjustable needle valve opening instead of a plunger to control rate of flow during 'all-levels' and 'running' sampling from storage tanks. Plated brass construction.

Ordering Information

Catalog No.	
K27800	All-Levels Sample Thief

Adjustable-Level Sample Thief

Takes samples at depths up to 12" (30.5cm) from bottom. Similar to the standard 16 oz (473mL) Sample Thief (Bacon Bomb), but with built-in graduated extension rod adjustable between 0-12" (30.5cm). Plated brass construction.

Ordering Information

Catalog No.	
K27900	Adjustable Level Sample Thief

Drum Thief (Sampling Tube)

- Choice of plated brass or stainless steel construction

For tube sampling from barrels and drums. Takes bottom samples or all-levels samples. 40" Long x 1¼" dia. (102x3.2cm). Maximum sample capacity of 24 oz (710mL). Shipping Weight: 6 lbs (2.7kg).

Ordering Information

Catalog No.	
K27400	Drum Thief, plated brass
K27401	Drum Thief, stainless steel

Weighted Beaker

- Capacity 32 oz. (946mL)
- Choice of ¾" or 1½" (19 or 38mm) opening

For beaker sampling from tank cars, tank trucks, shore tanks, ship tanks and barge tanks. Copper or stainless steel construction with weighted bottom. Includes handle and chained cork. Takes all level samples, running samples, and top, upper, middle, lower and outlet samples. Select ¾" (19mm) opening for light crude oils, light lubricating oils, kerosenes, gasolines, transparent gas oils, diesel fuels, and distillates, or 1½" (38mm) for heavy crude and fuel oils, heavy lubricating oils and nontransparent gas oils. Shipping weight: 6 lbs (2.7kg).

Ordering Information

Catalog No.	
K27600	Weighted Copper Beaker, with ¾" opening
K27610	Weighted Copper Beaker, with 1½" opening
K27601	Weighted Stainless Steel Beaker, with ¾" opening

K27400
Drum Thief

K27600
Weighted Beaker

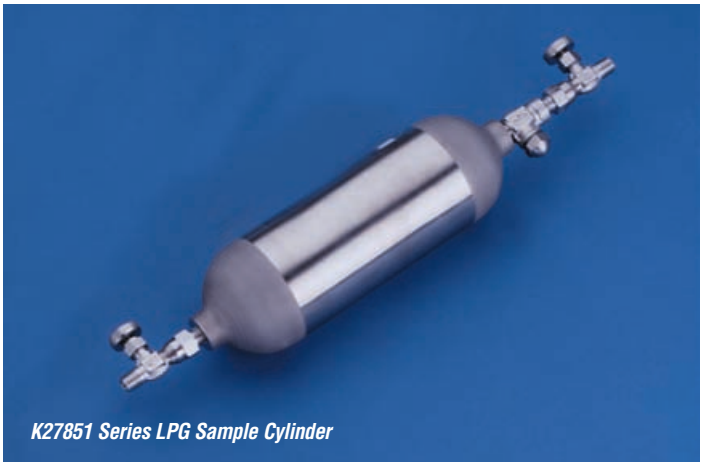
LPG Sample Containers

- Two-valve type with 20% outage tube
- Built-in pressure relief valve
- Conforming to ASTM D1265 and GPA 2140 specifications

Welded stainless steel cylinders for obtaining representative samples of liquefied petroleum (LP) gases. Two-valve type (¼ IPS), with 20% outage tube and built-in pressure relief valve factory preset between 540 to 600psi (38-42 kg/cm^2).

Ordering Information

Catalog No.	
K27851	LPG Sample Cylinder, 150mL
K27852	LPG Sample Cylinder, 300mL
K27853	LPG Sample Cylinder, 500mL
K27854	LPG Sample Cylinder, 1000mL
K27856	LPG Sample Cylinder, 3000mL



K27851 Series LPG Sample Cylinder

Core-Type Sampling Thief (Tulsa Oil Thief)

- Obtains bottom samples or samples from any level
- Butterfly valve on bottom for easy sampling
- Stainless steel and brass construction
- Three Petcocks for draining at different levels

The K28100, Core-Type Sampling Thief is used to manually obtain samples of a liquid, semi liquid or solid state whose vapor pressure at ambient conditions is below 101kPa (crude oil, etc.)

Ordering Information

Catalog No.	
K28100	Core-Type Sampling Thief

Specifications

Conforms to the specifications of: ASTM D4057
Capacity: 33oz.
Empty Weight: 6.187 lbs.
Sample Container Material: Polycarbonate
Markings: Every inch from 3" to 14"
Distance from tank bottom to inlet valve: 1.729"
Max height: 21"
Max length: 4.7"
Max width: 4.2"

Freezing Point of Aqueous Engine Coolant Solution

Test Method

Determines the freezing point of aqueous engine coolant solutions by cooling a sample with continuous agitation until a plateau is observed in a time-temperature curve.

Freezing Point Apparatus

- Conforms to ASTM D1177 specifications

Determines freezing points of aqueous engine coolants. Includes 200mL freezing tube with drilled cork, outer flask, motorized stirrer, clamps and stand. Similar to K29700 Freezing Point Apparatus.

Electrical Requirements: CE
115V 60Hz
220-240V 50Hz
220-240V 60Hz

Ordering Information

Catalog No.		Order Qty
K29750	Freezing Point Apparatus, 115V 60Hz	1
K29758	Freezing Point Apparatus, 220-240V 50Hz	
K29759	Freezing Point Apparatus, 220-240V 60Hz	
250-000-75F	ASTM 75F Thermometer Range: –35 to +35°F	1
250-000-76F	ASTM 76F Thermometer Range: –65 to +5°F	

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

K29750 Freezing Point Apparatus

Color of Maleic and Phthalic Anhydrides

K56300 Anhydride Purity Bath

Dimensions lxwxh,in.(cm)
12x12x21 (31x31x54)
Net Weight: 65 lbs (30 kg)
Electrical Requirements: CE
115V 60Hz
220-240V 50/60Hz

Shipping Information
Shipping Weight: 76 lbs (35 kg)
Dimensions: 9 Cu. ft.

Test Method

Molten samples of maleic or phthalic anhydride are compared with Platinum-Cobalt color standards for determining sample purity and the qualitative stability in the presence of contaminants. High color content normally indicates contamination.

Anhydride Purity Bath

- Conforms to ASTM D3366 specifications
- Redundant overtemperature protection circuitry
- Microprocessor-based temperature controller

Electrically heated aluminum block features a microprocessor-based temperature controller with overtemperature protection circuitry and a dual LED temperature display. The heating unit provides temperature stability, heating rates, and minimal temperature gradients which exceed ASTM specifications, and is housed in an insulated steel cabinet with a chemically-resistant painted finish. Up to six samples can be tested at a time using Nessler tubes. Visual color comparisons are made against solutions of Platinum-Cobalt color standards. (Please refer to pages 44-47 for Koehler's line of color measurement and comparison instrumentation.)

Ordering Information

Catalog No.		Order Qty
K56300	Anhydride Purity Bath, 115V 60Hz	1
K56390	Anhydride Purity Bath, 220-240V 50/60Hz	
K56306	Nessler Tubes	6

Automatic Melting Point Range Apparatus

Test Method

The melting point of a crystalline solid is the temperature at which the solid to liquid phase transition occurs, referenced at one atmosphere (1 ATM) of pressure.

- Conforms to BP Appendix 5 - Method 6 and GLP specifications
- Readily interchanged between automatic and manual detection of melting point ranges
- Intelligent Lamp Intensity Control with Soft Start
- Storage capacity for up to 20 sample tests
- User-interactive software and data entry, including easy alphanumeric entry of sample name, ID number, and date
- User selectable operating modes:
  - **AUTO detection mode:** Start/end of melting point range is automatically detected by a photosensing infrared device. The melting process is recorded and viewed on-screen in real-time by a CCD camera.
  - **MANUAL detection mode:** Start/end of melting point range can be selected manually with a key-press by user. Sample melting point can be determined as per BP method by 'Heat & Cool' temperature function. As above, the melting process is recorded and viewed on-screen in real-time by a CCD camera.

The Automatic Melting Point Apparatus is the latest technology for microprocessor-based determinations of melting point ranges of crystalline, powdered and polymeric materials, and is used to assess sample purity. Requires approximately 5mg of sample spread uniformly on a glass slide, covered with a glass coverslip. The slide is placed on a uniformly heated, round furnace and subjected to a heating profile as required by the user. Precise temperature control gives reproducible results to within 1%. The unit contains an automatic temperature safety cut-off feature if no melting points are detected 15°C above the expected melting point or if the oven reaches 315°C. The melting process is magnified, recorded, and viewed on-screen in real-time by a CCD camera. The change in physical appearance of the sample with respect to temperature is recorded, and the start/end of melting is observed automatically. A representation of the entire process can be printed out in graphical form for validation.

Dimensions lxwxh,in.(cm)
Main Unit: 16½x12¼x13 (42x31x33)
Monitor: 8x5½x5½ (20x14x14)
Net Weight: Main Unit: 22 lbs (10 kg)
Monitor: 1.8 lbs (0.8 kg)

Shipping Information
Weight: 29 lbs (13 kg)
Dimensions: 3.6 Cu. ft.

Ordering Information		
Catalog No.		**Order Qty**
K90100	Automatic Melting Point Range Apparatus, 115V 60Hz	1
K90190	Automatic Melting Point Range Apparatus, 220V 50Hz	
	Accessories	
K90100-1	Glass slides (pack of 500)	
K90100-2	Cover slips (pack of 1000)	
K90100-3	Sampling jig	

K90190 Automatic Melting Point Range Apparatus

Specifications

Conforms to the specifications of:
BP Appendix 5-Method 6; GLP
Visual Image: 10x magnified displayed on monitor
Temperature Range: ambient + 5 to 315°C
Heating Rates: 0.2, 0.5, 1.0, 2.0, 3.0, 6.0, 12.0°C/min
Temperature Readability: 0.1°C
Cooling Time: 20 minutes (300°C to ambient)
Temperature Accuracy: ±0.5°C (ambient + 5 to 200°C)
±0.8°C (200 to 315°C)
Sample size: 5 mg (approximately)
Sample Holder: Glass Slide ≤1mm ±0.02mm thick
Sample Cover: Glass Coverslip ±0.17mm thick
Temperature Sensor: Pt-100 (2 wire RTD)
Test Storage: Up to 20 tests with parameters
Electrical Requirements: CE
115V, 60Hz, Single Phase
220V, 50Hz, Single Phase

General Purpose Baths

Constant Temperature Water Baths

- Accurate Microprocessor Control
- Three User-defined Temperature Preset Buttons
- Redundant Safety Backup
- Front Panel Lockout
- Electronic Calibration

Economical constant temperature water baths offer superior temperature control, range, and uniformity. Bath fluids can be controlled at temperatures as high as 100°C (60°C without cover) with 0.1°C precision and +/- 0.2°C uniformity. Bath temperature is displayed continuously on a bright, easy-to-read LED panel in your choice of °C or °F. Set point temperature is recalled with just the touch of a button. Three user-defined temperature preset buttons allow for quick selection of often used temperature set points.

Dual thermostats provide optimum protection for your work and water bath. The high limit alarm alerts you if bath temperature exceeds your pre-set limit. A secondary Safety Set thermostat guards against thermal runaway, automatically disconnecting heater power should bath temperature get too high or the liquid level drop too low.

The Constant Temperature Water Baths are also designed for operating convenience. The steeply gabled, polycarbonate cover accommodates glassware of varying heights and tilts out of your way when loading or removing samples, allowing condensate to drain neatly back into the bath.

K33056 General Purpose Water Bath, 10L

Specifications

Temperature Control: 0.1°C setpoint and °C/°F switchable LED display
Temperature Stability: +/- 0.2°C
Temperature Range: Ambient to 100°C with cover,
Ambient to 60°C without cover

Ordering Information

Catalog No.	Capacity	Electrical Requirements CE	Overall Dimensions LxWxH	Opening Dimensions LxWxH	Shipping Weight
K33050 **K33051**	2L (0.5 gal)	120V, 50/60Hz, 2.5A 240V, 50/60Hz, 1.25A	8.94x7.90x8.13 in 22.71x20.07x20.65 cm	5.31x5.88x5.81 in 13.49x14.94x14.76 cm	11 lbs 4.99 kg
K33052 **K33053**	2L shallow (0.5 gal)	120V, 50/60Hz, 2.5A 240V, 50/60Hz, 1.25A	9.44x13.65x8.13 in 23.98x34.67x20.65 cm	5.81x11.69x2.50 in 14.76x29.69x6.35 cm	12 lbs 5.44 kg
K33054 **K33055**	5L (1.3 gal)	120V, 50/60Hz, 4.2A 240V, 50/60Hz, 2.1A	9.44x13.65x8.13 in 23.98x34.67x20.65 cm	5.94x11.75x5.94 in 15.09x29.85x15.09 cm	15 lbs 6.80 kg
K33056 **K33057**	10L (2.6 gal)	120V, 50/60Hz, 4.2A 240V, 50/60Hz, 2.1A	15.43x14.90x8.13 in 39.19x37.85x20.65 cm	11.69x12.75x5.94 in 29.69x32.39x15.09 cm	23 lbs 10.43 kg
K33058 **K33059**	20L (5.2 gal)	120V, 50/60Hz, 8.3A 240V, 50/60Hz, 4.15A	15.19x21.65x8.13 in 38.58x54.99x20.65 cm	11.50x19.50x5.88 in 29.21x49.53x14.94 cm	30 lbs 13.61 kg
K33060 **K33061**	28L (7.3 gal)	120V, 50/60Hz, 8.3A 240V, 50/60Hz, 4.15A	15.19x21.65x10.13 in 38.58x54.99x25.73 cm	11.63x19.56x7.94 in 29.54x49.68x20.17	33 lbs 14.97 kg

General Purpose Baths

K33064 Constant Temperature Circulating Bath

Constant Temperature Circulating Baths

- Above Ambient Temperature Control
- Available in Three Different Capacities: 6, 13, and 28 Liter
- Large Reservoir Opening
- Microprocessor temperature control with °C/°F digital temperature set and display
- Adjustable Over-Temperature protection and Low-Liquid Cutoff

Programmable Model - Constant temperature circulating bath provides precise temperature control stability of ±0.01°C and features time/temperature programming, remote probe capability, and a variable speed pressure/suction (duplex) pump. An RS232 interface and PC programming software are standard while LabView™ drivers and Excel® macros provide even greater programming and data logging conveinience. A full graphic LCD display and multi-language help menus simplify operation and set-up.

Standard Model - Economical constant temperature circulating bath model. Microprocessor temperature control ranges from 5°C to 150°C with ±0.05°C stability. This model features a bright set-and-read LED display with a readout accuracy of ±0.5°C, three user-defined set point buttons, and a 2-speed pressure (simplex) pump suitable for closed loop applications.

Specifications

Temperature Range:
K33064, K33065: +5°C to 200°C
All Other Models: +5°C to 150°C
Temperature Stability:
Programmable Model: ±0.01°C
Standard Model: ±0.05°C
Readout Accuracy:
Programmable Model: ±0.25°C
Standard Model: ±0.5°C
Temperature Readout: °C or °F
Pressure Flow Rate:
Programmable Model: 30 lpm max. (60 Hz)
22 lpm max. (50 Hz)
Standard Model: 2-speed, 9 or 15 lpm
Suction Flow Rate:
Programmable Model: 22 lpm max. (60 Hz)
15 lpm max. (50 Hz)
Standard Model: N/A
Heater:
Programmable Model: 1100 Watts (60 Hz)
2200 Watts (50 Hz)
Standard Model: 1100 Watts (60 Hz)
1600 Watts (50 Hz)

Ordering Information

Catalog No.	Model	Capacity	Electrical Requirements CE	Overall Dimensions LxWxH	Working Access LxWxD	Shipping Weight
K33062 **K33063**	Standard	6L (1.6 gal)	120V, 50/60Hz 240V, 50/60Hz	14.25x8.25x8.14 in 37.5x21x35.6 cm	5.25x5.25x5.5 in 13.3x13.3x14 cm	24 lbs 11 kg
K33064 **K33065**	Programmable	6L (1.6 gal)	120V, 50/60Hz 240V, 50/60Hz	14.25x8.25x8.14 in 37.5x21x35.6 cm	5.25x5.25x5.5 in 13.3x13.3x14 cm	30 lbs 14 kg
K33066 **K33067**	Standard	13L (3.4 gal)	120V, 50/60Hz 240V, 50/60Hz	15.5x10.88x14.75 in 39.4x27.6x37.5 cm	5.25x8.5x7.75 in 13.3x21.6x19.7 cm	31 lbs 14 kg
K33068 **K33069**	Programmable	13L (3.4 gal)	120V, 50/60Hz 240V, 50/60Hz	15.5x10.88x14.75 in 39.4x27.6x37.5 cm	5.25x8.5x7.75 in 13.3x21.6x19.7 cm	40 lbs 18 kg
K33070 **K33071**	Standard	28L (7.3 gal)	120V, 50/60Hz 240V, 50/60Hz	22.75x13.19x14.75 in 55.8x33.5x37.5 cm	12.13x10.38x8 in 30.8x26.4x120.3 cm	42 lbs 19 kg
K33072 **K33073**	Programmable	28L (7.3 gal)	120V, 50/60Hz 240V, 50/60Hz	22.75x13.19x14.75 in 55.8x33.5x37.5 cm	12.13x10.38x8 in 30.8x26.4x120.3 cm	50 lbs 23 kg

Water in Petroleum Products & Bituminous Materials by Distillation

K31800 Metal Still

Dean & Stark Moisture Test Apparatus

- Conforms to ASTM D95 and related specifications

Consists of 400mm condenser, 10mL receiver, 1000mL flask and mounting equipment.

Ordering Information	
Catalog No.	
K31830	Dean & Stark Apparatus

Test Method

Determines the water content in petroleum products, tars, emulsified asphalts and other bituminous materials by the distillation method.

Distillation Apparatus

- Conforms to ASTM D95, E123, D244 and related specifications

Consists of still, ring burner, glassware and all mounting hardware.

Specifications

Conforms to the specifications of:

ASTM D95, E123, D244, D370*; AASHTO T55, T59; API MPMS Ch. 10.5; IP 74, 291; FTM 791-3001; ISO 3733; NF T 60-113

*requires different glassware–information is available upon request.

Shipping Information

K31800: Shipping Weight: 10 lbs (4.5kg)
Dimensions: 1.3 Cu. ft.

K31810/K31820: Shipping Weight: 18 lbs (8.2kg)
Dimensions: 2.8 Cu. ft.

Ordering Information		
Catalog No.		**Order Qty**
K31800	Metal Still Plated brass and copper, with lid and clamp assembly, gasket and O-ring seal.	1
K31910	Ring Burner, 5" (12.7cm) dia.	1
K31810	Glassware Set Includes 400mL condenser, 10mL and 25mL receiving traps	1
K31820	Mounting Equipment Consists of stand and connecting hardware	

General Purpose Heater

Utility Heater

- For general laboratory applications
- Precise, reproducible settings
- 1000W or 1250W nichrome heater option
- Accepts flat bottom and round bottom beakers and flasks

Variable control electric heater designed for efficient, reproducible heating of flat bottom and round bottom beakers and flasks. Electronic unit control with reference dial permits fine temperature adjustment and accurate repeatable settings. Includes porcelain refractory heater with nichrome element (1000W or 1250W) and refractory support plate that reverses to accept different size beakers and flasks. Polished stainless steel housing has cooling vents and two dovetail clamps to accommodate accessory support rod. Line switch and 6ft. (1.8m) three-conductor line cord and plug are included.

Electrical Requirements: CE
115V 60Hz
220-240V 50/60Hz

Dimensions lxwxh,in.(cm)
5x5x10 (12.7x12.7x25.4)
Net Weight: 4½ lbs (2.0kg)

Shipping Information

Shipping Weight: 8 lbs (3.6 kg)
Dimensions: 1.5 Cu. ft.

Ordering Information	
Catalog No.	
K42000	Utility Heater, 115V 60Hz, 1000W
K42001	Utility Heater, 115V 60Hz, 1250W
K42090	Utility Heater, 230V 50/60Hz, 1000W
K42091	Utility Heater, 230V 50/60Hz, 1250W

K42000 General Purpose Utility Heater

Refractive Index of Petroleum Products

Test Method

Refractive index is a fundamental physical property that is used in conjunction with other properties to characterize pure hydrocarbons and their mixtures. It is a useful property for concentration measurements, purity determinations and chemical identification.

Automatic Petroleum Refractometer

- Conforms to ASTM D1218, D1747 and D5006 test specifications
- Electronic heating and cooling Peltier system eliminates the need for a circulating water bath
- Automated and precise refractive index measurements
- Rugged sapphire prism
- Designed for samples ranging from clear to highly colored, dark and opaque
- Clear graphical LCD display with on-screen instructions and full menu operation
- Multipoint calibration routines maximize accuracy
- RS232C and centronics communication ports

The Koehler Automatic Refractometer uses precision optics and superior image analysis to extend the repeatability and accuracy of refractive index measurements for petroleum products. Subjectivity is removed from tests results because no manual activities such as aligning shadowlines or reading analog scales are necessary. Opaque hydrocarbons present no problem for this unit which uses reflected light measurement technology as opposed to manual refractometers which are of the transmission type. The dual temperature control system and flat, easy clean sample area make the instrument ideal for viscous or sticky samples.

Two models are available. Models K27550 and K27560 conform to ASTM D1218 and D1747 (maximum temperature 100ºC) and measures to the fifth decimal place refractive index or one hundredth place in percent solids. The K27550 also has a built in data storage system with secure electronic signature recording.

The refractometer incorporates numerous innovations designed to improve the accuracy of petroleum product testing. A 589 nanometer filter gives true Sodium D-Line refractive index readings. The large graphical LCD is easy to read and provides complete sample analysis documentation including the reading, temperature and scale name of the screen.

Set-up, diagnostic and calibration routines are displayed with easy to follow step-by-step instructions. User-developed customer calibration curves may be programmed allowing automatic temperature correction and direct percent concentration, percent reaction completion, etc. This unit has been used successfully throughout the petrochemical industry.

Ordering Information

Catalog No.	
K27550	Automatic Petroleum Refractometer for D1218 and D1747 110-240V 50/60Hz Includes data storage
K27560	Automatic Petroleum Refractometer for D1218 and D1747 110-240V 50/60Hz
	Accessories
K27504	Calibration Fluid, Certificate of NIST traceability included.
K27505	Refractometer Communication Software Package, with real-time data export into Microsoft® Excel.

K27550 Automatic Refractometer

Specifications

Measurement Scales:
- Refractive Index (RI)
- BRIX (% sucrose)
- Temperature Corrected RI
- Temperature Corrected BRIX
- Ten User-Programmable Scales

Illumination: 589nm light emitting diode with interference filter (estimated life: 100,000 hrs)

Range:
- Dissolved Solids: 0 to 95% solids
- Refractive Index: 1.29000 to 1.70000nD (nD - Sodium D-Line Refractive Index)

Readability:
- Standard Mode: 0.1% Solids 0.0001nD
- Extended Mode: 0.01% Solids 0.00001nD

Precision:
- Standard Mode: ±0.02% Solids ± 0.00002nD
- Extended Display Mode: Refractive Index Standard Oils ± 0.00002 Typical clear aqueous samples, % Solids Temperature Compensated, as sucrose ±0.02%

Calibration Fluid: refractive index standard oil, NIST traceable nominal value 1.495 RI, 67.61 BRIX

Sample Types: Transparent, translucent or opaque

Prism Assembly: Stainless steel, synthetic sapphire sealed with solvent-resistant epoxy

Calibration:
- 1 point - Water only
- 2 point - Water and refractive index or Brix standard

Electrical Requirements: CE
- 110-240V 50/60Hz

Dimensions lxwxh,in.(cm)
15½x10x4½ (39½x25½x11½)

Net Weight: 23 lbs (10½kg)

Shipping Information

Shipping Weight: 30 lbs (14kg)

Dimensions: 5 Cu. ft.

Koehler INSTRUMENT COMPANY, INC.

Calibration of Liquid-in-Glass Thermometers

Thermometer Calibration Bath

- Calibrates thermometers, temperature controllers and other temperature instruments against a factory certified thermometer traceable to NIST standards
- Verifies accuracy of routine thermometers
- For temperatures between ambient to 200°C (–30°C with the use of circulated refrigerated coolant)
- Digital temperature control with temperature uniformity of ±0.02°C
- Built-in ice bath for performing ice point calibrations
- Meets the requirements of NBS Monograph 150

Constant temperature calibration bath for liquid-in-glass thermometers, dial thermometers, digital thermometers and other temperature measuring instruments. Consists of an oil bath with digital electronic control providing temperature uniformity of ±0.02°C in the range –30°C to +200°C. Accessory Standard Thermometer is calibrated and certified traceable to NIST standards. Turntable rack inserts in bath to immerse six thermometers or temperature probes and the standard thermometer. Bath depth of 12" (30.5cm) accommodates all partial immersion thermometers and most 15" total immersion thermometers.

Features digital setpoint and display (°C/°F switchable) of bath temperature for maximum convenience, and overtemperature control to prevent accidental overheating. Built-in cooling coil permits circulation of tap water or refrigerated coolant to permit operation at sub-ambient temperatures or to facilitate rapid cool down for multi-point calibrations. Equipped with drains for oil bath and ice bath.

Dimensions: lxwxh,in.(cm)
28x24x21(71x61x53)
Net Weight: 52¾ lbs (23.9kg)

Shipping Information
Shipping Weight: 66 lbs (30kg)
Dimensions: 8.2 Cu. ft.

Specifications

Temperature Range: –30°C to +200°C
For sub-ambient temperatures, refrigerated recirculating coolant is required from an external source.
Temperature Uniformity: ±0.02°C
Temperature Limit Control: –16.7°C (30°F) above setpoint and 204°C (400°F) maximum
Heater Range: 0-750W
Circulator: ⅓₀ hp impeller
Working Depth: Oil Bath: 12" (30.5cm)
Ice Bath: 10½" (26.7cm)
Electrical Requirements: CE
115V 60Hz
220-240V 50/60Hz

Ordering Information

Catalog No.		Order Qty
K26500	Thermometer Calibration Bath, 115V 60Hz	1
K26590	Thermometer Calibration Bath, 220-240V 50/60Hz	
	Accessories	
K26501	Standard Thermometer, certified traceable to NIST Standards at 0, 20, 37, 56, 80, 100, 121, 140, 160, 180 and 200°C	1
K26503	Thermometer Magnifier(10X)	1
K26502	Thermometer Carrying Case, holds K26501 Standard Thermometer	1

pH / Conductivity Meters

pH Meter

This bench-top pH meter is an ideal help in every laboratory for routine or R&D level measurement. This instrument measures pH, mV and has 40- point data memory storage. Instrument has two operating modes -
1. Standard mode
2. GLP mode: 40 data readings can be stored, printed and scanned on display. For GLP mode, additional entries of sample name and ID number can be stored.

The optional Data logging function enables the user to store 24 data points consisting of pH, temperature and time readings. For example, as required in kinetic study or in any chemical reaction. Time intervals from 1min. to 1Hr. in steps of 1min. are available. User entries of pH limit values make the data more defined and informative.

Conductivity Meter

Koehler offers the perfect choice of a bench top conductivity meter for measurements in the laboratory - whether routine or at the R & D level. The conductivity meter offers better operating comfort and measuring confidence in all areas of application. Due to a user selective temperature function, the instrument calculates the conductivity at the reference temperature 25 ± 0.1°C with a linear function.

Conductivity is an important factor in water analysis for quality of drinking water, direct ionic concentration measurement in pharmaceutical preparations, waste water treatment plants, pollution control in lakes & rivers, boiler feed water and oceanography to determine salinity and TDS.

Specifications

Temperature Range: 0 to 150°C
Temperature Resolution: 0.1°C
Temperature Accuracy: ± 0.2°C
Display: 20 x 2 line back-lit LCD
Keyboard: Aphanumeric splash water-proof polyester soft keys
Output: 1 – Parallel Port for Printer, 1 – RS232C for PC
Environmental Operating Temperature: Ambient to 45°C
Relative Humidity: 5 to 90% non-condensing
Electrical Requirements: CE
115V 60Hz
230V 50Hz

Dimensions wxdxh,in.(cm)
12x8.7x27.6 (30.5x22x70)
Net Weight: 4.85 lbs (2.2kg)

Ordering Information

Catalog No.	
K90601	pH Meter, 115V 60Hz
K90691	pH Meter, 230V 50Hz
K90602	Conductivity Meter, 115V 60Hz
K90692	Conductivity Meter, 230V 50Hz
K90603	pH / Conductivity Meter, 115V 60Hz
K90693	pH / Conductivity Meter, 230V 50Hz

Automatic Titration

Test Method

For determination of Total Acid Number (TAN), Total Base Number (TBN), Mercaptan Sulfur and Karl Fischer Water Content of petroleum products, lubricants and transformer insulating oils. Titration is the fundamental chemical analysis procedure whereby the concentration of a chemical substance in solution is determined by reacting it with a measured amount of another chemical. The Auto titrator performs this analysis using a motor driven dispenser, stirred reaction vessel and electrodes which sense the completion of reaction by measuring the potential difference between two electrodes. Automatic Titration increases accuracy, repeatability and reproducibility as well as minimizing errors in calculation and documentation.

Automatic Titrator

The Automatic Titrator is capable of performing a wide range of Titrations:

- Acid-base or aqueous titration
- Redox titration
- Complexometric titration or EDTA titration
- Blank titration
- Silver Assay titrations
- Non-aqueous titration
- Argentometric or Precipitation titration
- Voltametric / KF Titration
- Back titration

The Automatic Titrator is provided with two-point auto calibration and standardization (zero offset). The instrument is capable of displaying pH and mV of the sample, with temperature compensation. The Automatic Titrator can accept a variety of electrodes to cater to various applications in different fields. The liquid path is comprised of Teflon tubing, a Teflon lined valve and gas tight burette with a Teflon plunger head. It creates a chemically inert system for any sensitive analysis. The instrument is supplied with high speed vortex stirrer with digital speed indication. This specially designed stirrer provides excellent homogenous mixing of samples. An optional magnetic stirrer is also available.

Ordering Information

Catalog No.	
K90500	Automatic Potentiometric Titrator, 115V, 60Hz
K90590	Automatic Potentiometric Titrator, 230V, 50Hz

Accessories

K90500-1	Karl Fischer Titrator Burette Assembly
K90500-2	Filter Desiccant Dryer Tube
K90500-3	Magnetic Stirrer with Holding Ring
K90500-4	Magnetic Stirrer with Electrode Arm
K90500-5	Vessel Heating / Cooling Accessory
K90500-6	pH Checker

K90500 Automatic Potentiometric Titrator

Specifications

Conforms to the Specifications of:
ASTM D664, D2896, D3227, D4739
Principle: Volume determination by equivalence point, end point or pH STAT.
Control: Microcontroller based
mV range: ± 3200 mV.
Accuracy: ± 0.1 mV (± 0.0016 pH).
Amplifier input impedance: > 10 ohms
Burette Resolution: 1/5000 for 5 ml, 1/10000 for 10 ml, 1/5000 for 25 ml.
Filling time: Less than 20 seconds
Keyboard: Alphanumeric splash waterproof polyester soft keys.
Display: 40 x 2 line back lighted liquid crystal display (LCD).
Titration Head: Manual stand with swiveling arm.
Stirrer System: Microcontroller based variable speed, high torque vortex stirrer with digital indication. (Magnetic Stirrer optional)

Sensors:

Electrodes for Potentiometric titration - (pH, Ion, Redox, Argentometric).
a) Any combination electrode. b) Differential Electrode System comprising sensing (Indicator) Electrode with BNC Connector and Reference Electrode with 4mm Banana Connector.
Electrode for KF/Voltametric titration with BNC/TNC Connectors.
Temperature sensor (PRT/PT100)
Calibration: 3-point Calibration with user entered buffer values and standardization with 7 pH buffer.
End Point detection: a) Potentiometric b) Voltametric c) Thermometric and Photometric.
Cut-off criteria: a) Volume b) End point c) mV/pH.

Methods:

Titrations:
a) Acid base b) Nonaqueous c) Redox d) Preciptiation
e) Complexometric f) back titration
KF titration (Optional)
Results: a) Molarity b) % Assay(wt), c) % volume (ml) d) ppm e) mg/l f)mg/g g)g/l h) meq/l i) mol/kg j) TAN and TBN for oil samples.
Method Storage: 50 methods with parameters.
Titrant Molarity storage: 20 values
Input/Output Peripheral Interface:
(a) Parallel Port: 1 - for printer
(b) Serial Port: 2 - for Balance & PC
Electrical Requirements: CE
115V, 60Hz
230V, 50Hz

Koehler INSTRUMENT COMPANY, INC.

Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter

Test Method

Heat of combustion is determined in this test method by burning a weighed sample in an oxygen bomb calorimeter under controlled conditions. The heat of combustion is computed from temperature observations before, during and after combustion with proper allowances for thermochemical and heat transfer corrections. Either isothermal or adiabatic calorimeter jackets can be used.

Automatic Calorimeter

The automatic calorimeter is the latest system for determining gross calorific values of liquids and solid fuels. A higher level of automation with extremely simple handling characterizes this device.

In addition to the Isoperibolic measurement procedure, a Dynamic (reduced-time) mode is also available for the user. Different working temperatures can be selected for both procedures based on the temperature of the connected water.

To provide a supply of cooling water, the calorimeter can be connected to a standard thermostat or an appropriate permanently installed water connection, with a connection valve. The unit is equipped with a very convenient operating panel through which operation of the device takes place. The graphical display with active back lighting displays the appropriate status messages. The temporal course of a measurement that has been started and all current parameters of the weighed in sample can be constantly monitored and are arranged to be clearly visible.

Connections for analysis scale, printer, sample rack for identifying and managing samples are already integrated into the basic device. The network connection and the special configuration for data exchange can be implemented at any time with LIMS.

In combination with special halogen-resistant decomposition vessels quantitative decompositions can be performed to determine halogen and sulfur content.

Dimensions lxwxh,in.(cm)
17½x17¾x19¾ (440x450x500) Net Weight: 66 lbs (30 kg)

Specifications

Conforms to the specifications of:
ASTM D240; D4809; D5865; D1989; D5468; E711; ISO 1928; DIN 51900; BS1016
Measurement range: 40,000 J
Measuring mode: Isoperibolic 25°C; Isoperibolic 30°C; Dynamic 25°C; Dynamic 30°C
Isoperibolic Measuring Time: Approximately 22 min
Dynamic Measuring Time: Approximately 7 min
Oxygen Operating Pressure: 30 bar
Cooling Medium: Water via line, flow through quantity 60 + 10 liters / hour
Water Operating Pressure: 1 – 1.5 bar max.
Water Test Pressure: 10 bar
Interfaces: Serial (RS232); Parallel; Keyboard; Sample rack; External monitor

Ordering Information

Catalog No.	
K88800	Automatic Calorimeter, 115V 60Hz
K88890	Automatic Calorimeter, 220V 50Hz

Accessories

K88800-1	Cooling water supply unit, 115V 60Hz
K88890-1	Cooling water supply unit, 220V 50Hz
K88800-2	Pressure Gauge, Oxygen To reduce the pressure of the oxygen cylinder to 30 bar
K88800-3	Standard Decomposition Vessel
K88800-4	Decomposition Vessel, Halogen Resistant For quantitative decomposition determine halogen and sulfur content
K88800-5	Connection valve Required for permanently installed water connection

Automatic Filter Plugging Tendency Analyzer (FPT)

Test Method

Determines the Filter Plugging Tendency (FPT) of distillate fuel oils where the end use demands an exceptional degree of cleanliness. This test is applicable to fuels within the viscosity range of 1.50 to 6.00 mm2/s (cSt) at 40°C. The test is not applicable to fuels that are not clear and bright because water interferes with the measurement of filter plugging. Causes of poor filterability might include fuel degradation products, contaminants picked up during storage or transfer, or interaction of the fuel with the filter media. Any of these could correlate with orifice or filter system plugging, or both.

Automatic Filter Plugging Tendency Analyzer

- Integrated Cooling System equipped with a single stage gas motor compressor CFC free
- Measuring device complete with support for filter, Beakers, PT100 sensor Class A, level sensor, pressure gauge, tubes and joints.
- Pump 20 mL/min
- 6.4" TFT/LCD built-in touch screen panel PC for the managing of the analyzer by means of Lab-Link Software
- USB connection to an external printer or external PC
- Storage capacity for more than 60,000 analysis

Specifications

Conforms to the specifications of:
ASTM D2068; IP 387
Electrical Requirements: CE
115V 60Hz
220-240V 50/60Hz

KLA-6 Automatic Filter Plugging Tendency Analyzer (FPT)

Ordering Information

Catalog No.	
KLA-6	Automatic Filter Plugging Tendency Analyzer (FPT), 115V 60Hz
KLA-6 (220)	Automatic Filter Plugging Tendency Analyzer (FPT), 220-240V 50/60Hz

Accessories

KLA-1820-8013	Glass Fibre Filters, pk of 100
KLA-PT100-CAL	Calibration Box and Cables
KLA-DB-KIT	Kit of Connectors and Cables for Cold range

Oxidation Stability of Foods, Oils, Fats and Biodiesel Fuels

Test Method

For the determination of the oxidation stability of samples (solid, semi-solid, or liquid), in order to determine product quality and obtain value added information related to the fat oxidation processed in samples of foods, oils, fats and Biodiesel Fuels.

Oxidation Test Reactor

The Oxidation Test Reactor is a versatile instrument suitable for a wide range of oxidation stability and shelf-life applications including:

- Prediction of the oxidation stability during shelf-life studies, by analyzing the product at defined time intervals and building an experimental curve
- Evaluation of the adequacy of storage conditions
- Evaluation of an optimal packaging solution
- Comparison of the oxidation stability of different formulas for food preparations
- Evaluation of the oxidative stability of vegetable oils of different botanical origin
- Evaluation of the effectiveness of antioxidants
- Information on product oxidation when the oxidation flex is not visible, especially for products with a low fat content (4-5%). In this case, product oxidation can be achieved by combining the Oxidation Test Reactor with the gas chromatographic technique.

The Oxidation Test Reactor is a complete solution, controlled entirely by the Windows®-based oxidation software capable of providing high added value information concerning fat oxidation processes in foods, oils, fats and biodiesel fuels.

The Oxidation Test Reactor works directly on the whole sample without the need for preliminary fat separation, and is suitable for the determination of the quality and the state of preservation of the sample.

An extremely simple and intuitive instrument equipped with two separate titanium chambers in order to analyze the same sample in duplicate or different samples at the same time, under the same conditions.

The stability of the sample is determined by accelerating the oxidation process using high temperatures (from Ambient to 110°C) and a pre-determined oxygen pressure. Oxygen is consumed during fat oxidation and it is this decrease in oxygen pressure that enables us to obtain useful information concerning the sample.

The intuitive software controls the entire process in a user friendly way and the operator can record data in a database, compare tests, export the data to an Excel file, filter and order the data quickly and easily.

K83100 Oxidation Test Reactor

Specifications

Based on the Specifications of:
ASTM D942; IP 142
Temperature Range: Ambient to 110°C
Number of Oxidation Chambers: 2
Chamber Capacity: 100mL
Pressure Range: 0 – 8 bar
Interface: USB
Overpressure: Safety Valve
Out of Range Temperature: Visual Alarm
Damaged Probe: Visual Alarm
Electrical Requirements: CE
220-240VAC, 50/60Hz

Included Accessories

Oxidation Software
USB Cable
Sample Holder (6)
Spacer (4)

Dimensions wxdxh,in.(cm)

14.6 x 19.4 x 7.6 (36.5x48.5x19)
Net Weight: 36.3 lb (16.5 kg)

Ordering Information	
Catalog No.	
K83100	Oxidation Test Reactor, 220-240V 50/60Hz

Additional Accessories

Additional equipment, materials and/or reagents are required to perform some of the test procedures in the preceding pages. Please refer to the applicable test method for further information, or contact Koehler for assistance.

Aniline Point and Mixed Aniline Point of Petroleum Products and Hydrocarbon Solvents ..... Pages 42-43

ASTM D611; IP 2, ISO 2977; DIN 51775; FTM 791-3601

Pipets, 10mL and 5mL
Laboratory Balance
Oven
Rubber Suction Bulb
Safety Goggles
Plastic Gloves
Aniline
Calcium Sulfate or Sodium Sulfate, anhydrous
n-Heptane
Air Supply (for Automatic Aniline Apparatus)

Saybolt Color of Petroleum Products ..... Pages 44, 46-47

ASTM D156; DIN 51411; FTM 791-101

Acetone or other Solvent
Soap
Qualitative Filter Papers
Distilled Water

ASTM Color of Petroleum Products (ASTM Color Scale) ..... Pages 45-46

ASTM D1500; IP 196; ISO 2049; FTM 791-102

Solvent Kerosene (for dark samples)
Distilled Water

Distillation of Petroleum Products at Reduced Pressures ..... Pages 53-54

ASTM D1160

Toluene
Cyclohexane
n-Tetradecane
1L Beaker
Boiling Chips
Nitrogen
Balance
n-Hexadecane
Calcium Chloride
Silicone Fluids

Sulfur in Liquefied Petroleum Gases (Oxy-Hydrogen Burner) ..... Page 58

ASTM D2784

Oxygen
Nitrogen
Acetone
Hydrogen Peroxide
Methylene Blue
Alcohol
Thorin
Perchloric Acid
Spectrophotometer
Sodium Hydroxide
Low Sulfur Acetone
Safety Shield
Hydrogen
Sulfuric Acid
Isopropanol
Glycerin
Vacuum Source
Distilled Water
Carbon Dioxide
Barium Chloride Dihydrate
Denatured Ethyl Alcohol
Hydrochloric Acid
Barium Perchlorate
Fleisher's Methyl Purple Indicator

Traces of Volatile Chlorides in Butane-Butene Mixtures ..... Page 58

ASTM D2384

Mercuric Thiocyanate
Potassium Nitrate
Saturated Calomel Electrolyte
Mercury-Calomel Mixture
Silver Nitrate
Gelatin
Acetone
Hydrochloric Acid
Perchloric Acid
Agar Powder
Nitrogen
Nitric Acid
Iron Wire
Hydrogen
Hydrogen Peroxide
Bromthymol Blue Indicator
Sodium Carbonate
Titration Equipment
Oxygen
Vacuum Source

Ramsbottom Carbon Residue of Petroleum Products ..... Page 59

ASTM D524; IP 14; ISO 4262; FTM 791-5002

Desiccator
Strainer (100-mesh)
Analytical Balance
Calcium Chloride
Syringe

Sediment in Crude Oils and Fuel Oils by the Extraction Method ..... Page 61

ASTM D473; IP 53; ISO 3735; DIN 51789; FTM 791-3002

Desiccator
Toluene
Analytical Balance

Rust Protection by Metal Preservatives in the Humidity Cabinet ..... Page 65

ASTM D1748; FTM 791-5310

Silica Sand
Petroleum Naphtha
Precipitation Naphtha
Methyl Alcohol
Air Supply
Water Supply

Freezing Point of Aqueous Engine Coolant Solution ..... Page 68

ASTM D1177

Glass Wool
Solid Carbon Dioxide
Liquid Nitrogen

Fuels

Test Methods	Page
Oxidation Stability of Gasoline (Induction Period Method) ASTM D525, D5304; IP 40; ISO 7536 DIN 51799, 51780; FTM 791-3352	**80-84**
Oxidation Stability of Aviation Fuels (Potential Residue Method) ASTM D873; IP 138; DIN 51799; FTM 791-3354	**80-84**
Assessing Distillate Fuel Storage by Oxygen Overpressure ASTM D5304	**85**
Existent Gum in Fuels by Jet Evaporation ASTM D381; IP 131; ISO 6246; DIN 51784; FTM 791-3302	**86-87**
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For information on additional testing methods for fuels:

–Cloud Point and Pour Point of Petroleum Oils
–please refer to pages 132-133
–Oxidation Stability of Distillate Fuel Oil (Accelerated Method)
–please refer to pages 120-122
–Please refer to the Viscosity, Flash Point and General Tests Sections
–Additional test methods are available upon request
–please call or write for information

Oxidation Stability of Gasoline and Aviation Fuels

Oxidation Stability of Gasoline (Induction Period Method)
Oxidation Stability of Aviation Fuels (Potential Residue Method)

Test Method

Provides an indication of the tendency of gasoline and aviation fuels to form gum in storage. The sample is oxidized inside a stainless steel pressure vessel initially charged with oxygen at 100psi (689kPa) and heated in a boiling water bath. The amount of time required for a specified drop in pressure (gasoline) or the amount of gum and precipitate formed after a specific aging period (aviation fuels) is determined.

Oxidation Stability Test Apparatus

- Conforms to ASTM D525, D873, ISO 7536 and related specifications
- Oxidata® Pressure Measurement System
- Available in two, four or six-unit configurations
- Choice of water/liquid or solid block heating baths
- Oxidation pressure vessel incorporates burst disk assembly

Consists of Oxidation Pressure Vessel, Pressure Measurement Equipment, Oxidation Bath and Accessories.

Ordering Information

Oxidation Pressure Vessel	*page 80*
Oxidation Baths	*pages 81-82*
Pressure Measurement Equipment	*pages 83-84*
Accessories	*pages 81-82*

Oxidata® Pressure Measurement System

For Oxidata® specifications and ordering information refer to pages 83-84.

K10500 Oxidation Pressure Vessel

Oxidation Pressure Vessel

Precision machined stainless steel pressure vessel includes threaded body; lid; stem with filler rod and mounting flange; needle valve for purging, pressurizing and exhausting pressure vessel with oxygen; and burst disk assembly. Pressure vessel interior and inside of stem have a high polish to facilitate cleaning and prevent corrosion. Stainless steel burst disk ruptures at 223psi (1537kPa) to prevent unsafe pressure build-up inside pressure vessel. Octagonal sections on the pressure vessel and lid permit tight closure with wrench. Includes buna-N gaskets. See Accessories on pages 81-82 for available rupture disk assembly retrofit for existing pressure vessels. Can also be used as a pressure vessel in ASTM D5304 "Standard Test Method for Assessing Distillate Fuel Storage Stability by Oxygen Overpressure".

Ordering Information

Catalog No.	
K10500	Oxidation Pressure Vessel

Solid Block Oxidation Baths

- Solid block baths conforming to ASTM and related specifications. Constant temperature baths for heating K10500 Oxidation Pressure Vessels in accordance with ASTM specifications.

Solid Block Baths–Insulated aluminum block baths available in two or four-unit capacity. Baths feature microprocessor temperature control with built-in overtemperature protection and dual LED displays for setpoint and actual temperature values in °C/°F format. The solid block design offers operating advantages over the boiling water bath, and meets temperature control and other requirements of ASTM and related methods. It should be noted, however, that many applicable specifications for this test method call for a liquid bath medium. Housed in an insulated steel cabinet with chemical-resistant polyurethane enamel finish. Includes lids for pressure vessel ports. Order thermometer separately.

Communications software (RS232, etc.) ramp-to-set and other enhanced features are available on the solid block and 4-6 place liquid baths as extra cost options. Contact your Koehler representative for information.

Specifications

Conforms to the specifications of: ASTM D525, D873; IP 40, IP 138; ISO 7536; DIN 51780, 51799; FTM 791-3352, 791-3354; NF M 07-012, 07-013
Maximum Temperature:
Solid Block Baths: 250°F (121°C)

Solid block baths meet temperature control and other requirements of ASTM and related methods. While the aluminum block design offers operating advantages over the standard boiling water bath, it should be noted that many applicable specifications for this test call for a liquid bath medium. Please refer to the test method for the specific requirements.

Ordering Information

Type	Catalog No.		Electrical Requirements CE	Heater Range	Dimensions lxwxh,in.(cm)
Solid Block	**K10401**	2 vessels	115V 60Hz 12A	0-1300W	15x10x17 (38x25x43)
	K10491		220-240V 50/60Hz 6A		
	K10403	4 vessels	115V 60Hz 22A	0-2500W	24x10x17 (61x25x43)
	K10493		220-240V 50/60Hz 11A		

Software compatible, inquire with Koehler Customer Service.

K10491 Solid Block Oxidation Bath

Ordering Information

Catalog No.	
	Accessories
K10540	Glass Sample Container and Cover with pour out spout
K10540/C	Glass Sample Container Cover Only
K10510	Gasket. Replacement composition gasket for K10500 Oxidation Pressure Vessel
K10551	Pressure Line. For pressurizing Oxidation Pressure Vessel. 6 ft. (1.83m) long, with quick release coupling for needle valve on pressure vessel and threaded fitting for oxygen tank
K10556	Oxygen Manifold Pressure Relief System Connects to oxygen source to prevent overcharging of vessel. Equipped with relief valve to vent at 125psi and 300 series stainless steel 150psi burst disk assembly. Constructed from 300 series stainless steel. Cleaned for oxygen service
K10520	Wrench. For tightening seal on Oxidation Pressure Vessel
K10530	Table Socket. Installs in benchtop to aid in tightening seal on Oxidation Pressure Vessel
K10560	Bronze Tubing For connecting pressure recorder to vessel. Flexible seamless helical tubing with protective armor braid and connections. 5 ft (1.52m) long
K10525	Burst Disk Assembly Retrofit kit for Oxidation Pressure Vessel without burst disk assembly
250-000-22F	ASTM 22F Thermometer Range: 204 to 218°F
250-000-22C	ASTM 22C Thermometer Range: 95 to 103°C

Oxidation Stability of Gasoline and Aviation Fuels

K10404 Liquid Oxidation Bath with K10500 Pressure Vessels

Water/Liquid Oxidation Baths

- Water/liquid baths conforming to ASTM and related specifications. Constant temperature baths for heating K10500 Oxidation Pressure Vessels in accordance with ASTM specifications.

Water/Liquid Baths–Two different models, both equipped with low liquid-level controllers in accordance with the latest ASTM specifications. Two-unit analog controlled water bath can be flush mounted in a table top if desired, and is equipped with an overflow standpipe/drain to maintain the proper depth when the pressure vessels are inserted, and a plated brass reflux condenser to minimize evaporation loss.

The six unit model can be used with water or oil as a bath medium, and has microprocessor temperature control that provides quick temperature stabilization without overshoot. Dual LED displays provide setpoint and actual temperature values in °C/°F format. A built-in overtemperature control circuit interrupts power should the bath temperature exceed a programmed cut-off point. Both models feature double-wall insulated construction with stainless steel tanks, support racks and port covers. Order thermometer separately. *The 6 unit model can be ordered with interchangeable racks for performing the ASTM D942, ASTM D323 and D1298 test methods–please contact your Koehler representative for additional information.*

Communications software (RS232, etc.) ramp-to-set and other enhanced features are available on the solid block and 4-6 place liquid baths as extra cost options. Contact your Koehler representative for information.

Specifications

Conforms to the specifications of: ASTM D525, D873; IP 40, IP 138; ISO 7536; DIN 51780, 51799; FTM 791-3352, 791-3354; NF M 07-012, 07-013

Maximum Temperature:

2 Unit Water/Liquid Bath: boiling water

6 Unit Water/Liquid Bath: 250°F (121°C)

Solid block baths meet temperature control and other requirements of ASTM and related methods. While the aluminum block design offers operating advantages over the standard boiling water bath, it should be noted that many applicable specifications for this test call for a liquid bath medium. Please refer to the test method for the specific requirements.

Ordering Information

Type	Catalog No.		Electrical Requirements CE	Heater Range	Dimensions lxwxh,in.(cm)
Water/ Liquid	**K10400** Analog	2 vessels	115V 60Hz 17.3A	0-2000W	24x14x24 (61x36x61)
	K10402 Analog		220-240V 50/60Hz 9.0A		
	K10404 Digital	6 vessels	220-240V 50/60Hz 18.1A	0-3000W	24x14x29½ (61x36x75)

Ordering Information

Catalog No.	
	Accessories
K10540	Glass Sample Container and Cover with pour out spout
K10540/C	Glass Sample Container Cover Only
K10510	Gasket. Replacement composition gasket for K10500 Oxidation Pressure Vessel
K10551	Pressure Line. For pressurizing Oxidation Pressure Vessel. 6 ft. (1.83m) long, with quick release coupling for needle valve on pressure vessel and threaded fitting for oxygen tank
K10556	Oxygen Manifold Pressure Relief System Connects to oxygen source to prevent overcharging of vessel. Equipped with relief valve to vent at 125psi and 300 series stainless steel 150psi burst disk assembly. Constructed from 300 series stainless steel. Cleaned for oxygen service
K10520	Wrench. For tightening seal on Oxidation Pressure Vessel
K10530	Table Socket. Installs in benchtop to aid in tightening seal on Oxidation Pressure Vessel
K10560	Bronze Tubing For connecting pressure recorder to vessel. Flexible seamless helical tubing with protective armor braid and connections. 5 ft (1.52m) long
K10525	Burst Disk Assembly Retrofit kit for Oxidation Pressure Vessel without burst disk assembly
250-000-22F	ASTM 22F Thermometer Range: 204 to 218°F
250-000-22C	ASTM 22C Thermometer Range: 95 to 103°C

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Oxidata® Pressure Measurement Systems

- Electronic pressure measurement systems exclusively designed for ASTM oxidation test methods
- Powerful Oxidata® software for Windows® environments
- Monitors up to twelve pressure and four temperature channels
- Automatic end-point detection
- Real-time average bath temperature display
- Can be installed to most manufacturer's fuels oxidation test apparatus

Complete electronic measurement systems for plotting pressure versus time and temperature in oxidation testing of fuels. Each system includes transducers, multiplexer, data acquisition card, software, and mounting and connecting hardware. Systems are available in two, three and four pressure vessel configurations, and additional channels can be added for up to a total of twelve pressure and four temperature channels.

Koehler's pressure measurement systems for fuels oxidation testing features Oxidata®, a high accuracy pressure measurement software package designed exclusively for ASTM oxidation test methods. Designed to run in a Windows® 2000 or Windows XP environment, Oxidata® monitors up to twelve samples simultaneously, with graphical or tabular display of results. Each channel can be independently configured for any of the applicable ASTM standard test methods without compromising the independence or accuracy of the other channels. Independent start and stop times and user programmable end points add even greater flexibility.

The software plots your data on screen on line, real time, and automatically saves your data on disk or to the hard drive during the test to prevent loss of valuable data. Multiple display options include the ability to view the status of all twelve pressure channels on screen simultaneously and then click on any one channel for a graph display; or to view four channels in graphical format simultaneously. Powerful program features allow you to change axes, have colored plot lines and zoom in on a specific plot sector to view data in greater detail.

Oxidata® software automatically detects the break point and induction period.

Oxidata® Features and Specifications

- On line, real time monitoring of up to twelve samples simultaneously – results plot directly to the screen for instant monitoring or printout of results
- Automatic detection and reporting of break point and induction period
- Invalid test indication when a pressure leak is detected
- Menu options for fuels oxidation testing and other ASTM oxidation tests
- Programmable automatic end point detection with graphical and tabular representation
- Each channel can be configured and operated independently with different start/stop times and different ASTM test methods
- Zoom in feature allows for magnification of any plot sector on any channel for a more detailed study
- Monitors and reports temperatures of as many as twelve pressure vessels simultaneously using accessory RTD's, and calculates and displays average temperature for each bath
- Exports data to spreadsheet programs such as Microsoft Excel®, Lotus 1-2-3® etc.
- Temperature and pressure calibration capability
- Data is saved directly to the disk or hard drive during testing to prevent loss of valuable data
- Operates in Windows® 2000 and Windows XP environments

Included Accessories (for the pressure measurement systems)

Transducers (connects directly to pressure vessel)
USB interface
Multiplexer
Oxidata® software
RTD probe assembly (1)
Connecting cables and hardware

Computer Requirements

Processor: Intel® Pentium II or similar (minimum)
Memory (RAM): 256MB or higher
Speed: 500 MHz or higher
Windows® 2000 or higher
Disk Space: 15 MB free space (minimum)
Communications Port: One USB port
Other Software: Microsoft® Excel (97 or above)
One RS232 port for temperature controller (optional)

Koehler INSTRUMENT COMPANY, INC.

Oxidation Stability of Gasoline and Aviation Fuels

Real-time plot screens display pressure versus time for up to twelve samples simultaneously (four different test methods shown).

Ordering Information

Catalog No.

The ordering information below is for installation to existing Koehler equipment. For other makes of equipment, a few basic hardware items may also be required – please contact your Koehler representative for assistance.

Oxidata® Pressure Measurement System for Fuels Oxidation CE

K10504-XP	2-Unit System, 115V 60Hz
K10594-XP	2-Unit System, 220-240V 50/60Hz
K10505-XP	4-Unit System, 115V 60Hz
K10595-XP	4-Unit System, 220-240V 50/60Hz
K10506-XP	6-Unit System, 115V 60Hz
K10596-XP	6-Unit System, 220-240V 50/60Hz

Accessories

K10504-0-1	Transducer
K70519	RTD Kit, for monitoring the temperature of an additional bath

Mechanical Pressure Measuring and Recording Equipment

- One-pen or two-pen mechanical recorders
- Pressure gauge for aviation fuel tests

Mechanical Recorders—Spring-wound circular chart recorder measures pressure inside oxidation pressure vessel for break point and induction period determinations on gasoline. Housed in a steel case suitable for wall mounting. Order accessory bronze tubing for connection to oxidation pressure vessel. Suitable for oxygen service. Includes 100 24-hour charts.

Pressure Gauge for Aviation Fuel Tests—Suitable for testing of aviation fuels according to ASTM D873. Range 0-200psi. Suitable for oxygen service.

Ordering Information

Catalog No.

Mechanical Recorders

K10570	One-Pen Recorder
K10580	Two-Pen Recorder

Pressure Gauge for Aviation Fuel Tests

K10590	Pressure Gauge

Accessories

308-000-005	Recorder Charts Pack of 100
308-001-02R	Recorder Cartridge Pen, Red (for use with K10570 Recorder)
308-001-02B	Recorder Cartridge Pen, Blue (for use with K10570 and K10580 Recorders)
308-001-L2R	Recorder Cartridge Pen, Long Red (for use with K10580 Recorder)

Assessing Distillate Fuel Storage Stability by Oxygen Overpressure

Test Method

Used for assessing potential storage stability of middle distillate fuels, including fuels with or without stabilizer additives, and freshly refined or previously stored fuels. The sample is aged in a pressurized vessel at constant temperature for 16 hours and, after cooling, the total amount of insoluble products is determined gravimetrically.

Pressure Vessel

- Conforms to the specification of ASTM D5304
- Four, Six and Ten unit models

Stainless steel pressure vessels accommodate multiple sample containers for determining storage stability of fuels by the oxygen overpressure method. Vessels meet all applicable ASME and ASTM safety requirements for construction and working pressure and maximum operating temperature and are equipped with pressure safety valves factory present at 200psi (1,332kpa). Included with each model are a collapsible glassware rack that installs and removes easily for cleaning, oxygen inlet and outlet valves with quick disconnect fittings and charging hose, pressure gauge and wide-mouth closure with viton O-ring seal.

Specifications

Conforms to the specifications of:
ASTM D5304
Capacity: Four, six or ten sample containers
Construction: 316 stainless steel, in accordance with ASME specifications
Working Pressure at 90˚C: Exceeds ASTM requirements
Safety Relief Valve Setting: 200psi (1,332kPa)
Pressure Gauge: 0-200psi

Included Accessories

Glassware rack, hinged, for four, six or ten sample containers
Charging hose with pressure tight crimp and quick disconnect

Dimensions:

K10600: 8½" high by 9½" round
Net Weight: 14 lbs (6.4kg)
K10601/K10602: 15½" high by 9½" round
Net Weight: 17 lbs (8kg)

Shipping Information:

K10600:
Shipping Weight: 17 lbs (8kg)
Dimensions: 2.6 Cu. Ft.
K10601/K10602:
Shipping Weight: 22 lbs (10kg)
Dimensions: 3.5 Cu. Ft.

K10600 Pressure Vessel, 4 Unit

Ordering Information

Catalog No.		Order Qty
K10600	Pressure Vessel, 4 Unit	1
K10601	Pressure Vessel, 6 Unit	
K10602	Pressure Vessel, 10 Unit	
	Accessories	
K10540	Sample Container with lid	

Existent Gum in Fuels by Jet Evaporation

Test Method

Gum formed during fuel storage can deposit on induction system surfaces, intake valves, stems and guides. To test for gum content, a 50mL sample is evaporated in an aluminum block bath for a specified period under controlled conditions of temperature and flow of air (aviation and motor gasolines) or steam (aircraft turbine fuel).

Existent Gum Test Apparatus

Evaporates aircraft turbine fuel and motor and aviation gasoline samples under controlled conditions in accordance with ASTM specifications. Consists of a high temperature evaporation bath with 100mL test beakers and, for aircraft turbine fuels, a steam generator and steam superheater.

Evaporation Baths

- Conforming to ASTM D381 and related specifications
- Choice of three-unit and six-unit models
- Available with built-in steam superheater
- Microprocessor programmable high accuracy temperature control
- Built-in pressure regulators and air flowmeters

Electrically heated baths for determining existent gum in aircraft turbine fuels by steam-jet evaporation and in motor and aviation gasolines by air-jet evaporation. Fully insulated, aluminum block design assures safe, efficient high temperature operation. Equipped with air/steam pressure regulator with gauge and a flowmeter for adjusting air flow per ASTM specifications. Stainless steel jets deliver air or steam flow to the test wells through removable brass conical adapters. Microprocessor PID control provides quick temperature stabilization without overshoot, and the bath is protected by an overtemperature control circuit that interrupts power should bath temperature exceed a programmed cut-off point. Dual LED displays provide actual and setpoint temperature values in °C/°F format. *Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. Contact your Koehler representative for information.*

Model K33800 with Built-in Superheater–Six-unit bath with a built-in thermostatically controlled superheater which delivers dried steam to the bath inlet for steam-jet method testing of aircraft turbine fuels. Has digital-indicating solid state bath temperature control with digital setpoint and display.

Model K33700–Six-unit bath without built-in superheater.

Model K33780–Three-unit bath without built-in superheater. All controls are housed in the bath cabinet.

Ordering Information

Catalog No.	
K33800	Existent Gum Evaporation Bath, 6-Unit with Superheater, 220-240V 50/60Hz
K33700	Existent Gum Evaporation Bath, 6-Unit, 220-240V 50/60Hz
K33780	Existent Gum Evaporation Bath, 3-Unit, 115V 60Hz
K33781	Existent Gum Evaporation Bath, 3-Unit, 220-240V 50/60Hz

Software compatible, inquire with Koehler Customer Service.

K33700 Existent Gum Evaporation Bath

Specifications

Conforms to the specifications of: ASTM D381; IP 131; ISO 6246; DIN 51784; FTM 791-3302; NF M 07-004
Testing Capacity:
K33800 and K33700: 6 sample beakers
K33780 and K33781: 3 sample beakers
Maximum Temperature: 475°F (246°C)
Temperature Control Stability: ±1°F (±0.5°C)
Bath Configuration: machined aluminum block with multiple cartridge heaters
Heater Range:
K33800 and K33700: 0-3000W
K33780 and K33781: 0-1500W
Superheater: (Model K33800 only)
Superheating chamber and condensate trap constructed of stainless steel
Solid state thermoregulator (0-550°F) Heater Range: 0-1500W
Electrical Requirements: CE
K33700: 220-240V 50/60Hz, Single Phase, 13.6A
K33800: 220-240V 50/60Hz, Single Phase, 20.4A
K33780: 115V 60Hz, Single Phase, 13.0A
K33781: 220-240V 50/60Hz, Single Phase, 6.8A

Included Accessories

Conical Brass Adapters for air/steam jets

Dimensions lxwxh,in.(cm)

K33800: 32½x20x20 (83x51x51)
K33780: 32½x11x19 (83x28x48)
K33700: 28x20x16 (71x51x41)
Net Weight:
K33800: 230 lbs (104.3kg)
K33780: 85 lbs (38.6kg)
K33700: 203 lbs (92.1kg)

Shipping Information

K33800
Shipping Weight: 313 lbs (142kg)
Dimensions: 17.2 Cu. ft.
K33780
Shipping Weight: 140 lbs (63.5kg)
Dimensions: 8.3 Cu. ft.
K33700
Shipping Weight: 271 lbs (123kg)
Dimensions: 13.7 Cu. ft.

Steam Generator

- For steam-jet method testing of aircraft turbine fuels
- Meets output requirements of three-unit and six-unit evaporation baths
- Electrically heated for clean, efficient operation and ease of installation
- Meets applicable ASME, NEC standards; UL listed, CSA approved

Electrically heated boiler provides instantaneous and reserve steam capacity for steam-jet evaporation tests. Easy to install and operate; electrical heating eliminates the need for on-site fuel combustion. Requires only a water feed source and electrical hook-up. Ruggedly constructed, with long life industrial grade incoloy heating element. Includes a full range of safety features: automatic water level control and low water cut-off; steam safety valve; high-limit pressure cut-out with manual reset; steam pressure gauge.

Specifications

Output: 54.1 lbs steam/hr at 212°F
Bhp Rating: 1.83
kW Rating: 18

Dimensions lxwxh,in.(cm)

20x28x36 (51x71x91)
Net Weight: 185 lbs (83.9kg)

Shipping Information

Shipping Weight: 200 lbs (91kg)
Dimensions: 18 Cu. ft.

Ordering Information

Catalog No.	
K33850	Steam Boiler, 120/240V 60Hz, Three Phase
K33850/208601	Steam Boiler, 208V 60Hz, Single Phase, 87A
K33850/208603	Steam Boiler, 208V 60Hz, Three Phase, 50A
K33850/240601	Steam Boiler, 240V 60Hz, Single Phase, 75A
K33850/240603	Steam Boiler, 240V 60Hz, Three Phase, 43A
K33850/380603	Steam Boiler, 380V 50/60Hz, Three Phase, 27A
K33850/415503	Steam Boiler, 415V 50Hz, Three Phase, 25A
K33850/480603	Steam Boiler, 480V 60Hz, Three Phase, 22A

Other electrical configurations for the Steam Boiler are available. Please inquire with Koehler Customer Service for additional information.

K33810 Steam Superheater

Accessories

Catalog No.		Order Qty
K33710	Sample Beaker, 100mL spun copper, 50x78mm	6
332-002-017	Sample Beaker, Borosilicate Glass, 100mL	
250-000-03F	ASTM 3F Thermometer Range: 20 to 760°F	2
250-000-03C	ASTM 3C Thermometer Range: –5 to +400°C	
K33810	Steam Superheater Provides dry superheated steam for evaporation baths not equipped with a built-in superheater. Use together with an outside steam source for steam-jet method testing of aircraft turbine fuels. Superheating chamber and condensate trap are constructed entirely of stainless steel. Solid state temperature controller adjusts between 0-550°F. Equipped with steam inlet and outlet connections and condensate drain valve. Steel exterior has a chemical resistant polyurethane enamel finish. Dimensions 5x27x9½" (13x70x24cm). Shipping Weight: 23 lbs (10.4kg) 220-240V 50/60Hz, Single Phase, 6.8A CE	

Test Apparatus for Steam Jet Method

Ordering Information

Catalog No.		Order Qty
K33800	Existent Gum Evaporation Bath	1
K33850 Series	Steam Boiler	1
K33710	Sample Beaker (or 332-002-017)	6
250-000-03F	ASTM 3F Thermometer. Range: +20 to +215°F	2
250-000-03C	ASTM 3C Thermometer. Range: –5 to +400°C	

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Determination of Accelerated Iron Corrosion in Petroleum Products

Test Method

Accelerated Laboratory and Field Procedure for the determination of corrosion of iron, in the presence of water, on samples such as gasoline and gasoline blended with 10% ethanol, E10 (Specification D4814); gasoline-blend components (except butane); diesel fuel and biodiesel B5, except Grade No. 4-D (Specification D975); biodiesel B6 to B20 (Specification D7467); diesel-blend component such as light cycle-oil; No.1 fuel oil, No.2 fuel oil (Specification D396); aviation turbine fuel (Specification D1655).

Accelerated Iron Corrosion Tester

- Preset Temperature and RPM value in direct accordance with ASTM D7548
- 5" Touch Screen Control Display with Soft keys
- 4-position liquid bath
- Integrated Timer
- Small Footprint

K30260 Accelerated Iron Corrosion Tester

Specifications

Conforms to the specifications of:
ASTM D7548
Temperature Setting: 37.8°C (100°F)
Bath Tank Volume: 1.3 Gallons
Heating/Cooling: Peltier Regulating System
Stirring Speed: 100 RPM; 900 RPM

Dimensions lxwxh,in.(cm)

15x23x14 (38.1x58.5x35.5)
Net Weight: 35 lbs (15.9kg)

Electrical Requirements CE

115V 60Hz
220-240V 50/60Hz

Included Accessories

5ml Syringe with 63.5mm (2.5 in) needle
Test Jar, 90 ml capacity, flat-bottom (4)
Corrosion Test Specimen Assembly (4)
Ethernet Crossover Cable (1)
Magnetic Stirrer Bar according to ASTM (5)
Temperature Probe (4)
Test Jar Cap (4)
Port Cover (4)
O-Ring (4)
2x Lighted Magnifying Lens (1)

Ordering Information

Catalog No.	
K30260	Accelerated Iron Corrosion Tester, 115V 60Hz
K30269	Accelerated Iron Corrosion Tester, 220-240V 50/60Hz

Accessories

250-000-28F	ASTM 28F Thermometer, Range: 97.5 to 102.5°F
250-000-28C	ASTM 28C Thermometer, Range: 36.6 to 39.4°C
K30130	Polishing Chuck
K30150	Drive Motor, 115V
K30180	Drive Motor, 230V
380-100-002	Silicone Carbide Abrasive Cloth Roll, C-100 grit Open Mesh, 38mm width x 22.5m length For Preliminary grinding and final polishing of test specimens.

Water Vapor Content by Measurement of Dew Point Temperature

Test Method

Determines the water vapor content of gaseous fuels by measurement of the dew point temperature, followed by calculation of the water vapor content.

Dew Point Apparatus

- Rugged construction
- Stainless steel sample chamber with incorporated "target mirror"

The Dew Point Apparatus consists of a closed stainless steel dew point chamber containing a highly polished stainless steel "target mirror" and sample inlet and outlet control valves. The chamber is chilled by refrigerant following through the outer cooling jacket, preventing any refrigerant contact with the test sample. The thermometer is inserted into the mirror support structure, providing the temperature of the "target mirror." As the sample flows in the chamber and is deflected across the surface of the mirror, the temperature at which condensation collects on the mirror is recorded as the dew point of the sample.

Specifications

Conforms to the specifications of: ASTM D1142; GPA

Dimensions lxwxh,in.(cm)

3½x6x12¾ (9x15x32.5)
Net Weight: 6½ lbs (3kg)

Shipping Information

Shipping Weight: 11 lbs (5kg)
Dimensions: 2.5 Cu. ft.

K32230 Dew Point Apparatus with Pressure Gauge and ASTM 33C Thermometer

Ordering Information

Catalog No.		Order Qty
K32230	Dew Point Apparatus	1

Accessories

K32230-1	Pressure Gauge, 0 to 4 bar	1
K32230-2	Pressure Gauge, 0 to 40 bar	
K32230-3	Pressure Gauge 0 to 70 bar	
K32230-4	Pressure Gauge 0 to 140 bar	
250-000-33F	ASTM 33F Thermometer, range: –36.5 to +107.5°F	1
250-000-33C	ASTM 33C Thermometer, range: –38 to +42°C	
250-000-114F	ASTM 114F Thermometer, range: –112 to +70°F	1
250-000-114C	ASTM 114C Thermometer, range: –80 to +20°C1	

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Copper Strip Corrosion by Liquefied Petroleum (LP) Gases

Test Method

Tests the corrosiveness of LPG to copper by immersion of a polished test strip in the sample inside a test cylinder at elevated temperature. After one hour the test strip is removed and compared against the ASTM Copper Strip Corrosion Standards.

LPG Copper Strip Corrosion Test Apparatus

- Conforms to ASTM D1838 and related specifications
- Four-sample testing capability

Consists of LPG Corrosion Test Cylinders, Water Bath, Copper Strips, Polishing Materials and the ASTM Copper Strip Corrosion Test Standards.

LPG Corrosion Test Cylinders–Stainless steel cylinder with ¼" needle valves for purging and admitting LPG samples. Dip tube with hook suspends copper strip in sample. Knurled, threaded cap with O-ring gasket hand tightens to a positive seal. Withstands hydrostatic test pressure of 1000 psig (6895kPa).

LPG Corrosion Test Water Bath–Thermostatically controlled water bath submerges four LPG Corrosion Test Cylinders in an upright position. Controls temperature at 100 ±1°F (37.8 ±0.5°C) per ASTM specifications. Soxhlet reflux condenser and constant water level device maintain proper working depth. Polished stainless steel inner wall and powder coated steel outer wall construction. Fully insulated.

Ordering Information

Catalog No.		Order Qty
K40000	LPG Corrosion Test Cylinder	4
K39900	LPG Corrosion Test Water Bath, 115V 60Hz	1
K39990	LPG Corrosion Test Water Bath, 220-240V 50/60Hz	
	Accessories	
K40200	Copper Strip for LPG 12.5x1.5-3.0x75mm with 3.2mm hole per ASTM specifications	4
K40100	Connecting Tubing Sulfur-free plastic-lined tubing for connection of test cylinder valve to sample source. With ¼" stainless steel and aluminum connectors. 24" long	1
K25100	ASTM Copper Strip Corrosion Test Standards Colored reproductions of tarnished strips encased in a plastic plaque.	1
380-240-001	Silicone Carbide Paper, 240-grit For polishing copper strips prior to testing. Pack of 50 sheets	1
380-150-000	Silicone Carbide Grain, 150-grit For final polishing of copper strips prior to testing. 1 lb package	1
380-150-001	Silicone Carbide Paper, 150-grit For polishing copper strips prior to testing. Pack of 50 sheets	1
K25000	Polishing Vise Holds copper strip firmly in place without marring the edges. Stainless steel, mounted on a composition base	1
K25090	Multi-Strip Polishing Vise Similar to K25000 but capable of holding four strips at a time	
250-000-12F	ASTM 12F Thermometer. Range: –5 to +215°F	1
250-000-12C	ASTM 12C Thermometer. Range: –20 to +102°C	

K39900 LPG Corrosion Test Bath

K40000 LPG Corrosion Test Cylinder

Specifications

Conforms to the specifications of:
ASTM D1838; GPA 2140; ISO 6251
Water Bath Specifications:
Capacity: four (4) LPG Corrosion Test Cylinders
Maximum Temperature: 221°F (105°C)
Temperature Control Stability: ±1°F (±0.5°C)
Heater Range: 0-750W
Bath Medium: 3.8 gal (14.4L) Water
Electrical Requirements: CE
115V 60Hz, Single Phase, 6.5A
220-240V 50/60Hz, Single Phase, 3.4A

Shipping Information

Shipping Weight: 27 lbs (12.2kg)
Dimensions: 5.3 Cu. ft.

Dimensions lxwxh,in.(cm)

12x10x24 (30x25x61)
Net Weight: 19 lbs (8.6kg)

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Koehler INSTRUMENT COMPANY, INC.

Copper Corrosion from Petroleum Products

Test Method

The Copper Strip Tarnish Test assesses the relative degree of corrosivity of petroleum products, including aviation fuels, automotive gasoline, natural gasoline, solvents, kerosene, diesel fuel, distillate fuel oil, lubricating oil and other products. A polished copper strip is immersed in 30mL of sample at elevated temperature. After the test period, the strip is examined for evidence of corrosion and a classification number from 1-4 is assigned based on a comparison with the ASTM Copper Strip Corrosion Standards. For aviation fuels and natural gasoline the sample tube is placed inside a stainless steel bomb during testing.

Test Bomb Baths

Thermostatically controlled water bath immerses Copper Strip Corrosion Test Bombs at the required depth per ASTM specifications. Use for testing aviation gasoline, aviation turbine fuel and natural gasoline. Fully insulated, double-wall stainless steel construction. Soxhlet reflux condenser and constant water level device maintain proper working depth. Choice of four-bomb and eight-bomb models. Optional removable test tube rack converts four-bomb model for testing of products not requiring corrosion bomb.

Specifications: Conforms to the specifications of: ASTM D130; IP 154 FSPT DT-28-65; ISO 2160; DIN 51759; FTM 791-5325; NF M 07-015
Testing Capacity:
K25310/K25319: four (4) copper strip corrosion test bombs
K25320/K25329*: eight (8) copper strip corrosion test bombs
**or sixteen (16) test tubes with optional test rack (Catalog No. K25309) installed*
Maximum Temperature: 221°F (105°C)
Temperature Control Stability: ±1°F (± 0.5°C)
Heater Range: 0-750W
Bath Medium: 5 gal (18.9L) water
Electrical Requirements: CE
115V 60Hz, Single Phase, 7.5A
220-240V 50/60Hz, Single Phase, 4A
Temperature Control: Analog

Included Accessories

Rubber Stoppers for bomb openings (4)

Dimensions: lxwxh,in.(cm)
4-bomb model: 12x10x21 (30x25x53)
8-bomb model: 16x11½x21 (41x29x54)
Net Weight:
4-bomb model: 18½ lbs (8.4kg)
8-bomb model: 24 lbs (10.9kg)

Shipping Information

Shipping Weight:
4-bomb model: 41 lbs (18.6kg)
8-bomb model: 45 lbs (20.4kg)
Dimensions:
4-bomb model: 5.3 Cu. ft.
8-bomb model: 5.5 Cu. ft.

Ordering Information

Catalog No.	
K25310	Bath for Copper Strip Corrosion Test Bombs, 4-Unit, 115V 60Hz
K25319	Bath for Copper Strip Corrosion Test Bombs, 4-Unit, 220-240V 50/60Hz
K25320	Bath for Copper Strip Corrosion Test Bombs, 8-Unit, 115V 60Hz
K25329	Bath for Copper Strip Corrosion Test Bombs, 8-unit, 220-240V 50/60Hz
K25309	Optional Test Tube Rack for 8-Bomb Bath

Please refer to page 99 for photograph of K25310 Series Corrosion Baths.

K25330 Copper Strip Test Tube Bath

Test Tube Bath

Constant temperature bath immerses 17 test tubes for copper strip tarnish tests of products not requiring a test bomb, including: diesel fuel, fuel oil, automotive gasoline, Stoddard solvent, kerosene and lubricating oil. Microprocessor temperature controller has °C/°F switchable digital setpoint and display. Operator and equipment are protected by an overtemperature control circuit which automatically interrupts power to the unit should bath temperature exceed a programmed cut-off point. *Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. Contact your Koehler representative for information.* Welded stainless steel inner wall and powder coated steel outer wall construction with built-in support rack. Fully insulated.

Specifications

Conforms to the specifications of: ASTM D130, D6074, D6158; FSPT DT-28-65; IP 154; ISO 2160; DIN 51759; FTM 791-5325; NF M 07-015
Capacity: 17 test tubes
Maximum Temperature: 190°C (374°F)
Temperature Control Stability: ±1°C (±2°F)
Heater Range: 0-750W
Bath Medium: 5 gal (18.9L) water or high temperature heater transfer fluid
Electrical Requirements: CE
115V 60Hz, Single Phase, 7.5A
220-240V 50/60Hz, Single Phase, 4A
Temperature Control: Digital

Dimensions: lxwxh,in.(cm)
15½x12½x14 (39x32x36)
Net Weight: 27 lbs (12.2kg)

Shipping Information

Shipping Weight: 45 lbs (20.4kg)
Dimensions: 12.8 Cu. ft.

Ordering Information

Catalog No.	
K25330	Copper Strip Test Tube Bath, 115V 60Hz
K25339	Copper Strip Test Tube Bath, 220-240V 50/60Hz
K25330-8B	Optional test Bomb Rack
K25330-4B-8T	Optional Rack, 4-Bomb, 8- Tube
K25330-6B-6T	Optional Rack, 6-Bomb, 6-Tube

Software compatible, inquire with Koehler Customer Service.

Copper Strip Corrosion Test Bomb

- For aviation fuels and natural gasoline

Precision machined stainless steel bomb inserts in copper corrosion bath for testing aviation fuels and natural gasoline. Withstands test pressure of 100psi (689kPa) per specifications. Threaded cap with O-ring gasket and knurled circumference tightens by hand to a positive seal. A ⅛" groove in the bomb threads permits safe, gradual release of pressure when opening the bomb.

Specifications

Conforms to the specifications of:
ASTM D130, D6074, D6158; IP 154; ISO 2160; DIN 51759; FTM 791-5325; NF M 07-015
Net Weight: 1 lb (.45kg)

Shipping Information:

Shipping Weight: 2 lbs (.91kg)

Ordering Information

Catalog No.	
K25200	Copper Strip Corrosion Test Bomb

Accessories

K25080	Copper Test Strip 12.5x1.5-3.0mm x 75mm to ASTM specifications
332-004-004	Test Tube 25 x 150mm
332-004-002	Viewing Test Tube Protects copper strip during inspection or storage
K25100	ASTM Copper Strip Corrosion Standards Colored reproductions of tarnished strips encased in a plastic plaque
380-220-001	Silicone Carbide Paper, FEPA Grade, 220 grit For polishing of copper strips prior to testing - Pack of 50 sheets
380-150-003	Silicone Carbide Grain, FEPA grade, 150 grit For final polishing of copper strips prior to testing - 1 lb package
K25000	Polishing Vise Holds copper strip firmly in place without marring the edges. Stainless steel, mounted on a composition base
K25090	Multi-Strip Polishing Vise Similar to K25000 but capable of holding four strips at a time
250-000-12F	ASTM 12F Thermometer. Range: –5 to +215°F
250-000-12C	ASTM 12C Thermometer. Range: –20 to +102°C

Silver Corrosion Test

Please refer to page 99 for information.

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Test Apparatus for Aviation Fuels and Natural Gasoline

Catalog No.		Order Qty
K25310	Bath for Copper Strip Corrosion Test Bombs, 115V	1
K25319	Bath for Copper Strip Corrosion Test Bombs, 220-240V	
K25200	Copper Strip Corrosion Test Bomb	4
K25080	Copper Strips	4
332-004-004	Test Tube	4
332-004-002	Viewing Test Tube	4
K25100	ASTM Copper Strip Corrosion Standard	1
380-220-001	Silicone Carbide Paper, FEPA Grade, 220 grit	1
380-150-003	Silicone Carbide Grain, FEPA grade, 150 grit	1
K25000	Polishing Vise	1
250-000-12F	ASTM 12F Thermometer	1
250-000-12C	ASTM 12C Thermometer	

Test Apparatus for Diesel Fuel, Fuel Oil, Automotive Gasoline, Stoddard Solvent, Kerosene, Lubricating Oil and Biodiesel

Catalog No.		Order Qty
K25330	Copper Strip Test Tube Bath, 115V (or K25339 Bath, 220-240V)	1
K25080	Copper Strips	17
332-004-004	Test Tube	17
332-004-002	Viewing Test Tube	17
K25100	ASTM Copper Strip Corrosion Standard	1
380-220-001	Silicone Carbide Paper, FEPA Grade, 220 grit	1
380-150-003	Silicone Carbide Grain, FEPA grade, 150 grit	1
K25090	Multi-Strip Polishing Vise	1
250-000-12F	ASTM 12F Thermometer	1
250-000-12C	ASTM 12C Thermometer	

K25200 Copper Strip Corrosion Bomb with K25100 and K25080

Vapor Pressure of Petroleum Products (Reid Method) and Liquefied Petroleum Gases (LPG Method)

Test Method

Vapor pressure is a critical factor in the handling and performance of liquid petroleum and liquefied petroleum gas (LPG) products. The vapor pressure of automotive gasolines is subject to governmental regulation for pollution control purposes.

Reid Vapor Pressure Cylinders

- Conform to ASTM D323, D1267 and related specifications
- One-opening and two-opening types

Polished stainless steel test cylinders for vapor pressure tests of liquid petroleum products, volatile crude oil and liquefied petroleum gas (LPG). Consists of upper chamber and lower chamber in required 4:1 volume ratio. O-ring gaskets provide tight seal between chambers and at gauge coupling. One-opening type is for gasoline and other products having a Reid Vapor Pressure below 26psi (180kPa). Two-opening type is for liquid products having a Reid Vapor Pressure above 26psi (ASTM D323) and for LPG (ASTM D1267). Lower chamber of two-opening apparatus includes straight-through ball valve and ¼" needle valve. For LPG testing, order two-opening type apparatus and accessory bleeder valve assembly.

Specifications:

Conforms to the specifications of: ASTM D323, D1267; GPA 2140; IP 69, 161; ISO 3007, 4256; DIN 51616, 51754; FTM 791-1201

Hydrostatic Test (two-opening type): Withstands 1000psi (6894kPa) gauge hydrostatic pressure per ASTM D1267 specifications

Included Accessories

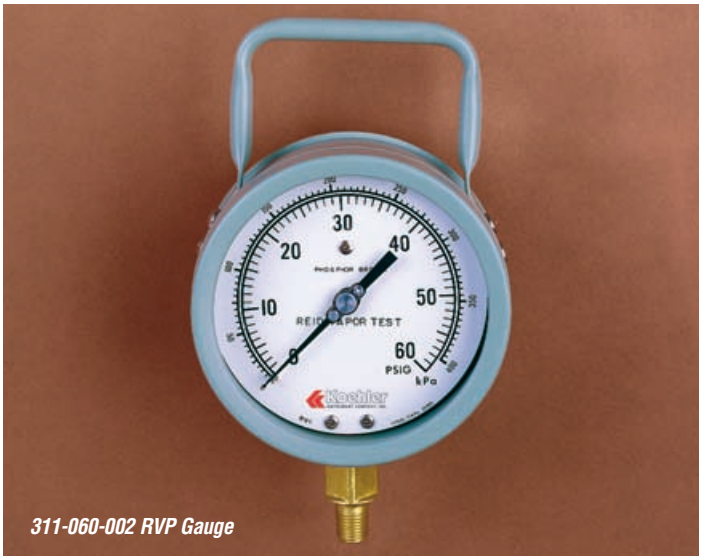
Threaded ⅛" Gauge Coupling
O-ring Seals (2)

Shipping Information

Shipping Weight: 7 lbs (3.2kg)

Ordering Information

Catalog No.	
K11500	Reid Vapor Pressure Cylinder, One-Opening Type
K11201	Reid Vapor Pressure Cylinder Two-Opening Type
K11202	Bleeder Valve Assembly for LPG tests for K11201 test cylinder



311-060-002 RVP Gauge


K11500 *K11201*

Reid Vapor Pressure Gauges

- Conforming to ASTM D323, D1267 and related specifications
- Dual psi/kPa scale on a 4½" diameter dial
- Accurate to within 0.5% of scale range
- Micrometer adjustable pointer

Ruggedly constructed Bourdon type gauge designed especially for the Reid Vapor Pressure test. Heavy duty rotary brushed stainless steel movement. Lightweight aluminum case with corrosion-resistant finish and heavy duty brass non-sparking handle. Includes blow-out disc and ¼" NPT male thread connection.

Ordering Information

Catalog No.	Range psi/kPa	Figure Intervals psi/kPa	Interval Graduations psi/kPa
311-005-004	0-5/35	0.5/5	0.05/0.2
311-015-002	0-15/100	1.0/10	0.1/1.0
311-030-002	0-30/200	5.0/20	0.5/2.0
311-060-002	0-60/400	5.0/50	0.2/2.5
311-100-002	0-100/700	10/50	0.5/2.5
311-250-001	0-250/1750	25/100	1.0/20
311-600-003	0-600/4200	50/250	2.0/25

Wireless Reid Vapor Pressure Data Acquisition System

Windows®-based electronic pressure measurement software designed for ASTM Reid Vapor Pressure test methods. Monitors up to eight pressure vessel channels, graphing pressure and RVP data in real-time for each channel. Each channel can be run independently and configured for the pressure ranges of 0-50, 0-200, and 0-1000 psi. Pressure values can be reported in psi or kPa. Software automatically exports results into Microsoft® Excel for data analysis and storage.

Ordering Information

Catalog No.		Order Qty
K11401	RVP Data Acquisition System, 115V 60 Hz	1
K11491	RVP Data Acquisition System, 230V 50/60 Hz *Includes software, multiplexer box, USB converter box and RTD temperature probe.* *Requires one pressure transducer for each pressure vessel.*	
K11404-50	RVP Pressure Transducer, 0-50 psi	1-8
K11404-200	RVP Pressure Transducer, 0-200 psi	1-8
K11404-1000	RVP Pressure Transducer, 0-1000 psi	1-8

Reid Vapor Pressure Data Acquisition System

4 Unit Reid Vapor Pressure Bath

- Conforms to ASTM D323, D1267 and related specifications
- Free standing or flush-mount benchtop installation
- Microprocessor programmable high accuracy temperature control

Constant temperature water baths designed for Reid Vapor Pressure determinations of liquid petroleum products and liquefied petroleum gases (LPG). Immerses vapor pressure apparatus at the proper depth per ASTM specifications. Controls bath temperature with ±0.2°F (±0.1°C) precision. Microprocessor PID control provides quick temperature stabilization without overshoot, and the bath is protected by an overtemperature control circuit that interrupts power should bath temperature exceed a programmed cut-off point. Dual LED displays provide actual and setpoint temperature values in °C/°F format. Double-wall construction with fiberglass insulated stainless steel tank. A sturdy 1" (25mm) flange permits flush-mount benchtop installation for easy access to the bath interior. Built-in holders suspend test cylinders at the required depth. Equipped with overflow stand pipe/drain.

Specifications

Conforms to the specifications of:
ASTM D323, D1267; GPA 2140; IP 69, 161; ISO 3007, 4256; DIN 51616, 51754; FTM 791-1201; NF M 07-007, 41-010
Capacity: 1 to 4 vapor pressure apparatus, one- or two-opening type
Temperature Control Stability: ±0.2°F (±0.1°C)
Maximum Temperature: 212°F (100°C)
Bath Medium: 13.7 gal (51.9L) water
Electrical Requirements: CE
115V 60Hz, Single Phase, 18.8A
220-240V 50/60Hz, Single Phase, 9.4A

Dimensions lxwxh,in.(cm)
15x15x36 (38.1x38.1x91.5)
Net Weight: 67 lbs (30.4kg)

Shipping Information
Shipping Weight: 105 lbs (47.7kg)
Dimensions: 14 Cu. ft.

Ordering Information

Catalog No.	
K11450	Reid Vapor Pressure Bath, 4-Unit, 115V 60Hz
K11459	Reid Vapor Pressure Bath, 4-Unit, 220-240V 50/60Hz

Photograph, thermometers, and additional accessories for Reid Vapor Pressure testing appear on page 94.

21-Unit Reid Vapor Pressure Bath

- Conforms to ASTM D323, 1267 and related specifications
- Digital electronic temperature control
- Automatic water level control maintains proper immersion depth

Constant temperature water bath immerses twenty-one test cylinders for vapor pressure tests on liquid products and liquefied petroleum gas (LPG). Electronic level control automatically maintains the proper immersion depth per ASTM specifications. Heating system employs a 6kW stainless steel heat exchanger with a heavy duty circulating pump to provide rapid heat-up, even heat distribution and ease of servicing. Convenient digital setpoint and display permits rapid selection of any bath liquid temperature within the operating range. A built-in overtemperature limit control protects against accidental overheating. Bath interior and internal components are constructed of heavy gauge stainless steel. Control panel is shielded by a hinged acrylic cover. Includes sturdy angle-iron base with corrosion resistant polyurethane finish. Order pressure gauges and cylinders separately.

Specifications

Conforms to the specifications of: ASTM D323, D1267; GPA 2140; IP 69, 161; ISO 3007, 4256; DIN 51616, 51754; FTM 791-1201
Testing Capacity: 21 vapor pressure test cylinders
Temperature Range: 212°F (100°C)
Temperature Control Stability: ±0.2°F (±0.1°C)
Heater Range: 0-6000W
Bath Medium: 58 gal (219.5L) water
Electrical Requirements: CE
220-240V 50Hz, Single Phase, 28A
220-240V 60Hz, Single Phase, 28A

Dimensions lxwxh,in.(cm)
Overall: 48x22x36 (122x56x91)

Ordering Information

Catalog No.	
K11415	Reid Vapor Pressure Bath, 21-Unit, 220-240V 50Hz
K11416	Reid Vapor Pressure Bath, 21-Unit, 220-240V 60Hz

Vapor Pressure of Petroleum Products and LP Gases

K11459 Reid Vapor Pressure Bath

Test apparatus for liquid products (ASTM D323) requires:
Test Cylinders, one or two-opening type
Pressure Gauges
Constant Temperature Bath
Bath Thermometer
Sample Container with Cover Assembly
Transfer Connection
Manometer
Manometer Adapter Kit

On-line version of this product is available. Please contact Koehler Customer Service for additional information.

Ordering Information

Catalog No.	
250-000-18F	ASTM 18F Thermometer Range: 94 to 108°F
250-000-18C	ASTM 18C Thermometer Range: 34 to 42°C
250-000-65F	ASTM 65F Thermometer Range: 122 to 176°F
250-000-65C	ASTM 65C Thermometer Range: 50 to 80°C
K11800	Sample Container with Cover Assembly
K11810	Transfer Connection Consists of threaded brass cap, delivery tube and sampling tube. Use for removing liquid from the sample container in accordance with ASTM specifications
371-000-002	Liquid Manometer Graduated in inches (0.1" div.). For checking pressure gauge reading of up to 15psi
K112B-1-0-12	Manometer Adapter Kit Kit for attaching pressure gauge to liquid manometer for pressure verification
AS568-210	O-ring Seal For coupling between air and gas chambers on K11500 and K11201 vapor pressure bombs
AS568-113	O-ring Seal For gauge and bleeder valve assembly connections on K11500 and K11201 vapor pressure bombs
K40100	Flexible Tubing Sulfur-free plastic lined tubing with ¼" stainless steel and aluminum connectors. For charging LPG test cylinder.

Test apparatus for liquefied petroleum gases (ASTM D1267) requires:
Test Cylinders, two-opening type
Bleeder Valve Assemblies
Pressure Gauges
Constant Temperature Bath
Bath Thermometer
Flexible Tubing
Manometer
Manometer Adapter Kit

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Wax Appearance Point of Distillate Fuels

Test Method

Detects the formation of wax crystals in burner fuels, diesel fuels and turbine engine fuels at low temperatures. The sample is cooled at a specified rate while being agitated. The temperature at which wax first appears is the wax appearance point.

Wax Appearance Point Apparatus

- Conforms to ASTM D3117 specifications

For detection of separated solids in burner fuels, diesel fuels and turbine engine fuels. Similar to K29700 Freezing Point Apparatus. Includes jacketed sample tube, motorized stirrer assembly, outer vacuum flask, clamps and stand.

Electrical Requirements: CE
115V 60Hz
220-240V 50Hz
220-240V 60Hz

Ordering Information

Catalog No.		Order Qty
K29760	Wax Appearance Point Apparatus, 115V 60Hz	1
K29768	Wax Appearance Point Apparatus, 220-240V 50Hz	
K29769	Wax Appearance Point Apparatus, 220-240V 60Hz	
250-000-06F	ASTM 6F Thermometer. Range: –112 to +70°F	1
250-000-06C	ASTM 6C Thermometer. Range: –80 to +20°C	

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Smoke Point of Kerosene and Aviation Turbine Fuel

Test Method

Smoke point is an indicator of the combustion qualities of aviation turbine fuels and kerosene. The fuel sample is burned in the Smoke Point Lamp, and the maximum flame height obtainable without smoking is measured.

Smoke Point Lamp

• Conforms to ASTM D1322 and related specifications

Burns fuel samples under controlled conditions for smoke point determinations of aviation turbine fuels and similar products. Consists of brass lamp body with chimney; gallery; 0-50mm black glass scale with white markings; brass plated door with curved glass window; candle socket; and plated brass candle with wick tube and air vent. Mounted on a cast iron base with aluminum support rod.

Ordering Information

Catalog No.		Order Qty
K27000	Smoke Point Lamp	1
	Accessories	
K27021	Extracted Cotton Wicks Prepared in accordance with ASTM D1322 (9.2) requirements. Packed in a sealed tube with desiccant. Case of 12	
K27020	Cotton Wicks, pack of 12	
K27050	Sighting Device Installs on chimney of Smoke Point Lamp. Eliminates parallax	1
K27060	Wick Insertion Tool Facilitates insertion of cotton wick into wick tube	1
K27065	Wick Trimmer Use together with K27060 Insertion Tool to place wick at the correct height in the wick tube, free of twists and frayed ends.	1
K27010	Interchangeable Candle	

Automatic Smoke Point Apparatus available. Inquire with Koehler Customer Service.

K27000 Smoke Point Apparatus with K27050 Sighting Device and K27060 Wick Insertion Tool

Specifications

Conforms to the specifications of:
ASTM D1322; ISO 3014; IP 57;
DIN 51406; FTM 791-2107; NF M 07-028

Included Accessories

Cotton Wicks, non-extracted (6)
Interchangeable Candle

Dimensions dia.xh,in.(cm)

7x18½ (18x47)
Net Weight: 10 lbs (4.5kg)

Shipping Information

Shipping Weight: 16 lbs (7.3kg)
Dimensions: 5 Cu. ft.

Freezing Point of Aviation Fuels

K29790 Freezing Point Bath with Freezing Point Apparatus and Stirrer

Ordering Information

Catalog No.		Order Qty
K29790	Refrigerated Freezing Point Bath 115V 60Hz, Single Phase, 18.3A	1
K29795	Refrigerated Freezing Point Bath 220-240V 50Hz, Single Phase, 10.0A	
K29796	Refrigerated Freezing Point Bath 220-240V 60Hz, Single Phase, 10.0A	
K29700	Freezing Point Apparatus, ASTM D2386	1
K29750-1-7	Stirrer Motor, 115V 60Hz	1
K29758-0-7	Stirrer Motor, 220-240V 50Hz	
K29759-1-7	Stirrer Motor, 220-240V 60Hz	
	Accessories	
250-000-114C	ASTM 114C Thermometer. Range: –80 to +20°C	1
K29720	Moistureproof Collar, Type A Use in place of brass packing gland to prevent condensation of moisture.	
K29721	Moistureproof Collar, Type B Use to prevent condensation.	

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Software compatible, inquire with Koehler Customer Service.

Test Method

The freezing point of an aviation fuel is the lowest temperature at which the fuel remains free of solid hydrocarbon crystals that can restrict the flow of fuel. The temperature of the fuel in the aircraft tank normally falls during flight depending upon aircraft speed, altitude, and flight duration. The freezing point of the fuel must be lower than the minimum operational tank temperature. The test determines the temperature below which solid hydrocarbon crystals form in aviation fuels. The sample is cooled with continuous stirring in a Dewar-type sample tube until crystals appear.

Refrigerated Freezing Point Bath

- Improved design with enhanced performance and safety features
- Operating range to –100°F (–73°C)
- Microprocessor PID digital temperature control
- Dual digital displays show setpoint and actual bath temperature
- Selectable temperature scale – Fahrenheit or Celsius
- Conforms to ASTM D2386 and related specifications

Redesigned constant temperature bath for freezing point determinations on fuel samples at temperatures as low as –100°F (–73°C). Accommodates K29700 Freezing Point Apparatus and accessory stirrer. Microprocessor PID circuitry provides precise, reliable temperature control within ASTM specified tolerances. Simple push button controls and dual digital displays permit easy setting and monitoring of bath temperature. Bath medium is contained in a clear, evacuated Dewar flask, and glare-free fluorescent backlighting provides excellent visibility when working with the freezing point samples. Air-cooled hermetic compressors provide efficient operation with the use of CFC-free refrigerants. Temperature control uniformity is assured by means of a motorized stirrer which provides complete circulation without turbulence. Cabinet construction is polyester-epoxy finished steel with a chemical-resistant composite top surface. Working (top) surface includes port and mounting plate for K29700 Freezing Point Apparatus and accessory stirrer. Bath rests on adjustable leveling feet.

Specifications

Conforms to the specifications of:
ASTM D2386; IP 16; ISO 3013; DIN 51421; FTM 791-1411; NF M 07-048
Temperature Range: Ambient to –100°F (–73°C)
Temperature Control Accuracy and Uniformity: Exceeds ASTM requirements throughout the operating range
Display: 0.1°C/°F resolution

Electrical Requirements: CE

115V, 60Hz, Single Phase, 18.3A
220-240V, 50Hz, Single Phase, 10.0A
220-240V, 60Hz, Single Phase, 10.0A

Dimensions lxwxh,in.(cm)

35x26x31 (89x66x78.75)
Net Weight: 259 lbs (117.75kg)

Shipping Information

Shipping Weight: 373 lbs (169.5kg)
Dimensions: 23¾ Cu. ft.

Automated Freezing Point of Aviation Fuels

Test Method

Determines the temperature below which solid hydrocarbon crystals may form in aviation turbine fuels and aviation gasoline. The freezing point of an aviation fuel is the lowest temperature at which the fuel remains free of solid hydrocarbon crystals that can restrict the flow of fuel through filters if present in the fuel system of the aircraft. The temperature of the fuel in the aircraft tank normally decreases during flight depending on aircraft speed, altitude, and flight duration. The freezing point of the fuel must always be lower than the minimum operational fuel temperature.

Automatic Freezing Point Analyzer with Integrated Panel PC

- Conforms to ASTM D1177, D1655, D2386, D5901, D5972 and related specifications
- Stand alone system with Integrated Touch Screen Panel PC
- Direct Cooling system eliminates the need for solvent cooling baths
- One-stage cooling system provides temperatures as low as -45°C and a two-stage cooling system down to -80°C
- Freezing Point measured by light pulsed emission on I.R spectrum through a coaxial fiber optic with mirror

The freezing point detection system provides automated sample testing with the accuracy and repeatability in accordance with ASTM D1177, D1655, D2386, D5901, D5972 and related international specification. The sample is cooled in the test chamber with constant stirring. The sophisticated dynamic measurement system emits a light pulse every 0.5°C from a coaxial fiber optic cable positioned above the test sample. The light pulse is then reflected off the mirror of the fiber optic to an optical sensor. The advanced software package analyzes the response of the light pulse. The initial appearance of crystallization is monitored by light scattering. The sample is then warmed up, and the temperature at which the hydrocarbon crystals disappear is recorded as the freezing point. All clear and transparent fuels are readily measured by the detection system, regardless of sample color.

Integrated Panel PC and Software Package–The Automated Freezing Point Analyzer is a complete standalone system featuring an integrated panel PC with an advanced software package. The 6.4" TFT/LCD touch screen display has a resolution of 640x480 with a 262K color scheme. All analytical parameters are graphed and displayed in real time as well as recorded in Microsoft® Excel compatible file format. The software monitors the operation and performance of all the analyzer components for proper data measurement, including the solenoid valves, cooling system, pressure sensors, and the Platinum resistance PT100 Class A temperature probe.

Cooling System–For various user applications, the automated freezing point system is available with either one-stage cooling for temperatures as low as -45°C or two-stage cooling for temperatures as low as -80°C. The direct cooling system features integrated gas CFC free motors compressors thus eliminating the need for a solvent cooling bath. The direct system is capable of rapid cooling, approaching -80°C bath temperatures in approximately 15 minutes, and utilizes less electricity than standard cooling systems. The rapid cooling feature combined with a consistent cooling profile system provides repeatable results with high test reproducibility.

Safety Features

- Audible alarm and displayed messages (at the end of the analysis and in case of errors and/or malfunctions)
- Pressure controller for 1st and 2nd stage motor compressor
- Thermostat for 2nd stage activation
- Thermo-switch for each cooling / heating jacket
- Motor compressors equipped with internal overload devices

KLA-5-TS Automatic Freezing Point Analyzer with integrated touch screen PC

Multiple Configuration System–These automated sample cooling and physical property measurement systems can be configured with one, two, three, four and six test positions with one of five possible analytical heads at each position: cloud point, pour point, cloud & pour point, cold filter plugging point and freezing point. Standard and customized multiple configuration systems are readily available.

Specifications

Conforms to the specifications of:
ASTM D1177, D1655, D2386, D5901 (Withdrawn 2010); IP 16; ISO 3013
Temperature Range:
One-Stage: +30 to -45°C
Two-Stage: +30 to -80°C
Resolution: 0.06°C
Accuracy: ±0.1°C
Repeatability / Reproducibility: as per standard test methods or better
Data Storage: > 60,000 analyses
Electrical Requirements: CE
115V ± 15% / 60Hz
220V ± 15% / 50 to 60Hz

Dimensions WxDxH,in.(cm)
26 x 23¾x 31½ (66x60x80)
Net Weight: 176.5 lbs (80kg)

Ordering Information

Catalog No.	
KLA-5-TS	Automatic Freezing Point Analyzer with Touch Screen, (One-stage)
KLA-5-TS/2	Automatic Freezing Point Analyzer with Touch Screen, (Two-stage)

Please specify voltage requirements when ordering.

Accessories

KLA-PT100-CAL	Certified Calibration Decade Box - PT100 Simulator
KLA-DB-KIT	Set of Connectors and Cables

Extended Cooling Range down to -100˚C Available Upon Request.

Koehler INSTRUMENT COMPANY, INC.

Antirust Properties of Petroleum Products Pipeline Cargoes

K30160NACE Rust Preventing Characteristics Bath

Specifications

Conforms to the specifications of:
NACE TM-01-72; ASTM D665*, D6158, D3603*;
IP 135; ISO 7120; DIN 51585; FTM 791-4011; NF T 60-151
Testing Capacity: Six (6) 400mL sample beakers
Maximum Temperature: 104°C (220°F)
Temperature Control Stability: ±0.5°C (±1°F)
Heater Range: 0-1500W
Drive Motor: explosion proof ball bearing type
Bath Medium: 11 gal (41.6L) white technical oil
Electrical Requirements: CE
115V 60Hz, Single Phase,13.0A
220-240V 50Hz, Single Phase, 6.8A
220-240V 60Hz, Single Phase, 6.8A

Included Accessories

Steel Test Specimens (6)
Type 2 Plastic Specimen Holders (6)
Plastic Beaker Covers (6)

Dimensions lxwxh,in.(cm)

32¾x14¼x27 (83x36x69)
Net Weight: 79 lbs (35.8kg)

Shipping Information

Shipping Weight: 150 lbs (68.0kg)
Dimensions: 16.2 Cu. ft.

This equipment has been modified for safe operation when testing volatile petroleum products in accordance with NACE Standard Test Method TM-01-72.

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Software compatible, inquire with Koehler Customer Service.

Test Method

Used to control corrosion in product pipelines caused by moisture condensed from gasoline and distillate fuels. Antirust properties are determined by immersing a polished steel test specimen in a stirred mixture of the sample and distilled water held at constant temperature.

Rust Preventing Characteristics Oil Bath

- Conforms to NACE TM-01-72, ASTM D665* and D3603* specifications
- Accommodates six sample beakers
- Microprocessor temperature control with digital display and overtemperature protection

Six-place constant temperature bath with stirrers for rust preventing characteristics tests. Stirs sample-water mixtures at 1000rpm and controls temperature with ±0.5°C (±1°F) stability. Immerses test beakers at the proper depth per NACE specifications. Microprocessor temperature control has °C/°F switchable digital setpoint and display. Operator and equipment are protected by an overtemperature control circuit which automatically interrupts power to the unit should bath temperature exceed a programmed cut-off point. Stainless steel stirrer paddles are driven at 1000rpm by an improved pulley drive-roller bearing arrangement. Paddles move to a raised position for placement of sample beakers in the bath. Stainless steel bath includes perforated support shelf for beakers and cover plate. Long lasting polyester drive belt improves reliability. Drive train components are protected by a removable steel guard. All exterior surfaces have stainless steel or chemical resistant polyurethane enamel finishes.

**To order this equipment for ASTM and equivalent test methods, please turn to page 128.*

Ordering Information

Catalog No.		Order Qty
Rust Preventing Characteristics Oil Bath		1
K30160NACE	Rust Preventing Characteristics Oil Bath, 115V 60Hz	
K30165NACE	Rust Preventing Characteristics Oil Bath, 220-240V 50Hz	
K30166NACE	Rust Preventing Characteristics Oil Bath, 220-240V 60Hz	
Accessories		
332-002-007	Test Beaker, 400mL, for NACE TM-01-72	6
250-000-09F	ASTM 9F Thermometer Range: 20 to 230°F	7
250-000-09C	ASTM 9C Thermometer Range: –5 to +110°C	
K30130	Chuck for polishing test specimens Includes locknut and shaft for mounting on accessory drive motor	1
K30150	Drive Motor Drives K30130 Chuck. Mounted on base. 115V 60Hz	1
380-100-001	Silicone Carbide Cloth, 100 grit For preliminary grinding and final polishing of test specimens. Pack of 50	1
Test Specimens		
K30110	Steel Test Specimens for ASTM D665/ NACE TM-01-72. Machined to ASTM/NACE specifications. Without holder	
K30100	Test Specimen with Type 2 PMMA Holder for ASTM D665/NACE TM-01-72	
K30101	Test Specimen with Type 2 PTFE Holder	

Silver Corrosion of Aviation Turbine Fuels

Test Method

Tests the corrosiveness of aviation turbine fuels towards silver. A polished silver strip is immersed in a fuel sample at elevated temperature. After a specified test period, the strip is removed from the sample, washed and evaluated for corrosion.

Water Bath for Silver Corrosion

- Conforms to IP 227 specifications
- Six sample capability

Fully insulated, thermostatically controlled water bath with constant water level device. Use together with K25370 Bath Conversion Kit to immerse six 350mL test tubes for silver strip corrosion tests. Stainless steel inner wall and powder coated steel outer wall construction.

Ordering Information

Catalog No.		Order Qty
K25310	Water Bath, 115V 60Hz	1
K25319	Water Bath, 220-240V 50/60Hz	
K25370	Bath Conversion Kit for IP 227	1
	Accessories	
K25360	Glassware Set for IP 227 Includes cold-finger condenser, glass cradle and 350mL test tube	6
K25280	Silver Test Strip Conforming to IP 227 specifications	6
K25282	ASTM D3241-IP 323 Color Standard	1
250-000-12C	ASTM 12C Thermometer Range: –20 to +102°C	
K25000	Polishing Vise Holds silver strip firmly in place without marring the edges. Stainless steel, mounted on a composition base	1
380-240-001	Silicone Carbide Paper, 240-grit For final polishing of strips prior to testing. Pack of 50 sheets	1
380-150-001	Silicone Carbide Paper, 150-grit For polishing strips prior to testing. Pack of 50 sheets	1
380-150-000	Silicone Carbide Grain, 150-grit For polishing ends and sides of strips prior to testing. 1 lb package	1
	Additional Accessories for D4814	
K25200	Copper Strip Corrosion Test Bomb	4
332-004-004	Test Tube	4

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

K25310 Constant Temperature Bath

Specifications

Conforms to the specifications of:
IP 227; ASTM D130, D4814, D6074, D6158; FSPT DT-28-65; IP 154; ISO 2160; DIN 51759; FTM 791-5325
Testing Capacity: 6 samples for silver strip corrosion testing
Maximum Temperature: 221°F (105°C)
Temperature Control Stability: ±1°F (±0.5°C)
Heater Range: 0-750W
Bath Medium: 5 gal (18.9L) water
Electrical Requirements: CE
115V 60Hz, Single Phase, 7.5A
220-240V 50/60Hz, Single Phase, 4A
Temperature Control: Analog

Shipping Information

Shipping Weight: 29 lbs (13.2kg)
Dimensions: 5.3 Cu. ft.

Cold Filter Plugging Point of Distillate Fuels

K45950 Cold Filter Plugging Point Bath

Ordering Information

Catalog No.		Order Qty
Cold Filter Plugging Point Apparatus		
K45900	Cold Filter Plugging Point Apparatus	1
Vacuum System		
K45920	Vacuum System	1
Cooling Bath		
K45950	Mechanically Refrigerated Cold Filter Plugging Point Bath, 115V 60Hz	1
K45995	Mechanically Refrigerated Cold Filter Plugging Point Bath, 220-240V 50Hz	
K45910	Cooling Bath (Dry Ice Model)	
	Accessories	
250-000-05C	ASTM 5C Thermometer Range: –38 to +50°C	1
250-000-06C	ASTM 6C Thermometer Range: –80 to +20°C	

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Software compatible, inquire with Koehler Customer Service.

Test Method

Determines the low temperature flow characteristics of automotive diesel fuels and gas oils, including samples with flow improving additives, by measuring the temperature at which the sample ceases to flow through a wire mesh filter under standard test conditions.

Cold Filter Plugging Point Test Equipment

- Conforms to ASTM D6371, IP 309 and DIN 51428 specifications
- Choice of mechanically refrigerated or dry ice cooled bath

Consists of Cold Filter Plugging Point Apparatus, Vacuum System and Cooling Bath.

Cold Filter Plugging Point Apparatus–Includes borosilicate glass test jar with graduation, brass jacket with plastic support ring, plastic stopper, plastic insulating ring and spacer, pipette and brass filter unit with stainless steel fine wire mesh screen.

Vacuum System–Connects to Cold Filter Plugging Point Apparatus to draw sample through filter screen. Consists of U-tube Manometer (without mercury), three-way stopcock, air vent tube, cork stopper with elbows, and large glass bottle. Vacuum pump is not included.

Cooling Baths–Choice of mechanically refrigerated or dry-ice cooled baths. Mechanically refrigerated model utilizes a cascade hermetic cooling system to attain temperatures as low as –90°F (–68°C). Cold Filter Plugging Point Apparatus inserts in composition top plate of bath. Insulated stainless steel tank and polished stainless steel cabinet.

Dry-ice model includes insulated copper interior and steel exterior with corrosion resistant polyurethane enamel finish. Composition top plate suspends Cold Filter Plugging Point Apparatus in freezing mixture at the required depth. Handles on exterior permit easy emptying of freezing mixture. Supplied with thermometer holder.

Specifications

Conforms to the specifications of:
ASTM D6371; IP 309; DIN 51428
Electrical Requirements: CE
Mechanically Refrigerated Baths
115V 60Hz, Single Phase, 6A
220-240V 50Hz, Single Phase, 3A

Dimensions*in.(cm):

Refrigerated Model (lxwxh):
35x26x31 (89x66x78.75)
Net Weight: 259 lbs (117.75kg)
Dry-Ice Model (dia.xh):
12x12 (30x30)
*Cooling Bath

Shipping Information

Shipping Weight:
Refrigerated Model: 373 lbs (169.5kg)
Dry-Ice Model: 19 lbs (8.6kg)
Dimensions:
Refrigerated Model: 23¾ Cu. ft.
Dry-Ice Model: 3 Cu. ft.

Automated Cold Filter Plugging Point of Distillate Fuels

Test Method

Determines the highest temperature at which a given volume of diesel, biodiesel or heating fuel fails to pass through a standardized wire mesh filtration device in a specified time when cooled under specified conditions. The Cold Filter Plugging Point (CFPP) of a fuel is suitable for estimating the lowest temperature at which a fuel will give trouble-free flow in certain fuel systems.

Automatic Cold Filter Plugging Point Analyzer with Integrated Panel PC

- Conforms to ASTM D6371 and related specifications
- Stand alone system with Integrated Touch Screen Panel PC
- Direct Cooling system eliminates the need for solvent cooling baths
- One-stage cooling system provides temperatures as low as -45°C and a two-stage cooling system down to -80°C
- Option of internal or external vacuum generation system

The cold filter plugging point detection system provides automated sample testing with the accuracy and repeatability in accordance with ASTM D6371 and related international test methods. The sample is cooled according to the pre-selected temperature profile. A 20 mBar vacuum is applied to the sample at specific intervals across a 45 micron mesh filter into the aspiration glass cell assembly. If it takes more than 60 seconds for the sample to reach the upper barrier detector or more than 60 seconds to return below the detector upon release, then the test is complete and the cold filter plugging point has been reached.

Integrated Panel PC and Software Package–The Automated Cold Filter Plugging Point Analyzer is a complete standalone system featuring an integrated panel PC with an advanced software package. The 6.4" TFT/LCD touch screen display has a resolution of 640x480 with a 262K color scheme. All analytical parameters are graphed and displayed in real time as well as recorded in Microsoft® Excel compatible file format. The software monitors the operation and performance of all the analyzer components for proper data measurement, including the solenoid valves, cooling system, pressure sensors, and the Platinum resistance PT100 Class A temperature probe.

Cooling System–For various user applications, the automated cold filter plugging point system is available with either one-stage cooling for temperatures as low as -45°C or two-stage cooling for temperatures as low as -80°C. The direct cooling system features integrated gas CFC free motors compressors thus eliminating the need for a solvent cooling bath. The direct system is capable of rapid cooling, approaching -80°C bath temperatures in approximately 15 minutes, and utilizes less electricity than standard cooling systems. The rapid cooling feature combined with a consistent cooling profile system provides repeatable results with high test reproducibility.

Vacuum System–The automated cold filter plugging point analyzer can be configured with either an internal or external vacuum generator. The internal vacuum generator provides a smaller footprint for the complete CFPP system and consists of a 350 mBar micro-pump and an electronic pressure/vacuum regulator composed of a proportional valve, pressure/vacuum control sensor, regulator for reference vacuum generation at 20 mBar and a vacuum stabilizer. The external vacuum generator includes a vacuum pump, two glass bottles and a glass cork with a U-tube, funnel and manual flow regulating valve.

Multiple Configuration System–These automated sample cooling and physical property measurement systems can be configured with one, two, three, four and six test positions with one of five possible analytical heads at each position: cloud point, pour point, cloud & pour point, cold filter plugging point and freezing point. Standard and customized multiple configuration systems are readily available.

KLA-4-TS Automatic CFPP Analyzer with Integrated Touch Screen PC

Specifications

Conforms to the specifications of: ASTM D6371; IP 309, 419; EN 116
Temperature Range: One-Stage: +60 to -45°C Two-Stage: +60 to -80°C
Resolution: 0.06°C Accuracy: ±0.1°C
Repeatability / Reproducibility: as per standard test methods or better
Data Storage: > 60,000 analyses
Electrical Requirements: 115V ± 15% / 60Hz 220V ± 15% / 50 to 60Hz CE

Dimensions WxDxH,in.(cm)

26 x 23⅜x 31½(66x60x80) Net Weight: 176.5 lbs (80kg)

Included Accessories

Calibrated Aspiration Pipette complete with Filter Kit for CFPP

Cord Cable without plug	Calibrated Test Jar	User Manual
Connection Tube for Vacuum System	Operating Software	Spacer

Safety Features

- Audible alarm and displayed messages (at the end of the analysis and in case of errors and/or malfunctions)
- Pressure controller for 1st and 2nd stage motor compressor
- Thermostat for 2nd stage activation
- Thermo-switch for each cooling / heating jacket
- Motor compressors equipped with internal overload devices

Ordering Information

Catalog No.	
KLA-4-TS	Automatic Cold Filter Plugging Point Analyzer with Touch Screen, (One-stage)
KLA-4-TS/2	Automatic Cold Filter Plugging Point Analyzer with Touch Screen, (Two-stage)
KLA-4-IVPS	Internal Vacuum System for Cold Filter Plugging Point Analyzer
KLA-4-VPS(115)	External Vacuum System for Cold Filter Plugging Point, 115V
KLA-4-VPS(220)	External Vacuum System for Cold Filter Plugging Point, 220V

Please specify voltage requirements when ordering.

Accessories

KLA-PT100-CAL	Calibration Decade Box - PT100 Simulator
KLA-DB-KIT	Set of Connectors and Cables

Extended Cooling Range down to -100˚C Available Upon Request.

Koehler INSTRUMENT COMPANY, INC.

Octane Analyzer For Unleaded Gasolines

Test Method

Determines the Pump Octane Number (AKI), Research Octane Number (RON), and Motor Octane Number (MON) of unleaded gasoline, ethanol blended gasoline, leaded gasoline and Cetane Number for diesel fuels.

Portable Octane Analyzer

- Test results equivalent to ASTM D2699 and D2700 test methods
- Measures all grades of unleaded gasoline and ethanol blended gasoline
- Test results equivalent to ASTM D613 for Cetane Number of diesel fuels (Optional with K88612)
- Displays results in 20 seconds
- Directly measures octane number for {(R+M)}/2, RON and MON
- Optional feature for cetane number determination of diesel fuels
- Includes RS-232 output, built-in printer and LCD display
- Results traceable to official knock engine laboratory
- GPS model available for use with GPS locator accessory

Measures octane number via near-infrared (NIR) transmission spectroscopy utilizing 14 near-infrared emitting diodes with narrow bandpass filters, a silicon detector system, and a fully integrated microprocessor. Simple octane number determination requires three easy steps: sampling a background signal, acquiring two absorption spectra of the gas sample, and then acquiring a second background signal. Analyzer is pre-calibrated for unleaded gasoline and ethanol-blended fuels, and can be calibrated for up to eight additional fuel types.

The analyzer is small, lightweight, and operates on "AA" batteries or AC. Before each reading, the unit standardizes itself to assure accuracy. The octane number is printed with time and date on the built-in printer. All data can be downloaded via the RS232 port to an external computer.

Specifications

Accuracy and repeatability equivalent to ASTM approved CFR engines test methods (ASTM D2699, D2700)
Sample Holder: Sealed, cubical glass container (75mm optical path length)
Sample Volume: 8 Ounces (approx. 225 mL)
Operating Temperature Range: 7°C - 38°C
Pre-calibrated for unleaded & ethanol-blended gasoline
(Analyzer can be calibrated for up to 8 additional fuel types.)
Battery operated (6 AA batteries)
Electrical Requirements: CE
115/240V 50/60Hz

Safety Features

Out of Temperature Range Warning: Analyzer displays Out of Range Warning Message when instrument in being used outside of its standard operating temperature range. Either above 38°C or below 7°C.

Out of Calibration Range Warning: Analyzer displays “Too High” or “Too Low” message when measurement reading is out of the instruments calibration range.

Bad Curve Warning: Analyzer warns user when light protective lid is not on during testing. External light source will greatly disrupt results.

Included Accessories

Calibration Software
Aluminum Carrying Case
Sample Holder (3)
AA Battery (6)
RS232 Cable
Printer Paper Roll (5)
Light Cover
Sample Holder Label (6)

K88600 Portable Octane Analyzer

Dimensions wxdxh,in.(cm)
13½x4½x2½ (34x11½x6¼)
Net Weight: 12 lbs (5.5kg)

Shipping Information
23x17x8½ (58½x43¼x22)
Shipping weight: 25 lbs (11.5kg)

Ordering Information

Catalog No.	
K88600	Portable Octane Analyzer
K88600-GPS	Portable Octane Analyzer GPS Model Requires GPS Locator Feature (K88613)

Accessories

K88601	Printer Paper, 10 Rolls
K88603	Sample Holder (additional)
K88604	Sample Holder (Box of 12)
K88605	Light Shield
K88606	RS232 Cable
K88607	Aluminum Sample Carrying Case w/12 Sample Holders
K88608	Sample Holder Lids, Quantity 12
K88609	Sample Holder Labels, Quantity 12
K88610	25 Sample Memory

Optional Features

K88612	Cetane Number Calibration
K88602	Additional Fuel Calibration
K88613	GPS Locator (for K88600-GPS model only)

Density/Relative Density of Light Hydrocarbons by Pressure Thermohydrometer

Test Method

Density and relative density measurements of light hydrocarbons, including LPG, are used for transportation, storage and regulatory purposes. The measurement is made by floating a thermohydrometer in a sample that has been introduced into a pressure cylinder.

Pressure Hydrometer Cylinder

- Conforms to ASTM D1657 and related specifications
- Built-in safety relief valve

Transparent plastic cylinder mounted between machined aluminum end plates and surrounded by stainless steel safety guard. Use together with ASTM 310H Thermohydrometer to determine density or relative density of LPG and light hydrocarbons. Equipped with inlet, outlet and vapor vent valves for admitting sample and purging cylinder. End plates have positive sealing buna-N O-rings and are joined by sturdy steel support rods. Top plate detaches easily without tools for insertion or removal of thermohydrometer. Safety relief valve prevents unsafe pressure build-up inside cylinder. Mounted on a finished steel base.

Specifications

Conforms to the specifications of:
ASTM D1657; GPA 2140;
IP 235; IS0 3993; NF M 41-008
Safety relief valve: 200psi (1.4MPa)

Dimensions dia.xh,in.(cm)

8¼x23¾ (21x60)
Net Weight: 5 lbs (2.3kg)

Ordering Information

Catalog No.	
K26150	Pressure Hydrometer Cylinder
	Accessories
251-000-001	ASTM 101H Thermohydrometer Nominal Relative Density Range: 0.500 to 0.650 Standard Temperature, °F: 60/60 Temperature Range, °F: 30 to 90
251-000-004	ASTM 310H Thermohydrometer Density Range kg/m^3: 500-650 Standard Temperature, °C: 15 Temperature Range, °C: 0 to 35

K26150 Pressure Hydrometer Cylinder

Constant Temperature Water Bath

- Conforms to ASTM D1657 and related specifications
- Mechanically refrigerated for convenient sub-ambient temperature operation

Immerses two Pressure Hydrometer Cylinders at 60°F (15°C) for density and relative density determinations of LPG and other light hydrocarbons. Mechanically refrigerated cooling system maintains sub-ambient temperature. Thermistor activated solid state temperature controller and 750W copper immersion heater maintain bath temperature with ±0.5°F (±0.2°C) stability. A 1/20 hp ball bearing stirrer circulates the bath medium to assure temperature uniformity. Stainless steel tank is fiberglass insulated. Equipped with overflow standpipe/drain. Steel exterior has a durable polyurethane enamel finish.

Specifications

Conforms to the specifications of: ASTM D1657; IP 235; ISO 3993
Controller Sensitivity: ±0.5°F (±0.2°C)
Capacity: two (2) K26150 cylinders
Electrical Requirements: CE
115V 60Hz, Single Phase, 12.5A
220-240V 50 or 60Hz, Single Phase, 6.4A

Dimensions lxwxh,in.(cm)

Bath interior: 12x18x22(30x46x56)
Overall: 18x20x49 (46x51x124)
Net Weight: 158 lbs (71.7kg)

Shipping Information

Shipping Weight: 186 lbs (84.4kg)
Dimensions: 15.4 Cu. ft.

Ordering Information

Catalog No.	
K25900	Constant Temperature Water Bath, 115V 60Hz
K25990	Constant Temperature Water Bath, 220-240V 60Hz
K25995	Constant Temperature Water Bath, 220-240V 50Hz
	Accessories
250-000-12F	ASTM 12F Thermometer. Range –5 to +215°F
250-000-12C	ASTM 12C Thermometer. Range –20 to +102°C

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Koehler INSTRUMENT COMPANY, INC.

K41506 Fluorescent Indicator Absorption Apparatus

Specifications

Conforms to the specifications of:
ASTM D1319; IP 156; NF M 07-024
Electrical Requirements: CE
115V 60Hz
220-240V 50/60Hz

Included Accessories

Syringe, 1mL	Ball-and-Socket Joint Clamps
Bottles (2)	Mounting Brackets (2)
O-Rings	Integrated Electric Vibration Handheld UV Lamp

Dimensions lxwxh,in. (cm)
8x26x82 (20x66x208)
Net Weight: 100 lbs (45.5kg)

Shipping Information

Shipping Weight: 121 lbs (55kg)
Dimensions: 12 Cu. ft.

Test Method

Determines saturates, olefins and aromatics in petroleum fractions that distill below 315˚C.

Fluorescent Indicator Absorption Apparatus

- Conforms to ASTM D1319 specifications
- Quick connections for columns for faster set-up and analysis
- Integrated vibration system for dry silica gel packing
- Handheld UV Lamp
- Two, four, or six column models available

A complete system for conducting FIA analyses of a single or up to six samples simultaneously. Each system is complete with an upper multi-position air pressure manifold with independently-operated gauges, pressure regulators and ball O-ring joints allowing for individual pressure control at each column. Each pressure regulator may be set at any point from 0-15 psi and will maintain the set pressure regardless of changes in back pressure. An integral pressure gauge on each station continuously registers the active pressure on each column. The ball O-ring connection system connects the pressure regulators to the upper columns, and the proper seal is achieved by applying moderate clamping pressure of stainless steel clamps without utilizing any grease. Convenient O-ring compression type fittings simplify the connection of the analyzer tubes (3mm OD x 1200mm) to the upper columns. The internal geometry of the fittings is optimized for transition between tubing diameters, and a simple twist of the connection fitting releases the analyzer tube. O-ring compression type fittings are also used to cap the end of each analyzer tube with the column support tips. The tips contain an internal porous polyethylene disc in order to support the silica gel packing in each analyzer tube. An integrated electric vibration system is mounted to the upper chassis so that the columns can be vibrated to facilitate the dry gel packing procedure, and features an on/off and amplitude selector switch. The complete unit also includes a 1mL syringe with 4" needle, two gel bottles for pouring silica gel, extra O-rings, stainless steel ball-and-socket joint clamps, and two mounting brackets with screws for stabilizing chassis.

Ordering Information

Catalog No.	
K41502	Fluorescent Indicator Absorption Apparatus, Two-Position, 115V 60Hz
K41592	Fluorescent Indicator Absorption Apparatus, Two-Position, 230V 50/60Hz
K41504	Fluorescent Indicator Absorption Apparatus, Four-Position, 115V 60Hz
K41594	Fluorescent Indicator Absorption Apparatus, Four-Position, 230V 50/60Hz
K41506	Fluorescent Indicator Absorption Apparatus, Six-Position, 115V 60Hz
K41596	Fluorescent Indicator Absorption Apparatus, Six-Position, 230V 50/60Hz

Accessories

K41500-4	Silica Gel, 500 Gram Amber Bottle
K41500-5	Silica Gel, Dyed, 40 Gram Bottle
K41579	Standup UV Lamp, 115V 60Hz
K41580	Standup UV Lamp, 230V 50/60Hz

Volatility and Residues in Liquefied Petroleum (LP) Gases

Volatility of Liquefied Petroleum (LP) Gases
Residues in Liquefied Petroleum (LP) Gases

Test Method

The volatility of liquefied petroleum (LP) gases is determined by allowing a precooled sample to weather under specified conditions and observing the temperature when 95% has evaporated. Residues in LP gases are determined by weathering of a precooled sample and determination of the volume remaining at 100°F (37.8°C).

Precooling Apparatus

- Conforms to ASTM and GPA specifications

Consists of brass cooling vessel with built-in 20 ft. (6m) copper cooling coil. Includes compression fittings and ⅛" needle valve at the downstream end.

Specifications

Conforms to the specifications of: ASTM D1837; D2158; GPA 2140; ISO 13757

Dimensions: *dia.xh,in.(cm) 3x11¼ (7.6x29.9)
*Cooling Vessel

Ordering Information

Catalog No.	
K48100	Precooling Apparatus
	Accessories
332-010-001	Weathering Tube, 100mL
339-000-001	Stand, for weathering tube
337-000-002	Clamp, for weathering tube
338-000-001	Clamp Holder
362-001-001	Syringe, 1mL (ASTM D2158)
K481-0-5	Needle, 8"/203mm (ASTM D2158)
250-000-99F	ASTM 99F Thermometer, Range: –55 to +41°F
250-000-99C	ASTM 99C Thermometer, Range: -50 to +5°C
250-000-05F	ASTM 5F Thermometer, Range: –36 to +120°F
250-000-05C	ASTM 5C Thermometer, Range: –38 to +50°C
250-000-57F	ASTM 57F Thermometer, Range: –4 to +122°F
250-000-57C	ASTM 57C Thermometer, Range: –20 to +50°C

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Filterability of Diesel Fuels by Low-Temperature Flow Test

Test Method

Determines the filterability of Diesel fuels and Biodiesel blend fuels in some automotive equipment at low temperatures. The Low Temperature Flow Test results are indicative of the low temperature flow performance of the test fuel in some diesel vehicles. The test method is especially useful for the evaluation of fuels containing flow improver additives in a range of +10°C to -30°C.

Automatic Low Temperature Filterability Test Analyzer (LTFT)

Up to (6) 300 ml test vessels are cooled at a specified rate of 1°C/h, and at every °C of cooling, a vacuum of 20 kPa is applied to a filter assembly immersed in the first sample. If the sample recovered in a graduated receiver vessel reaches the 180 ml in 60 sec., the analysis continues to the further 1°C test temperature (passed). When the sample doesn't reach the 180 ml within the 60 sec., the test is failed. The temperature of the last passing result test has to be recorded as minimum LTFT pass temperature.

The instrument is a six place floor model, equipped with a built in cooling system with a single stage CFC free motor compressor for temperatures as low as -45°C. Integrated Vacuum System consisting of a 350 kPa micropump, vacuum stabilizer and electronic control for vacuum regulation of 20 kPa. Fully automatic, controlled by an integrated panel pc with touch screen and a large display. All the parameters and the current status of the analysis are shown in real time.

KLA-7 LTFT

Specifications

Conforms to the Specifications of: ASTM D4539
Temperature Range: +80°C to -80°C
Resolution: 0.06°C
Accuracy: ±0.1°C
Repeatability / Reproducibility: Meets or exceeds ASTM specifications
Storage Capacity: Up to 60,000 analyses
Interface: USB Port (2)
Electrical Requirements: CE
115V ±15%, 60Hz
220V ±15%, 50/60Hz

Dimensions: wxdxh,in.(cm)
38½ x 23½ x 51¼ (98x60x130)
Net Weight: 176.5 lbs (80kg)

Ordering Information

Catalog No.	
KLA-7	Automatic Low Temperature Filterability Test Analyzer (LTFT), 115V 60Hz
KLA-7 (220)	Automatic Low Temperature Filterability Test Analyzer (LTFT), 220V 50/60Hz
	Accessories
KLA-PT100-CAL	Calibration Box and Cables
KLA-DB-KIT	Kit of Connectors and Cables for Cold range

Koehler INSTRUMENT COMPANY, INC.

Additional Accessories

Additional equipment, materials and/or reagents are required to perform some of the test procedures in the preceding pages. Please refer to the applicable test method for further information, or contact Koehler for assistance.

Oxidation Stability of Gasoline (Induction Period Method) ..... Pages 80-84

ASTM D525; IP 40; DIN 51780; FTM 791-3352

Corrosion Resistant Steel Forceps
Oven
Distilled Water
Chromic Acid or equivalent detergent cleaning solution
Toluene
Acetone
Oxygen

Oxidation Stability of Aviation Fuels (Potential Residue Method) ..... Pages 80-84

ASTM D873; IP 138; DIN 51799; FTM 791-3354

Corrosion Resistant Steel Forceps
Drying Oven
Filtering Crucible
Oxygen
Toluene
Distilled Water
Acetone

Existent Gum in Fuels by Jet Evaporation ..... Page 86-87

ASTM D381; IP 131; ISO 6246; DIN 51784; FTM 791-3302

Analytical Balance
Desiccator
Filtering Funnel, Sintered Glass
n-Heptane
Air Supply (for Air-Intake Method)
Toluene
Acetone
Graduated Cylinder
Chromic Acid or equivalent detergent cleaning solution
Distilled Water
Oven

Copper Strip Corrosion by Liquefied Petroleum (LP) Gases ..... Page 89

ASTM D1838; GPA 2140; ISO 6251

Acetone
2,2,4-Trimethylpentane
Cotton Wool

Copper Corrosion From Petroleum Products by the Copper Strip Tarnish Test ..... Pages 90-91

ASTM D130; FSPT DT-28-65; IP 154; ISO 2160; DIN 51759; FTM 791-5325

Filter Paper
Cotton Wool
Isooctane or volatile, sulfur-free hydrocarbon solvent
Stainless Steel Forceps
Stoddard Solvent
Kerosene

Vapor Pressure of Petroleum Products (Reid Method) .... Pages 92-94

ASTM D323, D1267; GPA 2140; IP 69, 161; ISO 3007, 4256; DIN 51616, 51754; FTM 791-1201

Dead-Weight Tester
Petroleum Naphta
Acetone
Air Supply

Wax Appearance Point of Distillate Fuels ..... Page 94

ASTM D3117

Isopropanol
Solid Carbon Dioxide
Liquid Nitrogen

Freezing Point of Aviation Fuels ..... Page 96-97

ASTM D2386; IP 16; ISO 3013; DIN 51421; FTM 791-1411

Ethanol
Methanol
Solid Carbon Dioxide
Liquid Nitrogen
Acetone
Isopropanol

Silver Corrosion by Aviation Turbine Fuels ..... Page 99

IP227; ASTM D130; FSPT DT-28-65; IP 154; ISO 2160, DIN 51759; FTM 791-5325

2,2,4-Trimethylpentane
Ashless Filter Paper
Stainless Steel Forceps
Cotton Wool

Antirust Properties of Petroleum Products Pipeline Cargoes ..... Page 98

NACE TM-0172

Naphtha or Acetone
Chromic Acid

Cold Filter Plugging Point of Distillate Fuels ..... Pages 100-101

ASTM D6371; IP 309; DIN 51428

Heptane
Lintless Filter Paper
Vacuum Pump

Lubricating Oils

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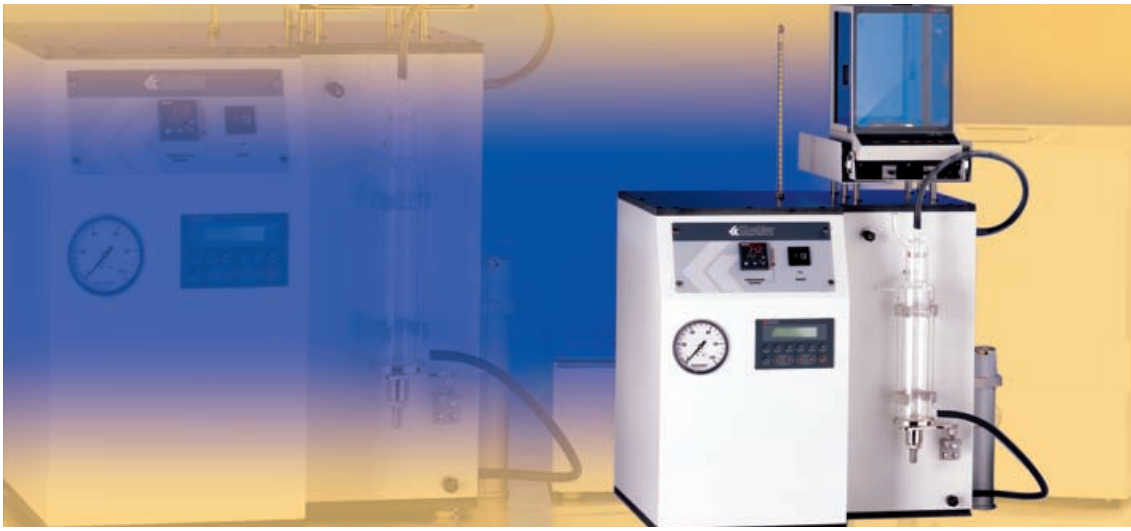
For information on additional test methods for Lubricating Oils:

–Evaporation Loss of Lubricating Greases and Oils
–please refer to pages 148-149
–Estimating Apparent Vapor Pressures and Molecular Weights of Lubricating Oils
–please refer to pages 92-94
–Please refer to the Viscosity, Flash Point and General Tests Sections
–Additional test methods are available upon request
–please call or write for information.



Foaming Characteristics of Lubricating Oils

Test Method

Foaming of lubricating oils in applications involving turbulence, high speed gearing or high volume pumping can cause inadequate lubrication, cavitation, overflow and premature oxidation. The sample is blown with a controlled volume of air at different specified temperatures, including a newer high temperature test at 150°C. The resultant foam is measured at the end of each aeration period and at different intervals afterward. In the high temperature test, the amount of time required for the foam to collapse to "0" after the aeration period is also measured.

Foaming Characteristics Test Baths

- Dual-twin models for standard foaming characteristics tests
- High temperature liquid bath for 'Sequence IV' tests
- Automatic time sequence models for both tests
- Custom configurations for specialized applications

Dual Twin Foaming Characteristics Test Apparatus–Performs two tests at 75°F (24°C) and two tests at 200°F (93.5°C). Consists of two 12x18" (30.5x45.7cm) constant temperature baths with 1000mL test cylinders, certified diffusers, air delivery tubes, and flowmeters (94mL/min.) for each sample. Baths are equipped with microprocessor temperature controls, copper immersion heaters and 1/20hp circulation stirrers to maintain temperature uniformity of ±1°F (±0.5°C). Microprocessor PID control provides quick temperature stabilization without overshoot and the bath is protected by an overtemperature control circuit that interrupts power should bath temperature exceed a programmed cut-off point. Dual LED displays provide actual and setpoint temperature values in °C/°F format. Test cylinders are held securely in place by quick-locking cams in the bath cover assembly. A separate stainless steel support rack is provided to hold the test cylinders after removal from the bath. Cold bath (24°C) has built-in coils for circulating exit air from the high temperature test cylinders prior to passing to a volume meter, and a separate coil for circulating cooling water or refrigerant when the ambient temperature exceeds the test temperature. Supplied with rubber stoppers and glass air outlet tubes for each cylinder. Bath controls are enclosed in a finished steel base with chemical resistant polyurethane enamel finish. *Communications software as seen on page 110 (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. Contact your Koehler representative for information.*

FTM 791-3213 Aircraft Lubricants Test–Employs more severe conditions, smaller sample, increased air flow, and longer aeration period to test the foaming characteristics of aircraft-turbine lubricants. All models are available on special order for FTM 791-3213 testing. Please call or write for specifications and ordering information.

Specifications

Conforms to the specifications of:
ASTM D892; IP 146; DIN 51566; FTM 791-3211, 791-3213*; NF T 60-129
Temperature Control:
Digital Setpoint and Displays °C/°F switchable
Built-in Overtemperature Cut-off Protection

Included Accessories

Test Cylinders, 1000mL (4)
Diffuser Stones, calibrated and certified (4)
Air Delivery Tube Assemblies (4)
Air Outlet Tubes (4)
Rubber Stoppers (4)
Bath Jars (2)
Support Rack (1)
Acrylic Safety Shield, 18"

**Requires modifications to standard equipment.*

This equipment is available with a digital-indicating mass flow controller in place of the standard flowmeter. Please call or write for specifications and/or ordering information.

Digital Flowmeter option is available for this unit.

Software compatible, inquire with Koehler Customer Service.

K43041 Sequence IV Liquid Foaming Characteristics Apparatus

High Temperature 'Sequence IV' Liquid Foam Test Bath–For two tests at 150°C with a flow rate of 200mL/min. in accordance with ASTM D6082 specifications. Consists of a constant temperature bath with 1000mL test cylinders, certified diffusers, air delivery tubes and flowmeters. Microprocessor PID control provides quick temperature stabilization without overshoot and the bath is protected by an overtemperature control circuit that interrupts power should bath temperature exceed a programmed cut-off point. Dual LED displays provide actual and setpoint temperature values in °C/°F format. Quick response copper immersion heaters provide efficient high temperature operation, and a stirrer unit provides complete circulation for temperature uniformity of better than ±1°F (±0.5°C). Locking cams hold the test cylinders in a vertical position, and a separate rack is provided to hold the cylinders after removal from the bath. For operator safety, an acrylic heat shield surrounds the Borosilicate Glass bath jar. *Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. Contact your Koehler representative for information.*

Specifications

Conforms to the specifications of: ASTM D6082
Temperature Control:
Digital Setpoint and Displays °C/°F switchable
Built-in Overtemperature Cut-off Protection

Included Accessories

Test Cylinders, 1000mL (2)
Diffuser Stones, calibrated and certified (2)
Air Delivery Tube Assemblies (2)
Air Outlet Tube (2)
Bath Jar (1)
Support Rack (1)
Rubber Stoppers (2)
Acrylic Safety Shield, 18"

Foaming Characteristics of Lubricating Oils

Ordering Information

Model	Catalog No.	Electrical CE Requirements	Bath Temperature	Air Flow Rate	Bath Capacity	Dimensions lxwxh,in.(cm)	Shipping Information
Dual-Twin	**K43002**	115V 60Hz 15.6A	24°C (75°F) and 93.5°C (200°F) (Operator variable)	94mL/min	9 gal (38.5L) each bath	32¼x15x31¼ (82x38x79.4) Net Weight: 108 lbs (49kg)	Shipping Wgt. 217 lbs (98.4kg) Dimensions 29.6 Cu. ft.
	K43092	220-240V 50/60Hz 8.1A					
Automatic Time Sequence	**K43003**	115V 60Hz 16A				32¼x15x31¼ (82x38x79.4) Net Weight: 118 lbs (53.5kg)	Shipping Wgt. 227 lbs (103kg) Dimensions: 33 Cu. ft.
	K43093	220-240V 50/60Hz 8A					
Sequence IV Liquid	**K43041**	115V 60Hz 14A	150°C (302°F) (Operator variable)	200mL/min	9 gal (38.5L)	16¾x15x31¼ (42.5x38x79.4) Net Weight: 62 lbs (28.1kg)	Shipping Wgt. 89 lbs (40.4kg) Dimensions 16.3 Cu. ft.
	K43049	220-240V 50/60Hz 7A					

K43092 Dual-Twin Foaming Characteristics Apparatus

D892 and D6082 Dual Twin Foaming Characteristics Test Apparatus–For four tests in accordance with control ASTM D6082 and ASTM D892 specifications. Dual liquid baths feature digital temperature control for Sequences I through IV. Four flowmeters maintain the required flow rate of 94 and 200mL/min to the air diffusers. Requires the use of an external chiller to perform the Sequence I and III tests at 24°C.

Specifications

Conforms to the specifications of:
ASTM D892, D6082; IP 146; DIN 51566; FTM 791-3211; NF T 60-129
Temperature Control:
Digital Setpoint and Displays °C/°F switchable
Built-in Overtemperature Cut-off Protection

Included Accessories

Test Cylinders, 1000mL (4)
Diffuser Stones, calibrated and certified (4)
Air Delivery Tube Assemblies (4)
Air Outlet Tubes (4)
Rubber Stoppers (4)
Bath Jars (2)
Support Rack (1)
Acrylic Safety Shield, 18"

Accessories and Additional Ordering Information

For a complete listing of accessories and information on ordering a complete package for ASTM D892 and/or D6082 testing, please turn to page 110.

Ordering Information

Model	Catalog No.	Electrical CE Requirements	Bath Temperature	Air Flow Rate	Bath Capacity	Dimensions lxwxh,in.(cm)	Shipping Information
D892/D6082 Dual Twin	**K43005**	115V 60Hz 15.6A	**Left (Cold) Bath:** Ambient to 93.5°C (200°F) External Chiller required to perform Sequence I and III at 24°C **Right (Hot) Bath:** Ambient to 150°C (302°F)	94mL/min and 200mL/min	9 gal (38.5L) each	32¼x15x31¼ (82x38x79.4) Net Weight: 108 lbs (49kg)	Shipping Wgt. 217 lbs (98.4kg) Dimensions: 29.6 Cu. ft.
	K43095	220-240V 50/60Hz 8.1A					

Digital Flowmeter option is available for this unit.

Software compatible, inquire with Koehler Customer Service.

Foaming Characteristics of Lubricating Oils

Advanced Communications Software Package for Data Management

Test apparatus for ASTM D892 Sequence I, II and III

Catalog No.		Order Qty
K43002	Dual Twin Foam Test Apparatus (or K43003 Automatic Time Sequence Model)	1
387-115-001	Air Pump	1
K43025	Diffuser Stone Test Apparatus	1
250-000-12F	ASTM 12F Thermometer (or 250-000-12C ASTM 12C Thermometer)	2
K43026	Wet Test Gas Meter (not required for Alternative Procedure)	1
332-005-005	Drying Tower	1

Test apparatus for ASTM D6082 Sequence IV

Catalog No.		Order Qty
K43041	Sequence IV Foam Test Bath	1
K43025	Diffuser Stone Test Apparatus	1
K43026	Wet Test Gas Meter	1
332-005-005	Drying Tower	1
387-115-001	Air Pump	1
250-000-41C	ASTM 41C Thermometer	1

Test apparatus for ASTM D892 and D6082

Catalog No.		Order Qty
K43005	D892 and D6082 Dual Twin Foam Test Apparatus	1
K43025	Diffuser Stone Test Apparatus	1
K43026	Wet Test Gas Meter	1
332-005-005	Drying Tower	1
387-115-001	Air Pump	1
250-000-12F	ASTM 12F Thermometer (or 250-000-12C ASTM 12C Thermometer)	2
250-000-41C	ASTM 41C Thermometer	2

Accessories

Catalog No.	
387-115-001	Air Pump, oil-less. Delivers 100% oil-free air. 115V 60Hz
387-230-001	Air Pump, oil-less. 220-240V 50/60Hz
K43026	Wet Test Gas Meter For volume measurements of air leaving the test cylinders. **Note:** One meter is required for each test cylinder. Not required for the 'Alternative Procedure' - Section 9.1.
332-005-005	Drying Tower. 300mm
K43025	Diffuser Stone Test Apparatus For maximum pore diameter and permeability tests on diffuser stones. Consists of 90cm manometer, 500mL flask, flowmeter, graduate, delivery tube assembly and control valve.
K33031	Refrigerated Recirculator Use with foam test baths for 24°C tests (Sequence I and III). Microprocessor based digital control and quiet running compressor provide reliable operation and accurate control within ±0.5°C. For complete specifications, please contact Koehler Customer Service. 115V 60Hz, 8A
K33032	Refrigerated Recirculator, 220-240V 50Hz, 4A
250-000-12F	ASTM 12F Thermometer. Range: –5 to +215°F
250-000-12C	ASTM 12C Thermometer. Range: –20 to +102°C
250-000-41C	ASTM 41C Thermometer. Range: 98 to 152°C
344-100-01C	Certified Diffuser Stone. Calibrated and certified for compliance with ASTM specifications for pore diameter and permeability
344-100-001	Diffuser Stone, non-calibrated
344-005-001	Stainless Steel 'Mott' Diffuser
344-005-01C	Stainless Steel 'Mott' Diffuser Certified
K43012	Test Cylinder Replacement 1000mL cylinder. Includes retaining ring.

For NIST traceable certified thermometers, please refer to the ASTM Thermometers sections on pages 184 through 191.

Water Separability of Petroleum Oils and Synthetic Fluids

Test Method

The ability of a lubricating oil to separate from water and resist emulsification is an important performance characteristic for applications involving water contamination and turbulence. Water separability is determined by stirring equal volumes of water and sample together at a controlled temperature to form an emulsion and observing the time required for separation of the emulsion to occur. This method is suitable for petroleum oils and synthetic fluids.

Water Separability Tester

- Tests emulsion characteristics of lubricating oils
- Seven sample capacity
- Movable digital stirrer with microprocessor control incorporates advanced features for flexibility and ease of operation
- Clear, illuminated heating bath provides excellent visibility
- Microprocessor temperature control with digital display and built-in protection against overtemperature and low liquid level hazards
- Conforms to ASTM, ISO and related standards for water separability testing
- Optional sensor for direct measurement of sample temperature
- With built in drain for convenient draining of bath medium

Seven-sample Water Separability Tester provides full visibility and microprocessor control of all functions for simplified, accurate testing of up to seven samples at a time. Use for specification of new oils and monitoring of in-service petroleum oils and synthetic fluids.

Seven position heating bath–A full visibility bath immerses seven 100mL cylinders at the proper depth per ASTM and ISO specifications. Sample cylinders are held securely in place by stainless steel supports inside the bath. A microprocessor based heater controls bath operating controls bath fluid temperature with greater than ±1˚C accuracy and stability throughout the operating range of 25˚C to 84˚C. Large LED readouts display setpoint and actual temperatures in Celsius or Fahrenheit scale at the operator's option. For most samples, ASTM/ISO sample temperatures of 54˚C and 82˚C are attained within 10 minutes after placement of the test cylinders into the stabilized bath. Clear polycarbonate tank has backlighting for excellent visibility when viewing emulsion separations in the test cylinders. Cut-off circuits for low water level and over-temperature conditions provide protection in the event of equipment malfunction. Easy removal of top plate for filling or cleaning the bath. Polycarbonate jar is encased in a Polyester-Epoxy finished steel housing with a protective distortion-free viewing window and a solid foundation.

Microprocessor sample stirrer–To avoid sample movement, the sample stirrer housing pivots to each test position in the bath and locks securely in place at the required position in relation to the 100mL sample cylinder. The digital stirrer offers complete flexibility for test duration and stirring speed at the push of a button. Operating speed and count down time are prominently displayed on a large backlit LCD panel. A wide operating range of 0-2000rpm permits in-house customized testing with ±1rpm accuracy, and the operator may select a stirring time of up to 99.99 minutes. At the end of the selected interval, the stirrer automatically shuts off and alerts the operator with audible and visual signals that the settling period has commenced. For added convenience, all test parameters are stored in memory and repeated in subsequent tests until they are changed by the operator. Engaging the stirrer mechanism is visible to the operator and housed in a clear tube for added safety.

For NIST traceable certified thermometers, please refer to the ASTM Thermometers sections on pages 184 through 191.

Software compatible, inquire with Koehler Customer Service.

K39400 Water Separability Tester

Specifications

Conforms to the specifications of: ASTM D1401, D6074, D6158; ISO 6614; DIN 51599; FTM 791-3201; NF T 60-125
Stirrer Range: 0-2000rpm
Accuracy: ±1.0rpm
Drive: 1/10hp (75W), high torque
Bath Temperature Range: 25˚C to 84˚C
Control Stability: ±0.05˚C
Capacity: seven (7) 100mL graduated cylinders
Construction: Clear polycarbonate tank 10"x11.25"x9.5" (25.5x28x24cm)
Medium: Water or white technical oil
Medium Capacity: 15.15L (4 gal)
Electrical Requirements: CE
115V 60Hz, Single Phase, 12A
220-240V 50/60 Hz, Single Phase, 12A

Dimensions lxwxh, in.(cm)
20.75x15.25x29.5
(52.7x38.75x 74.9)
Net Weight: 78 lbs (35.5kg)

Included Accessories
Seven 100mL Cylinders

Ordering Information

Catalog No.		Order Qty
K39400	Water Separability Tester, 115V 60Hz	1
K39496	Water Separability Tester, 230V 50/60Hz	
	Accessories	
332-002-018	Cylinder 100mL, graduated from 5 to 100mL with 1.0mL divisions	
250-000-19F	ASTM 19F Thermometer. Range: 120 to 134°F	1
250-000-19C	ASTM 19C Thermometer. Range: 49 to 57°C	
250-000-21F	ASTM 21F Thermometer. Range: 174 to 188°F	1
250-000-21C	ASTM 21C Thermometer. Range: 79 to 87°C	
K39252	PTFE Policeman	7
K39251	Test Tube Rack	1

Demulsibility Characteristics of Lubricating Oils

K39190 Demulsibility Bath With Stirrers and Funnels

Test Method

Tests the ability of medium to high viscosity oils to separate from water when water contamination and turbulence are encountered. The sample is stirred together with distilled water for 5 min. at constant temperature. After a specified settling period, the degree of separation is measured by volume and the percentage of water in oil is determined. For lighter oils and synthetic fluids, the ASTM D1401 Water Separability Test is used.

Demulsibility Apparatus

- Conforms to the specifications of ASTM D2711
- Variable stirrer speed
- Choice of digital or analog bath models

Stirrer–Complete stirrer assembly per Fig. 1 and 2 of ASTM D2711, including variable high speed drive motor, stainless steel propeller shaft, top, center and bottom bearings, and steel motor housing with positioning plate. Entire assembly mounts vertically in K39190/K39199 Constant Temperature Bath. Built-in tachometer disc allows for precise stirrer speed adjustment.

Constant Temperature Baths–Standard model holds two K39103 Stirrers and two K39120 Separatory Funnels in proper alignment for demulsibility characteristics testing. Stirrers mount securely on a stainless steel support plate having brackets for testing and drainage positions. Separate motor speed controls are provided for each stirrer. All wetted parts are constructed of stainless steel.

Microprocessor digital temperature control with dual LED displays for setpoint and actual temperatures and an illuminated bath interior with window for viewing sample cylinders. Digital LED speed control is provided for each stirrer.

Specifications

Conforms to the specifications of: ASTM D2711
Capacity: Two (2) sample-water mixtures
Maximum Temperature: 212°F (100°C)
Temperature Control: Microprocessor digital control with LED display
Bath Medium: 9 gal (38.5L) water
Electrical Requirements: CE
115V 60Hz
220-240V 50/60 Hz

Dimensions: WxDxH in (cm)
15¼x15x37 (39x38x94)
Net Weight: 72 lbs (32.6kg)

Shipping Information
Shipping Weight 133 lbs (60.3kg)
Dimensions: 25.4 Cu. ft.

Accessories

Catalog No.		Order Qty
K39120	Separatory Funnel With 0-500mL graduations. Meets ASTM specifications.	2
K39130	Solvent Tank. Immerses stirrer assembly for convenient cleaning after testing.	1
K39140	Forced Warm Air Dryer, 115V 60Hz High output 1400W dryer and brass cylinder mounted on a sturdy base. Rapidly dries stirrer assembly after cleaning.	
K39149	Forced Warm Air Dryer, 220-240V 50/60Hz	1
K39150	Sampling Gauge and Centering Device Per Fig. X1.1 of ASTM D2711. Aids in accurately obtaining 50mL samples from separatory funnels for the 'percent water in oil' determination.	1
360-000-003	Digital Tachometer Hand held non-contact LCD tachometer takes measurements up to 3 ft away with ±1rpm accuracy. Supplied with four 1.5V AA batteries.	1
250-000-09F	ASTM 9F Thermometer Range: 20 to 230°F	1
250-000-09C	ASTM 9C Thermometer Range: –5 to +110°C	
K39170	Conditioning Bath, 115V 60Hz Constant temperature water bath holds 8 separatory funnels in two removable 4-unit racks for conditioning prior to testing in Demulsibility Apparatus. Includes microprocessor digital temperature control, automatic water level control and gabled cover.	1
K39179	Conditioning Bath, 220-240V 50/60Hz	

Ordering Information

Catalog No.		Order Qty
K39190	Demulsibility Bath, 115V, 60Hz	1
K39199	Demulsibility Bath, 220-240V, 50/60Hz	
K39103	Stirrer** **Suitable for use with K39190 & K39199	2

For NIST traceable certified thermometers, please refer to the ASTM Thermometers sections on pages 184 through 191.

Software compatible, inquire with Koehler Customer Service.

Air Release Properties of Petroleum Oils

K88500 Air Release Value Apparatus

Test Method

The ability of a turbine, hydraulic, or lubricating oil to separate entrained air is a key performance characteristic in applications where agitation causes a dispersion of air bubbles in the oil. To determine air release properties, the sample is heated to a specified test temperature and blown with compressed air. After the air flow is stopped, the time required for the air entrained in the oil to reduce in volume to 0.2% is the air bubble separation time.

Air Release Value Apparatus

- Conforms to ASTM D3427, IP 313 and related specifications
- High accuracy temperature control with digital setpoint and display
- Digital control panel leads user from start to finish of test operation
- Automatic calculation of final sample density for determination of air release value
- Redundant overtemperature protection circuitry assures safe operation

The Koehler Air Release Value Apparatus consists of a test vessel and air flow control equipment for delivering heated air at the specified flow rate to a lubricating oil sample maintained at constant temperature. Microprocessor-based control panel guides user from start to finish of test operation and provides density calculation and timing operation for measuring the air release value of the test sample. The system includes drying oven for warming test oil at temperatures of up to 100°C; circulating bath with digital temperature controller and air bath for sinker; compressed air heater with digital temperature controller, overtemperature and overpressure protection circuitry; pressure gauge; thermometer. Optional Windows® software automatically measures the time for air release.

Specifications

Conforms to the specifications of:
ASTM D3427; IP 313; ISO 9120; DIN 51381; NF E 48-614

Temperature Range:
ambient to 75°C (167°F)

Electrical Requirements: CE
115V 60Hz, 3.0A
230V 50Hz, 1.5A
230V 60Hz, 1.5A

Dimensions lxwxh,in.(cm)
24x28x38¼ (61x71x97)
(Air Release Value Apparatus only)

Net Weight for complete system:
225 lbs (103kg)

Included Accessories

ASTM 12C Thermometer
Sinkers, 5mL and 10mL
Drying oven
Pressure gauge
Circulating Bath
Air Bath for Sinker
Balance
Platinum Wire
Jacketed Test Vessel

Shipping Information

Shipping Weight for complete system:
300 lbs (136kg)
Dimensions: 50.7 Cu. ft.

Ordering Information

Catalog No.		Order Qty
K88500	Air Release Value Apparatus, 115V 60Hz	1
K88501	Air Release Value Apparatus, 230V 50Hz	
K88502	Air Release Value Apparatus, 230V 60Hz	

Software compatible, inquire with Koehler Customer Service.

Koehler INSTRUMENT COMPANY, INC.

Oxidation Stability of Steam Turbine Oils by Rotating Pressure Vessel (Bomb)
Oxidation Stability of Inhibited Mineral Insulating Oil by Rotating Pressure Vessel (Bomb)
Oxidation Stability of Gasoline Automotive Engine Oils by Thin Film Oxidation Uptake (TFOUT)

Test Method

The RPVOT (RBOT) procedure employs severe oxidation conditions to rapidly determine oxidation stability. Suitable for both new and in-service oils, the RPVOT (RBOT) method is applicable to many types of petroleum oils. The sample is oxidized in the presence of water and a copper catalyst in a stainless steel pressure vessel under an initial pressure of 90psi (620kPa). Pressure inside the vessel is recorded electronically or mechanically while the vessel is rotated at 100rpm at constant temperature, and the amount of time required for a specified drop in pressure is the oxidation stability of the sample. A variation of the RPVOT (RBOT) method is the "Thin Film Oxidation Uptake Test" (TFOUT) for gasoline automotive engine oils.

RPVOT (RBOT) Test Apparatus

- 2, 3 and 4-unit systems
- Oxidata® Pressure Measurement System
- Conforms to ASTM D2112, D2272 and IP 229 specifications for RPVOT (RBOT) testing
- Conforms to ASTM D4742 specifications for TFOUT testing

For product specifications and ordering information:

Oxidation Pressure Vessels	*Page 114*
Oxidation Baths	*Page 116*
Beakers and Accessories	*Page 117*
Catalysts	*Page 117*
Pressure Recorder	*Page 117*
Oxidata® Pressure Measurement System	*Page 115*
Complete Systems, 2, 3 and 4-Unit	*Page 118*

Oxidation Pressure Vessel

- Polished stainless steel construction
- Can be converted for use in the Thin Film Oxidation Uptake Test (TFOUT)

Consists of pressure vessel body, cap and stem with inlet needle valve in accordance with ASTM specifications. Vessel holds one borosilicate glass sample container between two PTFE discs. Closure ring tightens by hand to seal cap to pressure vessel body. Vessel connects to pressure recorder or rotary transducer and rotates on magnetic carriage in RBOT bath. Withstands working pressure of 500psi (3450kPa) per ASTM specifications. Stainless steel construction ensures proper rate of heat transfer. Closure ring is constructed of chrome plated steel. Includes PTFE fluorocarbon wear disc and sample container cover disc.

Ordering Information

Catalog No.	
K70000	Oxidation Pressure Vessel
K70092	Aluminum Insert Converts standard K70000 Oxidation Pressure Vessel for use in the TFOUT method

Oxidata® Pressure Measurement System

Oxidata® Pressure Measurement Systems

- Electronic pressure measurement systems exclusively designed for RPVOT (RBOT), TFOUT and other ASTM oxidation test methods
- Powerful Oxidata® software for Windows® and Windows 95® environments
- Monitors up to twelve pressure and four temperature channels
- **Can be installed to most manufacturer's RPVOT(RBOT)/TFOUT test apparatus**

Complete electronic measurement systems for plotting pressure versus time and temperature in RPVOT (RBOT) and TFOUT testing. Each system includes transducers, bomb couplings, RTD probe assembly, multiplexer, data acquisition card, software, and mounting and connecting hardware. Systems are available in two, three and four pressure vessel configurations, and additional channels can be added for up to a total of twelve pressure and four temperature channels.

Koehler pressure measurement systems for RPVOT (RBOT) and TFOUT feature Oxidata®, a high accuracy pressure measurement software package designed exclusively for ASTM oxidation test methods. Designed to run in a Windows® or Windows 95® environment, Oxidata® monitors up to twelve samples simultaneously, with graphical or tabular display of results. Each channel can be independently configured for any of the applicable ASTM standard test methods without compromising the independence or accuracy of the other channels. Independent start and stop times and user programmable end points add even greater flexibility.

The software plots your data on screen on line, real time, and automatically saves your data on disk or to the hard drive during the test to prevent loss of valuable data. Multiple display options include the ability to view the status of all twelve pressure channels on screen simultaneously and then click on any one channel for a graph display; or to view four channels in graphical format simultaneously. Powerful program features allow you to change axes, have colored plot lines and zoom in on a specific plot sector to view data in greater detail.

Oxidation Stability – RPVOT & TFOUT

Oxidata® Features and Specifications

- On-line, real time monitoring of up to twelve samples simultaneously - results plot directly to the screen for instant monitoring or printout of results
- Menu options for RPVOT (RBOT) or TFOUT testing, as well as for other ASTM fuel and lubricant oxidation tests
- Programmable automatic end point detection with graphical and tabular representation
- Each channel can be configured and operated independently with different start/stop times and different ASTM test methods
- Zoom in feature allows for magnification of any plot sector on any channel for a more detailed study
- Monitors and reports temperatures of as many as four baths simultaneously using accessory RTD's, and calculates and displays average temperature for each bath. Exports data to spreadsheet programs such as Microsoft Excel®, Lotus 1-2-3®, etc.
- Temperature and pressure calibration capability
- Data is saved directly to the hard drive during testing to prevent loss of valuable data
- Operates in Windows® 2000 or higher
- Simple upgrade from existing Koehler data acquisition systems

Included Accessories (for the pressure measurement systems)

Rotary transducers (connects directly to bomb)
Data acquisition box with USB interface
Oxidata® software
Multiplexer
RTD probe assembly (1)
Mounting Bracket for bath
Connecting cables and hardware

Computer Requirements

Processor: Intel® Pentium II or similar (minimum)
Memory (RAM): 256MB or higher
Speed: 500 MHz or higher
Windows® 2000 or higher
Disk Space: 15 MB free space (minimum)
Communications Port: One USB port
Other Software: Microsoft® Excel (97 or above)
One RS232 port for temperature controller (optional)

Ordering Information

The ordering information below is for installation to Koehler equipment. For other makes of equipment, a few basic hardware items may also be required - please contact your Koehler representative for assistance.

Catalog No.

RBOT/TFOUT Electronic Pressure Measurement System CE

K70502-XP	Two-Unit System, 115V 60Hz
K70592-XP	Two-Unit System, 220-240V 50/60Hz
K70503-XP	Three-Unit System, 115V 60Hz
K70593-XP	Three-Unit System, 220-240V 50/60Hz
K70504-XP	Four-Unit System, 115V 60Hz
K70594-XP	Four-Unit System, 220-240V 50/60Hz

Oxidata® Software automatically calculates and displays the endpoint of RPVOT (RBOT)/TFOUT test methods.

Real-time plot screen displays pressure versus time for up to twelve samples simultaneously.

Oxidata® Retrofit Kits

To upgrade your existing Koehler electronic pressure measurement system to the Oxidata® software, please refer to page 118.

Koehler INSTRUMENT COMPANY, INC.

Oxidation Stability – RPVOT & TFOUT

Oxidation Baths

- Two, three and four-pressure vessel models
- Conforming to ASTM requirements for RPVOT (RBOT) and TFOUT testing

Constant temperature bath rotates oxidation pressure vessels at 100rpm at an angle of 30° in accordance with ASTM specifications. Includes drive system and oil bath with electronic solid state temperature control. Meets ASTM requirements for heat transfer capability and temperature control precision.

A convenient carriage arrangement allows the oxidation vessels to be inserted quickly and securely in the drive system. A strong magnet holds the vessel in place while locating pins in the carriage engage the base of the vessel. PTFE guides support the pressure vessel stem for added stability. If the vessel becomes obstructed for any reason, the magnetic carriage releases it to prevent damage. A chain and sprocket drive system powered by a heavy duty capacitor start motor rotates the vessel carriages at 100rpm. Drive shafts ride on PTFE fluorocarbon bearings which provide extended service and are compatible with silicone heat transfer fluids and other types of bath oils.

Bath temperature is controlled within ASTM specified limits by an electronic solid state controller with °C/°F switchable digital setpoint and display. Overtemperature protection is provided by a built-in limit control that automatically interrupts power to the bath when bath liquid temperature exceeds 16.7°C (30°F) above the temperature setting or 177°C (350°F). Power must then be manually restored by the operator after checking the cause of the problem. Pressure vessel carriage vanes circulate the bath oil during testing to ensure temperature uniformity, and an auxiliary stirrer can be operated between tests to prevent sludging of non-silicone bath oils.

The bath interior is constructed of welded stainless steel and is fully insulated. A hinged section of the bath cover provides easy access to the vessel carriages. Vapor barriers in the cover close around the vessel stems to contain vapors from the hot bath medium. A chemical resistant polyurethane finish protects the bath exterior and control cabinet.

Specifications

Conforms to the specifications of: ASTM D2112, D2272, D4742; IP 229
Capacity: 2, 3 or 4 oxidation pressure vessels
Temperature Control:
Maximum Temperature: 200°C (392°F)
Control Stability: ±0.02°C (±0.04°F)
Heater Range:
2 and 3-pressure vessel models: 0-2750W
4-pressure vessel models: 0-3750W
Recommended Bath Medium: high temperature silicone heat transfer fluid (355-001-002 or 355-001-004—page 8)
Drive System: 100rpm positive drive transmission powered by a continuous duty ½hp ball bearing motor with built-in gear reducer

Ordering Information

Catalog No	Capacity	Electrical Requirements CE	Bath Capacity, gal (L)	Dimensions, lxwxh,in.(cm)	Net Weight	Shipping Weight
K70200	2 oxidation	220-240V 60Hz, 17.17A	18 (68)	28x26x33	237 lbs	356 lbs (161.5kg)
K70290	vessels	220-240V 50Hz, 17.17A		(71x66x84)	(107.5kg)	25.3 Cu. ft.
K70300	3 oxidation	220-240V 60Hz, 17.17A	25 (95)	37x26x33	284 lbs	416 lbs (188.7kg)
K70390	vessels	220-240V 50Hz, 17.17A		(94x66x84)	(129kg)	32 Cu. ft.
K70400	4 oxidation	220-240V 60Hz, 21.5A	32 (121)	46x26x33	375 lbs	542 lbs (245.9kg)
K70490	vessels	220-240V 50Hz, 21.5A		(117x66x84)	(170kg)	40.3 Cu. ft.

- For verifying bath temperature in accordance with ASTM and IP test method specifications

Ordering Information

Catalog No.	
250-001-37C	IP 37C Thermometer. Range: 144 to 156°C For RPVOT (RBOT) method.
250-000-96C	ASTM 96C Thermometer. Range: 120 to 150°C For ASTM D2112 method.
250-000-100C	ASTM 100C Thermometer. Range: 145 to 205°C For TFOUT method.

For NIST traceable certified thermometers, please refer to the ASTM Thermometers sections on pages 184 through 191.

Oxidation Pressure Vessel Accessories

- Sample beakers for RBOT and TFOUT methods
- Oxygen charging accessories

Ordering Information

Catalog No.	
Sample Beakers	
K70040	RPVOT (RBOT) Sample Beaker Borosilicate glass, 175mL Meets ASTM D2112, D2272 specifications
K70091	TFOUT Sample Container Borosilicate glass. Meets ASTM D4742 specifications
Oxygen Charging Accessories	
K70080	Charging Hose. 6 ft (1.8m), with connections
K70082	Female Quick Disconnect Coupling, for charging hose
K70081-1	Male Quick Disconnect Coupling, ¼" NPT, for oxidation pressure vessel
K70013	Oxygen Pressure Regulator
Oxidation Pressure Vessel Accessories	
K70050	Silicone O-ring Replacement seal for pressure vessel lid-body connection
K70049	Sample Beaker Cover (PTFE disk)
K70048	TFOUT Sample Beaker Cover (PTFE disk)
K70000-03008	Spring. Inserts in pressure vessel to hold RPVOT (RBOT) beaker and cover in place
K700-0-3A	Spring. Inserts in pressure vessel to hold TFOUT container and cover in place

Pressure Recorder

- Conforms to ASTM D2112, D2272, D4742 and IP 229 specifications
  Records pressure inside oxidation bomb on 24-hour charts. Range 0 to 200psi, accurate to within 2% of scale range, 24-hour spring wound chart movement. Housed in a finished metal case. Includes cartridge pen.

Ordering Information

Catalog No.	
K70010/24	Pressure Recorder, 24-hour
Accessories	
K70018	Replacement Cartridge Pen
308-000-004	Recorder Chart, 24-hour Box of 60 charts

Oxidata® pressure measurement equipment is now available for the RPVOT (RBOT) and TFOUT Methods. *Please refer to page 115.*

Pressure Vessel Support Racks

- For convenient handling of oxidation pressure vessel during assembly and disassembly

Securely holds vessel-recorder assembly in an upright position. Convenient for assembling and disassembling vessel. Equipped with drainage trough for bath oil remaining on the vessel exterior after testing.

Ordering Information

Catalog No.	
K70017	Pressure Vessel Support Rack, 2-Unit
K70011	Pressure Vessel Support Rack, 3-Unit
K70012	Pressure Vessel Support Rack, 4-Unit

Catalysts

- For Rotating Pressure Vessel Oxidation Test (RPVOT)
- For Thin Film Oxidation Uptake Test (TFOUT)

Ordering Information

Catalog No.	
Copper Catalyst for RPVOT (RBOT) Method	
K70030	Copper Catalyst Coil Prepared in accordance with ASTM specifications and packed in a sealed glass container with nitrogen atmosphere. Ready to use.
K70090	Copper Catalyst Wire 1.63mm electrolytic copper wire in 500 ft (152m) lengths.
K70002	Winding Mandrel Machined aluminum mandrel for winding copper wire into coils meeting ASTM specifications. Mounts on K70003/K70004 Drive Unit
K70003	Drive Unit for Winding Mandrel Slow speed gear motor mounted on a sturdy base. Facilitates coil winding procedure. 115V
K70004	Drive Unit for Winding Mandrel Similar to K70003 but for operation on 220-240V
Catalyst Package for TFOUT Method	
K70093	Catalyst Package A For simulating IIID engine test. Includes 3 catalyst packages
K70095	Catalyst Package B For simulating IIIE engine test. Includes 3 catalyst packages

2 Unit RBOT System:

K70200	*Oxidation Bath (or K70290)*
K70000	*Oxidation Pressure Vessel (2)*
K70502-XP	*Oxidata® Pressure Measurement System (or K70592-XP)*
K70002	*Winding Mandrel*
K70003	*Drive Unit (or K70004)*
K70017	*Pressure Vessel Support Rack*
250-001-37C	*IP 37C Bath Thermometer*
K70080	*Charging Hose*
K70082	*Female Quick Disconnect Coupling for charging hose*
K70081-1	*Male Quick Disconnect Coupling for oxidation pressure vessel (2)*
K70013	*Oxygen Pressure Regulator*
K70030	*Copper Catalyst Coils*
K70090	*Copper Catalyst Wire, 500 ft.*
K70040	*Sample Container*
K70050	*Silicone O-ring*

} *Order sufficient quantity to meet anticipated testing requirements.*

3-Unit RBOT System:

K70300	*Oxidation Bath (or K70390)*
K70000	*Oxidation Pressure Vessel (3)*
K70503-XP	*Oxidata® Pressure Measurement System (or K70593-XP)*
K70002	*Winding Mandrel*
K70003	*Drive Unit (or K70004)*
K70011	*Pressure Vessel Support Rack*
250-001-37C	*IP 37C Thermometer*
K70080	*Charging Hose*
K70082	*Female Quick Disconnect Coupling for charging hose*
K70081-1	*Male Quick Disconnect Coupling for oxidation pressure vessel (3)*
K70013	*Oxygen Pressure Regulator*
K70030	*Copper Catalyst Coils*
K70090	*Copper Catalyst Wire, 500 ft.*
K70040	*Sample container*
K70050	*Silicone O-ring*

} *Order sufficient quantity to meet anticipated testing requirements.*

4-Unit RBOT System:

K70400	*Oxidation Bath (or K70490)*
K70000	*Oxidation Pressure Vessel (4)*
K70504-XP	*Oxidata® Pressure Measurement System (or K70594-XP)*
K70508	*Mounting Bracket for Four-Unit XP System*
K70002	*Winding Mandrel*
K70003	*Drive Unit (or K70004)*
K70012	*Pressure Vessel Support Rack*
250-001-37C	*IP 37C Thermometer*
K70080	*Charging Hose*
K70082	*Female Quick Disconnect Coupling for charging hose*
K70081-1	*Male Quick Disconnect Coupling for oxidation pressure vessel (4)*
K70013	*Oxygen Pressure Regulator*
K70030	*Copper Catalyst Coil*
K70090	*Copper Catalyst Wire, 500 ft.*
K70040	*Sample Container*
K70050	*Silicone O-ring*

} *Order sufficient quantity to meet anticipated testing requirements.*

For TFOUT testing, make the following substitutions:

K70091	*Sample Beaker (replaces K70040)*
K70092	*Aluminum Insert (2, 3 or 4)*
K70095	*TFOUT Catalyst Package (in lieu of K70030, K70090, K70002, K70003)*
250-000-100C	*ASTM 100C Thermometer (replaces 250-001-37C)*

Oxidata® Retrofit Kits

To upgrade existing DOS-based Koehler electronic pressure measurement systems to the Oxidata® system. Kits include Oxidata® software, data acquisition card, multiplexer board, RTD probe assembly and connecting cables. Does not include rotary transducers or bath mounting bracket. *For information on upgrading other makes of equipment to the Oxidata® system, please contact your Koehler representative.*

Ordering Information

Catalog No.	
K70502RETRO	2-Unit Oxidata® Pressure Measurement System without Transducers, 115V 60Hz
K70592RETRO	2-Unit Oxidata® Pressure Measurement System without Transducers, 220-240V 50/60Hz
K70503RETRO	3-Unit Oxidata® Pressure Measurement System without Transducers, 115V 60Hz
K70593RETRO	3-Unit Oxidata® Pressure Measurement System without Transducers, 220-240V 50/60Hz
K70504RETRO	4-Unit Oxidata® Pressure Measurement System without Transducers, 115V 60Hz
K70594RETRO	4-Unit Oxidata® Pressure Measurement System without Transducers, 220-240 50/60Hz

Accessories

K70500	Rotary Transducer Includes electronic transducer and rotating stainless steel housing
K70519	RTD Kit, for monitoring the temperature of an additional bath

For NIST traceable certified thermometers, please refer to the ASTM Thermometers sections on pages 184 through 191.

Test Method

Various methods are available for testing the resistance to oxidation and/or the corrosiveness of lubricants, insulating oils, hydraulic oils and distillate fuel oils. The samples are subjected to a metered flow of air at elevated temperatures, sometimes in the presence of a metal catalyst. Each of the tests referenced on this page are also represented on other pages in this section of the catalog.

High Temperature Convertible Oxidation Bath

- Conforms to various ASTM, Federal and International Standards
- Removable racks hold different types of glassware for different tests
- Equipped with flowmeters or digital mass flow controls to measure and control the required flow rates
- Microprocessor digital temperature control

High temperature liquid bath for oxidation stability and corrosiveness tests at temperatures of up to 200°C. Available in different configurations for convertibility between several oxidation stability and corrosivity test methods including Cummins oxidation test. Removable rack/top plate assemblies remove and install with minimum effort to easily convert the bath between test methods. For most test methods, twelve sets of glassware can be accommodated in each rack assembly. Select flowmeters or digital mass flow control to maintain air flow at the required rates. Microprocessor PID control provides quick temperature stabilization without overshoot, and the bath is protected by an overtemperature control circuit that interrupts power should bath temperature exceed a programmed cut-off point. Dual LED displays provide actual and setpoint temperature values in °C/°F format. *Communication software (RS232, etc.) ramp-to-set and other enhanced features are available as extra cost options. Contact your Koehler representative for information.*

Specifications

Conforms to the specifications of*:
ASTM D943, D2274, D2440, D2893, D4310, D4636, D4871**, D5968, D6594; DIN 51394, 51586, 51587; FTM 791-5307, 791-5308
*with the appropriate glassware rack and flow control equipment installed –see ordering information.
****Modified versions of this equipment are available for D4871 (UOT) test method.**
Capacity: Twelve (12) sets of glassware. For ASTM D5968, FTM 791-5307, and FTM 791-5308, only ten (10) sets of glassware.
Temperature Range: Ambient to 200°C
Temperature Control Accuracy: 0.2°F (0.1°C)
Bath Medium: Silicone heat transfer fluid
Flow Rate: As specified for ASTM or applicable specifications
Electrical Requirements: CE
115V 60Hz, Single Phase, 27.3A
220-240V 50/60Hz, Single Phase, 14.6A

Dimensions lxwxh,in.(cm)
Bath (without glassware): 25½x24x42(65x61x107)

Shipping Information (without glassware)
Shipping Weight: 213 lbs (96.6kg)
Dimensions: 29 Cu. ft.

Digital Flowmeter option is available for this unit.

Software compatible, inquire with Koehler Customer Service.


K12230 High Temperature Convertible Oxidation Bath

Ordering Information

Catalog No.
Please contact your Koehler representative for information on glassware racks and airflow control options prior to order placement.

K12230	High Temperature Convertible Oxidation Bath, 115V 60Hz
K12239	High Temperature Convertible Oxidation Bath, 220-240V 50/60Hz

Accessories

K1223-R943	Sample Rack for D943, D2274, D2983, D4310 testing
K1223-R2440	Sample Rack for D2440 testing
K1223-R4636	Sample Rack for D4636, D5968, D6594 testing
K1223-3L	Flowmeter Stand with Flowmeters for D943, D2274, D2440, D4310 testing (range 3 ±0.1 L/hr)
K1223-10L	Flowmeter Stand with Flowmeters for D2893, D4636, D5968, D6594 testing (range to 10 ±0.5 L/hr)

To order glassware and other accessories please refer to the pages in this section of the catalog that correspond to the test methods that you will be following.

Koehler INSTRUMENT COMPANY, INC.

Oxidation Characteristics of Inhibited Mineral Oils

Sludging and Corrosion Tendencies of Inhibited Mineral Oils

Oxidation Stability of Distillate Fuel Oil (Accelerated Method)

Oxidation Characteristics of Extreme-Pressure Lubrication Oils

Test Method

Evaluates oxidation stability by subjecting the sample to a temperature of 95°C in the presence of oxygen or dry air. For inhibited mineral oils, the sample is reacted with oxygen in the presence of water and an iron-copper catalyst.

Oxidation Stability Apparatus

- Thirty and sixty-place liquid baths for high volume testing requirements
- Eight and twelve-place liquid baths for benchtop placement
- Twelve-place solid block bath
- Conforming to ASTM and related test method specifications
- Special baths for ASTM D2893 and AOCS CD12-57 tests

For product specifications and ordering information:
30 and 60-place Oxidation Baths - page 121
Solid-Block Oxidation Bath - page 121
Oxidation Cell Glassware and Accessories - page 122
Iron-Copper Catalyst and Thermometers - page 122

Eight and Twelve-Place Oxidation Baths

- Conforming to ASTM and related test method specifications

Constant temperature baths with solid state temperature control, calibrated flowmeters and condenser water manifold for oxidation stability tests on fuels and lubricants. Individual flowmeters and control valves for each oxidation cell deliver air flow at the rate of 3L/h. Condenser water manifold has individual control valves for each cell. Microprocessor PID control provides quick temperature stabilization without overshoot, and the bath is protected by a redundant overtemperature control circuit that interrupts power should bath temperature exceed a programmed cut-off point. Display provides actual setpoint temperature values in °C/°F format. Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. Double-wall insulated baths are equipped with copper immersion heaters and a 1/20 hp circulation stirrer. Stainless steel bath interior has a built-in support rack and overflow/drain to immerse the test cells at the required depth. Order oxidation cell glassware and accessories separately.

Dimensions lxwxh,in.(cm)
8-place model: 17½x25x42 (44x64x107)
12-place model: 22x14x42 (57.15x35.56x107)

Shipping Information:
Shipping Weight:
8-place model: 137 lbs (62.1kg)
12-place model: 213 lbs (96.6kg)
Dimensions:
8-place model: 29 Cu. ft.
12-place model: 29 Cu. ft.

Digital Flowmeter option is available for this unit.

Software compatible, inquire with Koehler Customer Service.

K12219 Oxidation Stability Bath

Specifications

Conforms to the specifications of:
ASTM D943, D2274, D2893*, D4310, D6158; AOCS CD12-57**
DIN 51586, 51587; ISO 4263, ISO 12205; NF M 07-047; NF T 60-150
Test Capacity: 8 or 12 oxidation cells
Temperature Range: ambient to 212°F (100°C)
Temperature Control Stability: ±0.2°F (±0.1°C)
Bath Medium: white technical oil
Bath Capacity:
8-place model: 10 gal (37.8L)
12-place model: 19 gal (71.9L)
Electrical Requirements: CE

8-place model:	115V 60Hz, Single Phase, 13.0A
	220-240V 50/60Hz, Single Phase, 6.8A
12-place model:	115V 60Hz, Single Phase, 32.6A
	220-240V 50/60Hz, Single Phase, 17.0A

Ordering Information

Catalog No.	
K12200	Oxidation Bath, 8-Unit, 115V 60Hz
K12290	Oxidation Bath, 8-Unit, 220-240V 50/60Hz
K12212	Oxidation Bath, 12-Unit, 115V 60Hz
K12219	Oxidation Bath, 12-Unit, 220-240V 50/60Hz

**Modified versions of this equipment are available for ASTM D2893*
***"Oxidation Characteristics of Extreme Pressure Lubricating Oils" and AOCS CD12-57 "Fat Stability-Active Oxygen Method." Information will be furnished upon request.*

30- and 60-Place Oxidation Baths

- Convenient operation and servicing of thirty or sixty test cells
- Complete bath temperature, water level, air flow and condenser water systems

Constant temperature water baths for high volume oxidation stability applications. Provides temperature control, metered air flow and condenser water supply controls for as many as thirty or sixty cells in a single system, eliminating the need for multiple water and electrical feeds and oxygen supply tanks. Microprocessor PID control provides quick temperature stabilization without overshoot, and the bath is protected by a redundant overtemperature control circuit that interrupts power should bath temperature exceed a programmed cut-off point. Display provides actual setpoint temperature values in °C/°F format. Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. A 6 or 12kW heat exchanger with heavy duty magnetic drive circulation pump provides rapid and uniform heat transfer throughout the bath. Bath liquid depth is automatically maintained within ASTM specified tolerances by an electronic water level control system. Two banks of individually controlled flowmeters maintain the required oxygen flow rate to each test cell, and condenser water control valves for each cell are mounted on manifolds along the sides of the bath. A centrally mounted trough collects condenser waste water for convenient disposal or recirculation through an external cooling device. Bath interior is constructed of heavy gauge welded stainless steel. All components are easily accessible for servicing if required. Supplied with a sturdy finished angle-iron frame for floor standing installation. Order oxidation cell glassware and accessories separately.

Specifications

Conforms to the specifications of:
ASTM D943, D2274, D2893*, D4310, D6158; ISO 4263, 12205
AOCS CD12-57*; DIN 51586, DIN 51587; NF M 07-047; NF T 60-150
Temperature Control Stability: ±0.1°C (±0.2°F)
Oxygen Flow Rate: 3L/h to each test cell, individually controlled
Bath Capacity:
30-place model: 60 gal (227L)
60-place model: 114 gal (432L)
Electrical Requirements: CE
30-place model: 220-240V 50/60Hz, Single Phase, 28A
60-place model: 220-240V 50/60Hz, Single Phase, 54A
Other electrical configurations are available upon request.

Dimensions lxwxh,in.(cm)

30-place model: 43x55x52 (109x140x132)
60-place model: 43x78x52 (109x198x132)

Shipping Information

Shipping Weight:
30-place model: 892 lbs (404.6kg)
60-place model: 995 lbs (451.3kg)

Dimensions:
30-place model: 94 Cu. ft.
60-place model: 148 Cu. ft.

Ordering Information

Catalog No.	
K12330	30-Place Oxidation Stability Bath, 220-240V 60Hz
K12339	30-Place Oxidation Stability Bath, 220-240V 50Hz
K12300	60-Place Oxidation Stability Bath, 220-240V 60Hz
K12395	60-Place Oxidation Stability Bath, 220-240V 50Hz

Photograph, thermometers, and additional accessories for oxidation stability testing appear on page 122.

**Modified versions of this equipment are available for ASTM D2893 "Oxidation Characteristics of Extreme Pressure Lubricating Oils" and AOCS CD12-57 "Fat Stability Active Oxygen Method." Information will be furnished upon request.*

Available option for 30- and 60-place Oxidation Baths–temperature/pressure recorder with built-in alarms for low pressure and over/under temperature. Please call or write for specifications and ordering information.

Software compatible, inquire with Koehler Customer Service.

Advanced Communications Software Package for Data Management

12-Place Solid-Block Oxidation Bath

- Accommodates twelve oxidation cells
- Microprocessor digital temperature control

Constant temperature aluminum block oxidation bath with flowmeters and condenser water manifold for twelve cells. Insulated solid block design provides efficient operation at temperatures of up to 450°F (232°C). Microprocessor temperature control unit features digital setpoint and display and built-in overtemperature protection. Includes individual flowmeters and control valves for each cell, delivering air flow at the rate of 3L/h. Condenser water manifold has individual control valves for each cell. Order oxidation cell glassware and accessories separately.

Specifications

Conforms to the specifications of:
ASTM D943, D2274, D2893*, D4310, D6158; AOCS CD12-57*;
DIN 51586, 51587; ISO 4263, 12205; NF M 07-047; NF T 60-150
Testing Capacity: 12 oxidation cells
Maximum Temperature: 450°F
Temperature Control Stability: ±0.2°F (±0.1°C)
Air Flow Rate: 3L/h
Electrical Requirements: 220-240V 50/60Hz, Single Phase, 16A CE

Dimensions lxwxh,in.(cm)

30x10x43 (76x25x109)
Net Weight: 345 lbs (156.5kg)

Shipping Information

Shipping Weight: 440 lbs (199.6kg)
Dimensions: 12 Cu. ft.

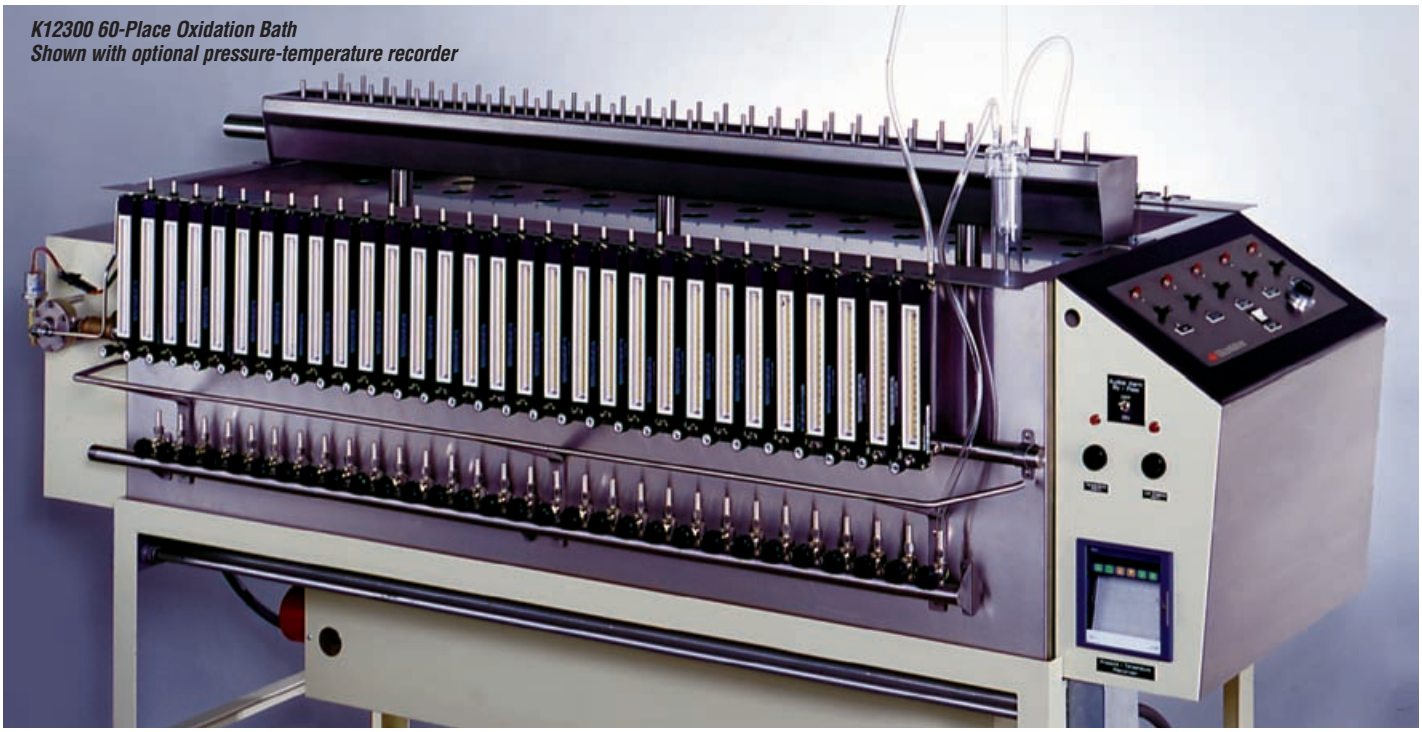
Solid block baths meet temperature control and other requirements of ASTM and related methods. While the aluminum block design offers operating advantages over the standard oil bath, it should be noted that many applicable specifications for this test call for a liquid bath medium.

Ordering Information

Catalog No.	
K12201	12-Place Solid Block Oxidation Bath, 220-240V 50/60Hz

**Modified versions of this equipment are available for ASTM D2893 "Oxidation Characteristics of Extreme Pressure Oils" and AOCS CD12-57 "Fat Stability-Active Oxygen Method." Information will be furnished upon request.*

Digital Flowmeter option is available for this unit.



K12300 60-Place Oxidation Bath
Shown with optional pressure-temperature recorder

Oxidation Cell Glassware and Accessories

Ordering Information	
Catalog No.	
K12281	Oxidation Cell Assembly for ASTM D943 and D4310 Includes oxidation cell, condenser, oxygen delivery tube, thermometer bracket, oil level indicator strip, syringe sampling tube, sampling tube holder, spacer, PTFE stopper and O-rings
K122-0-18	Oxygen Delivery Tube
K122-0-19	Oxidation Test Tube
K122-0-20	Condenser
K122-0-21	Thermometer Bracket
K122-0-22	Oil Level Indicator Strip
K122-0-23	Syringe Sampling Tube Holder
K122-0-27	PTFE Stopper
K122-0-28	Syringe Sampling Spacer
K122-0-30	Syringe Sampling Tube
AS568-009-V14	O-rings

For ASTM D2274, order one each K122-0-18 Oxygen Delivery Tube, K122-0-19 Oxidation Test Tube, and K122-0-20 Condenser for each cell.

For NIST traceable certified thermometers, please refer to the ASTM Thermometers sections on pages 184 through 191.

Digital Flowmeter option is available for this unit.

Iron-Copper Catalyst

For ASTM D943 and D4310

Ordering Information	
Catalog No.	
K12210	Catalyst Coil Low-metalloid steel wire and electrolytic copper wire wound in a double spiral conforming to ASTM specifications. Packed in a sealed glass tube with a nitrogen atmosphere. Ready for use.
K24000	Wire Coiling Mandrel Mounts on bench for winding steel and copper wire into catalyst coils meeting ASTM specifications.
K12250	Steel Wire Low metalloid steel wire, 0.0625" (1.59mm) diameter, for catalyst coils. Supplied in 1000 ft (304.8m) lengths.
K12260	Copper Wire Electrolytic copper wire, 0.064" (1.63mm) diameter, for catalyst coils. Supplied in 1000 ft (304.8m) lengths.
380-100-001	Silicone Carbide Paper Used to polish steel and copper wire prior to winding into catalyst coils. 100 grit.

Thermometers

Ordering Information	
Catalog No.	
250-002-001	Oxidation Cell Thermometer Range: 80 to 100°C. For ASTM D943 and D4310.
250-000-40C	ASTM 40C Thermometer Range: 72 to 126°C. For constant temperature baths.

Oxidation Stability of Mineral Insulating Oils

K12100 Oxidation Stability Bath

Test Method

Determines oxidation stability of mineral transformer oils by measuring the amount of sludge and acid formed under prescribed accelerated aging conditions.

Oxidation Stability Bath

- Conforms to ASTM D2440 specifications
- Microprocessor temperature control with digital display and overtemperature cut-off
- Six-sample testing capacity

Constant temperature oil bath for testing oxidation stability of mineral insulating oils. Immerses six oil receptacles at the required depth per ASTM specifications at 110°C ± 0.5°C, and controls oxygen flow to each sample at the rate of 1L/h ± 0.1L/h through six independent flowmeters mounted on a common manifold. Insulated double-wall stainless steel bath has microprocessor temperature control with °C/°F switchable digital setpoint and display. Operator and equipment are protected by an overtemperature control circuit which automatically interrupts power to the unit when bath temperature exceeds a programmed cut-off point. *Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. Contact your Koehler representative for information.* Order bath thermometer drying tower and catalyst separately.

Specifications

Conforms to the specifications of:
ASTM D2440
Capacity: Six samples
Temperature Range: ambient to 260°F (127°C)
Circulator: ½hp impeller
Bath Capacity/Medium: 2.5 gal (9.5L) white technical oil
Electrical Requirements: CE
115V 60Hz, Single Phase, 8.1A
220-240V 50/60Hz, Single Phase, 4.2A

Included Accessories

Oil Receptacle and Head (6)

Dimensions lxwxh,in.(cm)

14x15x22 (36x38x56)
Net Weight: 31 lbs (14.1kg)

Shipping Information

Shipping Weight: 61 lbs (27.7kg)
Dimensions: 14.4 Cu. ft.

Digital Flowmeter option is available for this unit.

Software compatible, inquire with Koehler Customer Service.

Ordering Information

Catalog No.		Order Qty
K12100	Oxidation Stability Bath, 115V 60Hz	1
K12190	Oxidation Stability Bath, 220-240V 50/60Hz	

Accessories

K12130	Copper Catalyst Coils Sealed in a glass jar with a nitrogen atmosphere. Pack of 24 (12 sets)	1
332-005-010	Drying Tower 250mL with ground glass stopper and side tubes	1
332-005-011	Glass Filter Crucible	1
250-000-95C	ASTM 95C Thermometer Range: 100 to 130°C	1
355-001-001	White Technical Oil 1 gal container. See page 8 for specifications.	3
355-001-003	White Technical Oil 5 gal container. See page 8 for specifications.	1

For NIST traceable certified thermometers, please refer to the ASTM Thermometers sections on pages 184 through 191.

Koehler INSTRUMENT COMPANY, INC.

K35100 FTM 791-5307 Model with accessory glassware

Specifications

Conforms to the specifications of:
ASTM D4636, D5968, D6594; FTM 791-5307, 791-5308;
IHC BT-10; DIN 51394
Capacity: 6 test cells
Temperature Range:125 to 750°F (51.7 to 399°C)
Temperature Control Stability: ±1°F (±0.5°C)
Air Flow Rate: ASTM D4636/FTM 791-5307: 10L/h
FTM 791-5308: 3L/h and 5L/h (dual range flowmeters)
IHC BT-10: 3L/h (50mL/min.)
Electrical Requirements: 220-240V 50/60Hz, Single Phase, 15.9A CE

Dimensions lxwxh,in.(cm)
32½x14½x41½ (83x37x105)
Net Weight: 271 lbs (122.9kg)

Shipping Information

Shipping Weight: 375 lbs (170.1kg)
Dimensions: 18.5 Cu. ft.

Digital Flowmeter option is available for this unit.

Software compatible, inquire with Koehler Customer Service.

Corrosiveness and Oxidation Stability of Hydraulic Oils, Aircraft Turbine Engine Lubricants, and Other Highly Refined Oils

Test Method

Evaluates the ability of a lubricant to resist oxidation and the formation of corrosive acid compounds by subjecting a sample to accelerated oxidation conditions in a catalytic environment. The sample is maintained at elevated temperature and subjected to a controlled air flow while in the presence of a series of test specimens made of metals commonly found in actual service conditions.

Corrosiveness and Oxidation Stability Test Apparatus

- Models for ASTM, Federal and IHC test methods
- Six-sample testing capability
- Solid aluminum block design
- Microprocessor temperature control with digital display and overtemperature protection

Constant temperature block baths for corrosivity and oxidation stability determinations on hydraulic oils, aircraft turbine lubricants, transmission fluids and other highly refined oils. Insulated aluminum block provides safe, efficient performance at operating temperatures of up to 750°F (399°C). Microprocessor temperature control has °C/°F switchable digital setpoint and display. Operator and equipment are protected by an overtemperature control circuit which automatically interrupts power to the unit should block temperature exceed a programmed cut-off point. *Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. Contact your Koehler representative for information.* Air flow is controlled at the specified rate by six individually adjustable flowmeters mounted on a common manifold. Includes inlet valve and outlet fitting for condenser water supply and support rack for glassware.

Ordering Information

Catalog No.		Order Qty
Corrosivity and Oxidation Stability Test Apparatus		1
K35100	ASTM D4636, D5968 and FTM 791-5307 Model, 220-240V 50/60Hz	
K35000	FTM 791-5308 Model, 220-240V 50/60Hz	
K35300	IHC BT-10 Model, 220-240V 50/60Hz	
Thermometers		
250-000-08F	ASTM 8F Thermometer Range: 30 to 760°F	
250-000-08C	ASTM 8C Thermometer Range: –2 to +400°C	

For NIST traceable certified thermometers, please refer to the ASTM Thermometers sections on pages 184 through 191.

Corrosiveness and Oxidation Stability

Glassware, Test Specimens and Accessories

Catalog No.		Order Qty
ASTM D4636, D5968, D6594 and FTM 791-5307		
K351-0-1	Sample Tube	6
K351-0-2	Sample Tube Head	6
K351-0-3	Air Tube	6
K351-0-4	Thermocouple Tube	6
K351-0-5	Condenser, Allihn Type	6
K351-0-6	Oil Sampling Tube (for D4636)	6
K351-0-7	Spacer	36
K351-0-8	PTFE Adapter	6
K351-0-13	Oil Sampling Tube (for D5968 and FTM 791-5307)	
K351-0-14	Specimen Hanger (for D6594)	
K293-0-12	Thermocouple, Type J	6
K29319	Digital Thermometer, 220-240V Microprocessor based digital thermocouple thermometer with ten-channel input. Monitors Type J thermocouples from sample tubes.	1
K35090	Test Panel Assembly Fixture Holds square-shaped metal specimens for tying with cord (for ASTM D4636 Alternate Procedure and FTM 791-5308)	1
K35095	Test Panel Assembly Fixture Holds square-shaped metal specimens for tying with cord (for ASTM D5968)	1
FTM 791-5308		
K350-0-23	Test Tube	6
K350-0-24	Air Tube	6
K350-0-25	Condenser	6
K35090	Test Panel Assembly Fixture Holds square-shaped metal specimens for tying with cord.	1
IHC BT-10		
K353-0-1	Test Cell	6
K353-0-2	Condenser	6
K353-0-3	Air Tube	6
K353-0-4	Ring Rod	6

Metal Test Specimens

Catalog No.	
Washer Shaped Specimens for ASTM D4636 Standard Procedure and for FTM 791-5307	
K35110	Bronze
K35120	Mild Steel
K35130	Aluminum Alloy
K35140	Magnesium
K35150	Steel M50
K35160	Silver
K35170	Titanium
Square Shaped Specimens for ASTM D4636 Alternate Procedure and for FTM 791-5308	
K35010	Copper
K35020	Mild Carbon Steel
K35030	Aluminum Alloy
K35040	Magnesium Alloy
K35050	Cadmium Plated Steel
K35060	Silver
K35070	Solid Cadmium (non standard)
K35080	Titanium (non standard)
Square Shaped Specimens for ASTM D5968 and D6594	
K35010	Copper
K35011	Lead
K35012	Tin
K35013	Phosphor Bronze
Rectangular Shaped Specimens for IHC BT-10	
K353-0-5	Aluminum
K353-0-6	Copper
K353-0-7	Steel
K353-0-8	Brass

Polishing Materials

380-150-001 Silicone Carbide Paper, 150-grit, Pack of 50 sheets
380-240-001 Silicone Carbide Paper, 240-grit, Pack of 50 sheets
380-150-000 Silicone Carbide Grain, 150-grit, 1 lb package

K56100 Cigre Bath with K56110 Glassware

Oxidation Stability of Inhibited Mineral Turbine Oils

Oxidation Stability of Straight Mineral Oil

Oxidation Stability of Mineral Insulating Oil

Oxidation Stability of Inhibited Mineral Insulating Oils

Oxidation Test For Lubricating Oil

Test Method

Oxidation stability is determined by exposing the sample to a measured oxygen flow at elevated temperature in the presence of metal catalysts.

Oxidation Stability Apparatus (Cigre Bath)

- Conforms to IP specifications
- Twelve-sample testing capability
- Microprocessor programmable high accuracy temperature control

Constant temperature aluminum block type bath for oxidation stability tests in accordance with the Institute of Petroleum (IP) testing methods. Accommodates twelve sets of oxidation and absorption tubes. Insulated block bath operates efficiently at temperatures of up to 200°C (392°F). Microprocessor PID control provides quick temperature stabilization without overshoot, and the bath is protected by a an overtemperature control circuit that interrupts power should block temperature exceed a programmed cut-off point. Dual LED displays provide actual and setpoint temperature values in °C/°F format. *Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. Contact your Koehler representative for information.* A bank of twelve flowmeters on a movable stand regulates oxygen flow at 1 ±0.1L/h to each oil sample per IP specifications. Includes soap bubble flowmeter for checking oxygen flow rate.

Specifications

Conforms to the specifications of:
IP 48, IP 280, IP 306, IP 307, IP 335
Testing Capacity: Twelve samples
Temperature Range: 80 to 200°C
Temperature Uniformity: ±0.2°C
Air Flow Control:
Standard Model: 1L/h to each sample
IP 48 Model: 15L/h to each sample
Electrical Requirements: CE
115V 60Hz, Single Phase, 12.1A
220-240V 50/60Hz, Single Phase, 6.3A

Included Accessories

Soap Bubble Flowmeter

Dimensions

Bath: dia.xh,in.(cm)
17x22 (43.2x55.9)
Flowmeter Stand: lxwxh,in.(cm)
24x8x30¼ (61x20.3x76.8)
Net Weight: 186 lbs (84.4kg)

Shipping Information

Shipping Weight: 245 lbs (111.1kg)
Dimensions: 16.7 Cu. ft.

For NIST traceable certified thermometers, please refer to the ASTM Thermometers sections on pages 184 through 191.

Digital Flowmeter option is available for this unit.

Software compatible, inquire with Koehler Customer Service.

Ordering Information

Catalog No.		Order Qty
K56100	Oxidation Stability Apparatus 115V 60Hz	1
K56190	Oxidation Stability Apparatus 220-240V 50/60Hz	
K56200	Oxidation Stability Apparatus 115V 60Hz For IP 48 Method.	
K56290	Oxidation Stability Apparatus 220-240V 50/60Hz For IP 48 Method	
	Accessories	
K56110	Set of Glassware Includes one each oxidation and absorption tube. For IP 48, IP 280, IP 306, IP 307, IP 335	12
250-000-09C	ASTM 9C Thermometer Range: –5 to +110°C (equivalent to IP 15C Thermometer)	1
250-000-41C	ASTM 41C Thermometer Range: 98 to 152°C (equivalent to IP 81C Thermometer)	

A liquid bath version of this equipment to perform the proposed ASTM test for High Temperature Stability of Distillate Fuels is also available. Please contact Koehler's Customer Service for additional information.

Thermal Oxidation Stability of Automotive Gear Lubricants

Test Method

The L-60-1 Performance Test determines the deterioration of gear lubricants under severe thermal oxidation conditions. The sample lubricant is tested for 50 hours in a standardized gear box operating under a predetermined load. An elevated temperature and controlled air flow are maintained throughout the test and a copper catalyst is employed to accelerate the breakdown. At the end of the test period, various lubricant properties are determined by standard testing methods, and the weight loss of the catalyst is measured. The deposits that are formed on the gear box surfaces and the catalyst are examined and reported.

Ordering Information

Catalog No.	
K18660	L-60-1 Performance Test Apparatus, 220-240V 60Hz
K18650	L-60-1 Performance Test Apparatus, 220-240V 50Hz

Accessories

K18661	Test Kit, for one test. Includes GA34 test gear, GA50 test gear, R-14 test bearing, viton shaft seals (2), O-ring seal, copper test strips (2)
380-150-001	Silicone Carbide Paper, 150-grit (pack of 50)

K18660 L-60-1 Performance Test Apparatus

L-60-1 Performance Test Apparatus

• Conforms to ASTM D5704 and STP512A L-60-1 Performance Test specifications. Performs the L-60-1 Thermal Oxidation Stability performance test for API GL-5 gear lubricant service. Consists of a standardized gear box assembly with motor drive system and digital indicating controls for all test functions.

Gear Case and Drive System

Two spur gears and a test bearing are operated inside a machined stainless steel case with removable window. The drive gear shaft is coupled to a heavy duty ball bearing motor loaded by a 45 ampere alternator. The standard L-60-1 test gear loading value of 128 watts generator output is precisely maintained by a digitally indicated load bank. All gear box components are easily accessible for cleaning.

Temperature Control

An insulated heating case with high volume blower encloses the gear box. Sample oil temperature is maintained at 325°F ± 1°F (162.8 ± 0.6°C) by a digital indicating controller with PT-RTD sensor. A built-in microprocessor based recorder produces a test oil temperature chart for reporting purposes. Overtemperature protection is provided by a separate PT-RTD-sensed controller.

Air Flow Control

A high accuracy mass flow controller with digital indication maintains air flow to the gear box at a constant 1.1L/h. The self correcting controller maintains the setpoint flow rate regardless of fluctuations in air input pressure or temperature. Test cabinet and control cabinet are finished in chemical resistant polyurethane enamel. Test cabinet has a cover for access to the gear box and a removable drive motor cover.

Specifications

Conforms to the specifications of:
- ASTM D5704; STP512A L-60-1 Performance Test (formerly CRC L-60 Test); FTM 791-2504

Controls and Monitors:
- Sample Oil Temperature: °C/°F, digital setpoint and display, user adjustable
- Overtemperature Limit Control: °F, user acceptable
- Heating Chamber Air Temperature:°C/°F
- Air Flow: L/h, digital setpoint and display, user adjustable
- Test Gear Load: Volts DC, Amps. DC, digital display, user adjustable
- Sample Oil Temperature Recorder: Programmable microprocessor based strip chart recorder with digital display, °C/°F
- Drive Motor: 1725rpm thermally protected ball bearing type
- Alternator: 45 ampere output

Electrical Requirements: CE
- 220-240V 60Hz, Single Phase, 15A
- 220-240V 50Hz. Single Phase, 15A

Dimensions lxwxh,in.(cm)
- Test Cabinet: 24x24x14½ (61x61x37)
- Control Cabinet: 23½x23½x17⅜ (60x60x44)

Net Weight: 330 lbs (149.7kg)

Shipping Information

Shipping Weight: 498 Lbs (225.9kg)
Dimensions: 29.2 Cu. ft.

Koehler INSTRUMENT COMPANY, INC.

Rust Preventing Characteristics

K30160 Rust Preventing Characteristics Bath

Specifications

Conforms to the specifications of:
ASTM D665, D3603, D6158; NACE TM-01-72*; IP 135; ISO 7120; DIN 51355**, DIN 51585; FTM 791-4011, 791-5315**; NF T 60-151
Testing Capacity: Six (6) 400mL sample beakers
Maximum Temperature: 104°C (220°F)
Temperature Control Stability: ±0.5°C (±1°F)
Drive Motor: ½hp induction motor
Bath Medium: 11 gal (41.6L) white technical oil
Electrical Requirements: CE
115V 60Hz, Single Phase, 13.0A
220-240V 50 or 60Hz, Single Phase, 6.8A

Included Accessories

ASTM D665 Models (K30160, K30165, K30166)
Steel Test Specimens (6)
Type 2 Plastic Specimen Holders (6)
Plastic Beaker Covers (6)

ASTM D3603 Models (K30161, K30167, K30168)
Horizontal Disc Test Assembly (6) consisting of:
plastic beaker cover
horizontal test specimen
vertical test specimen
fluorocarbon washer
plastic cap
stainless steel support rods and hardware

Dimensions lxwxh,in.(cm)

32¾x14¼x27 (83x36x69)
Net Weight: 79 lbs (35.8kg)

Shipping Information

Shipping Weight: 150 lbs (68kg)
Dimensions: 16.2 Cu. ft.

**Accessories for these test methods are available upon request.

Software compatible, inquire with Koehler Customer Service.

Rust Preventing Characteristics of Inhibited Mineral Oil in the Presence of Water (Standard and Horizontal Disc Methods)

Test Method

Determines a lubricant's ability to prevent rusting of metal surfaces. Suitable for steam turbine oils, gear oils, hydraulic oils and other types of inhibited mineral oils. A steel test specimen is immersed in a heated mixture of sample oil and water which is stirred continuously during the test. After the test period the specimen is examined for rusting. The standard (ASTM D665) method uses a vertical specimen; the 'horizontal disc method' (ASTM D3603) uses both horizontal and vertical test surfaces.

Rust Preventing Characteristics Oil Bath

- Conforms to ASTM D665, D3603 and NACE TM-01-72* specifications
- Accommodates six sample beakers
- Microprocessor programmable high accuracy temperature control

Constant temperature bath with stirrers for rust preventing characteristics tests. Stirs sample-water mixtures at 1000rpm and controls temperature with ± 0.5°C (± 1°F) stability. Immerses test beakers at the proper depth per ASTM specifications.

Microprocessor PID control provides quick temperature stabilization without overshoot, and the bath is protected by an overtemperature control circuit that interrupts power should bath temperature exceed a programmed cut-off point. Dual LED displays provide actual and setpoint temperature values in °C/°F format. *Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. Contact your Koehler representative for information.*

Stainless steel stirrer paddles are driven by a ball bearing type motor through an improved pulley drive-roller bearing arrangement. Paddles can be raised and lowered for placement of sample beakers in the bath. Includes test specimens, holders and beaker covers for ASTM D665 or D3603 testing (see specifications and ordering information). Stainless steel bath includes perforated support shelf for beakers and two-position cover plate that adjusts for either ASTM D665 or D3603 testing. Long-lasting polyester drive belt improves reliability. Drive train components are protected by a removable steel guard. All exterior surfaces have stainless steel or chemical resistant polyurethane enamel finishes.

Ordering Information

Catalog No.	
Rust Preventing Characteristics Oil Bath For ASTM D665	
K30160	Rust Preventing Characteristics Oil Bath, 115V 60Hz
K30165	Rust Preventing Characteristics Oil Bath, 220-240V 50Hz
K30166	Rust Preventing Characteristics Oil Bath, 220-240V 60Hz
For ASTM D3603	
K30161	Rust Preventing Characteristics Oil Bath, 115V 60Hz
K30167	Rust Preventing Characteristics Oil Bath, 220-240V 50Hz
K30168	Rust Preventing Characteristics Oil Bath, 220-240V 60Hz

*To order this equipment for the NACE TM-01-72 test please turn to page 98.

Rust Preventing Characteristics

K30800 Horizontal Disk Assembly

K30101 Specimen with Holder

K30130 Chuck

Accessories

Catalog No.		Order Qty
332-002-006	Test Beaker, 400mL for ASTM D665 & D3603	6
250-000-09F	ASTM 9F Thermometer Range: 20 to 230°F	7
250-000-09C	ASTM 9C Thermometer Range: –5 to +110°C	
K30130	Chuck for polishing test specimens Includes locknut and shaft for mounting on accessory drive motor.	1
K30150	Drive Motor Drives K30130 Chuck. Mounted on base. 115V 60Hz	1
K30180	Drive Motor Similar to K30150 but for operation on 220-240V 50Hz	
380-150-002	Aluminum Oxide Cloth, 150-grit for preliminary grinding of test specimens Pack of 50	
380-240-002	Aluminum Oxide Cloth, 240-grit for final polishing of test specimens Pack of 50	1
K30140	Auxiliary Stirrer Blade - Attaches to stirrer shaft - for testing heavier than water samples - ASTM D665. Procedure C.	

Test Specimens

Catalog No.	
K30110	Steel Test Specimen for ASTM D665 Machined to ASTM specifications. Without Holder
K30100	Test Specimen with Type 2 Plastic Holder for ASTM D665
K30119	Test Specimen with Type 1 Plastic Holder for ASTM D665
K30101	Test Specimen with Type 2 PTFE Holder
K30810	Horizontal Test Specimen for ASTM D3603
K30820	Vertical Test Specimen for ASTM D3603
K30800	Horizontal Disc Rust Test Assembly for ASTM D3603. Includes polycarbonate beaker cover, two stainless steel support rods, disc carrier and one each horizontal and vertical test specimens.

For NIST traceable certified thermometers, please refer to the ASTM Thermometers sections on pages 184 through 191.

Corrosion of Lead by Lubricating Oils

Test Method

Measures the corrosiveness of lubricating oils to lead in the presence of a copper catalyst. Lead and copper test panels are rotated in the test lubricant under specified test conditions, and the degree of corrosion is determined by the change in weight of the lead panel.

Lead Corrosion Test Apparatus

- Conforms to FTM 791-5321 specifications
- Six-sample capacity
- Microprocessor programmable high accuracy temperature control

Constant temperature apparatus rotates copper and lead test panels in lubricant samples to determine corrosiveness to lead per FTM specifications. Panels are rotated at 600rpm in samples maintained at 163°C (325°F) and aerated at 0.94L/min. (2.0 Cu. ft./hr.).

Test panel shafts ride on ball bearing spindles driven by a 1/15hp motor. A counterbalanced support bar positions the drive shaft for testing or for mounting and removal of test panels. When the support bar is raised, a safety microswitch automatically stops the drive motor to prevent splashing of hot oil.

Fully insulated bath features double-wall stainless steel construction, with a built-in support rack to suspend test cells vertically at the proper depth. Microprocessor PID control provides quick temperature stabilization without overshoot, and the bath is protected by an overtemperature control circuit that interrupts power should bath temperature exceed a programmed cut-off point. Dual LED displays provide actual and setpoint temperature values in °C/°F format. *Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. Contact your Koehler representative for information.* A 1/20hp stirrer thoroughly circulates the bath medium for temperature uniformity. Redundant overtemperature protection is provided by a built-in backup thermostat. Flowmeters and valves mounted on a convenient manifold provide individual air flow control for each test cell.

Digital Flowmeter option is available for this unit.

Specifications

Conforms to the specifications of:
FTM 791-5321
Testing Capacity: 6 lubricant samples
Maximum Temperature: 199°C (390°F)
Temperature Control Stability: ±0.05°C (±0.1°F)
Air Flow Control: 0.94±0.047L/min.
(2±0.1 Cu. ft./hr) six (6) flowmeters mounted on a common manifold
Electrical Requirements: CE
220-240V 60Hz, Single Phase, 14.5A
220-240V 50Hz, Single Phase, 14.5A

Included Accessories

Copper Test Panels (6)
Lead Test Panels (6)
Mounting Hardware for Panels

Dimensions lxwxh,in.(cm)

39x25x47 (99x64x119)
Net Weight: 214 lbs (97kg)

Shipping Information

Shipping Weight: 330 lbs (150kg)
Dimensions: 33.5 Cu. ft.

Ordering Information

Catalog No.		Order Qty
K29900	Lead Corrosion Apparatus, 220-240V 60Hz	1
K29990	Lead Corrosion Apparatus. 220-240V 50Hz	
	Accessories	
K29910	Borosilicate Glass Sample Tube	6
250-000-16F	ASTM 16F Thermometer Range: 85 to 392°F	1
250-000-16C	ASTM 16C Thermometer Range: 30 to 200°C	
K29920	Lead Test Panels	
K29930	Copper Test Panels	

For NIST traceable certified thermometers, please refer to the ASTM Thermometers sections on pages 184 through 191.

Stability of Lubricating Oils (Work Factor)

Test Method

Determines the stability of a lubricating oil when subjected to an endurance test in a journal bearing operated under prescribed conditions. After a 100 hour test period, the 'work factor' is computed from measured changes in viscosity, neutralization number and carbon residue.

Navy Work Factor Machine

- Conforms to FTM 791-3451 specifications

Complete apparatus for the 'Navy Work Factor' stability test for lubricating oils. Consists of bearing and journal, bearing loading device with calibrated springs, 5hp drive system with variable speed control, oil circulation system, and full instrumentation. Operates the journal bearing at 2000 or 3000rpm under a specified load. Oil system pressure is maintained at a constant 15 psig (103 gauge kPa) throughout the test. Includes digital displays of oil pressure and temperature and a built-in strip chart recorder for hard copy test reports.

Specifications

Conforms to the specifications of: FTM 791-3451.4
Electrical Requirements: 220-240V, 3 Phase, 50/60Hz, 20A CE

Dimensions lxwxh,in.(cm)

50x40x60 (127x102x152)
Net Weight: 1378 lbs (625.1kg)

Shipping Information

Shipping Weight: 1660 lbs (753kg)
Dimensions: 110 Cu. ft.

Ordering Information

Catalog No.	
K30000	Navy Work Factor Machine, 220-240V *Specify 50 or 60Hz when ordering*
K30010	Replacement Test Bearing

Copper Corrosion from Petroleum Products

Test Method

The Copper Strip Tarnish Test assesses the relative degree of corrosivity of petroleum products, including lubricating oils. A polished copper strip is immersed in 30mL of sample at elevated temperature. After the test period, the strip is examined for evidence of corrosion and a classification number from 1-4 is assigned based on a comparison with the ASTM Copper Strip Corrosion Standards.

Copper Strip Tarnish Test Apparatus

- Conforms to ASTM D130, D6074, D6158 and related specifications

The complete apparatus for the Copper Strip Tarnish Test for lubricating oils consists of:

Test Tube Bath
Copper Strips
Test Tubes
ASTM Copper Strip Corrosion Test Standard
Surface Preparation Accessories

Test Tube Bath

- Accommodates 17 test tubes
- Temperature range to 190°C (374°F)
- Microprocessor temperature control with digital display and overtemperature protection.

Constant temperature bath immerses 16 test tubes for copper strip tarnish tests of products not requiring a test bomb. Microprocessor temperature control has °C/°F switchable digital setpoint and display. Operator and equipment are protected by an overtemperature control circuit which automatically interrupts power to the unit should bath temperature exceed a programmed cut-off point. Welded stainless steel double-wall construction with built-in support rack. Fully insulated. For complete specifications, please refer to page 90.

Ordering Information

Catalog No.		Order Qty
K25330	Copper Strip Test Tube Bath, 115V 60Hz	1
K25339	Copper Strip Test Tube Bath, 220-240V 50/60Hz	
K25312	Vented Cork	

Accessories

K25080	Copper Test Strips 12.5x1.5-3.0mmx75mm to ASTM specifications	17
332-004-004	Test Tube, 25x150mm	17
332-004-002	Viewing Test Tube Protects copper strip during inspection or storage	17
K25100	ASTM Copper Strip Corrosion Standard Colored reproductions of tarnished strips encased in a plastic plaque	1
380-220-001	Silicone Carbide Paper, FEPA Grade, 220 grit For polishing of copper strips prior to testing Pack of 50 sheets	
380-150-003	Silicone Carbide Grain, FEPA grade, 150 grit For final polishing of copper strips prior to testing 1 lb package	
K25000	Polishing Vise Holds copper strip firmly in place without marring the edges. Stainless steel. mounted on a composition base	1
K25090	Multi-Strip Polishing Vise. Similar to K25000 but capable of holding four strips at a time	1
250-000-12F	ASTM 12F Thermometer, Range: –5 to +215°F	1
250-000-12C	ASTM 12C Thermometer, Range: –20 to +102°C	

Bearing Compatibility of Turbine Oils

Test Method

Evaluates the in-service stability of turbine lubricants by running a sample-lubricated babbit journal bearing for an extended period at high speed under controlled conditions of load, lubricant flow and temperature. The change in various properties (viscosity, carbon residue, acidity) is measured at the end of the endurance test and the bearing is cleaned and examined for evidence of deposits, corrosion and other changes.

Bearing Compatibility Tester

- Conforms to FTM 791-3452 specifications
- Digital-indicating controls and built-in temperature recorder

Tests the bearing compatibility (lacquering, deposits, corrosion) and stability of turbine lubricants when subjected to an endurance test. Consists of bearing housing assembly with test bearing and support bearings, hydraulic loading device, oil circulation system with thermostatic and hydrostatic control, and powerful 5hp variable speed drive system. Digital LCD controls monitor oil pressure, oil temperature and spindle rpm, and a built-in strip chart recorder plots oil temperature at three different points—at the bearing housing, in-line, and in the reservoir. Equipped with overtemperature and low pressure cut-off switches and a cartridge oil filter for convenient 'flush run' operation. All components are mounted in a sturdy angle iron frame. A removable steel guard protects drive train components.

Dimensions lxwxh,in.(cm)
48x36x54 (122x91x137)
Net Weight: 1300 lbs (589.7kg)

Shipping Information
Shipping Weight: 1582 lbs (717.6kg)
Dimensions: 101.7 Cu. ft.

Specifications

Conforms to the specifications of: FTM 791-3452
Journal Drive Motor: 5hp variable speed, with digital 0-3500rpm control.
Fan cooled with thermal overload protection.
Lubricant Flow: 3.8L/min. gear pump recirculating 1.9-23L/min.
of test lubricant to support bearing and test bearing.
Digital oil pressure circulation.
Temperature Control: Sump temperature (0-500°F) with digital indication and recording of temperature at bearing housing, sump and in-line.
Bearing Load: Hydraulic loading device maintaining 1520 kPa (220 psig) on the loading bearing.
Electrical Requirements: CE
200-240V 50/60Hz, 3-Phase, 20A
380V 50/60Hz, 3-Phase, 12A
440V 50/60Hz, 3-Phase, 10A

Ordering Information

Catalog No.		Order Qty
K29800	Bearing Compatibility Tester *Specify electrical requirements when ordering.*	1

Accessories

K29801	Test Bearing	

For NIST traceable certified thermometers, please refer to the ASTM Thermometers sections on pages 184 through 191.

Cloud Point and Pour Point of Petroleum Products

K46100 Refrigerated Bench Model

Ordering Information

Catalog No.

Cloud and Pour Point Chamber

K46000 Cloud and Pour Point Chamber
K46001 Cloud and Pour Point Chamber, with inlet/outlet fittings

Refrigerated Models:

K46100 Cloud and Pour Point Bath, Bench Model, 115V 60Hz
K46195 Cloud and Pour Point Bath, Bench Model, 220-240V 50Hz
K46196 Cloud and Pour Point Bath, Bench Model, 220-240V 60Hz
K46300 Cloud and Pour Point Bath, Floor Model, 115V 60Hz
K46395 Cloud and Pour Point Bath, Floor Model, 220-240V 50Hz
K46396 Cloud and Pour Point Bath, Floor Model, 220-240V 60Hz
K46500 Cloud and Pour Point Bath, Floor Model, 5-Bath, 115V 60Hz
K46595 Cloud and Pour Point Bath, Floor Model, 5-Bath, 220-240V 50Hz
K46596 Cloud and Pour Point Bath, Floor Model, 5-Bath, 220-240V 60Hz

Accessories

332-004-001	Test Jar Clear, flat bottom jar with sample height graduation
250-000-05F	ASTM 5F Thermometer, range: –36 to +120°F
250-000-05C	ASTM 5C Thermometer, range: –38 to +50°C
250-000-06F	ASTM 6F Thermometer, range: –112 to +70°F
250-000-06C	ASTM 6C Thermometer, range: –80 to +20°C
K46120	Cork Disk
K46130	Foam Sponge Disc
AS568-219	Gasket, for test jar
K460-0-8	Thermometer Holder, for test jar
K460-1-7B	Copper Jacket

For NIST traceable certified thermometers, please refer to the ASTM Thermometers sections on pages 184 through 191.

Custom configurations of this bath are available. Please contact Koehler Customer Service for additional information.

Software compatible, inquire with Koehler Customer Service.

Test Method

Cloud point and pour point are indicators of the lowest temperature of utility for petroleum products. The sample is periodically examined while it is being cooled in the cloud and pour point apparatus. The highest temperature at which haziness is observed (cloud point), or the lowest temperature at which movement of the oil is observed (pour point), is reported as the test result.

Cloud and Pour Point Test Equipment

- Conforms to ASTM D97, D2500 and related specifications
- Compact four-place portable chamber
- Mechanically refrigerated models with factory preset cold baths

Cloud and Pour Point Chamber–Immerses four copper test jackets in suitable freezing mixtures at the required depth per ASTM specifications. Available with inlet and outlet connections for circulating refrigerated coolant from an external source. Consists of steel exterior housing with polyurethane enamel finish and all copper interior for corrosion resistance. Removable composition top plate and ½" (13mm) cork insulation around interior aid in cold retention. Supplied with copper jackets, gaskets, disks, and thermometer holders for test jars and cooling bath. Order test jars and thermometers separately.

Mechanically Refrigerated Baths–Bench-model and floor-model test units with multiple four-jacket mechanically refrigerated baths, each factory preset at a different temperature for convenient cloud and pour point testing. Bench model has three baths, set at +32, 0 and -27°F (0, -18 and -33°C); floor model available with either four or five baths, set at +32, 0, -27 and -60°F (0, -18, -33 and -51°C) and +32, 0, -27, -60 and -92°F (0, -18, -33, -51, and -69°C) respectively. Each bath has a phenolic top plate with ports for thermometer and four copper test jackets. Synthetic sponge covers over each top plate and gasketed hoods over each bath prevent excessive ice accumulation around the test jackets. Cascade hermetic refrigeration system provides reliable long term service. Bath interior is made of stainless steel, cabinet is constructed of polyester-epoxy finished steel housing. Floor model rides on swivel castors. Supplied with test jackets, gaskets, disks, and thermometer holders for test jars and cooling baths.

Specifications

Conforms to the specifications of:
ASTM D97, D2500, D5853, D6074, D6158; IP 15, 219;
ISO 3015, 3016; DIN 51597; FTM 791-201; NF T 60-105
Electrical Requirements: CE
Model K46100 Refrigerated Bench Model:
115V 60Hz, Single Phase, 12.2A
220-240V 50/60Hz, Single Phase, 6.9A
Model K46300/K46500 Refrigerated Floor Model:
115V 60Hz, Single Phase, 17.7A
220-240V 50/60Hz, Single Phase, 9.7A

Dimensions

K46000: dia.xh,in.(cm)
10½x12 (27x30)
K46100: lxwxh,in.(cm)
30x28x35 (76x71x89)
K46300/K46500: lxwxh,in.(cm)
44x38x4 (112x97x115)
Net Weight:
K46000: 14 lbs (6.3 kg)
K46100: 340 lbs (155 kg)
K46300/K46500: 392 lbs (178 kg)

Shipping Information

Shipping Weight:
K46000: 18 lbs (8.2 kg)
K46100: 550 lbs (250 kg)
K46300/K46500: 605 lbs (275 kg)
Dimensions:
K46000: 2.6 Cu. ft.
K46100: 14.1 Cu. ft.
K46300/K46500: 60.6 Cu. ft.

Automated Cloud Point and Pour Point of Petroleum Products

Test Method

For Petroleum Products, cloud point and pour point of a petroleum product is an index of the lowest temperature of its utility for certain applications. The specimen is cooled at a specified rate and examined periodically. The highest temperature at which a cloud is first observed at the bottom of the test jar is recorded as the cloud point. The lowest temperature at which movement of the specimen is observed is recorded as the pour point.

Automatic Cloud Point and Pour Point Analyzer with Integrated Panel PC

- Cloud Point Analyzer conforms to ASTM D2500, D5771, D5772, D5773 and related test methods
- Pour Point Analyzer conforms to ASTM D97, D5853, D5950 and related test methods
- Stand alone system with Integrated Touch Screen Panel PC
- Direct Cooling system eliminates the need for solvent cooling baths
- One-stage cooling system provides temperatures as low as -45°C and a two-stage cooling system down to -80°C
- Cloud Point measured by light pulsed emission on I.R spectrum through a coaxial fiber optic
- Pour Point measured by two PT100 detection probes placed on the surface of the product and a mechanical moving arm bringing the test jar to a horizontal position

Cloud Point Detection–The cloud point detection system provides automated sample testing with the accuracy and repeatability in accordance with ASTM D2500, D5771, D5772, D5773 and related international test methods. The sophisticated dynamic measuring system emits a light pulse every 1°C from a coaxial fiber optic cable positioned above the test sample. The light pulse is then reflected off the silver bottom test jar to an optical sensor. The advanced software package analyzes the response of the light pulse. The initial appearance of crystallization is monitored by light scattering, signifying the cloud point of the sample. All clear and transparent oils are readily measured by the detection system, regardless of sample color.

Pour Point Detection–The pour point detection system provides automated sample testing with the accuracy and repeatability in accordance with ASTM D97, D5853, D5950 and related international test methods. The automated operation involves removing the sample from the cooling jacket at 3°C intervals and tilting it to a 90° angle as prescribed by the test method until no flow is observed. Contact of the cold sample with the two PT100 detection probes positioned just above the surface liquid level when the test jar is tilted identifies sample flow. The test jar is automatically returned to the cooling jacket and sampled again until no flow is detected for 5 seconds. The pour point result is then reported at 3°C higher than the temperature at which the sample ceased to flow in accordance with the test method.

Integrated Panel PC and Software Package–The Automated Cloud and Pour Point Analyzers are complete standalone systems featuring an integrated panel PC with an advanced software package. The 6.4" TFT/LCD touch screen display has a resolution of 640x480 with a 262K color scheme. All analytical parameters are graphed and displayed in real time as well as recorded in Microsoft® Excel compatible file format. The software monitors the operation and performance of all the analyzer components for proper data measurement, including the solenoid valves, cooling system, pressure sensors, and the Platinum resistance PT100 Class A temperature probe.

Cooling System–For various user applications, the automated cloud and pour point systems are available with either one-stage cooling for temperatures as low as -45°C or two-stage cooling for temperatures as low as -80°C. The direct cooling system features integrated gas CFC free motors compressors thus eliminating the need for a solvent cooling bath. The direct system is capable of rapid cooling, approaching -80°C bath temperatures in approximately 15 minutes, and utilizes less electricity than standard cooling systems. The rapid cooling feature combined with a consistent cooling profile system provides repeatable results with high test reproducibility.

KLA-3-TS
Automatic Cloud & Pour Point Analyzer with Touch Screen

Multiple Configuration System–These automated sample cooling and physical property measurement systems can be configured with one, two, three, four and six test positions with one of five possible analytical heads at each position: cloud point, pour point, cloud & pour point, cold filter plugging point and freezing point. Standard and customized multiple configuration systems are readily available.

Specifications

Conforms to the specifications of:
KLA-1-TS: ASTM D2500, D5771, D5772, D5773; DIN 51597; IP 219, IP 444, IP 445, IP 446; ISO 3015
KLA-2-TS: ASTM D97, D5853, D5950; IP 15, IP441; ISO 3016
KLA-3-TS: ASTM D97, D2500, D5771, D5772, D5773, D5853, D5950; DIN 51597; IP 15, IP 219, IP441, IP 444, IP 445, IP 446; ISO 3015, ISO 3016
Temperature Range:
One-Stage: +60°C to -45°C
Two-Stage: +60°C to -80°C
Resolution: 0.06°C
Accuracy: ±0.1°C
Repeatability / Reproducibility: as per standard test methods or better
Data Storage: < 60,000 analyses
Electrical Requirements: CE
115V ± 15% / 60Hz
220V ± 15% / 50 to 60Hz

Dimensions WxDxH,in.(cm)
26 x 23¾ x 31½ (66x60x80)
Net Weight: 176.5 lbs (80kg)

Ordering Information

Catalog No.	
KLA-1-TS	Auto Cloud Point Analyzer, Touch Screen (One-stage)
KLA-1-TS/2	Auto Cloud Point Analyzer, Touch Screen (Two-stage)
KLA-2-TS	Auto Pour Point Analyzer, Touch Screen (One-stage)
KLA-2-TS/2	Auto Pour Point Analyzer, Touch Screen (Two-stage)
KLA-3-TS	Auto Cloud & Pour Point Analyzer, Touch Screen (One-stage)
KLA-3-TS/2	Auto Cloud & Pour Point Analyzer, Touch Screen (Two-stage)

Please specify voltage requirements when ordering.

Accessories

KLA-PT100-CAL	Calibration Decade Box - PT100 Simulator
KLA-DB-KIT	Set of Connectors and Cables

Extended Cooling Range down to -100°C Available Upon Request.

Koehler INSTRUMENT COMPANY, INC.

Dielectric Breakdown Voltage of Insulating Oils

Test Method

The majority of high-voltage transformers, cables, switchgears, transducers, capacitors, and rectifiers use insulating oils for insulating electrically live parts and to carry off thermal energy. The quality of the insulating oil must be checked at regular intervals to ensure a long equipment service life. The most important requirement of an insulating oil is a high dielectric strength. Determination of the dielectric breakdown voltage of insulating oils provides an early detection method for any reduction in the insulating properties.

Automatic Portable Dielectric Breakdown Tester

- Conforms to ASTM D877, D1816 and related test specifications
- Output voltage: 75kV
- Features 2.8" ultra bright color display for optimal readability and mobility
- Built-in printer offers direct evaluation and reporting of results
- Internal battery, external 12V power supply
- Automatic Vernier function for electrode gap spacing
- Measurement of Silicone based oils
- Internal temperature measurement of oil sample
- Bluetooth PC Connectivity and USB Flashdrive Capability

Specifications

Conforms to the specifications of:
ASTM D877, D1816; BS EN 60156; CEI EN 60156; IEC 156; VDE 0370 Pt. 5
Output Voltage: Up to 75kV rms symmetrical
Voltage measurement accuracy: 0 - 75kV ±1kV
Voltage slew rate: 0.5 - 10kV/s
Resolution (displayed): 0.1kV
Power Supply: 85V - 264V, 47Hz - 63Hz, 12V external supply CE
Power consumption: 60VA
Internal rechargeable battery: 1 x 12V / 7.2Ah
Switch-off time on flashover: < 5µs
Measurement of oil temperature: 0 - 100°C / 32 - 212°F
Temperature Resolution: 1°C / 1.8°F
Display: 2.8" color (ultra bright)
Selectable Programs: ASTM D1816-04-1mm, ASTM D1816-04-2mm, ASTM D877-02A, ASTM D877-02B, IEC 156/95
Customer-specific programs: Unlimited
PC Software: Included
Printer: Dot Matrix Hard Copy Output
Interface: Bluetooth
USB: USB memory stick
Operating Temperature: -5°C - 45°C (23°F - 113°F)
Storage Temperature: -20°C - 60°C (-4°F

Included Accessories

Calibration Sheet	AC Power Cable	Integrated Battery
User Manual	PC Software	Integrated Printer

K16175 Automatic Portable Dielectric Tester

Dimensions WxHxD,in.(cm)
16.9x11x9.85 (43x28x25)
Net Weight: 48.5 lbs (22kg)

Shipping Information

Shipping Weight: 54.5 lbs (24.7kg)
Dimensions: 25x21x19in. (63.5x53.4x48.3cm)

Ordering Information

Catalog No.	
K16175	Automatic Dielectric Breakdown Tester, 0-75kVAC, 100-240V 50/60Hz

Accessories

K16175-4	Transport Case
K16175-5	Test Vessel complete with electrodes for ASTM D1816
K16175-6	Test Vessel complete with electrodes for ASTM D877
K16175-23	IEC156 Test Cell with VDE Electrode
K16175-24	IEC156 Test Cell with Sphere Electrode
K16175-12	Spacer Gauge, 1mm
K16175-13	Spacer Gauge, 2mm
K16175-14	Spacer Gauge, 2.5mm

Coking Tendency of Oil

K50100 Panel Coker

Test Method

Determines the tendency of finished oils to form coke when in contact with surfaces at elevated temperatures for short periods. A sample of oil is mechanically splashed against an aluminum test panel at elevated temperature. After a specified test period, the amount of coke deposited on the panel is determined by weight.

Panel Coking Test Apparatus

- Conforms to FTM 791-3462 specifications
- Suitable as a screening test prior to performing engine tests

Digitally controlled panel coking apparatus for finished lubricating oils, consisting of mechanical splasher, splash chamber and sample oil reservoir Test panel temperature and oil sump temperature are individually controlled by separate heaters with digital-indicating controllers. Mechanical splasher has a variable speed 0-1800rpm drive motor with digital indicating control. A high accuracy variable area flowmeter permits introduction of a corrosive acidic atmosphere to increase the severity of the test. Equipped with a digital countdown timer. Hinged safety cover has a port for fume removal and a safety interlock switch that interrupts power to the drive motor when the cover is lifted.

Specifications

Conforms to the specifications of:
FTM 791-3462
Maximum Temperature:
Test Panel: 400°C (752°F)
Sample Oil: 210°C (410°F)
Temperature Control: Separate controls for test panel and oil temperature, with digital °C/°F digital setpoint and display
Splashing Rate: 0-1800rpm, with digital display
Timer: 0-99.9 hr variable countdown
Flowmeter Range: 0.2-1.0L/hr
Oil Reservoir Capacity: 0.35 liter
Electrical Requirements: CE
115V 60Hz, 8A
220-240V 50/60Hz, 5A

Dimensions lxwxh,in.(cm)

Test Unit: 32x18x21 (81x46x53)
Control Cabinet:
18x12x18 (46x30x46)
Net Weight:
Test Unit: 50 lbs (22.7kg)
Control Cabinet: 25 lbs (11.3kg)

Shipping Information

Shipping Weight: 135 lbs (61.2kg)
Dimensions: 26.7 Cu. ft.

Digital Flowmeter option is available for this unit.

Software compatible, inquire with Koehler Customer Service.

Ordering Information

Catalog No.		Order Qty
K50100	Panel Coking Test Apparatus, 115V 60Hz	
K50110	Panel Coking Test Apparatus, with cyclic timer 115V 60Hz	
K50119	Panel Coking Test Apparatus, with cyclic timer 220-240V 50/60Hz	
K50190	Panel Coking Test Apparatus, 220-240V 50/60Hz	
	Accessories	
K50101	Aluminum Test Panel	1
K50102	Stainless Steel Test Panel (Type 321)	1

Koehler INSTRUMENT COMPANY, INC.

Evaporation Loss of Lubricating Oils by the Noack Method

K44100 Automatic Non-Woods Metal Noack Evaporative Apparatus

Test Method

For determining the evaporation loss of lubricating oils, particularly engine oils. High temperatures can evaporate oil which may contribute to oil consumption in an engine and can lead to a change in the properties of an oil. A measured quantity of sample is placed in an evaporation crucible that is then heated to 245.2°C with a constant flow of air drawn through it for 60 minutes. The loss in mass of the oil is determined.

Automatic Non-Woods Metal Noack Evaporative Apparatus

- Conforms to ASTM D5800, Procedure B
- 6.5" Integrated Touch Screen Panel PC
- Integrated Vacuum Pump with automatic electronic control system
- Direct sample temperature measurement via PT100 probe
- Equipped with high resistant Kalrez valve, inlet filter to remove product residuals
- USB port for connection to an external printer and/or external PC
- Storage capacity for more then 60,000 analysis
- CE Marked

The Automatic Non-Woods Metal Noack Evaporative Apparatus tests for the evaporation loss tendencies of lubricating oils at temperatures of up to 275°C. The newly designed electrically heated aluminum block allows for testing without the use of hazardous Woods Metal. The Noack tester is equipped with an Electronic regulator allowing for automatic control of temperature and differential pressure. The system is managed by an integrated 6.5" Touch Screen Panel PC by means of the Noack Evaluation Software run by a Windows® based operating system. The Evaluation Software is capable of recording all analytical parameters, allowing for user customizable parameters, methods and result reports as well as printing graphs and test results.

Specifications

Conforms to the specifications of:
ASTM D5800 Procedure B; IP 421; DIN 51581
Capacity: 1 Sample
Temperature Range: 225°C to 275°C
Temperature Resolution: 0.01°C
Temperature Accuracy: ±0.2°C
Repeatability/Reproducibility: Meets or Exceeds ASTM D5800
Ambient Temperature: Max. 35°C
Relative Humidity: Max 80%
Heater Power: 420W
Electrical Requirements: CE
115V 60Hz
220V 50/60Hz

Included Accessories

Integrated Touch Screen Panel PC
Integrated Vacuum Pump
Inlet Filter
Evaporation Crucible
Test Ball (10)
Nozzle Cleaner
Crucible Holder
Protective Gloves
Hook Wrench
Pliers

Dimensions lxwxh,in.(cm)
15.75x17.72x17.72 (40x45x45)
Net Weight: 48.5 lbs (22 kg)

Ordering Information

Catalog No.	
K44100	Automatic Non-Woods Metal Noack Evaporative Apparatus 115V 60Hz
K44190	Automatic Non-Woods Metal Noack Evaporative Apparatus 220V 50/60Hz

Accessories

K44100-SFW	Noack Evaluation Software
K44100-1	Glassware Accessory Set Includes: 2L Glass Bottle (2), Rubber Stopper (4), Glass Delivery Tubes, Silicon Connection Tubing
K44100-2	Stand for Glass Bottles with Inclined Manometer, 0-50mm H2O
K44100-3	Noack Reference Oil, 1 Liter
KLA-DB-KIT	Set of Calibration Connectors and Cables
KLA-PT100-CAL	Calibration Decade Box – PT100 Simulator

Additional Accessories

Additional equipment, materials and/or reagents are required to perform some of the test procedures in the preceding pages. Please refer to the applicable test method for further information, or contact Koehler for assistance.

Foaming Characteristics of Lubricating Oils ..... Pages 108-110

ASTM D892; IP 146; DIN 51566; FTM 791-3211, 791-3213

Air Supply
Acetone
Desiccant
Toluene
Isopropanol
Cotton

Water Separability of Petroleum Oils and Synthetic Fluids ..... Page 111

ASTM D1401; ISO 6614; DIN 51599; FTM 791-3201

Precipitation Naphtha
Nochromix
Cotton
Acetone
Distilled Water

Demulsibility Characteristics of Lubricating Oils ..... Page 112

ASTM D2711 and DIN 51353

Centrifuge
Distilled Water
Centrifuge Tubes
1,1,1-Trichloroethane

Oxidation Stability of Steam Turbine Oils and Inhibited Mineral Insulating Oils by Rotating Bomb ..... Pages 114-118

ASTM D2112, D2272; IP 229

Liquid Detergent
Potassium Hydroxide
Acetone
Chloroform
Oxygen
Petroleum Spirit
Hydrochloric Acid
Isopropanol

Oxidation Stability of Gasoline Automotive Engine Oils by Thin-Film Oxidation Uptake (TFOUT) ..... Pages 114-118

ASTM D4742

Liquid Detergent
n-Hexane
Potassium Hydroxide
Isopropanol
Acetone
Oxygen
Air Supply
Water

Oxidation Stability of Distillate Fuel Oil (Accelerated Method) ..... Pages 119-122

ASTM D2274

Drying Oven
Membrane Filters
Hot Plate
Oxygen
Acetone
Toluene
Filter Assembly
Beaker, 200mL
Isooctane
Water Supply
Methanol

Oxidation Characteristics of Inhibited Mineral Oils ..... Pages 119-122

ASTM D943; DIN 51587

Desiccant Bags
Abrasive Cloth
Distilled Water
Detergent
Hydrochloric Acid
Oxygen
Gloves
Acetone
Glass Syringes, 10 and 50mL
Flexible Tubing
n-Heptane
Isopropanol
Nitrogen

Sludging Tendencies of Inhibited Mineral Oils ..... Pages 119-122

ASTM D4310

Syringe, 50mL
Acetone
n-Heptane
Chromic Acid
Filter Holder
Separatory Funnel
Forceps
Nitrogen
Desiccant Bags
Isopropanol
Flexible Tubing
Detergent
Hydrochloric Acid
Oxygen
Membrane Filters
Weighing Bottle, 60mL
Drying Oven
Vacuum Source
Flushing Tube
Rubber Policeman

Oxidation Characteristics of Extreme Pressure Lubricating Oils ..... Pages 119-122

ASTM D2893

Drying Tower
Chromic Acid or equivalent detergent cleaning solution
Air Supply

Oxidation Stability of Mineral Insulating Oils ..... Page 123

ASTM D2440

n-Heptane
Potassium Hydroxide Solution
Isopropyl Alcohol
Acid Free Filter Paper
Oxygen
Toluene
Chloroform
p-Naphtolbenzein Indicator

Oxidation Stability of Inhibited Mineral Turbine Oils ..... Page 126

IP 280

Oxygen
Phenolphthalein
Hydrochloric Acid
Toluene
Ethanol
Membrane Filters
Burette
Filtration Apparatus
Alkali Blue Indicator
Heptane
Potassium Hydroxide
Dichloromethane
Sulfuric Acid
Evaporating Dish
Air Oven
Conical Flask, 500mL

Oxidation Stability of Straight Mineral Oil ..... Page 126

IP 306

Filtering Crucibles
Burette
Alkali Blue Indicator
n-Heptane
Potassium Hydroxide
Chloroform
Sulfuric Acid
Membrane Filters
Petri Dishes
Oven
Porcelain Crucibles
Oxygen
Phenolphthalein
Hydrochloric Acid
Toluene
Ethanol
Acetone
Forceps
Filtration Apparatus
Isopropanol

Additional Accessories (Continued)

Oxidation Stability of Mineral Insulating Oil .....Page 126

IP307

Filtering Crucibles
Burette
Alkali Blue Indicator
Heptane
Potassium Hydroxide
Chloroform
Sulfuric Acid
Isopropanol
Forceps
Filtration Apparatus
Porcelain Crucibles
Oxygen
Phenolphthalein
Hydrochloric Acid
Toluene
Ethanol
Acetone
Membrane Filters
Petri Dishes
Oven

Oxidation Stability of Inhibited Mineral Insulating Oils .....Page 126

IP 335

Porcelain Crucibles
Oxygen
Phenolphthalein Solution
Hydrochloric Acid
Toluene
Ethanol
Forceps
Filtration Apparatus
Sulfuric Acid
Isopropanol
Burette
Alkali Blue Indicator
n-Heptane
Potassium Hydroxide
Chloroform
Membrane Filters, 5.0 µm
Petri Dishes
Oven
Acetone

Thermal Oxidation Stability of Automotive Gear Lubricants .....Page 127

ASTM 5704; STP12A L-60-1 Performance Test (formerly CRC L-60 Test); FTM 791B Method 2504

Oakite 811
Stoddard Solvent
Reference Oils
Absorbent Cotton
Heptane
Pentane
Toluene
Air Supply
Tweezers
Organic Cleaning Solvent

Corrosiveness and Oxidation Stability of Hydraulic Oils, Aircraft Turbine Engine Lubricants and Other Highly Refined Oils.....Pages 124-125

ASTM D4636; FTM 791-5307, FTM 791-5308; IHC BT-10, DIN 51394

Air Supply
Analytical Balance
Centrifuge and Tubes
Microscope
Oven (optional)
Forceps
Sodium Dichromate
Brush
Nochromix
Cotton
n-Heptane
Acetone
Nitric Acid
Sodium Hydroxide
Sodium Phosphate
Sulfuric Acid
Distilled Water

Rust Preventing Characteristics of Inhibited Mineral Oil in the Presence of Water (Standard and Horizontal Disc Methods) .....Pages 128-129

ASTM D665, D3603; NACE TM-01-72; IP 135; ISO 7120; DIN 51355, DIN 51585; FTM 791-4011, 791-5315

Oven
Isooctane
Distilled Water
Petroleum Spirit 60/80
Naphtha
Synthetic Sea Water
Precipitation Naphtha

Corrosion of Lead by Lubricating Oils.....Page 130

FTM 791-5321.1

Air Supply
Forceps
Acetone
Cotton
Analytical Balance
Petroleum Naphtha
Steel Wool

Bearing Compatibility of Turbine Oils .....Page 131

FTM 791-3452

Test Equipment for:
- ASTM D445 Kinematic Viscosity (refer to Viscosity Section)
- ASTM D524 Ramsbottom Carbon Residue (refer to Page 53)
- ASTM D974 Total Acid Number

Copper Corrosion From Petroleum Products.....Page 131

ASTM D130

Filter Paper
Isooctane
Stoddard Solvents
Cotton Wool
Stainless Steel Forceps

Cloud Point and Pour Point of Petroleum Oils.....Pages 132-133

ASTM D97, D2500; IP 15, 219; ISO 3015, 3016; DIN 51597; FTM 791-201

Methanol
Solid Carbon Dioxide
Calcium Chloride
Ethanol
Sodium Sulfate
Petroleum Naphtha
Acetone
Sodium Chloride

Coking Tendency of Oil .....Page 135

FTM 791-3462

Emery Paper
Petroleum Ether

Evaporation Loss of Lubricating Oils (Noack Test) .....Page 136

ASTM D5800; DIN 51581; IP 421

Balance
Toluene
Naphtha

Tribology

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Four Ball Wear and EP

K93100 Four Ball Tester

Tribology (Friction and Wear) Testing of Lubricants
Friction and Wear Test Equipment

Koehler Instrument Company is pleased to offer advanced equipment for a variety of friction and wear tests. Several of the standard instruments that we offer are listed here. Please contact us to discuss your requirements for these as well as custom-designed units for tribology analysis methods. Our applications personnel will consult with you on your requirements and work with our design staff to provide solutions for your tribology testing needs.

Test Method

Determines the Wear Preventative (WP) and Extreme Pressure (EP) characteristics of lubricating oils and greases in sliding steel-on-steel applications. The test consists of rotating a steel ball under load against three stationary steel balls coated with lubricant. Measurements are taken at the rotating speeds, temperatures, and duration as specified by published standards. The load-wear index can be calculated from the weld point in EP tests, and lubricant comparisons can be made based upon scar diameters incurred from wear tests.

Four Ball Wear and EP Tester

- Conforms to ASTM D2266, D2596, IP 239, and related specifications
- Performs Wear Preventative (WP) and Extreme Pressure (EP) tests
- Displays and records normal load, frictional torque, time, and temperature
- Test speeds and temperatures are electronically controlled
- Data Acquisition Software and Card are included
- Custom configurations are available
- Precise variable loading capability*

Four Ball Tester performs both Wear Preventative (WP) and Extreme Pressure (EP) analyses for measuring the wear and frictional properties of lubricants under sliding steel-on-steel test conditions. Tests are performed in accordance to the latest ASTM and IP published methods. Normal load on the ball assembly and frictional torque are measured through load cells. Data is processed and stored utilizing TriboDATA, an advanced data acquisition and processing software package. Test results can be plotted and compared, as well as exported to other programs. Wear scars on the steel balls are measured and recorded with a High Resolution Digital Microscope available as recommended accessory for the Four Ball Tester.

High Resolution Digital Microscope

Koehler's Four Ball Microscope is a versatile device for measuring the wear scar diameter on a steel test ball. This apparatus consists of the "Dinolite" Microscope with "DinoCapture" Software mounted at an angle on an aluminum base. The device is designed to measure the wear scar without removing the test balls from the ball pot allowing for a safer measurement procedure. The wear scar can be viewed through an external PC. The software measures the wear scar using a diameter and line tool. The images can be saved at varied resolutions on a PC.

Specifications

Conforms to the specifications of:
ASTM D2266, D2596, D2783, D4172, D5183*, IP 239
Electrical Requirements: CE
220V, 60Hz, 3 phase
440V, 50Hz, 3 phase
Drive Motor: 1.5 kW
Test Speeds: 1200, 1440, 1760 rpm
Optional Test Speeds (min/max): 1000/3000, 300/3000 rpm
Maximum Axial Load: 10000 N at 3000 rpm or 12000 N at 1800 rpm
Test Duration (min/max): 1/9999 min
Test Ball diameter: 12.7 mm

Shipping Information

Shipping Weight: 1360 lbs (620 kg)
Dimensions: 45 Cu. ft.

**Pneumatic option required*
IP300 or CEC-L-45-A-99 units available.
Please contact Koehler Customer Service for additional information.

Included Accessories

Set of Weights
Ball Chucks
Ball Pot
Ball Chuck Remover
Ball Rack
Ball Clamp Ring
Ball Holder Base Disc
Set of Hand Tools
Torque Wrench
Electrical Controller
Connecting Cables
TriboDATA Software
Calibration and Test Reports

Ordering Information

Catalog No.		Order Qty
K93100	Four Ball Tester, 220V 60Hz	1
K93100-PN	Four Ball Tester with pneumatic loading, 220V 60Hz	
K93190	Four Ball Tester, 380V 50Hz	1
K93190-PN	Four Ball Tester with pneumatic loading, 380V 50Hz	

Accessories

K93105	Test Balls (Pack of 100)	
K93111	High Resolution Digital Microscope	

Tribology Data Acquisition System

TriboDATA Data Acquisition System

- Powerful data acquisition system provides analog to digital conversion and data analysis of test results for many tribology instruments available from Koehler as well as ***other tribology instrument manufacturers***
- Real-time display of critical test parameters such as normal load, friction force, temperature, and time

The Koehler TriboDATA System is designed to acquire and process analog data from the various tribology test instrumentation offered from Koehler as well as from *other tribology instrument manufacturers*. The analog-to-digital converter card is comprised of four analog inputs, and the test data is recorded and displayed in real-time. Up to four graphs can be displayed simultaneously. The data can be stored to disk for future reference or exported in an ASCII text format to other software packages. Critical test parameters are also saved with the data. With the TriboDATA hardware and software package, data acquisition of crucial test parameters such as normal load, friction load, temperature, and time can be seamlessly performed to ensure that your test results are consistent and repeatable within prescribed test conditions. As an option, a CCD camera package is available to capture wear scar images and store them on a PC for analysis.

Computer Requirements

Processor: Pentium or higher
Processor Speed: 100 MHz or higher
Operating System: Windows® 95/98/NT
Memory (RAM): 16 Mb
Required Disk Space: 10 Mb
One Free Expansion ISA Slot

Included Accessories

Software on CD
Acquisition Data Card
Connection Cable
Instruction Manual

K93900 TriboDATA Data Acquisition System

Ordering Information		
Catalog No.		**Order Qty**
K93900	TriboDATA Data Acquisition System	1

High Frequency Reciprocating Rig

Test Method

A 2-mL test specimen of fuel is placed in the test reservoir and maintained at 25 or 60°C. When the temperature has stabilized, a vibrator arm holding a nonrotating steel ball and loaded with a 200-g mass is lowered until it contacts a test disk completely submerged in the fuel. The ball is caused to rub against the disk with a 1-mm stroke at a frequency of 50 Hz for 75 min. The ball is removed from the vibrator arm and cleaned. The dimensions of the major and minor axes of the wear scar are measured under magnification and recorded.

High Frequency Reciprocating Rig

The two-station Fuel Lubricity Wear Test Machine incorporates two test positions with heater pads and mounting arrangements for fuel lubricity test specimens. Load is applied manually by means of dead weights directly to the fixed ball specimen carrier by means of a loading yoke. Machine controls are limited to speed control of the drive motor to give the required frequency, temperature control of the specimen bath and test duration. Test data is limited to post test wear scar measurement only and no facilities are provided for friction force measurement.

Electrical Requirements CE

115V 60Hz, Single Phase
230V 50/60Hz, Single Phase

Ordering Information	
Catalog No.	
K93450	High Frequency Reciprocating Rig, 115V 60Hz
K93459	High Frequency Reciprocating Rig, 230V 50/60Hz

K93450 High Frequency Reciprocating Rig (HFRR)

Specifications

Test specifications: ASTM D6079; ISO 12156
Contact Geometry: Ball on Plate
Ball Specimen: 6 or 10 mm diameter
Load: 1.95 to 10.00 N (± 0.01 N)
Stroke: 1 mm (± 0.02 mm)
Frequency: 2.5 to 50 Hz (± 1 Hz)
Fluid Volume: 2 mL (± 0.2 mL)
Test Temperature: 25 or 60°C (± 2°C)
Test Duration: 75 min (± 0.1 min)
Bath Surface Area: 6 cm2

Koehler INSTRUMENT COMPANY, INC.

Pin-On-Disc

K93500 Pin-On-Disc Tester

Specifications for Pin-On-Disc with Environmental Chamber & Lubricant Recirculating System

Temperature: 60°C Maximum
Discharge Rate: 0-1 L/min
Viscosity Range: 90 SAE Maximum
Capacity: 3L of Lubricant

Shipping Information

Shipping Weight: 440 lbs (200 kg)
Dimensions: 18 Cu. ft.

Included Accessories

Electrical Controller Unit
Connecting Cables
Spare Fuses
TriboDATA Software
Set of Weights
Set of Hand Tools
Set of Pins
Calibration and Test Reports

Electrical Requirements CE

115V 60Hz
230V 50/60Hz

Ordering Information

Catalog No.		Order Qty
K93500	Pin-On-Disc Machine, 115V 60Hz	1
K93590	Pin-On-Disc Machine, 230V 50Hz	

Optional Configurations Available

Environmental Chamber
Lubricant Recirculating System
Environmental Chamber and
Lubricant Recirculating System

High temperature models (up to 700°C) are available. Please contact Koehler Customer Service for additional information.

Pin-On-Disc Tester

- Conforms to ASTM G99 standard test method
- Analyzes wear and friction characteristics of sliding contacts (dry or lubricated conditions)
- Tests can be performed on a variety of materials: metals, polymers, composites, ceramics, lubricants, cutting fluids, abrasive slurries, coatings, and heat-treated samples
- TriboDATA software package varies and records pin pressure, pin temperature, sliding speed, and lubrication parameters
- Custom configurations available

The Pin-On-Disc machine is a versatile unit designed to evaluate the wear and friction characteristics on a variety of materials exposed to sliding contacts in dry or lubricated environments. The sliding friction test occurs between a stationary pin stylus and a rotating disk. Normal load, rotational speed, and wear track diameter can be varied. Electronic sensors monitor wear and the tangential force of friction as a function of load, speed, lubrication, or environmental condition. These parameters as well as the acoustic emissions at the contact are measured and displayed graphically utilizing the TriboDATA software package.

Specifications

Conforms to the specifications of: ASTM G99

Sliding Speed Range:	0.26-10 m/sec
Disc Rotation Speed:	100-2000 rpm
Maximum Normal Load:	200 N
Frictional Force:	0-200 N
Wear Measurement Range:	4 mm
Pin Size:	3-12 mm diagonal/diameter
Disc Size:	160 mm diameter x 8 mm thick
Wear Track Diameter:	10-140 mm

Timken Testers

Timken Mechanical Tester

A steel test cup rotating at 800 RPM is pressed against a steel test block. Sample under test is carried by the test cup into the sliding contact. Test load at the contact is progressively increased, score value and OK value are determined.

Test Method

This tester is used to measure extreme pressure properties of lubricating grease and lubricating fluids.

Specifications

Conforms to the specifications of:
ASTM D 2509 - IP 326 for greases.
ASTM D 2782 - IP 240 for lubricating fluids.
Rate of loading : 0.9 to 1.3 Kg/sec.
Grease feed rate : 45 ± 9 g / min.
Fluid feeder : 3.8 liter with recirculating pump and heater.
Motor : 1.5 kW with variable frequency drive.
Power : 220V 60Hz, 380V 50Hz, 5 KVA max. CE

Included Accessories

- Calibration kit for load and RPM
- Set of tools for operation
- Microscope for scar measurement
- Electronic timer

K92000 Timkin Tester

Timken Pneumatic Tester

A steel test cup rotating at 800 RPM is pressed against a steel test block. Sample under test is carried by the test cup into the sliding contact. Test load at the contact is progressively increased, score value and OK value are determined.

Test Method

This tester is used to measure extreme pressure properties of lubricating grease and lubricating fluids.

Features & Benefits

• Loading is pneumatic. Frictional torque is measured with a torque cell.

Specifications

Conforms to the specifications of:
ASTM D 2509 - IP 326 for greases.
ASTM D 2782 - IP 240 for lubricating fluids.
Rate of loading : 0.9 to 1.3 Kg/sec.
Grease feed rate : 45 ± 9 g / min.
Fluid feeder : 3.8 liter with recirculating pump and heater.
Motor : 1.5 kW with variable frequency drive.
Power : 220V 60Hz, 380V 50Hz, 5 KVA max. CE

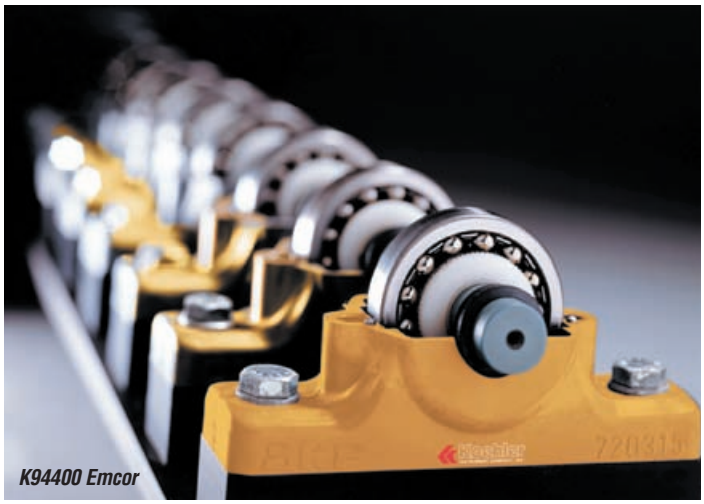
Included Accessories

- Calibration kit for load and RPM
- Vibration sensor
- Microscope for scar measurement
- Set of tools for operation
- Electronic timer

Ordering Information

Catalog No.	
K92000	Timken Tester, 220V 60Hz
K92000-PN	Timken Tester with pneumatic loading, 220V 60Hz
K92090	Timken Tester, 380V 50Hz
K92090-PN	Timken Tester with pneumatic loading, 380V 50Hz

Corrosion Inhibition Properties of Greases


K94400 Emcor

Test Method

Measures the ability of a grease to protect a bearing against corrosion in the presence of water. Two sets of grease-coated bearings per station are partially immersed in water and rotated at a speed of 80 rpm in a sequence of running and resting periods. At the end of the test, the raceways of the bearing outer rings are inspected for rust.

Emcor Grease Testing Machine

- Evaluates the rust preventive properties of greases and oils
- Performs both standing and dynamic testing

The Emcor Grease Testing Machine evaluates the rust preventive properties of greases on bearing components, measuring the ability of a grease to protect a bearing against corrosion in the presence of water. As bearings are normally used in environments exposed to humidity and temperature variations, condensation may form on the bearing thus promoting the onset of rust. Rust is detrimental to proper bearing operation and will compromise the longevity of the bearing. A good quality grease should be designed to protect the bearing from rust and corrosion under these conditions.

The Emcor system features test method versatility, since both greases and oils can be tested as well as variations can be made with regard to the test medium (e.g., brine instead of water). The costs for running these tests are minimal. The two test bearings are the only machined parts that have to be renewed for each test, and the polyamide material for the housing is rigid and strong and rarely ever needs replacement.

Ordering Information

Catalog No.		Order Qty
K94400	Emcor Grease Testing Machine, 115V 60Hz	1
K94490	Emcor Grease Testing Machine, 230V 50Hz	
	Accessories	
K94401	Test Bearing	8
K94402	Mounting Sleeve	8
K94403	Mounting Nut	8
K94408	Mounting Tool	1
K94410	Filling Device for Test Bearings	1
K94490-1	Emcor Washout Test Option *Includes: Peristaltic Pump, Overflow Container, Inlet and Outlet Tubing and Pipe Fittings*	1

Specifications

Conforms to the specifications of:
ASTM D6138; IP 220; ISO 11007; DIN 51802; NFT 60-135; SIS 155130
Electrical Requirements: CE
115V, 60Hz, 1 phase
230V, 50Hz, 1 phase

Dimensions lxwxh,in.(cm)

48½x15x11 (123x38x28)
Net Weight: 88 lbs (40kg)

Shipping Information

Shipping Weight: 121 lbs (55 kg)
Dimensions: 8 Cu. ft.

Scratch Tester

Specifications

Normal load control range: 2 - 20N
Normal load accuracy: 1% or 10mN
Tangential force measurement range: 2 - 20N
Tangential force accuracy: 1% or 10mN
Stroke (X): 0.1 - 50mm
Speed: 0.1 - 5mm/s
Pitch(Y): 0.2 - 50mm
Loading Rate: 0 - 20N/s. In steps of 0,2,5,10,15,20N/s
Sample Size (LxWxT): 60x60x10mm
Operating Temperature: 15 - 40°C. RH: 25 - 85%
Storage Temperature: -10 - 40°C, RH: 0 - 90%
Electrical Requirements: CE
115V 60Hz
220V 50Hz

Included Accessories

Control Box
Reference Sample (2)
Tool Kit
Diamond Indenter
Data Acquisition Software
Operating and Instruction Manual

Dimensions lxwxh,in.(cm)

11.81x10.83x21.65 (30x27.5x55)
Net Weight: 44.1lbs (20kg)

Scratch Tester

The Scratch Tester is a versatile instrument capable of quantifying scratch resistance, critical load, adhesion and bond strength for a wide range of surfaces. The tester evaluates scratch resistance of a sliding surface in relative motion (X movement) to a stylus. The stylus is pressed against the moving surface with controlled force which is normal to the surface. Tangential force at the contact is measured. The ratio of tangential and normal forces is merely the co-efficient of friction till the threshold of surface damage. Energy required to damage the surface contributes an additional component to the tangential force, which increase this ratio. Force ratio is not the only sign of damage - acoustic emission level also increases corroborating the occurrence of surface damage. Image of the entire scratch may be captured and the view at any given load can be seen to study nature of failure.

Ordering Information

Catalog No.	
K93000	Scratch Tester, 115V 60Hz
K93090	Scratch Tester, 220V 50Hz
	Accessories
K93004	CCD Based Image Acquisition System
K93016	Acoustic Emission Sensor

Pin and Vee Block Tester

Test Method

To evaluate wear preventative and load carrying properties of fluid lubricants, and endurance (wear) life of film lubricants.

Pin and Vee Block Tester

- Automatic Start of Test at Set Temperature
- Over-Temperature and Over-Torque Protection
- Maintenance of Test Speed within Specified Limits over entire Load Range
- Calibration kit for Load, Torque, and Wear
- High Performance Sensor to cover entire test load range with single load cell with adequate resolution.

The Pin and Vee Block Tester consists of a rotating pin pressed between two stationary steel Vee blocks. Load is applied to the Vee blocks by a ratchet mechanism. Ramping of load during extreme pressure testing is made possible by auto advancement mechanism of ratchet. Pin and Vee blocks are immersed in lubricant fluid under test in heated test cup. Wear, torque and endurance life is evaluated accordingly. The Pin and Vee Block tester comes with data acquisition software. Test torque, load, temperature and wear are measured and recorded. The software permits users to view, compare and report various test results.

K95190 Pin and Vee Block Tester

Specifications

Conforms to the Specifications of:
ASTM D2625, D2670, D3233, D5620;
FTM 791C-3807.1, FTM 791C-3812.1
Test Load: 0 to 4500 lbf
Torque: 0 to 100 in-lb
Speed: 100 to 500 RPM
Temperature: Ambient to 200°C
Duration: 0 to 999.9 minutes
Electrical Requirements: CE
230V, 50/60Hz, 2 KVA, 1 Phase

Included Accessories

Calibration Kit	Measuring Microscope
Data Acquisition Software	Steel Ruler, 6”
Brinell Ball Attachment	Dust Cover
Test Pin (50)	Shear Pin (50)
Vee Block (100)	

Ordering Information

Catalog No.	
K95190	Pin and Vee Block Tester, 230V 50/60Hz

Measurement of Lubricity of Aviation Turbine Fuels by the Ball-on-Cylinder Lubricity Evaluator (BOCLE)

Test Method

Covers the Assessment of the wear aspects of the boundary lubrication properties of aviation turbine fuels on rubbing steel surfaces.

Data Acquisition

Test parameters such as speed, test duration, fuel temperature, air temperature and humidity are acquired, displayed and recorded. The acquired data can be viewed in graphs. The data acquisition system provides the users with the facility to super impose up to four test graphs for comparative viewing.

Specifications

Conforms to the Specifications of: ASTM D5001
Motor Speed: 240 ± 0.5 RPM
Fuel Temperature Control: 25±1.0 max, 0.1°C typical
Flow Rate: 3.8 ± 0.1 L/min
Relative Humidity: 10.0 ± 0.2% indicated
Temperature: 25±1.0 max, 0.1°C typical
Fuel Conditioning: 15 min ± 0.1s
Test Duration: 30 min ± 0.1s
Ambient Temperature: 15 to 22°C
Electrical Requirements: 230V, 50Hz, 2 KVA, 1 Phase, 1.5 KVA Max. CE

ATF Lubricity Test Rig (BOCLE)

The instrument consists of a rotating test ring against which a fixed test ball is pressed with the required force. A fuel bath containing the fuel under test is placed on – movable stage under the test ring. The temperature is controlled and the air is conditioned.
Fuel under test is conditioned by maintaining the fuel temperature at 25°C maintained at 25°C with 10% Relative Humidity is passed through the test area which is enclosed.
After conditioning of the fuel, a test ball of 12.7 mm diameter is pressed against the outer surface of the test ring. The lower part of the test ring is immersed in the test fuel bath.
The test ball is pressed with a force of 10 N against the test ring. The test ring is made to rotate at 240 RPM for a period of 30 minutes after which the test stops.
The wear scar on the test ball is studied and the scar diameters of the wear scar (major and minor axis) are measured.

Ordering Information

Catalog No.	
K94190	ATF Lubricity Test Rig (BOCLE), 230V 50Hz

Koehler INSTRUMENT COMPANY, INC.

Multispecimen

Multispecimen Tester

- Multiple test configuration for wear and friction monitoring in one unit
- Speeds variable to 2000 rpm and loads to 1000 N
- Data acquisition system records speed of rotation, normal load, sample temperature, and frictional torque

Measures and displays a variety of friction and wear characteristics on various geometric test samples with different compositions and forms. Test configurations are easy to change on the instrument: single or multiple, sliding or rolling, point, line or area contacts are available. A wide range of materials including coatings, lubricants, plastics, metals, polymers, ceramics, and composites can be readily analyzed. The test is performed by mounting a test sample into the spindle and rotating it against a stationary counter-face test specimen. The spindle rotation speed, normal load, and interface temperature can be user-adjusted in accordance with published ASTM standards. Specimen holders are designed for standard test configurations; optional custom designed holders for customer specific applications are also available. This unit has a temperature range to 120°C, load to 1000 N and speed up to 2000 rpm. Windows®-based TriboDATA data acquisition software is included, and some of the possible configurations are shown in the table to the right.

Specifications

Conforms to the specifications of:
ASTM D2266, D3702, D4172
Normal Load: 5-1000 N
Frictional Torque Measurement Range: 0-10 Nm
Shaft Speed: 200-2000 rpm
Wear Measurement: 0-2000 µm
Non-Rotating Sample Diameter/Diagonal: up to 80 mm
Pin Sample Diameter: up to 8 mm
Ball Diameter: 12.7 mm
Non-rotating Sample Temperature: Ambient to 100°C

Configurations Table	
Ball on flat Sliding point contact	1, 2, 3 balls can be used Dry or lubricated contact
Cylinder on flat Sliding line contact	1 or 2 pins. Dry or lubricated
Pin on flat Sliding area contact	1, 2 or 3 pins. Dry or lubricated
Four ball wear Wear preventive properties of lubricants	ASTM D2266 ASTM D4172
Thrust washer Rotating washer against fixed washed with axial load	ASTM D3702

Ordering Information		
Catalog No.		**Order Qty**
K93600	Multispecimen Tester, 220V 60Hz 3 Phase	1
K93690	Multispecimen Tester, 380V 50Hz 3 Phase	

Included Accessories

Electrical Controller
Electrical Cables
TriboDATA Software
Set of Hand Tools
Calibration and Test Reports

Electrical Requirements CE

220V 60Hz 3 Phase
380V 50Hz 3 Phase

Included Adapters

Ball on Flat
Cylinder on Flat
Pin on Flat
Four Ball Wear Preventative
Thrust Washer

Shipping Information

Shipping Weight: 880 lbs (400 kg)
Dimensions: 32 Cu. ft.

Tribology Test Specimens and Other Tribology Equipment

Slurry Abrasion Tester

Measures the slurry abrasive resistance of solid materials as prescribed by ASTM G105 specifications. Performs tests on metals, minerals, polymers, composites, ceramics, coatings, and heat-processed materials. A rectangular test sample is rotated in a slurry cup with the temperature maintained using a water bath. The test speed, temperature, duration, sample size, and slurry composition can be varied. The differential mass of the sample before and after the test is converted to volume loss (abrasion index) for direct comparison of the tested materials.

Tapping Torque Tester

Evaluates metal working fluids and various machining operations according to ASTM D5619 for the the torque requirements of tapping operations in pre-drilled samples. Software package acquires cutting torque and rotational speed and displays them as a function of test duration or angle of tool rotation.

Air Jet Erosion Tester

Performs air jet erosion test according to ASTM G76 specifications. A test sample is bombarded by a gas containing particulates with a known velocity and concentration of particles. Comparison can be made by varying test sample composition, size, particle velocity, angle of incidence, and temperature.

Dry Abrasion Tester

Measures index of abrasive resistance to dry sand according to ASTM G65 test specifications. Test specimen is held against a rotating wheel and abraded with a grit of controlled size, composition, and flow with the proper test duration and applied force as prescribed by the ASTM test method. The differential mass of the specimen before and after the test is recorded and converted to volume loss (abrasion index) for direct comparison of tested materials.

Custom-Built Tribology Test Equipment and Test Specimens

Test specimens are available for all of the tribology instrumentation offered from Koehler. Please inquire with customer service about other custom-built tribology test equipment and test specimens.

Custom-designed equipment is readily available for the following tribology test methods:

Universal Wear (ASTM G77, G99)
Vane Pump Wear (ASTM D2882)
Shear Stability (ASTM D6278)
Slurry Erosion Tester
Reichert Tester
Grease Life Tester (D3336)
Grease Noise Tester
V2F Grease Testing Machine
ROF Grease Testing Machine (DIN 51806)
R2F Grease Testing Machine

High Temperature Air Jet Erosion Tester

Lubricating Greases

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For information on additional test methods for lubricating greases:

–Please refer to the Penetration Section

–Additional test methods are available upon request

–please call or write for information

Evaporation Loss of Lubricating Greases and Oils

K29500 Evaporation Test Cell with Grease Cup

Specifications

Conforms to the specifications of:
ASTM D972, D2878; IP 183; FTM 791-351
Capacity: 2 oil or grease samples
Maximum Temperature: 350°F (177°C)
Temperature Control Stability: ±1°F (± 0.5°C)
Circulation: 1/20hp stainless steel impeller
Bath Medium: 5.3 gal (20L) high temperature transfer fluid
Electrical Requirements:
115V 60Hz, Single Phase, 8.6A
220-240V 50/60Hz, Single Phase, 4.5A

Included Accessories

Support Clamps (2)
Thermometer Holder

Dimensions

33w" x 25½"h (84x65cm)
Maximum width with two evaporation cells inserted
Net Weight: 62 lbs (28.1kg)

Shipping Information

Shipping Weight: 90 lbs (40.8kg)
Dimensions: 14.2 Cu. ft.

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Test Method

Evaluates the potential for evaporation loss of lubricant components in high temperature service. A controlled flow of heated air is passed over the sample for a specified period. Evaporation loss is measured by the change in sample weight during the test. The Evaporation Loss test can also be used for Estimating Apparent Vapor Pressures and Molecular Weights of Lubricating Oils (ASTM D2878). A high temperature version of the Evaporation Loss test is available (See ASTM D2595).

Evaporation Loss Tester

- Conforms to ASTM D972, D2878 and related specifications
- Two-sample testing capability

Evaporation Cell–Suitable for evaporation loss tests on lubricating greases and oils in the temperature range of 210 to 300°F (99 to 149°C). Passes heated air over the sample at the required flow rate. Consists of stainless steel body, cover, eduction tube and hood. Calibrated flowmeter with needle valve maintains 2L/min. air flow at standard temperature and pressure. Supplied with stainless steel grease or oil sample cup. Sample cups are interchangeable. Entire assembly mounts in Evaporation Loss Test Bath.

Evaporation Loss Test Bath–Constant temperature oil bath mounts two Evaporation Cells in an upright position at the proper immersion level. Maintains test temperature within ±1°F (±0.5°C). Microprocessor PID control provides quick temperature stabilization without overshoot and the bath is protected by an overtemperature control circuit that interrupts power should bath temperature exceed a programmed cut-off point. Dual LED displays provide actual and setpoint temperature values in °C/°F format. *Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. Contact your Koehler representative for information.* Fully insulated, double-wall construction, with stainless steel tank and polyurethane-finished steel exterior.

**Also available–special bath to accommodate both ASTM D972 and D942 (Oxidation Stability of Greases on page 152) test methods. Please contact Koehler for additional information.*

Ordering Information

Catalog No.		Order Qty
K29400	Evaporation Loss Test Bath, 115V 60Hz	1
K29490	Evaporation Loss Test Bath, 220-240V 50/60Hz	
K29500	Evaporation Test Cell with Grease Cup	2
K29550	Evaporation Test Cell with Oil Cup	
	Accessories	
250-000-22F	ASTM 22F Thermometer Range: 204 to 218°F	
250-000-22C	ASTM 22C Thermometer Range: 95 to 103°C	
250-000-67F	ASTM 67F Thermometer Range: 203 to 311°F	
250-000-67C	ASTM 67C Thermometer Range: 95 to 155°C	
K29530	Oil Sample Cup with Hood	
K29540	Grease Sample Cup with Hood	

Evaporation Loss of Lubricating Greases Over Wide Temperature Range

Test Method

Similar to the ASTM D972 Evaporation Loss test, extending the temperature range for evaporation loss testing to 600°F (316°C).

High Temperature Evaporation Loss Tester

- Conforms to ASTM D2595 specifications
- Microprocessor temperature control with digital display and overtemperature cut-off
- Microprocessor programmable high accuracy temperature control

Performs evaporation loss tests on lubricating greases at temperatures of up to 600°F (316°C). Maintains sample temperature within ±0.3°F while passing heated air over the sample surface at a controlled flow rate. Consists of evaporation cells and aluminum block oven with controls for sample temperature, air temperature and air flow rate. Evaporation cells include grease sample cup, head, eduction tube, cover and thermocouple tube. Aluminum block oven provides efficient response and safe operation at high temperatures. Microprocessor temperature control has °C/°F switchable digital setpoint and display. Operator and equipment are protected by an overtemperature control circuit which automatically interrupts power to the unit when bath temperature exceeds a programmed cut-off point. Microprocessor PID control provides quick temperature stabilization without overshoot and the bath is protected by an overtemperature control circuit that interrupts power should bath temperature exceed a programmed cut-off point. Dual LED displays provide actual and setpoint temperature values in °C/°F format. *Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. Contact your Koehler representative for information.* Separate air preheater controls and flowmeters for each cell permit accurate control of heated air flow to sample surface. Order accessory Digital Thermometer (Cat. No. K29310) to monitor exit air temperature and ASTM 3F or 3C Thermometer for block (sample) temperature. Accessory oil sample cup (Cat. No. K29530) converts evaporation cell for lubricating oil samples.

Ordering Information

Catalog No.		Order Qty
K29300	High Temperature Evaporation Loss Tester, 220-240V 50/60Hz	1
	Accessories	
K29320	High Precision Digital Thermometer, 115V 60Hz Microprocessor based digital thermocouple thermometer with ten channel input. Monitors Type K Thermocouples from evaporation cells in K29300 Evaporation Loss Tester. Use together with preheater controls in Model K29300 to maintain air temperature within ±1.1°C (±2°F) per ASTM specifications	1
K29329	High Precision Digital Thermometer, 220-240V 50/60Hz	
250-000-03F	ASTM 3F Thermometer Range: 20 to 760°F	
250-000-03C	ASTM 3C Thermometer Range –5 to +400°C	
K29530	Oil Sample Cup with Hood	
K29540	Grease Sample Cup with Hood	

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

K29300 High Temperature Evaporation Loss Tester

Specifications

Conforms to the specifications of:
ASTM D2595, D2878*
*with accessory oil sample cup installed
Capacity: 2 samples
Temperature Range: 200 to 600°F (93 to 316°C)
Sample Temperature Control:
Type: microprocessor digital control
Exit Air Temperature Control: Two 0-500W variable control heaters and type K thermocouples (order K29320/K29329 Digital Thermometer separately)
Air Flow Control: Two externally mounted flowmeters maintaining 2L/min flow at standard temperature and pressure
Electrical Requirements: CE
220-240V 50/60Hz, Single Phase, 10.4A

Included Accessories

Evaporation Cell Assemblies with grease sample cups (2)
Type K Thermocouples (2)

Dimensions lxwxh,in.(cm)

25x16x17 (64x41x43)
Net Weight: 175 lbs (79.4kg)

Shipping Information:

Shipping Weight: 224 lbs (101.6kg)
Dimensions: 10.4 Cu. ft.

Koehler INSTRUMENT COMPANY, INC.

Dropping Point of Lubricating Grease

K19490 Dropping Point Apparatus

Ordering Information

Catalog No.		Order Qty
K19490	Dropping Point Apparatus,115V 60Hz	1
K19491	Dropping Point Apparatus, 220-240V 50/60Hz	

Accessories

250-000-02F	ASTM 2F Thermometer. Range: 20 to 580°F	2
250-000-02C	ASTM 2C Thermometer. Range: –5 to +300°C	
K194E7	Cup Plug Gauge Checks conformity of test cup with specifications. Per Fig. 1, ASTM D566 and Fig. 1-E7, ASTM D2265	1
K194E6	Polished Metal Rod	
K194EA	Grease Cup	
K19492	Test Tube with indentations	
K19493	Thermometer Cork	
K19499	Cork Ring Guide	

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Test Method

Dropping point determinations are used for identification and quality control purposes, and can be an indication of the highest temperature of utility for some applications. The sample is heated at a prescribed rate in a precision machined cup whose sides slope toward an opening at its center. The temperature at which a liquid drop first falls from the cup is the dropping point of the sample.

Dropping Point Apparatus

- Conforms to ASTM D566, D4950 and related specifications

Performs dropping point determinations on lubricating greases at temperatures of up to 550°F (288°C). Consists of dropping point cup, test cell with accessories and oil bath with stirrer and heater. Test cell is immersed in a 400mL Borosilicate Glass bath for heating at the prescribed rate. A 750W variable stepless control heater and ¹⁄₄₀hp stirrer permit accurate, uniform control of bath temperature rate of rise. Heater assembly includes refractory top plate and reference dial.

Specifications

Conforms to the specifications of:
ASTM D566, D4950; IP 132; ISO 2176; DIN 51801; FTM 791-1421; NF T 60-102
Maximum Temperature: 550°F (288°C)
Bath Medium: A high temperature heat transfer fluid having a flash point in excess of 400°C is recommended. Silicone fluid (P/N 355-001-002 — page 8) is suitable.
Electrical Requirements: CE
115V 60Hz, Single Phase, 6.5A
220-240V 50/60Hz. Single Phase, 3.4A

Included Accessories

Grease Cup, chromium plated brass
Test Tube with indentations
Cork Ring Guide
Thermometer Corks (2)
Thermometer Depth Gauge
Polished Metal Rod
Connecting Hardware

Dimensions lxwxh,in.(cm)

5x5x31(13x13x78)
Net Weight: 11 lbs (5.0kg)

Shipping Information

Shipping Weight: 16 lbs (7.3kg)
Dimensions: 2.8 Cu. ft.

Dropping Point of Lubricating Grease Over Wide Temperature Range

Test Method

The ASTM D2265 dropping point test permits higher temperatures than the ASTM D566 method and uses a different heating procedure: the test cell is inserted in an aluminum block oven maintained at a constant temperature that is higher than the expected dropping point of the sample. The sample temperature then rises to the dropping point without operator control.

High Temperature Dropping Point Apparatus

- Conforms to ASTM D2265 and D4950 specifications
- Six-sample testing capability
- Microprocessor programmable high accuracy temperature control

Tests dropping points of lubricating greases at temperatures of up to 400°C (752°F). Includes thermostatically controlled aluminum block oven and six complete dropping point assemblies. Six-place oven has large viewing ports with fluorescent backlighting for excellent visibility. Microprocessor PID control provides quick temperature stabilization without overshoot and the bath is protected by an overtemperature control circuit that interrupts power should block temperature exceed a programmed cut-off point. Dual LED displays provide actual and setpoint temperature values in °C/°F format. *Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. Contact your Koehler representative for information.* Microprocessor temperature control with digital readout and overtemperature safety cut-off maintains block temperature with ±0.5°C stability. Insulated cabinet has a chemical resistant polyurethane finish.

K19400 High Temperature Dropping Point Apparatus

Ordering Information

Catalog No.		Order Qty
K19400	High Temperature Dropping Point Apparatus, 115V 60Hz	1
K19410	High Temperature Dropping Point Apparatus, 220-240V 50/60Hz	
	Accessories	
250-000-03F	ASTM 3F Thermometer Range: 20 to 760°F	7
250-000-03C	ASTM 3C Thermometer Range: –5 to +400°C	
K194E7	Cup Plug Gauge Per Fig. 1, ASTM D566 and Fig. 1-E-7, ASTM D2265	1
K194EA	Grease Cup	
K194EB	Test Tube, 13x100mm	
K194EC	Cup Support	
K194E1	Thermometer Clamp	
K194E2	Upper Bushing	
K194E3	Lower Bushing	
K194E4	Bushing Support Ring	
K194E5	Thermometer Depth Gauge	
K194E6	Polished Metal Rod	

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Specifications

Conforms to the specifications of:
ASTM D2265, ASTM D4950
Maximum Temperature: 400°C (752°F)
Control Stability: ±0.5°C (±1°F)
Electrical Requirements: CE
115V 60Hz, Single Phase, 6.5A
220-240V 50/60Hz, Single Phase, 3.4A

Included Accessories:

Dropping Point Assemblies (6) consisting of: test tube, grease cup, thermometer clamp, upper and lower bushings and bushing support ring
Thermometer Depth Gauge
Polished Metal Rod
Cup Support

Dimensions lxwxh,in.(cm)

11½x9x14 (29x23x36)
Net Weight: 24½ lbs (11.1kg)

Shipping Information

Shipping Weight: 31 lbs (14.1kg)
Dimensions: 2.6 Cu. ft.

Please inquire about our Automated Dropping Point Test Equipment by contacting Koehler's Customer Service.

Koehler INSTRUMENT COMPANY, INC.

Oxidation Stability of Lubricating Greases by the Oxygen Bomb Method

K10901 Oxidation Bath with K11000 Oxidation Bombs

Test Method

The sample is oxidized in a bomb initially charged with oxygen at 110psi (758kPa) and maintained at elevated temperature for a specified aging period. The pressure drop inside the bomb is measured by means of a gauge or transducer.

Oxidation Stability Test Apparatus

- Conforms to ASTM D942 and related specifications
- Four sample testing capability
- Available Oxidata® Pressure Measurement System

Consists of Oxidation Bombs, Sample Dishes, Pressure Measuring and Recording Equipment and Oxidation Bath.

Oxidation Bomb–Stainless steel bomb consists of body, lid with stem and needle valve, and dish holder per ASTM specifications. Bomb interior surfaces and inside of stem have a high polish to facilitate cleaning. Safely withstands a working pressure of 180psi (1241kPa) at 99°C (210°F). Includes PTFE gasket seals (3) and cap screws with wrench. PTFE-fluorocarbon seals are available (see Accessories).

Pressure Measurement and Recording Equipment–Select mechanical pressure gauges or, for greater convenience and accuracy in test reporting, the Oxidata® Pressure Management System designed expressly for ASTM oxidation tests.

Pressure gauge measures pressure inside Oxidation Bomb with accuracy of better than 0.5psi (3.45kPa) in accordance with ASTM specifications. Range: 0-160psi (0-1100kPa), graduated in 1psi intervals. Cleaned for oxygen service.

Oxidata® Pressure Measurement System–A complete electronic measurement system based on powerful Oxidata® software for Windows® and Windows 95® environments. Electronically measures and reports pressure versus time and accuracy of better than 0.5psi (3.45kPa) in the range of 0-200psi (0-1378kPa) for four channels in graphical tabular format. Included RTD attachment permits measurement and reporting of bath temperature. Includes transducers, data acquisition card, multiplexer, Oxidata® software, RTD probe assembly and connecting cables and hardware. Refer to page 115 for complete specifications on Oxidata® software.

Oxidation Bath–Constant temperature oil bath holds bombs at the proper depth for determining oxidation stability of lubricating greases. Microprocessor PID control provides quick temperature stabilization without overshoot and the unit is protected by an overtemperature control circuit that interrupts power should bath temperature exceed a programmed cut-off point. Dual LED displays provide actual and setpoint temperature values in °C/°F format. *Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. Contact your Koehler representative for information.* Heavily insulated welded stainless steel bath interior has a bomb support rack and overflow standpipe/drain to maintain proper working depth. Steel exterior has a corrosion-resistant polyurethane enamel finish.

Also available–Special baths to accommodate two test methods:

- *ASTM D942 and D525 (Oxidation Stability of Gasoline–Induction Method on pages 81-82)*
- *ASTM D942 and D972 (Evaporation Loss of Lubricating Greases and Oils on page 149)*
- *Higher temperature models are available.*

Please contact Koehler's Customer Service for additional information.

Oxidation Stability of Lubricating Greases by the Oxygen Bomb Method

Oxidata® Pressure Measurement System

Specifications

Conforms to the specifications of:
ASTM D942; IP 142; DIN 51808; FTM 791-3453
Oxidation Bath:
Capacity: four (4) oxidation bombs
Temperature Range: ambient to 275°F (135°C)
Bath Medium: 12.5 gal (47.3L) white technical oil
Electrical Requirements: CE
115V 60Hz, Single Phase, 13.0A
220-240V 50/60Hz, Single Phase, 6.8A

Dimensions dia.xh,in.(cm)

Interior: 16x14 (41x36)
Overall: 19½x28½ (50x72)

Shipping Information (with electronic pressure measurement system)

Shipping Weight:
Bath: 75 lbs (34.0kg)
Electronic Pressure Measurement System: 48 lbs (21.8kg)
Dimensions:
Bath: 16.7 Cu. ft.
Electronic Pressure Measurement System: 7.8 Cu. ft.

Ordering Information

Catalog No.		Order Qty
Oxidation Bomb		
K11000	Oxidation Bomb	4
Pressure Measurement and Recording Equipment		
*Select either Pressure Gauges or Oxidata® Pressure Measurement System**		
311-160-003	Pressure Gauge	4
K11005	4-Unit Electronic Pressure Measurement for Lubricating Grease Oxidation Tests, 115V 60Hz	
K11095	4-Unit Electronic Pressure Measurement for Lubricating Grease Oxidation Tests, 220-240V 50/60Hz	
Oxidation Bath		
K10901	Oxidation Bath, 115V 60Hz	1
K10991	Oxidation Bath, 220-240V 50/60Hz	
Accessories		
K11040	Borosilicate Glass Dish	20
250-000-22F	ASTM 22F Thermometer. Range: 204 to 218°F	
250-000-22C	ASTM 22C Thermometer. Range: 95 to 103°C	1
355-001-001	White Technical Bath Oil, 1 Gallon container	13
355-001-003	White Technical Bath Oil, 5 Gallon container	3
	See page 8 for specifications	
K10504-0-1	Transducer Assembly	
K10551	Pressure Line. For pressurizing Oxidation Bomb. 6 ft (1.83m) long, with quick release coupling for needle valve on bomb and threaded fitting for oxygen tank	1
K10556	Oxygen Manifold Pressure Relief System Connects to oxygen source to prevent overcharging of bomb. Equipped with relief valve to vent at 125psi and 300 series stainless steel 150psi burst disk assembly. Constructed from 300 series stainless steel. Cleaned for oxygen service.	
K11029	PTFE-fluorocarbon Gasket	

**This ordering information is for installation to Koehler grease oxidation test equipment. For other makes of equipment, a few items of basic hardware may also be required–please contact your Koehler representative for assistance.*

K11000 Oxidation Bomb

Corrosion Preventive Properties of Lubricating Greases

Corrosion Preventive Properties of Lubricating Greases

Corrosion Preventive Properties of Lubricating Greases in Presence of Dilute Synthetic Sea Water Environments

Test Method

Determines the corrosion preventive properties of greases when distributed in a tapered roller bearing stored under wet conditions.

Corrosion Preventive Properties Apparatus

- Conforms to ASTM D1743 and D4950 specifications

Distributes a lubricating grease sample in a roller bearing by running the bearing under light thrust load. Corrosion preventive capability is determined on a pass/fail basis by the presence of rust spots (1mm or larger) on the bearing race after a 60 second run-in period followed by prolonged exposure to water at constant temperature. Consists of variable speed motor, 1750rpm run-in stand, bearing holder assemblies, spindle/thrust loading device, mechanical grease packer pliers and test bearings.

Specifications

Conforms to the specifications of: ASTM D1743, D4950, Draft Method, D5969
Drive Motor: 1750rpm
Electrical Requirements: CE
115V 60Hz, Single Phase, 2.0A
220-240V 50/60Hz. Single Phase, 1.0A

Included Accessories

Bearing Holder Assemblies (3): Consisting of:
1kg weight
upper and lower plastic collars for cone
plastic collar for cup
plastic jar with screw cap
metal screw
Spindle/Thrust Loading Device
Mechanical Grease Packer
Pliers
Test Bearings (3) (cone and roller assemblies)

Dimensions lxwxh,in.(cm)
10x15x20 (25.4x38.1x50.8)
Net Weight: 27 lbs (12.2kg)

Shipping Information
Shipping Weight: 36 lbs (16.3kg)
Dimensions: 5 Cu. ft.

Ordering Information

Catalog No.	
K17980	Corrosion Preventive Properties Apparatus, 115V 60Hz
K17989	Corrosion Preventive Properties Apparatus, 220-240V 50/60Hz

Accessories

K17981	Bearing Holder Assembly
K17981-0-2	Upper Flange
K17981-0-3	Lower Flange
K17982	Mechanical Grease Packer
K17983	Pliers
K17984	Plastic Jar
289-004-002	Test Bearing

K17980 Corrosion Preventive Properties Apparatus

Corrosion Preventive Properties Apparatus (Alternate Method)

- Conforms to ASTM D1743-73 specifications

Determines corrosion preventive properties of lubricating greases in accordance with original ASTM D1743-73 specifications, now incorporated as Appendix #2 in the current ASTM D1743 method. Offers a suitable alternative to the new method for laboratories needing a quicker screening test method. Consists of drive motor on base with driving cone hub, thrust loading device, mechanical grease packer, test bearings (3), bearing supports (3) and containers with lids (3).

Specifications

Conforms to the specifications of: ASTM D1743-73, FTM 791-4012
Electrical Requirements: CE
115V 60Hz, Single Phase, 5.2A
220-240V 50/60Hz, Single Phase, 2.6A

Dimensions lxwxh,in.(cm)
7x12x9¾ (18x30x25)
Net Weight: 27 lbs (12.3kg)

Shipping Information
Shipping Weight: 36 lbs (16.3kg)
Dimensions: 5 Cu. ft.

Ordering Information

Catalog No.	
K17970	Corrosion Preventive Properties Apparatus (Alternate Method), 115V 60Hz
K17979	Corrosion Preventive Properties Apparatus (Alternate Method), 220-240V 50/60Hz

Accessories (Alternate Method)

K17900	Thrust Loading Device and Mechanical Grease Packer
K17910	Test Bearing
K17920	Bearing Supports
K17930	Container with Lid

Copper Corrosion from Lubricating Grease

Test Method

Measures the tendency of lubricating grease to corrode copper under static conditions. A polished copper strip is immersed in a sample of grease at elevated temperature for a specified period. The strip is examined for corrosion and a classification number from 1-4 is assigned based on a comparison with the ASTM Copper Strip Corrosion Standards.

Copper Strip Tarnish Test Apparatus

- Conforms to ASTM D4048 specifications

Ordering Information

Catalog No.		Order Qty
K25330	Test Tube Bath, 115V 60Hz Constant temperature bath with microprocessor temperature control. Control features °C/°F switchable digital setpoint and display and overtemperature cut-off protection. Temperature range from ambient to 190°C (374°F) with ±1°C (±2°F) stability. Welded stainless steel inner wall and powder coated steel outer wall construction, fully insulated	1
K25339	Test Tube Bath, 220-240V 50/60Hz	
K25308	Test Jar Rack Inserts in K25330/K25339 baths to hold sixteen 332-004-001 Test Jars	1
332-004-001	Test Jar	16
K25080	Copper Test Strip Conforming to ASTM specifications	16
380-150-001	Silicone Carbide Paper, 150 grit For polishing of test strips Pack of 50 sheets	1
380-240-001	Silicone Carbide Paper 240 Grit For final polishing of test strips Pack of 50 sheets	1
380-150-000	Silicone Carbide Grain, 150 Grit For final polishing of test strips. 1 lb package	1
K25000	Polishing Vise Holds copper strip firmly in place without marring the edges. Stainless steel, mounted on a composition base	1
K25100	ASTM Copper Corrosion Standards Colored reproductions of tarnished strips encased in plastic	1
332-004-002	Viewing Test Tube Protects copper strip during inspection or storage	16
250-000-130F	ASTM 130F Thermometer Range: 20 to 220°F	1
250-000-130C	ASTM 130C Thermometer Range: –7 to +105°C	
K460-0-8	Vented Cork	16

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

K25339 Constant Temperature Bath with 332-004-001 Test Jars

Specifications:

Conforms to the specifications of:
ASTM D4048, FTM 791-5309
Test Tube Bath Capacity: 16 test jars
Maximum Temperature: 190°C (374°F)
Temperature Control Stability: ±1°C (±2°F)
Bath Medium: 5 gal (18.9L) water or high temperature heat transfer fluid
Electrical Requirements: CE
115V 60Hz, Single Phase, 7.5A
220-240V 50/60Hz, Single Phase, 4A

Dimensions lxwxh,in.(cm)

15½x12½x14 (39x32x36)
Net Weight: 27 lbs (12.2kg)

Shipping Information

Shipping Weight: 40 lbs (18.1kg)
Dimensions: 7.8 Cu. ft.

Roll Stability of Lubricating Grease

K18320 Double-Unit Roll Stability Tester

Test Method

Provides an indication of shear stability of lubricating greases by testing the change in worked penetrations after two hours in the roll stability tester.

Roll Stability Tester

- Conforms to ASTM D1831 and related specifications
- Single, double and four-unit models
- Microprocessor programmable high accuracy temperature control
- High Temperature model

Roll stability apparatus for shear stability tests on lubricating greases. Rotates steel test cylinders at 10 or 165rpm in a thermostatically controlled environment at temperatures of up to 200°F (93.3°C). Drive system is powered by a rugged ratio motor, and interchangeable drive chain sprockets are easily accessible for converting unit to either operating speed. Microprocessor PID control provides quick temperature stabilization without overshoot and is protected by an overtemperature control circuit that interrupts power should temperature exceed a programmed cut-off point. Dual LED displays provide actual and setpoint temperature values in °C/°F format. *Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. Contact your Koehler representative for information.* A balanced cast aluminum fan and 1200W heater provide efficient, uniform heat distribution. A dial thermometer in the hinged cover displays chamber temperature. Heaters and drive chain mechanism are shielded for operator safety. Insulated steel cabinet and base are finished with a durable polyurethane enamel finish.

High Temperature Model–A high temperature model is also available that expands the temperature range to 320°F (160°C). Tests can be conducted using the high temperature model unit for time/temperature specifications beyond those listed in existing D1831.

Specifications

Conforms to the specifications of:
ASTM D1831, MIL-G-10924SA
Maximum Temperature: 200°F (93°C)
Temperature Control Stability: ±2°F (±1°C)
Electrical Requirements (Single and double unit models): CE
115V 60Hz, Single Phase, 10.5A
220-240V 50Hz, Single Phase, 5.5A
220-240V 60Hz, Single Phase, 5.5A

Included Accessories

Test Cylinders with threaded end caps and O-ring seals
Test Rollers, steel, 5kg

Dimensions lxwxh,in.(cm)

Single-Unit: 16½x18⅝x15 (42x47x38)
Double-Unit: 16½x18⅝x15 (42x47x38)
Four-Unit: 25x18⅝x15 (64x47x38)

Net Weight:
Single-Unit: 98 lbs (44.4kg)
Double-Unit: 116 lbs (52.6kg)
Four-Unit: 187 lbs (84.8kg)

Shipping Information

Shipping Weight:
Single-Unit: 142 lbs (64.4kg)
Double-Unit: 175 lbs (79.4kg)
Four-Unit: 270 lbs (122.5kg)

Dimensions:
Single-Unit: 7.7 Cu. ft.
Double-Unit: 9.8 Cu. ft.
Four-Unit: 16.6 Cu. ft.

Ordering Information

Catalog No.	
Roll Stability Tester	
K18300	Single-Unit Model, 115V 60Hz
K18305	Single-Unit Model, 220-240V 50Hz
K18306	Single-Unit Model, 220-240V 60Hz
K18320	Double-Unit Model, 115V 60Hz
K18325	Double-Unit Model, 220-240V 50Hz
K18326	Double-Unit Model, 220-240V 60Hz
K18340	Four-Unit Model, 115V 60Hz
K18341	High Temperature Four-Unit Model, 115V 60Hz
K18345	Four-Unit Model, 220-240V 50Hz
K18346	Four-Unit Model, 220-240V 60Hz
K18347	High Temperature Four-Unit Model, 220/240V 50Hz
K18348	High Temperature Four-Unit Model, 220/240V 60Hz
Accessories	
K183-0-1A	Test Cylinder, plated steel with threaded end caps and O-ring seals
K183-0-4	Steel Cylinder Roller

Apparent Viscosity of Lubricating Greases

Test Method

Apparent viscosity is used to evaluate pumpability and handling characteristics of greases and is also suitable for analysis of adhesives, sealants and other semi-solid products. The sample is forced through a capillary by means of a gear pump-driven hydraulic system and the resulting pressure in the system is measured. Apparent viscosity is then calculated from the flow rate and pressure. Eight different capillaries and two pump speeds are used to determine the apparent viscosity at sixteen shear rates.

Pressure Viscometers

- Conforming to ASTM D1092 and related specifications
- Mechanically refrigerated low temperature model

Low Temperature Pressure Viscometer–Consists of power, hydraulic and grease systems with refrigerated test chamber. Hydraulic system includes constant displacement gear-driven metering pump, hydraulic oil reservoir with 50-mesh screen, stainless steel tubing, high pressure valve and fittings. Drive motor has interchangeable 40 and 64 tooth gears for two-speed operation. Four interchangeable gauges of 0-60, 0-100, 0-600 and 0-5000psi ranges monitor system pressure.
Supplied with three precision machined grease assemblies, each including piston, caps and thermocouple; set of eight (ASTM Nos. 1-8) stainless steel capillaries; and wrenches for gauge installation and removal. The refrigerated test chamber holds three cylinders at a time for sample preparation. Operating range is from ambient to –65°F (–53.8°C), with stability of ±0.5°F (±0.3°C). The refrigeration system uses hermetically sealed, self-lubricating compressors in cascaded configuration to provide efficient cool-down and trouble-free long term operation.
Floor-mounted cabinet is constructed of polished stainless steel with a welded reinforced frame.

Pressure Viscometer–Complete apparent viscometer meeting ASTM D1092 specifications. Includes power, hydraulic and grease systems and standard accessories as supplied with the Low Temperature Pressure Viscometer but without refrigerated test chamber or stainless steel cabinet. Mounted on a sturdy base having locating feet for permanent benchtop placement.

Specifications

Conforms to the specifications of:
ASTM D1092
Operating Range: performs apparent viscosity determinations at sixteen different shear rates
Low Temperature Pressure Viscometer:
Temperature Range: ambient to –65°F (–54°C)
*Optional –100°F cooling range available on special order**
Temperature Control Precision: ±0.5°F (±0.3°C) throughout the operating range
Test Chamber Medium: denatured alcohol
Electrical Requirements: CE
115V 60Hz
220-240V 50Hz
220-240V 60Hz

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Ordering Information

Catalog No.

Low Temperature Pressure Viscometer

K22690	Low Temperature Pressure Viscometer, 115V 60Hz
K22695	Low Temperature Pressure Viscometer, 220-240V 50Hz
K22696	Low Temperature Pressure Viscometer, 220-240 60Hz

**Please call or write for ordering Information on extended (–100°F) cooling range.*

Pressure Viscometer

K22600	Pressure Viscometer, 115V 60Hz
K22615	Pressure Viscometer, 220-240V 50Hz
K22610	Pressure Viscometer, 220-240V 60Hz

Accessories

K22690-0-27	Grease Cylinder Assembly for Low Temperature Pressure Viscometer (K22690 Series) – Includes piston and caps
K226-0-16	Grease Cylinder Assembly for Pressure Viscometer - (K22600 Series) – Includes piston and caps
K226-0-22	Capillary Set. Nos. 1-8
250-000-74F	ASTM 74F Thermometer Range –67.5 to –62.5°F
250-000-74C	ASTM 74C Thermometer Range: –55.4 to –52.6°C

Included Accessories

Stainless Steel Grease Cylinder Assemblies (3)
Thermocouples (3)
Set of Stainless Steel Capillaries (Nos. 1-8)
Interchangeable Pressure Gauges (4)
Interchangeable Pump Drive Gears, 40 and 64-tooth
Set of Wrenches (3)

Dimensions lxwxh,in.(cm)
Low Temperature Pressure Viscometer: 43¼x30¾x66¼ (110x78x168)
Net Weight: 640 lbs (290.3kg)
Pressure Viscometer: 30x12x36 (76x30x91)
Net Weight: 121 lbs (54.9kg)

Shipping Information

Low Temperature Pressure Viscometer:
Shipping Weight: 900 lbs (408.2kg)
Dimensions: 89.8 Cu. ft.
Pressure Viscometer:
Shipping Weight: 186 lbs (84.4kg)
Dimensions: 14.8 Cu. ft.

Grease Mobility

K22680 Grease Mobility Tester

Test Method

Determines the resistance of lubricating grease to flow under prescribed conditions. Mobility is measured in grams per second by pumping the sample through a standardized SOD pressure viscometer at controlled temperature and pressure.

Grease Mobility Tester

- U.S. Steel Method; ASTM Draft Method
- Test temperatures as low as –30°F (–34.4°C)

Performs grease mobility tests at low temperatures to predict pumpability characteristics. Determines the suitability of greases for applications in centralized or bulk systems where pumps, valves or pipes are used to distribute or transfer grease. Consists of pressure viscometer, cooling bath and refrigeration system. The stainless steel pressure viscometer is fitted with a modified No.1, 40:1 ratio capillary. After the sample is loaded in the pressure viscometer, the assembly is installed in the cooling bath and allowed to reach the test temperature. Mechanically refrigerated cooling bath can attain test temperatures as low as –30°F (–34.4°C) with stability of ±2°F (±1°C). With the sample at the test temperature, the flow of grease is started under the selected pressure on a nitrogen tank regulator. Flow per second is determined by collecting the grease for a specified period. Includes sample collector turntable.

Ordering Information

Catalog No.	
K22680	Grease Mobility Apparatus, 115V 60Hz
K22685	Grease Mobility Apparatus, 220-240V 50Hz
K22686	Grease Mobility Apparatus, 220-240V 60Hz

Accessories

K22680-0-22	Grease Cylinder with plunger and fittings
K22680-0-16	Capillary
250-100-001	Thermometer dial type Range: –100 to +100°F with 2°F subdivisions

Specifications

Conforms to the specifications of:
U.S. Steel Method; ASTM Draft Method
Minimum Temperature: –30°F (–34.4°C)
Control Stability: ±2°F (±1°C)

Included Accessories

Grease Cylinder (pressure viscometer) with modified No.1, 40:1 capillary
Sample Collector Turntable

Electrical Requirements: CE
115V 60Hz, Single Phase, 6A
220-240V 50 or 60Hz, Single Phase, 3A

Dimensions lxwxh,in.(cm)

Cooling Chamber: 12x12x30 (30.5x30.5x76)
Refrigeration Unit: 15x12x12 (38x30x30)
Net Weight: 114 lbs (51.7kg)

Shipping Information

Shipping Weight: 188 lbs (85.3kg)
Dimensions: 18.4 Cu. ft.

Low-Temperature Torque of Lubricating Grease

Low-Temperature Torque of Ball Bearing Grease

Low-Temperature Torque of Grease-Lubricated Wheel Bearings

Test Method

Significant for the design and specification of greases for low temperature service, the low temperature torque test measures the extent to which a grease sample retards rotation of a bearing assembly at the test temperature.

Low Temperature Torque Apparatus

- Digital torque indication for two samples
- Choice of test rig combinations
- Mechanically refrigerated, with standard –65°F (–54°C) operating range
- Optional cooling range to –100°F (–73°C)
- Conforms to ASTM D1478, D4693 and D4950 specifications
- Data acquisition software available

Refrigerated two unit apparatus for ASTM low temperature torque tests on lubricating greases. Includes an insulated, thermostatically controlled air chamber with test rigs, drive shafts and externally mounted gear motors. Rotates drive shafts at 1rpm while electronic load cell-strain gauge indicators measure the torque required to restrain the test rigs. Digital LED displays indicate torque for each drive unit and cold chamber temperature. On ASTM D4693 models, spindle temperature is also indicated for each drive unit. Includes drive shaft overtorque protection—when drive shaft torque exceeds a preset value, the drive motors automatically shut down to prevent breakage of shaft insulators. Standard cooling range of –65°F (–54°C) meets ASTM requirements for D1478 and D4693 test methods. Optional –100°F (–73°C) range is available for special testing requirements.

ASTM D1478 Model for Ball Bearing Greases–Equipped with two test cages and two 6204 ball bearings per ASTM D1478 specifications.

ASTM D4693 Model for Automotive Wheel Bearing Greases–Equipped with two spring loaded spindle-bearings-hub assemblies, bearing packer assembly and bearing installation and removal tools.

Combined ASTM D1478-D4693 Model–Equipped with one test cage and one 6204 ball bearing for ASTM D1478 testing and one spindle-bearings-hub assembly with bearing packer and tools for ASTM D4693 testing.

Data acquisition software–Data acquisition software facilitates running both ASTM D1478 and D4693 tests. Graph of torque versus time details starting torque, running torque and time elapsed. Includes software, data acquisition board and cable.

Specifications

Conforms to the specifications of:
ASTM D1478, D4693, D4950; FTM 791-334
Cooling Range:
Standard: –65°F (–54°C)
Optional: –100°F (–73°C)
Temperature Uniformity: ±1°F (±0.5°C)
Refrigeration: air cooled mechanical cascade hermetic system
Cabinet: floor-mount, polished stainless steel exterior, rides on swivel casters

K18860 Low Temperature Torque Apparatus

Ordering Information

Catalog No.	Test Method	Cooling Range	Electrical Requirements CE
K18852	ASTM D1478	–65°F(–54°C)	220-240V 50Hz
K18862			220-240V 60Hz
K18853		–100°F(–73°C)	220-240V 50Hz
K18863			220-240V 60Hz
K18850	ASTM D4693	–65°F(–54°C)	220-240V 50Hz
K18860			220-240V 60Hz
K18851		–100°F(–73°C)	220-240V 50Hz
K18861			220-240V 60Hz
K18854	Combined ASTM D1478-D4693	–65°F(–54°C)	220-240V 50Hz
K18864			220-240V 60Hz
K18855		–100°F(–73°C)	220-240V 50Hz
K18865			220-240V 60Hz

Accessories

K18871	Data Acquisition Package.	1
289-001-006	Test Bearing, 6204, for ASTM D1478	1
308-230-009	Chart Recorder, 115V/230V	1
K18860-0-24	Inboard Test Bearing, for ASTM D4693, LM-67010-LM-67048 tapered roller bearing	1
K18860-0-16	Outboard Test Bearing for ASTM D4693, LM-11910-LM-11949 tapered roller bearing	1

Dimensions lxwxh,in.(cm)
48½x34x45½ (123x86x116)
Net Weight: 600 lbs (272.2kg)

Shipping Information
Shipping Weight: 697 lbs (316.1kg)
Dimensions: 6.4 Cu. ft.

Koehler INSTRUMENT COMPANY, INC.

Leakage Tendencies of Automotive Wheel Bearing Greases

Test Method

Evaluates the tendency of automotive wheel bearing grease to separate oil and/or grease under prescribed laboratory conditions. The test is performed at elevated temperature in a modified automotive spindle-hub assembly rotated at 660rpm. Any leakage of oil or grease during the test period is collected and weighed. See also "ASTM D4290 Accelerated Leakage Tendencies Method" (Page 161).

Leakage Tendencies Tester

- Conforms to ASTM D1263 and FTM 791-3454 specifications
- Microprocessor programmable high accuracy temperature control

Consists of a modified front wheel hub and spindle assembly with drive motor and constant temperature air cabinet. Rotates hub at 660rpm while maintaining spindle temperature at a constant 220°F (104°C) or other specified temperature. Oil that has separated from the sample grease during the test period is collected in the hub cap and in a leakage collector that installs on the spindle. The hub is rotated by a durable ⅛hp motor through a V-belt drive. Microprocessor PID control provides quick temperature stabilization without overshoot, and the unit is protected by an overtemperature control circuit that interrupts power should bath temperature exceed a programmed cut-off point. Dual LED displays provide actual and setpoint temperature values in °C/°F format. *Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. Contact your Koehler representative for information.* Cabinet is insulated on all sides and has a hinged cover for easy access to the hub-spindle assembly. Thermometer ports in the spindle and the cabinet allow for precise setting and monitoring of test temperature. Housed in a heavy-gauge steel exterior with polyurethane enamel finish.

Specifications

Conforms to the specifications of:
ASTM D1263; FTM 791-3454
Maximum Temperature: 250°F (121°C)
Electrical Requirements: CE
115V 60Hz, Single Phase, 13.0A
220-240V 50Hz, Single Phase, 7A
220-240V 60Hz, Single Phase, 7A

Included Accessories

Large (Inner) Bearing (1)
Small (Outer) Bearing (1)

Dimensions lxwxh,in.(cm)

20½x18x15 (52x46x38)
Net Weight: 95 lbs (43.1kg)

Shipping Information

Shipping Weight: 145 lbs (65.8kg)
Dimensions: 8.3 Cu. ft.

High temperature models to 205˚C available. Contact your Koehler representative for information.

Ordering Information

Catalog No.		Order Qty
Leakage Tendencies Tester		1
K18700	Leakage Tendencies Tester, 115V 60Hz	
K18795	Leakage Tendencies Tester, 220-240V 50Hz	
K18790	Leakage Tendencies Tester, 220-240V 60Hz	
	Accessories	
K18723	Torque Wrench	1
250-000-07F	ASTM 7F Thermometer Range: 30 to +580°F	2
250-000-07C	ASTM 7C Thermometer Range: –2 to +300°C	
289-004-004	Large (Inner) Bearing	
289-004-003	Small (Outer) Bearing	

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Life Performance of Automotive Wheel Bearing Grease

Leakage Tendencies of Automotive Wheel Bearing Grease Under Accelerated Conditions

Test Method

Evaluates the high temperature stability of automotive wheel bearing greases in a modified automotive front wheel hub-spindle-bearings assembly. The ASTM D3527 Life Performance test employs severe conditions–25 lbf (111N) thrust load, 1000rpm, 160°C spindle temperature –to induce grease deterioration and failure. The test continues in a 20/4 hour on/off cycle until grease breakdown causes measured drive motor torque to increase past an established end point. The number of hours to failure is the test result. The ASTM D4290 Accelerated Leakage Tendencies procedure employs similar test conditions for a 20 hour period, after which leakage of grease and oil is measured and the bearings are washed and examined for deposits of gum and varnish.

High Temperature Wheel Bearing Grease Tester

- Conforms to ASTM D3527, D4290 and D4950 specifications
- Fully automatic operation
- Digital monitoring of all test functions

Performs life performance and accelerated leakage tendencies tests on lubricating greases in accordance with ASTM test specifications. Consists of a modified front wheel hub-spindle-bearings assembly housed in a constant temperature oven and coupled to a ¼hp variable-speed drive motor. Controls test functions automatically and provides continuous digital display of motor torque, rpm, chamber temperature, spindle temperature, time cycle and elapsed time. Test parameters outside of ASTM specifications can be selected by the operator for in-house testing. Automatically terminates test and displays elapsed on-cycle hours when grease deterioration causes drive motor torque to increase to the calibrated end point. A built-in thirty second time delay circuit prevents erroneous test terminations due to momentary surges in motor torque at the beginning of the on-cycle. Insulated constant temperature oven is equipped with a 1200W heater and balanced ⅛ hp circulation fan for efficient heat distribution. Sliding access doors and a movable platform that swings the drive motor out of the way provide easy access to the spindle assembly. Modified steel spindle and hub assembly conforms to all critical 1971 Chevy II dimensions and is fitted with thermocouple, bearing thrust loading device and anodized aluminum grease collector. All controls and monitors are housed in a separate cabinet.

Ordering Information

Catalog No.		Order Qty
Wheel Bearing Grease Tester		1
K18500	High Temperature Wheel Bearing Grease Tester, 115V 60Hz	
K18595	High Temperature Wheel Bearing Grease Tester, 220-240V 50Hz	
K18590	High Temperature Wheel Bearing Grease Tester, 220-240V 60Hz	
	Accessories	
250-000-42C	ASTM 42C Thermometer Range: 95 to 255°C	1
289-004-001	Inboard Bearing Set Includes LM67048 Cone and LM67010 Cup	
289-004-002	Outboard Bearing Set Includes LM11949 Cone and LM11910 Cup	

K18500 High Temperature Wheel Bearing Grease Tester

Specifications

Conforms to the specifications of:
ASTM D3527, D4290, D4950
Digital controls and displays:
Timer: on/off cycle and real time
Chamber Temperature: °C
Spindle Temperature: °C
Motor rpm: 0-1725rpm
Motor Torque: current draw
Elapsed Time: 9999.9 hr.
Maximum Temperature: 177°C (350°F)
Electrical Requirements: CE
115V 60Hz, Single Phase, 13A
220-240V 50Hz, Single Phase, 7A
220-240V 60Hz, Single Phase, 7A

Included Accessories

Thermocouples (2)
Thermometer holder
Bearings (1set)
Grease Packer Assembly
Bearing Installation/Removal Tools:
bearing installer, small and large
bearing cup removers, bearing cup installer,
bearing puller and spindle wrenches (pins)

Dimensions lxwxh,in.(cm)

Test Unit: 16x20x15¾ (41x51x40)
Control Unit: 16x14x16 (41x36x41)
Net Weight: 145 lbs (65.8kg)

Shipping Information

Shipping Weight: 230 lbs (104.3kg)
Dimensions: 14.8 Cu. ft.

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Water Washout Characteristics of Lubricating Greases

Test Method

A grease sample is packed in a ball bearing and subjected to a steady water stream under controlled test conditions. The percentage of grease washed out in a one hour period is determined by weight.

Water Washout Tester

- Conforms to ASTM D1264, D4950 and related specifications

Rotates a lubricated ASTM ball bearing at 600rpm in a modified bearing/housing assembly while impinging the bearing with a jet of water at the specified flow rate and temperature. The tared bearing and bearing shields are weighed before installation in the bearing housing and again after testing and drying to determine the amount of sample loss. Consists of reservoir, bearing housing, circulation system and drive motor. Reservoir is equipped with cartridge heater, thermoregulator and thermometer port for accurate temperature control at 100°F and 175°F (38°C and 79°C) per ASTM specifications. Circulation system includes constant velocity carbon bearing gear pump, valves and flowmeter directing a controlled water flow to a capillary (1mm) spray nozzle aimed at the bearing housing. Rugged ⅛hp drive motor rotates test bearing at 600rpm while driving the circulation pump. A two-pulley system permits independent pump operation to circulate water while heating it to test temperature. Mounted on a finished steel base with locating feet for permanent benchtop placement.

Ordering Information

Catalog No.		Order Qty
Water Washout Tester		1
K19200	Water Washout Tester, 115V 60Hz	
K19295	Water Washout Tester, 220-240V 50Hz	
K19290	Water Washout Tester, 220-240V 60Hz	
	Accessories	
289-001-006	Test Bearing	3
K192-1-4	Outer Bearing Shield	3
K192-1-6	Inner Bearing Shield	3
250-000-15F	ASTM 15F Thermometer Range: 30 to 180°F	1
250-000-15C	ASTM 15C Thermometer Range: –2 to +80°C	

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Specifications

Conforms to the specifications of:
ASTM D1264, D4950; IP 215; FTM 791-3252
Drive Motor: ⅛hp 1725rpm
Temperature Control: ±1°F (±0.5°C) sensitivity
Electrical Requirements: CE
115V 60Hz, Single Phase,10.1A
220-240V 50Hz, Single Phase, 5.1A
220-240V 60Hz, Single Phase, 5.1A

Included Accessories

Ball Bearing (2)
Drive Train Guard
Acrylic Reservoir Cover
Outer Bearing Shield
Inner Bearing Shield
Test Bearing

Dimensions lxwxh,in.(cm)

18x12x18¾ (46x30x48)
Net Weight: 67 lbs (30.4kg)

Shipping Information

Shipping Weight: 102 lbs (46.3kg)
Dimensions: 6.7 Cu. ft.

Resistance of Lubricating Grease to Water Spray

Test Method

Evaluates the ability of a lubricating grease to adhere to a metal surface when subjected to a direct water spray under controlled conditions. The percentage of grease sprayed off a stainless steel test panel after a specified period is determined by weight.

Water Spray Apparatus

- Conforms to ASTM D4049 specifications
- Improved spray chamber design

Complete Water Spray Apparatus meeting ASTM specifications, including spray chamber, delivery system and constant temperature reservoir. Sprays water at the specified rate and temperature on a test panel coated with sample grease. To test for water spray resistance, fill reservoir with 8L of tap water and set thermostat at test temperature. Circulate the water through the system to attain temperature equilibrium and insert the coated test panel in the spray chamber. Adjust water spray to 40psi (276kPa) and continue for 5 minutes. Water spray system includes ⅛hp positive displacement pump; spray nozzle with snubber fitting: 0-60psi pressure gauge; bypass valve; shut-off and drain valves; and flexible high pressure water lines. Hinged acrylic spray chamber cover is recessed into the chamber housing to insure watertight operation. Two thermometer wells permit separate monitoring of reservoir and water spray temperatures. Standardized grease application fixture coats test panel with the required thickness of sample grease. Uses tap water; does not require water hook-up.

Ordering Information

Catalog No.		Order Qty
Water Spray Apparatus		1
K18200	Water Spray Apparatus, 115V 60Hz	
K18295	Water Spray Apparatus, 220-240V 50Hz	
K18290	Water Spray Apparatus, 220-240V 60Hz	
	Accessories	
250-000-37C	ASTM 37C Thermometer Range: –2 to +52°C	1
K18210	Stainless Steel Test Panel	
K18220	Grease Application Fixture	

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

K18200 Water Spray Off Tester

Specifications

Conforms to the specifications of:
ASTM D4049
Circulation System:
Drive Motor: ⅛hp, 1725rpm
Pump: rotary gear positive displacement type
Pressure Gauge: 0-60psi
Temperature Control Stability: ±1°F (±0.5°C)
Electrical Requirements: CE
115V 60Hz, Single Phase, 13.3A
220-240V 50Hz, Single Phase, 6.8A
220-240V 60Hz, Single Phase, 6.8A

Included Accessories

Stainless Steel Test Panel
Grease Application Fixture

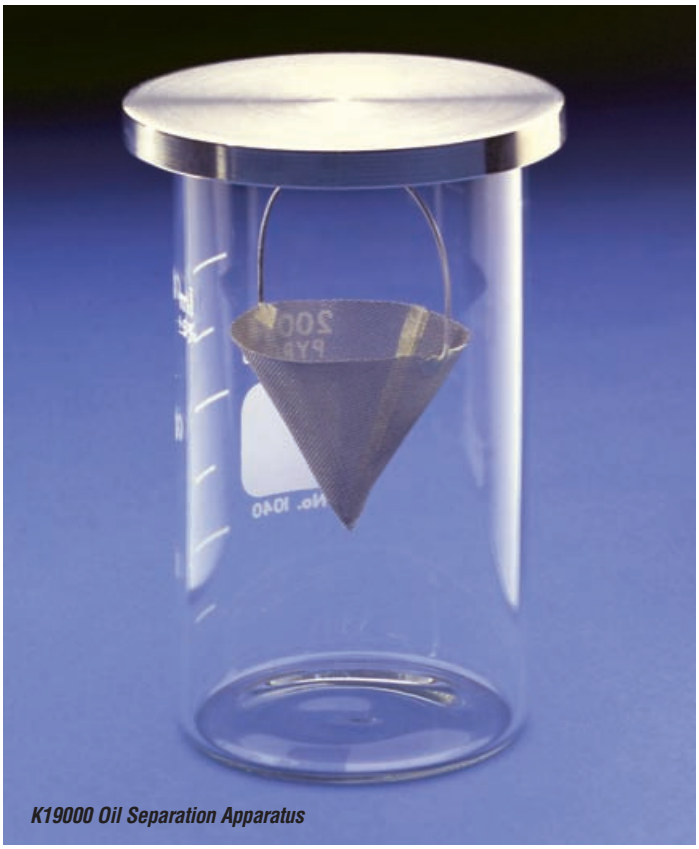
Dimensions lxwxh,in.(cm)

29x18x33½ (74x46x85)
Net Weight: 110 lbs (49.9kg)

Shipping Information

Shipping Weight: 180 lbs (81.6kg)
Dimensions: 14.2 Cu. ft.

Oil Separation From Lubricating Grease



K19000 Oil Separation Apparatus

Test Method

Determines the tendency of oil and lubricating grease to separate at elevated temperature.

Oil Separation Apparatus

- Conforms to ASTM D6184 and FTM 791-321 specifications

Consists of 60 mesh nickel gauze cone with wire handle, tall form 200mL beaker and cover with hook. Place sample in wire gauze cone and determine weight loss after heating at test temperature for specified time period. Withstands test temperatures of up to 900°F (482°C).

Shipping Information

Net Weight: ½ lb (0.2kg)
Shipping Weight: 1 lb (0.45kg)

Included Accessories

Beaker, 200mL
Cover and Hook Assembly
Cone Assembly

Ordering Information

Catalog No.	
K19000	Oil Separation Apparatus

Accessories

332-002-008	Beaker, 200mL
K190-0-1C	Cover and Hook Assembly
K190-0-5	Cone Assembly

Oil Separation On Storage of Grease

Test Method

Provides a measure of the stability of lubricating grease towards oil separation during storage.

Oil Separation Apparatus

- Conforms to IP 121 and DIN 51817 specifications

Consists of stainless steel separation cup with cone of 240 mesh woven wire cloth, 100g metal weight and oil cup. Oil separation is determined by placing the sample on the wire mesh cone and loading it with the 100g metal weight. The percentage of sample weight lost is calculated after a storage period of 42 hours.

Shipping Information

Net Weight: ¾ lb (.34kg)
Shipping Weight: 1 lb (.45kg)

Ordering Information

Catalog No.	
K19050	Oil Separation Apparatus

K19050 Oil Separation Apparatus

Oil Separation From Lubricating Grease During Storage

Test Method

Determines the tendency of lubricating grease to separate oil during storage in a 35 lb pail. The sample is placed on a sieve inside a special test cell and subjected to 0.25psi (1.72kPa) air pressure at constant temperature. Any oil that bleeds from the grease during a 24 hour period is collected in the cell and weighed.

Oil Separation Apparatus

- Conforms to ASTM D1742 and related specifications
- Four sample capability
- Controls temperature and air pressure

Consists of pressure bleeding test cells with air pressure regulation system and constant temperature air cabinet.

Pressure Bleeding Test Cell–Type A test cell includes cup assembly with funnel and positioning seat for beaker; cover with air inlet fitting; and 200-mesh stainless steel sieve strainer with brass support ring. Bayonet type connection and o-ring seal provide tight closure between cover and base. Cup, funnel and base are constructed of chrome plated spun copper. Order test beaker separately.

Constant Temperature Air Cabinet–Provides a constant temperature environment and regulated air pressure per ASTM specifications. Consists of an insulated airtight cabinet with pressure system to accommodate four pressure bleeding test cells. Equipped with electric heater, solid state controller, cooling coil and circulating fan for efficient temperature control at 77°F (25°C). Pressure system includes air inlet pressure regulator with gauge, cartesian manostat, manifold with control valves for four test cells, output gauge, manostat and gas washing bottle. Built-in pressure relief valve protects against pressure surge. Cabinet is constructed of double-wall stainless steel with full insulation. Order thermometer and pressure bleeding test cell separately.

Specifications

Conforms to the specifications of:
ASTM D1742, FTM 791-322
Capacity: four samples
Controller Sensitivity ±1°F (±0.5°C)
Electrical Requirements: CE
115V 60Hz, Single Phase, 3A
220-240V 50/60Hz, Single Phase, 1.5A

Dimensions lxwxh,in.(cm)
Interior: 19¾x19¾x21½ (50x50x55)
Overall: 47*x23¾x31¼ (119x60x79)
*includes external pressure system components
Net Weight: 121 lbs (54.9kg)

Shipping Information

Shipping Weight: 224 lbs (101.6kg)
Dimensions: 27.8 Cu. ft.

K18910 Constant Temperature Air Cabinet with K18900 Cell

Ordering Information

Catalog No.		Order Qty
K18910	Constant Temperature Air Cabinet,115V 60Hz	1
K18919	Constant Temperature Air Cabinet, 220-240V 50/60Hz	
K18900	Pressure Bleeding Test Cell	4

Accessories

332-002-009	Test Beaker, 20mL	4
250-000-57F	ASTM 57F Thermometer. Range: –4 to +122°F	1
250-000-57C	ASTM 57C Thermometer. Range: –20 to +50°C	

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

K18900 Pressure Bleeding Test Cell

Koehler INSTRUMENT COMPANY, INC.

Estimation of Deleterious Particles in Lubricating Grease

K19300 Deleterious Particles Determination Apparatus

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Test Method

Detects and estimates deleterious particle contamination in lubricating greases and other semi-solids and heavy liquids. Grease fillers can be tested for abrasive contaminants by first mixing them into petrolatum or grease known to be free of deleterious particles.

Deleterious Particles Determination Apparatus

- Conforms to ASTM D1404 specifications

Complete apparatus per Figure 1 and 2 of ASTM D1404. Rotates plastic plate 30° against stationary plate while applying 200psi pressure. Includes body, test plate holders, loading screw, calibrated spring with scale for applying test load and removable cap assembly with milled slot and handle for rotating test plates. Constructed of stainless steel. Order plastic test plates separately.

Ordering Information

Catalog No.		Order Qty
K19300	Deleterious Particles Determination Apparatus	1
	Accessories	
K19310	Plastic Test Plate. For use in Model K19300. Highly polished. Two (2) required for each test	20

Oil and Grease in Water and Wastewater by Infrared (IR)

Test Method

For the determination of oil and grease and nonpolar material in water and wastewater by an infrared (IR) determination of dimer/trimer of chlorotrifluoroethylene (S-316) extractable substances from an acidified sample. Included in this estimation of oil and grease are any other compounds soluble in the solvent.

Infrared Analyzer

- Analyze produced water on offshore oil rigs
- Monitor effluents from refineries or wastewater treatment and industrial plants
- Measurement of fats, oil and grease (FOG) discharges
- Determine efficiency of oil/water separation systems
- Conduct soil studies at remediation sites or around underground storage tanks
- Measurement of residual oil on pre-cleaned metal components
- Determine purity level of reclaimed solvents or virtually any on-site testing of water and soil requiring measurement of TOG and/or TPH concentration levels

Recommended for measuring total oil and grease (TOG) and total petroleum hydrocarbon (TPH) levels in water and soils, as well as fats, oil and grease (FOG) in water using the traditional EPA methods 413.2 and 418.1 with Freon-113 or ASTM Method D7066-04 with S-316, also compatible with other infrared transparent solvents such as hydrocarbon-free spectroscopic grade perchloroethylene, AK-225 or other infrared transparent solvent as the extracting solvent. The IR analyzer is ideal for on-site analysis to meet new European regulations. Since there is no evaporation step in the analysis the light end volatile components are retained for measurement.

Dimensions wxdxh,in.(cm)
6.5 x 6.5 x 5 (16.5x16.5x12.7)
Net Weight: 4.5 lb (2.0 kg)

Included Accessories
Power Supply
Instruction Manual

Specifications

Conforms to the specifications of:
ASTM D7066; EPA Methods 413.2 and 418.1
Type: Fixed filter infrared filtometer
Display: 4 digit, 7-segment red LED, 5/8 in. character height
Measurement Range:
For Water: 2 – 1000 ppm (using a 10:1 extraction ratio)
For Soil: 3 – 5000 ppm (using a 1:2 extraction ratio)
Usable Solvents for Extraction Process:
Freon, perchloroethylene, S-316, AK-225 or other infrared transparent solvent
Analysis Time: 10-15 minutes, including extraction process
Operating Temperature Range: 40°F (4°C) to 110°F (45°C)
User Selected Calibration: Zero balance adjustment. Up to 20 point curve fitting calibration
Repeatability: ± 1ppm
Electrical Requirements: CE
Voltage – 12VDC, +2% max.
Power – 7.5 watts max., 5 watts typical
Input – Switchcraft 760 plug or equivalent, center positive
Suggested Power Sources:
Wall Supply; AC/DC converter type (supplied as standard
12 volt auto battery adapter connector (optional)
Portable 12 volt battery pack (optional)

Ordering Information

Catalog No.	
K25552	Infrared Analyzer, 12 VDC
	Accessories
K25551-1	10mm Quartz Cuvette Cells, Set of 4
K25551-2	Car Adapter Cable
K25551-3	IR Sample Plate, pk 5
K25501	External 12V Battery Pack
K25502	Carrying Case
K25507	Dust Cover
K25509	Serial Printer

Lincoln Ventmeter

Test Method

The K95400 Lincoln Ventmeter evaluates the ventability of grease, which is useful in determining by consistency what type of greases can be used in a centralized automatic lubrication system. Furthermore, the size or diameter of the supply line in an automatic lubrication system can be accurately determined for a particular type of grease. Pressurizing lubricant grease in 25 feet coil tube to 1800 psi with a grease gun, opening the venting valve and reading the pressure on the gage after 30 seconds will provide the supply line size and maximum supply line information for the tested grease by referring the supplied grease ventmeter reading to supply line reference charts after measuring of the grease ventablility.

Lincoln Ventmeter

Lincoln Ventmeter, as a simulation device of a centralized lubrication system, consists of 25 feet coil tube with valve 1 at the pressure gage end and valve 2 at the end where a level grease gun is connected. Build up pressure with the grease gun attached when valve 1 closed. Open instantly valve 2 when pressure gage reading stabilizes at 1800 psi. Read the pressure gage after venting for 30 seconds. Repeat test three times and take an average reading to determine supply line pipe size and maximum length of supply line.

Test under Different Temperature – The test could be done under any temperature as application required. The standard test recommend three temperature: 0°F, 30°F and 75°F. When testing under temperature other than the ambient, the ventmeter filled with grease should be put in temperature chamber for at least 4 hours. The same test steps should be used for different temperature conditions.

Specifications

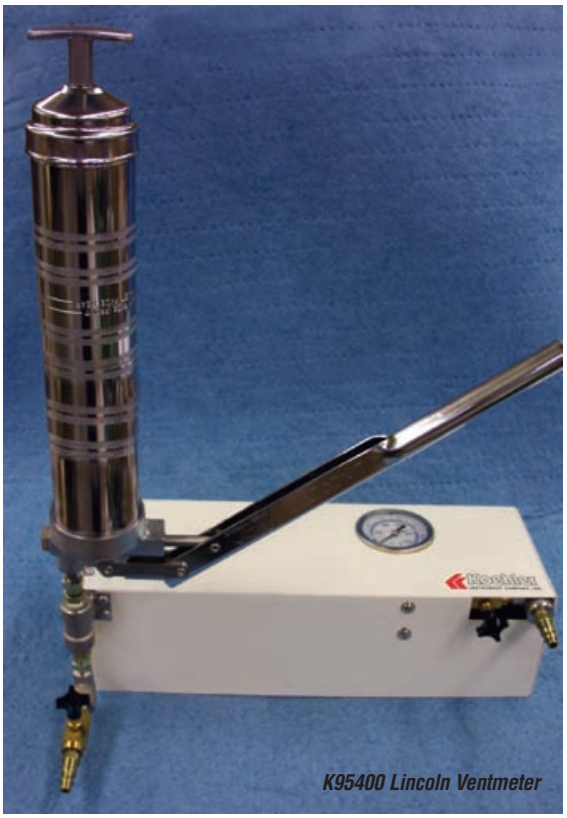
Model:
K95400
Electrical Requirements:
None

Dimensions lxwxh

Overall: 15"x6"x5"

Shipping Information

Shipping Weight: 12 lbs
Dimensions: 16"x10"x6"



K95400 Lincoln Ventmeter

Ordering Information

Catalog No.		Order Qty
K95400	Lincoln Ventmeter	1
	Accessories	
K95400-1	Cleaning Kit	1

Additional Accessories

Additional equipment, materials and/or reagents are required to perform some of the test procedures in the preceding pages. Please refer to the applicable test method for further information, or contact Koehler for assistance.

Evaporation Loss of Lubricating Greases and Oils ..... **Page 148**

ASTM D972, D2878, IP 183, FTM 791-351

Laboratory Balance • m-Terphenyl • Air Supply

Evaporation Loss of Lubricating Grease Over Wide Temperature Range ..... **Page 149**

ASTM D2595, D2878

Laboratory Balance • m-Terphenyl • Air Supply • Cleaning Solvent

Dropping Point of Lubricating Greases ..... **Page 150**

ASTM D566, D4950, IP 132, ISO 2176, DIN 51801, FTM 791-1421

Spatula • Mineral Spirits

Dropping Point of Lubricating Grease Over Wide Temperature Range ..... **Page 151**

ASTM D2265,D4950

Mineral Spirits

Oxidation Stability of Lubricating Greases by the Oxygen Bomb Method ..... **Pages 152-153**

ASTM D942, IP 142, DIN 51808, FTM 791-3453

Oxygen • Forceps • n-Heptane • Oven • Sulfuric Acid
Distilled Water • Chromic Acid • Soap Powder

Corrosion Preventive Properties of Lubricating Greases ..... **Page 154**

ASTM D1743

Syringe, 100mL • Stoddard Solvent • Laboratory Oven
Isopropanol • Distilled Water • Ammonium Hydroxide

Copper Corrosion From Lubricating Grease by the Copper Strip Tarnish Test ..... **Page 155**

ASTM D4048, FTM 791-5309

Steel Forceps • Cotton Wool • Oven
Isooctane • Acetone

Roll Stability of Lubricating Grease ..... **Page 156**

ASTM D1831, MIL-G-10924SA

Spatula

Apparent Viscosity of Lubricating Greases ..... **Page 157**

ASTM D1092

Hydraulic Oil • Nitrogen • Flexible Tubing • Alcohol
Balance • Kerosene

Grease Mobility ..... **Page 158**

U.S. Steel Method

Nitrogen • Laboratory Balance

Low Temperature Torque of Ball Bearing Greases ..... **Page 159**

ASTM D1478, D4693, D4950, FTM 791-334

Stoddard Solvent • Oven • n-Heptane
Spatula • Desiccant

Low Temperature Torque of Grease-Lubricated Wheel Bearings ..... **Page 159**

ASTM D4693, D4950

Laboratory Oven • 1,1,1-Trichloroethane • Mercury
Ethylene Glycol • Ultrasonic Cleaner

Leakage Tendencies of Automotive Wheel Bearing Greases ..... **Page 160**

ASTM D1263, FTM 791-3454

Laboratory Balance • Spatula • n-Heptane

Life Performance and Accelerated Leakage Tendencies Tests for Automotive Wheel Hearing Greases ..... **Page 161**

ASTM D3527, D4290, D4950

Laboratory Balance • SAE Low Engine Oil • n-Heptane
Steel Wool • Penetone ECS • Oven • Stoddard Solvent • Isopropanol

Water Washout Characteristics of Lubricating Greases ..... **Page 162**

ASTM D1264, D4950, IP 215, FTM 791-3252

Distilled Water • Stoddard Solvent • n-Heptane

Resistance of Lubricating Grease to Water Spray ..... **Page 163**

ASTM D4049

Stoddard Solvent • n-Heptane

Oil Separation From Lubricating Grease ..... **Page 164**

ASTM D6184; FTM 791-321

Laboratory Oven • Laboratory Balance

Oil Separation On Storage of Grease ..... **Page 164**

IP 121

Laboratory Oven • Laboratory Balance

Oil Separation From Lubricating Grease During Storage ..... **Page 165**

ASTM D1742, FTM 791-322

Air Supply • Mineral Spirits

Bitumens and Waxes

Test Methods	Page
Ductility of Bituminous Materials ASTM D113, P226; AASHTO T51; ANS A37.11; Federal Specifications SS-R-406C; USDA Method 51 (BUL 12-16); IP 32; DIN 52013	**170**
Automated Softening Point of Bitumen (Ring-and-Ball Apparatus) ASTM D36, E28; AASHTO T53; IP 58; ISO 4625; DIN 52011; NF T 66-008; EN 1427, 13179	**171**
Softening Point of Bitumen (Ring-and-Ball Apparatus) ASTM D36, D2398, E28; AASHTO T53; IP 58, 198	**172**
Breaking Point of Bitumen, Fraass Method IP 80	**172**
Accelerated Aging of Asphalt Binder by Pressurized Aging Vessel (PAV) ASTM D6521	**173**
Effect of Heat and Air on Asphaltic Materials (Thin-Film Oven Test) ASTM D1754	**174**
Effect of Heat and Air on a Moving Film of Asphalt (Rolling Thin Film Oven Test) ASTM D2872	**175**
Float Test for Bituminous Materials ASTM D139; AASHTO T50; ANS A37.2	**176**

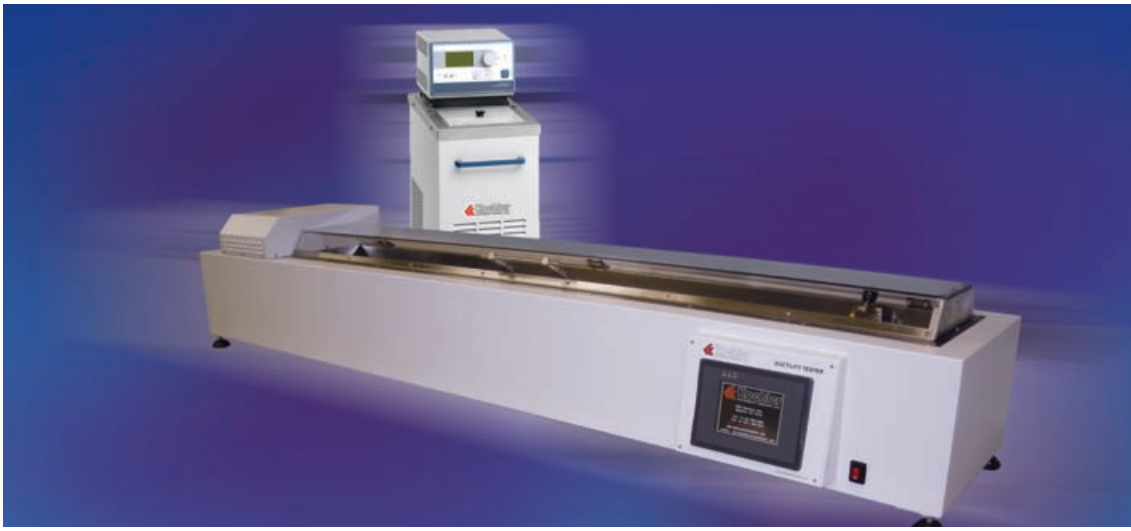
Test Methods	Page
Residue and Oil Distillate in Emulsified Asphalts by Distillation ASTM D244; AASHTO T59	**176**
Blocking and Picking Points of Petroleum Wax ASTM D1465; TAPPI T652	**177**
Melting Point of Petroleum Wax (Cooling Curve) ASTM D87; IP 55; ISO 3841; DIN 51570; FTM 791-1402	**178**
Oil Content of Petroleum Waxes ASTM D721; IP 158; ISO 2908; DIN 51571, 51572; FTM 791-5431	**179**
Solvent Extractables in Petroleum Waxes ASTM D3235	**179**

For information on additional testing methods for bitumens and waxes:

–Saybolt Color of Petroleum Waxes–please refer to pages 44, 46-47

–Water in Petroleum Products and Bituminous Materials by Distillation –please refer to pages 56-57

–Please refer to the Viscosity, Penetration, Flash Point and General Test Equipment Sections



Ductility and Elastic Recovery of Bituminous Materials

K80060 Constant Temperature Ductility Machine with Circulator

Test Method

Determines the ductility of a bituminous material by measuring the distancein which a sample will elongate before breaking when two ends of a briquetspecimen of the test material are pulled apart at a specified speed and temperature. Elastic Recovery is determined by pulling the briquet specimen to a specified distance at a specified speed and temperature. The briquet is then cut and the distance in which it takes for the two halves to reconnect is used to determine the elastic recovery of the test sample.

Semi-Automatic Ductility Testing Machine

- Conforms to ASTM D113, D6084 and related specifications
- Standard and Constant Temperature Models available
- Capable of testing up to 3 samples simultaneously
- 6" LCD Touch Screen Control Panel
- Pre-programmed with Ductility, Recovery, and Custom test methods
- Maximum travel length of 150 cm
- Variable traction speed from 0.25 to 7.0 cm/min
- Constant Temperature model equipped with Lexan Cover for enhanced temperature stability

Semi-Automatic Ductility Testing Machine designed explicitly for testing the ductility and elastic recovery of bituminous materials. Features a 6" LCD touch screen control panel. This integrated touch screen allows the user to choose between the ductility or recovery test methods. The custom menu allows for the input of desired speed and time parameters. During testing, the distance traveled by the specimen is displayed and a simple touch of the screen can record the distance traveled upon breakage of the briquet. A motor jogging feature permits locking of the sample carriage without additional movement after briquet sample is loaded into the machine.

Included Accessories

Standard Model:
Standard Mold (3)
Base Plate

Constant Temperature Model:
Circulation Bath
Remote Temp. Probe, 10 ft. length
Connection Tubing
Standard Mold (3)
Base Plate
Lexan Cover

Dimensions lxwxh,in.(cm)

Standard Model:
86¼x19x16 (219.1 x 48.3 x 40.6)
Net Weight: 200 lbs (91.7kg)

Constant Temperature Model:
86¼x19x16 (219.1 x 48.3 x 40.6)
Net Weight: 217 lbs (98.5 kg)

Circulation Bath:
15¾x8¼x22½ (219.1 x 48.3 x 40.6)
Net Weight: 50 lbs (22.7 kg)

Electrical Requirements CE

115V 60Hz
220-240V 50Hz
220-240V 60Hz

Shipping Information

Standard Model:
Shipping Weight: 350 lbs (159kg)
Dimensions: 92¾x 25¼x 23¼" (235.6 x 64.1 x 59.1cm)
Constant Temperature Model:
Shipping Weight: 368 lbs (167kg)
Dimensions: 92¾x 25¼x 23¼" (235.6 x 64.1 x 59.1cm)
Circulation Bath:
Shipping Weight: 74 lbs (34kg)
Dimensions: 22 x 10½ x 26½" (55.9 x 26.7 x 67.3 cm)

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 180 through 187.

Specifications

Conforms to the specifications of:
ASTM D113, D5892, D6084, P226; IP 32, 516; DIN 52013, EN 13398; NF T 66-006; AASHTO T 51, T 301; JIS K2207; ANS A37.11; Federal Specification SS-R-406C; USDA Method 5 (BUL 12-16)
Capacity: 3 molds with samples
Maximum Travel Length: 150 cm
Standard Traction Speed: 5 cm/min
Variable Traction Speed: 0.25 to 7.0 cm/min
Timer: 1-999 min

Ordering Information

Catalog No.	
K80050	Semi-Automatic Standard Ductility Testing Machine, 115V/220-240V 50/60Hz
K80060	Semi-Automatic Constant Temperature Ductility Testing Machine, 115V 60Hz
K80068	Semi-Automatic Constant Temperature Ductility Testing Machine, 220-240V 60Hz
K80069	Semi-Automatic Constant Temperature Ductility Testing Machine, 220-240V 50Hz

Accessories

K80012	Standard Mold
K80041	Recovery Mold
K80013	Base Plate
250-000-63F	ASTM 63F Thermometer, Range: 18 to 89°F
250-000-63C	ASTM 63C Thermometer, Range: -8 to 32°C
K80050-SFW	Semi-Automatic Ductility Software

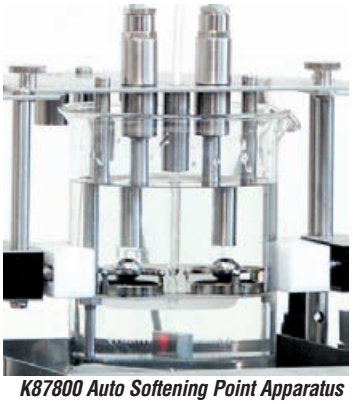
Automatic Softening Point of Bitumen (Ring and Ball Apparatus)

Test Method

Determines the Softening Point of Bitumen in the range from 30 to 157°C (86 to 315°F) using the ring and ball apparatus immersed in distilled water (30 to 80°C), USP glycerine (above 80 to 157°C), or ethylene glycol (30 to 110°C).

Automatic Softening Point Apparatus

- Conforms to ASTM D36 and related test specifications
- Optical detectors for automatic measurement of softening point
- Data Storage: 200 Results
- Quick access to calibration parameters
- Auto diagnostic
- Four programmable preset test methods available
- Controllable heating rate and stirring speeds
- Preheating cycle
- Cooling by fan at the end of the test
- Waterproof heating element



K87800 Auto Softening Point Apparatus

Specifications

Conforms to the specifications of:
ASTM D36; AFNOR T66-008; EN 1427; ISO 4625; NF EN 1427; IP 58; DIN 52011

Included Accessories

Printer
Glass Beaker (2)
Shouldered Rings (10)
Load Balls (10)
Craddle
Pt 100 Probe
Detection Cable
Stirrer
RS232C Output

Electrical Requirements CE

115V 60Hz
230V 50Hz

Dimensions wxdxh,in.(cm)

Adapter: 10¼x21x20 (26x53.5x50)

Shipping Information

Shipping Weight: 44 lbs (20 kg)

Ordering Information

Catalog No.	
K87800	Automatic Softening Point Apparatus, 115V 60Hz
K87890	Automatic Softening Point Apparatus, 230V 50Hz

Accessories

K87800-1	Glass Beaker
K87800-2	Straight Rings, Pack of 10
K87800-3	Shouldered Rings, Pack of 10
K87800-4	Conical Rings, Pack of 10
K87800-5	Detection Lamp
K87800-6	Ring & Ball Cradle
K87800-7	PT 100 Probe
K87800-8	Heating Element, 1000W
K87800-9	Roll of Printer Paper
K87800-10	Load Ball, Pack of 10

Softening Point of Bitumen (Ring-and-Ball Apparatus)

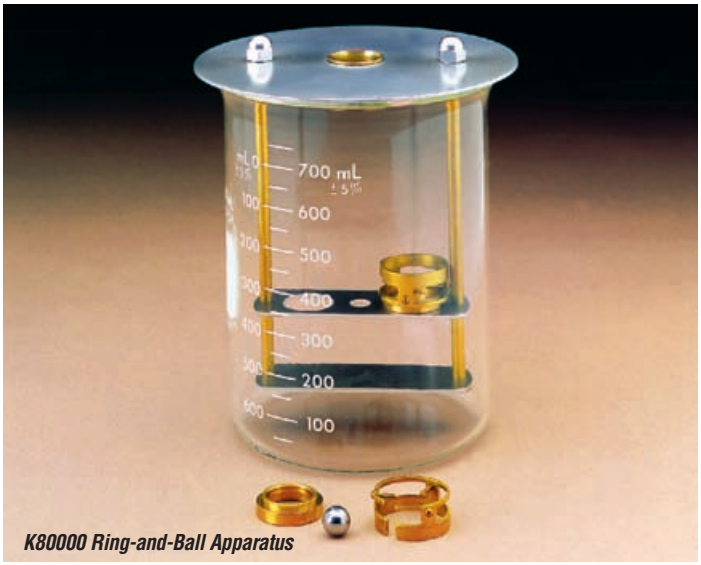
Test Method

The sample is cast in shouldered rings and heated at a controlled rate under the weight of a steel ball. The softening point is the temperature at which the bitumen disks soften and sag downward a specified distance.

Softening Point Apparatus

- Conforms to ASTM D36 and related specifications

Consists of 800mL beaker, 2 standard balls, shouldered rings, ball centering guides, ring holder, bottom plate and beaker cover with support rods. Order thermometer and heater separately.



K80000 Ring-and-Ball Apparatus

Ordering Information

Catalog No.		Order Qty
K80000	Softening Point Apparatus	1
	Accessories	
K42000	Powertrol Heater 1000W heater with variable stepless control and porcelain refractory top plate with positioning well for beaker. Enclosed in a stainless steel housing with cooling vents, Shipping Weight: 8 lbs, 14 oz (3.6kg). 115V 60Hz	
K42090	Powertrol Heater, 220-240V 50/60Hz	1
250-000-15F	ASTM 15F Thermometer Range: 30 to 180°F	1
250-000-15C	ASTM 15C Thermometer Range: –2 to +80°C	1
250-000-16F	ASTM 16F Thermometer Range: 85 to 392°F	
250-000-16C	ASTM 16C Thermometer Range: 30 to 200°C	
K80001	Ring. Brass, shouldered ring conforming to ASTM specifications. Pack of 10	
K80002	Ball. Hardened steel, conforming to ASTM specifications. Pack of 10	
K80003	Ball-Centering Guide	

Specifications

Conforms to the specifications of:
ASTM D36, E28; AASHTO T53;
IP 58, 198; NF T 66-008

Shipping Information

Shipping Weight: 4 lbs (1.8kg)

Breaking Point of Bitumen, Fraass Method

Test Method

Determines the breaking point of solid and semi-solid bitumens. A thin steel plaque is coated with the sample and flexed in a bending apparatus at descending temperatures until cracks appear in the sample coating.

Breaking Point Apparatus

- Conforms to IP 80 specifications

Consists of two concentric borosilicate glass tubes with movable steel plate holders. A cone-and-peg mechanism moves the inner tube up and down relative to the outer tube, which varies the distance between the plate holders, causing the stainless steel test plate to be flexed. The inner tube accommodates a test thermometer. Supplied with 12 spring stainless steel plaques.

Ordering Information

Catalog No.		Order Qty
K28300	Bending Apparatus	1
K28310	Cooling Apparatus Consists of test tubes, cylinder, bungs and thistle tunnel	1
K28320	Electric Hotplate, 115V 50/60Hz	1
K28321	Electric Hotplate, 220-240V 50/60Hz	
250-000-33C	ASTM 33C Thermometer. Range: –38 to + 42°C	1

Shipping Information

Shipping Weight: 20 lbs (9.1kg)
Dimensions: 2.5 Cu. ft.

Accelerated Aging of Asphalt Binder Using a Pressurized Aging Vessel (PAV)

Test Method

For accelerated aging (oxidation) of asphalt binders by means of pressurized air and elevated temperature. This is intended to simulate the type of changes which occur in asphalt binders during in-service oxidative aging but may not accurately simulate the relative rates of aging. It is intended for use with residue from Test Method D2872 (RTFOT) which is designed to simulate plant aging.

Pressure Aging Vessel (PAV)

The Pressure Aging Vessel (PAV) is used to simulate in service oxidative aging of asphalt binder according to procedures developed by the Strategic Highway Research Program (SHRP). The K88100 is fully compliant with the most recent ASTM and AASHTO standards for these tests. The complete PAV system consists of an ASME-code stainless steel pressure vessel in a stainless steel cabinet with encased band heaters, a precision sample holder for simultaneous testing of ten specimens, a set of ten TFOT specimen trays, a pressure controller, temperature controller, pressure and temperature measurement devices, temperature recorder, and a specimen loading and unloading tool.

The K88100 PAV takes the hassle out of running and documenting asphalt binder aging operations. Three easy, non-complicated steps produce accurate and reliable results. Just press the "heat" button, inset specimens when prompted and press the "Age" button and let the PAV do the rest. Custom status screens guide the user step-by-step through the entire process. Each display screen (preheat start-up, preheat ready, aging heat up, aging pressurized, and aging complete) is simple and direct, with detailed process and status information. The final output screen, when the test is complete, shows the current vessel pressure, as well as minimum and maximum temperatures achieved during the test procedure. Process data (temperature and pressure) is continually stored at regular intervals in the programmable logic controller (PLC) that controls and monitors the process.

The K88100 features a compact, bench top design with integral pressure vessel. Its rotating vessel lid with rounded support block provides easy opening and closing. A built-in timer accumulates and records out-of-range time (out of range time for the PAV is typically less than 10 minutes during a 20-hour test). Minimum and maximum temperature data is recorded and is displayed at the end of each test.

Specifications

Conforms to the specifications of:
ASTM D6521; AASHTO R28
Operating Pressure: 2.10 ± 0.05 MPa (304 psi)
Temperature Range: 90°C to 110°C (194°F to 230°F)
Temperature Control Resolution: ± 0.1°C
Test Temperature Uniformity: ± 0.5°C
Time to Set point: 3 hours from ambient
Return to Set point: 120 min. after preheating and lading of specimens
Pressure Vessel: ASME code section VIII, division 1; 1992 A 93
Maximum Pressure: 325 psi (2.24 MPa) at 120°C (250°F)
Pressure Safety Release: 325 psi (2.24 MPa)

Ordering Information

Catalog No.	
K88100	Pressure Aging Vessel, 230V 50/60Hz

Accessories

K88100-1	UPS Battery Backup System
K88100-2	PAV Verification Kit
K88100-3	PAV O-Ring
K88100-4	CGA Adapter
K88100-5	High Pressure Hose
K88100-6	Specimen Pans Set (Pk / 10)

Loss on Heating of Oil and Asphaltic Compounds

Effect of Heat and Air on Asphaltic Materials (Thin Film Oven Test)

Test Method

Determines the effect on asphaltic materials of heating in an oven under prescribed conditions. The results are reported in terms of change in sample mass and/or changes in selected properties such as viscosity, penetration and ductility as evidenced by test data taken before and after the oven cycle.

Asphalt Oven

Dual purpose oven for loss of heat test and thin film test for bitumen and asphaltic materials. Interior chamber of stainless steel and stored powder painter steel exterior. Double glazed window in door for viewing test chamber.

Side mounted controls comprise microprocessor digital control, independent overheat thermostat, main switch and indicator lamps. Two rotating platforms supplied to perform both the tests.

Specifications

Conforms to the specifications of:
ASTM D6, D1754; Specification E145, Type 1B; AASHTO T47, T179, BS2000
Temperature Range: to 356˚F (180˚C)
Pre-set at 163˚C ± 1˚C
Electrical Requirements: CE
110V 60Hz
220V 50Hz

Dimensions

Internal Chamber Dimension 38cm(H) x 52cm(W) x 46cm(D)
External Dimension 57cm(H) x 87cm(W) x 63cm(D)
(External Dimension does not include motor or handle)
Net Weight: 44kg

K45850 Loss on Heat / Thin Film Oven

Ordering Information

Catalog No.		Order Qty
K45850	Loss on Heat/Thin Film Oven for D6, D1754 110V, 60Hz	1
K45859	Loss on Heat/Thin Film Oven for D6, D1754 220V, 50Hz	

Accessories

388-001-003	Sample Container for ASTM D6	9
K17000	Thin Film Oven Pan, aluminum for D1754	4
K17090	Thin Film Oven Pan, stainless steel for D1754	4

Effect of Heat and Air on a Moving Film of Asphalt (Rolling Thin Film Oven Test)

Test Method

Determines the effect of heat and air on a moving film of asphalt to serve as an indicator of approximate change in properties during conventional hot-mixing. The results are reported in terms of the changes in selected properties such as viscosity, penetration and ductility brought about by the RTFO test, as evidenced by test data taken before and after the 75 minute oven cycle.

Rolling Thin Film Oven

- Conforms to the specifications of ASTM D2872

Double-walled electrically heated convection oven for rolling thin film oven tests on asphalts. Incorporates all required features per ASTM specifications, including: door with double-pane viewing window; symmetrical top and bottom vents; air plenum; squirrel cage-type 1725rpm fan; digital indicating thermostat to control oven temperature at 163°C ±0.5°C; vertical circular carriage to mechanically rotate the samples at 15 ±0.2rpm; air jets to blow heated air into each sample bottle at its lowest point of travel; and a calibrated flowmeter to control air flow at 4000mL/min. An overtemperature cut-off circuit disconnects power to the unit in the event of control failure.

Specifications

Conforms to the specifications of: ASTM D2872; AASHTO T240

Included Accessories

Glass Sample Container (8)
ASTM 13C Thermometer

Dimensions lxwxh,in.(cm)

40x36x26 (101.6x91.44x66.04)
Net Weight: 310 lbs (141kg)

Shipping Information

Shipping Weight: 380 lbs (173kg)
Dimensions: 7.96 Cu. ft.

Electrical Requirements CE

220-240V 60Hz
220-240V 50Hz

K88000 Rolling Thin Film Oven

Ordering Information

Catalog No.		Order Qty
K88000	Rolling Thin Film Oven, 220-240V 60Hz	1
K88001	Rolling Thin Film Oven, 220-240V 50Hz	
	Accessories	
K88000-1	Glass Sample Container	8
K88000-2	Cooling Rack	
250-000-13C	ASTM 13C Thermometer Range: 155 to 170°C	1

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Float Test for Bituminous Materials

Test Method

Provides a measure of the consistency of bituminous materials, including asphalts and tar products.

Float Test Apparatus

• Conforms to ASTM D139, AASHTO T50 and ANS A37.2 specifications Consists of aluminum float and three brass collars for determining the consistency of bituminous materials and tar products.

Shipping Information

Shipping Weight: 3 lbs (1.4kg)

Ordering Information		
Catalog No.		**Order Qty**
K30500	Float Test Apparatus	1
	Accessories	
K30510	Float, only	
K30520	Collar, only	
250-000-15F	ASTM 15F Thermometer Range: 30 to 180°F	1
250-000-15C	ASTM 15C Thermometer Range: –2 to +80°C	

K30500 Float Test Apparatus

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Residue & Oil Distillate in Emulsified Asphalts by Distillation

Test Method

Determines residue and oil distillate in emulsified asphalt for research, quality control and specification acceptance purposes.

Residue and Oil Distillate Determination Apparatus

• Conforms to ASTM D244 and AASHT0 T59 specifications Consists of an aluminum alloy still with lid and clamp assembly, ring burner, connection apparatus, graduate cylinder and thermometers.

Shipping Information

K31900: Shipping Weight: 7 lbs (3.2kg)
Dimensions: 1.3 Cu. ft.
K31956: Shipping Weight: 18 lbs (8.2kg)
Dimensions: 2.8 Cu. ft.

Ordering Information		
Catalog No.		**Order Qty**
K31900	Aluminum Alloy Still	1
	Accessories	
K31910	Ring Burner, 5" (12.7cm) dia	1
K31956	Connection Apparatus Includes Borosilicate Glass condenser with metal jacket, tin shield, clamps and stand	1
332-002-003	Graduated Cylinder, 100mL	1
250-000-07F	ASTM 7F Thermometer Range: 30 to 580°F	2
250-000-07C	ASTM 7C Thermometer Range: –2 to +300°C	

K31900 Metal Still

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Blocking and Picking Points of Petroleum Wax

Test Method

Blocking point and picking point are indicators of the temperature above which surface film injury will occur when waxed surfaces come in contact with one another as on a roll of wax paper. Paper test specimens are coated with the wax sample, folded with the waxed surfaces together, and heated on a metal blocking plate having a measured temperature gradient. After a specified period, the specimens are removed and unfolded, and the points at which film disruption occurred are noted together with their corresponding temperatures.

Blocking and Picking Points Apparatus

- Conforms to ASTM D1465 and TAPPI T652 specifications
- Choice of Type A or Type B Blocking Plates

Applies wax samples to paper test specimens and creates a temperature gradient for determining blocking point and picking point temperatures.

Wax Coating Device–Coats paper with wax samples per ASTM specifications. Consists of an insulated electrically heated hot wax bath and a cooling water bath with doctor rods and paper roller. Variable auto transformer and 200W heater situated underneath the hot wax bath heat sample to a temperature above the melting point. Doctor rods connect to an external hot water supply to maintain proper temperature. Cooling bath has water inlet/outlet fittings, and each bath has a built-in paper guide.

Blocking Plates–Choice of Type A or Type B plates per ASTM specifications. Type A Aluminum Blocking Plate uses a strip heater and cooling coil on opposite ends of the block to create a temperature gradient. Six thermocouples along the length of the block input to accessory Digital Thermometer. Accommodates eight rows of paper test specimens.
Type B Aluminum Blocking Plate uses two thermostatically controlled baths to establish a temperature gradient, with the ends of the plate extending into the baths. Cold bath has a cooling coil and 100W immersion heater; hot bath has a 300W immersion heater. Thermoregulators and motor stirrers provide uniform temperature control in each bath. Ten thermocouples along the length of the block input to accessory Digital Thermometer. Accommodates six rows of test specimens.

Digital Thermometer–Ten-channel microprocessor based digital thermocouple thermometer with large LED display. Ten-position front panel rotary selector switch. Mounted in a heavy duty bench case.

Specifications

Conforms to the specifications of: ASTM D1465; TAPPI T652
Electrical Requirements: CE
Wax Coating Device: 115V 60Hz, Single Phase, 1.7A
220-240V 5060Hz, Single Phase, .9A
Type A Blocking Plate: 115V 60Hz, Single Phase, 2.1A
220-240V 50/60Hz, Single Phase, 1.1A or
Type B Blocking Plate: 115V 60Hz, Single Phase, 3.4A
220-240V 50/60Hz, Single Phase, 1.8A

Included Accessories

Type A Blocking Plate:
Steel weights, 1x1x30"(8)
Sponge rubber pads (8)
IC thermocouples (6) or
Type B Blocking Plate:
Steel weights, 1x1x6" (24)
Sponge rubber pads (8)
IC thermocouples (10)

Dimensions lxwxh,in.(cm)

Wax Coating Device: 19x8x12 (48x20x30)
Type A Blocking Plate: 38x12x2 (97x30x5)
Type B Blocking Plate: 19x8x12 (48x20x30)

Shipping Information

Shipping Weight:
Wax Coating Device: 44 lbs (20kg)
Type A Blocking Plate: 164 lbs (74.4kg)
Type B Blocking Plate: 183 lbs (83.0kg)
Dimensions:
Wax Coating Device: 5.3 Cu. ft.
Type A Blocking Plate: 4.1 Cu. ft.
Type B Blocking Plate: 12.3 Cu. ft.

Ordering Information

Catalog No.		Order Qty
Wax Coating Device		1
K17100	Wax Coating Device, 115V 60Hz	
K17190	Wax Coating Device, 220-240V 50/60Hz	
Blocking Plates		1
K17200	Type A Blocking Plate, 115V 60Hz	
K17290	Type A Blocking Plate, 220-240V 50/60Hz	
K17300	Type B Blocking Plate. 115V 60Hz	
K17390	Type B Blocking Plate. 220-240V 50/60Hz	
Digital Thermometer		1
K29310	Digital Thermometer, 115V 60Hz	
K29319	Digital Thermometer, 220-240V 50/60Hz	
K17110	Test Paper, Cereal glassine, 30 lb basic weight. 3½" (8.9cm) wide x 6" (15.25cm) dia. roll on a 3" (7.6cm) dia. core.	1
Thermometers		2
Use with Type B Blocking Plate only.		
250-000-09F	ASTM 9F Thermometer Range: 20 to 230°F	
250-000-09C	ASTM 9C Thermometer Range: –5 to +110°C	

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Melting Point of Petroleum Wax (Cooling Curve)

K17500 Wax Melting Point Apparatus

Test Method

Periodic temperature measurements are taken of a sample of molten wax as it is cooled in an air bath. When the wax solidifies, a plateau in the cooling curve occurs, indicating the melting point (cooling curve) of the sample.

Wax Melting Point Apparatus

- Conforms to ASTM D87 and related specifications

Cools molten wax samples in accordance with ASTM and related specifications. Consists of nickel-plated air and water bath assembly with removable cover. Supports test tube in a vertical position in the air bath.

Specifications

Conforms to the specifications of:
ASTM D87; IP 55; ISO 3841; DIN 51570; FTM 791-1402; NF T 60-114

Included Accessories

Test Tube, Thermometer Holders (2)

Dimensions

dia.xh,in.(cm) 5½x7 (14x18)
Net Weight 4 lbs (1.8kg)

Shipping Information

Shipping Weight: 6 lbs (2.7kg)
Dimensions: 0.7 Cu. ft.

Ordering Information

Catalog No.		Order Qty
K17500	Wax Melting Point Apparatus	1
	Accessories	
250-000-14F	ASTM 14F Thermometer Range: 100 to 180°F	2
250-000-14C	ASTM 14C Thermometer Range: 38 to 82°C	
K175-0-8	Test Tube, 25x100mm	

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Oil Content and Solvent Extractables in Petroleum Waxes

Oil Content of Petroleum Waxes

Solvent Extractables in Petroleum Waxes

Test Method

Oil content or solvent extractables in wax can affect key properties such as strength, hardness, melting point, etc. The sample is dissolved in methyl-ethyl ketone or a 50-50 mixture of methyl-ethyl ketone and toluene, cooled to precipitate the wax, and filtered. The oil content or solvent extractables content of the filtrate is then determined by evaporating the solvent and weighing the residue.

Oil-Solvent Extractables Content Apparatus

- Conforms to ASTM D721, D3235 and related specifications

Determines oil content or solvent extractables content in petroleum waxes in accordance with ASTM specifications. Includes Filter Stick Assembly; Cooling Bath; Air Pressure Regulator; and Evaporation Cabinet.

Filter Stick and Assembly–Filters petroleum wax samples per ASTM specifications. Consists of 10mm diameter sintered glass filter stick with air pressure inlet tube and delivery nozzle, and a 25x170mm test tube. Inserts in Cooling Bath.

Cooling Bath–Accommodates three (3) 25x170mm test tubes for cooling samples and filter stick assemblies. Insulated stainless steel tank with finished steel exterior. Removable composition top plate has thermometer port, filling port and three 25.4mm (1") test tube ports. Fill tank with suitable cooling mixture.

Air Pressure Regulator–Controls air flow to the filter stick assembly at the required rate. Mercury bubbler-type, with 250mL glass cylinder, T-tube and rubber stopper.

Evaporation Cabinet–Thermostatically heated cabinet evaporates solvent from filtrate per specifications. Accommodates four weighing bottles. Delivers air stream vertically downward into bottles through glass jets. Manifold assembly is adjustable for positioning of jets at the correct height above the sample surface. Controls temperature at 35 ±1°C (95 ±2°F). Finished steel cabinet with composition front plate and hinged glass door.

Ordering Information

Catalog No.		Order Qty
K17600	Oil-Solvent Extractables Content Apparatus, 115V 60Hz	1
K17690	Oil-Solvent Extractables Content Apparatus, 220-240V 50/60Hz	
	Accessories	
K17605	Mechanically Refrigerated Cooling Bath, 115V 60Hz, Ambient to -35°C	
K17695	Mechanically Refrigerated Cooling Bath, 220-240V 50/60Hz, Ambient to -35°C	
332-004-009	Test Tube, 25x170mm	4
250-000-71F	ASTM 71 F Thermometer Range: –35 to +70°F	1

For NIST traceable certified thermometers, please refer to the ASTM Thermometer section on pages 184 through 191.

Specifications

Conforms to the specifications of:
ASTM D721, D3235; IP 158; ISO 2908; DIN 51571, 51572; FTM 791-5431
Electrical Requirements: CE
115V 60Hz, Single Phase, 0.8A
220-240V 50/60Hz, Single Phase, 0.4A

Included Accessories

Weighing Bottles, 15mL (4)
Filter Stick Assembly (K17630)
Air Pressure Regulator (K17640)

Dimensions lxwxh,in.(cm)

Cooling Bath: 8x6x9 (20x15x23)
Evaporation Cabinet: 9x5x16 (23x13x41)
Net Weight:
Cooling Bath: 6 lbs (2.7kg)
Evaporation Cabinet: 7 lbs (3.2kg)

Shipping Information

Shipping Weight: 24 lbs (10.9kg)
Dimensions: 5 Cu. ft.

Additional Accessories

Additional equipment, materials and/or reagents are required to perform some of the test procedures in the preceding pages. Please refer to the applicable test method for further information, or contact Koehler for assistance.

Ductility of Bituminous Materials ..... Page 170

ASTM D113, D-4; AASHTO T51; ANS A37.11; Federal Specification SS-R-406C; USDA Method 51 (BUL 12-16); IP 32; DIN 52013

Glycerin
No. 50 300 µm Sieve
150mL Beaker, Griffin Low-form
Carbon Disulfide
Celite Analytical Filter Aid (CAFA)
Evaporating Dish
Analytical Balance
Suction Pump
Filtering Crucible, Porcelain
Dextrin, Talc or Kaolin
Spatula
30mL Beaker, Griffin Low-form
Drying Oven
Watch Glasses
Desiccator
Filtering Flask, with Crucible Adapter
Bunsen Burner or Muffle Furnace

Softening Point of Bitumen (Ring-and-Ball Apparatus) ..... Page 171-172

ASTM D36, E28; AASHTO T53; IP 58, IP 198

Distilled Water
Ethylene Glycol
Silicone Oil or Grease
Dextrin or Talc
Spatula

Breaking Point of Bitumen ..... Page 173

IP 80

Acetone
Solid Carbon Dioxide

Effect of Heat and Air on Asphaltic Materials ..... Page 174

ASTM D1754

Laboratory Oven with Rotating Shelf
Analytical Balance

Float Test for Bituminous Materials ..... Page 176

ASTM D139; AASHTO T50 and ANS A37.2

Spatula

Residue and Oil Distillate in Emulsified Asphalts by Distillation ..... Page 176

ASTM D244 and AASHTO T59

No. 50 300 µm Sieve
No. 20 850 µm Sieve
Condenser
Xylol

Blocking and Picking Points of Petroleum Wax ..... Page 177

ASTM D1465; TAPPI T652

Trimming Board
Analytical Balance
Paper Cereal Glassine

Melting Point of Petroleum Wax (Cooling Curve) ..... Page 178

ASTM D87; TAPPI T630M-61; IP 55; ISO 3841; DIN 51570; FTM 791-1402

Heating Device

Oil Content of Petroleum Waxes Solvent Extractables in Petroleum Waxes ..... Page 179

ASTM D721, D3235; TAPPI T636; IP 158; ISO 2908, DIN 51571, 51572; FTM 791-5431

Dropper Pipet, 15mL
Transfer Pipet, 15mL
Analytical Balance
Wire Stirrer
Methyl Ethyl Ketone
Toluene
Anhydrous Calcium Sulfate
Air Supply
Drying Oven
Kerosene
Cotton

Certified Petroleum Standards

Test Methods **Page**

Certified Petroleum Standards Listing.....182

Koehler offers laboratory reference standards for our full line of testing equipment. Each test standard comes with original certification listing the ASTM test method, the name and ISO status of each testing laboratory, and the average test result and standard deviation. Please inquire with Koehler's Customer Service Department about further information as well as ordering these reference standards for your testing needs.

Certified Petroleum Reference Standards

- Manufactured and certified for ASTM and related test procedures
- NIST traceable standards developed utilizing ASTM Round Robin trials
- Custom standards available

Koehler offers an extensive range of certified petroleum reference materials meeting the analytical requirements for ASTM, ISO, EPA, and related test methods, and are traceable to National Institute of Standards and Technology.

Complete certification is provided with each standard. Refer to the list below for the reference standard that you require or contact us to discuss your needs for a special standard. Detailed datasheets and quotations for standards listed below or for specially prepared standards are readily available from Koehler by contacting our Customer Service Department. We will respond to you promptly upon receiving your request.

Certified Standards for Petroleum Test Methods

--	PIANO, PONA, PNA by GC
--	O-PONA Method by GC
--	Simulated Distillation (Sim Dis) by GC
D56	Flash Point by Tag Closed Cup
D86	Synthetic Distillation Standard
D92	Flash Point by Cleveland Open Cup
D93	Flash Point by Pensky-Martens Closed Cup
D97	Pour Point
D323	Reid Vapor Pressure of Petroleum Products
D445	Kinematic Viscosity *(please refer to pages 18-19)*
D611	Aniline Point
D613	Cetane Number of Diesel Fuel Oil
D1015	Freezing Point
D1319	Olefin Analysis by FIA
D1744	Water in Liquid Petroleum Products
D2162	Calibration of Master Viscometers & Viscosity Oil Standards
D2386	Freezing Point
D2500	Cloud Point
D2699	RON of Spark-Ignition Engine Fuel
D2700	MON of Spark-Ignition Engine Fuel
D2789	Hydrocarbon Analysis in Gasoline by GC/MS
D2887	Boiling Range by GC
D3230	Salts in Crude Oil
D3231	Phosphorus in Gasoline
D3237	Lead in Gasoline by AA
D3242	Acidity in Aviation Turbine Fuel
D3340	Li and Na in Lubricating Greases by Flame Photometer
D3524	Diesel Fuel Analysis by GC
D3605	Trace Metal in Gas Turbine Fuel by AA
D3606	Aromatics in Gasoline by GC
D3610	Total Cobalt Analysis by Potentiometric Titration
D3710	Boiling Range by GC
D3798	p-Xylene Analysis by GC
D3831	Manganese in Gasoline by AA
D4052	Density, Relative, and API Gravity of Liquids
D4053	Benzene in Motor and Aviation Gasoline
D4059	PCB Analysis by GC
D4110	Ion Chromatography
D4291	Ethylene Glycol by GC
D4327	Ion Chromatography
D4377	Water in Liquid Petroleum Products
D4420	Aromatics in Gasoline by GC
D4628	Wear Metals in Lube Oil
D4629	Nitrogen by Chemilluminescence
D4815	Oxygenates in Gasoline by GC
D4927	Wear Metals and Additives by WD-XRF
D4928	Water in Liquid Petroleum Products
D4929	Chlorine in Crude Oil by Microcoulometry
D4951	Wear Metals and Additives by ICP
D4953	Vapor Pressure of Gasoline
D5056	Trace Metals in Petroleum Coke by AA
D5059	Lead in Gasoline by X-Ray Spectroscopy
D5134	Petroleum Naphthas through n-Nonane Analysis by GC

Certified Standards for Petroleum Test Methods (cont'd)

D5184	Al and Si by ICP
D5186	Aromatics by SFC
D5188	Vapor-Liquid Ratio Temperature
D5191	Vapor Pressure Standards
D5307	Boiling Range Distribution by GC
D5441	MTBE Analysis by GC
D5442	Petroleum Waxes by GC
D5443	PNA Analysis by Multidimensional GC
D5480	Oil Volatility by GC
D5482	Vapor Pressure Standards
D5501	Ethanol Analysis by GC
D5580	Aromatics by GC
D5599	Oxygenates by OFID
D5600	Trace Metals by ICP
D5622	Oxygenates by Reductive Pyrolysis
D5623	Sulfur Compounds by Sulfur Selective Detection
D5708	Trace Metals by ICP
D5762	Nitrogen by Chemilluminescence
D5769	Aromatics by GC/MS
D5771	Cloud Point (Stepped Cooling Method)
D5772	Cloud Point (Linear Cooling Rate)
D5773	Cloud Point (Constant Cooling Rate)
D5863	Trace Metals by AA
D5901	Freezing Point (Auto Optical Method)
D5949	Pour Point (Auto Pressure Pulsing Method)
D5950	Pour Point (Auto Tilt Method)
D5972	Freezing Point
D5985	Pour Point (Rotational Method)
D5986	Oxygenates and Aromatics by GC/FTIR
D6160	PCBs by GC
D6258	Solvent Red 164 Dye Concentration in Diesel Fuels
D6277	Benzene in Spark Ignition Fuels
D6293	Oxygenates in Engine Fuels by GC
D6296	Total Olefins in Spark Ignition Engine Fuels by GC
D6304	Water in Liquid Petroleum Products
D6352	Boiling Range Distribution of Petroleum
D6371	Cold Filter Plugging Point of Diesel and Heating Fuels
D6378	Vapor Pressure
D6379	Aromatic Hydrocarbon by HPLC
D6417	Engine Oil by GC
D6443	Metals in Oil
D6481	Lube Oils by ED-XRF
D6550	Olefin Content of Gasoline by SFC
IP170	Flash Point by Abel Closed Cup

Sulfur Standards

D2622	Sulfur by WD-XRF
D3120	Sulfur by Oxidative Microcoulometry
D3246	Sulfur in Petroleum Gas by Oxidative Microcoulometry
D4294	Sulfur by ED-XRF
D5453	Sulfur by Ultraviolet Fluorescence
D6334	Sulfur in Gasoline by Wavelength
D6445	Sulfur in Gasoline by ED-XRF

ASTM Thermometers, Test Specimens and Glassware

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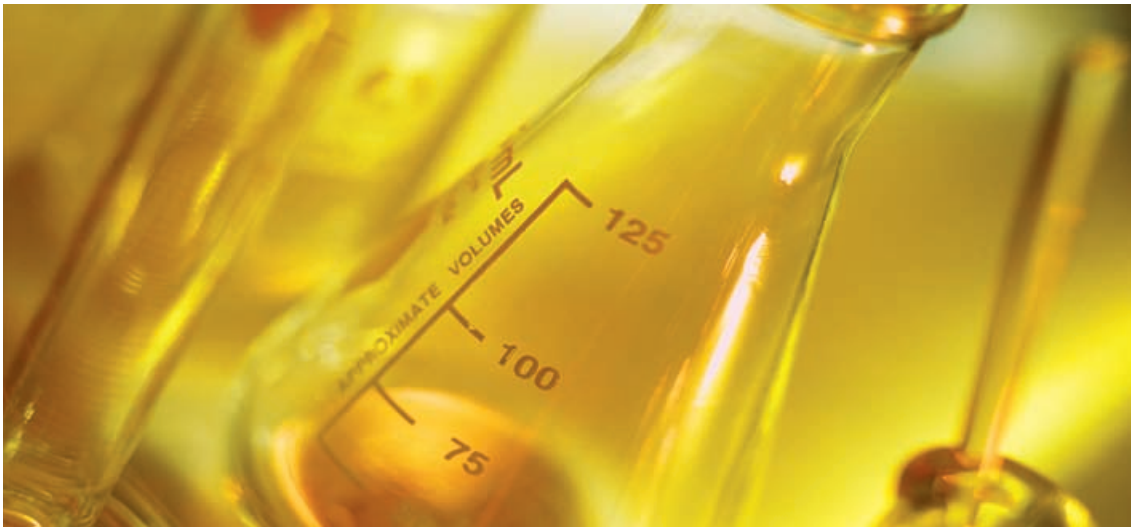

ASTM Thermometers

Koehler is pleased to offer our customers calibrated thermometers in addition to the wide range of ASTM thermometers available. Thermometers are calibrated to ASTM E-1 requirements in accordance with Method E-77 and are NIST traceable. Calibrated thermometers come with an ISO/IEC 17025 and ANSI/NCSL Z-540-1 Report of Calibration. When ordering, please indicate by catalog number the thermometer(s) which meet your testing requirements.

Catalog Number	ASTM Designation	IP Reference	Name	Range
250-000-01C	1C	—	Partial Immersion	–20 to +150°C
250-004-01C	1C	—	1C CERTIFIED @ ASTM specified test points of –20, 0, +50, 100, 150°C	
250-000-01F	1F	—	Partial Immersion	0 to 302°F
250-004-01F	1F	—	1F CERTIFIED @ ASTM specified test points of 0, 32, 122, 212, 302°F	
250-000-02C	2C	62C	Partial Immersion	–5 to +300°C
250-004-02C	2C	62C	2C CERTIFIED @ ASTM specified test points of 0, 75, 150, 225, 300°C	
250-000-02F	2F	62F	Partial Immersion	20 to 580°F
250-004-02F	2F	62F	2F CERTIFIED @ ASTM specified test points of 32, 150, 300, 450, 580°F	
250-000-03C	3C	73C	Partial Immersion	–5 to +400°C
250-004-03C	3C	73C	3C CERTIFIED @ ASTM specified test points of 0, 100, 200, 300, 370°C	
250-000-03F	3F	73F	Partial Immersion	20 to 760°F
250-004-03F	3F	73F	3F CERTIFIED @ ASTM specified test points of 32, 200, 370, 540, 700°F	
250-000-04C	4C	—	Acid Heat	–1 to +105°C
250-004-04C	4C	—	4C CERTIFIED @ ASTM specified test points of 0, 50, 100°C	
250-000-04F	4F	—	Acid Heat	30 to 220°F
250-004-04F	4F	—	4F CERTIFIED @ ASTM specified test points of 32, 122, 212°F	
250-000-05C	5C	1C	Cloud & Pour, High	–38 to +50°C
250-004-05C	5C	1C	5C CERTIFIED @ ASTM specified test points of –35, 0, +50°C	
250-000-05F	5F	1F	Cloud & Pour, High	–36 to +120°F
250-004-05F	5F	1F	5F CERTIFIED @ ASTM specified test points of –30, +32, 120°F	
250-000-06C	6C	2C	Cloud & Pour, Low	–80 to +20°C
250-004-06C	6C	2C	6C CERTIFIED @ ASTM specified test points of –70, –35, 0, +20°C	
250-000-06F	6F	2F	Cloud & Pour, Low	–112 to +70°F
250-004-06F	6F	2F	6F CERTIFIED @ ASTM specified test points of –94, –30, +32, 70°F	
250-000-07C	7C	5C	Distillation, Low	–2 to +300°C
250-004-07C	7C	5C	7C CERTIFIED @ ASTM specified test points of 0, 50, 100, 150, 200, 250, 300°C	
250-000-07F	7F	—	Distillation, Low	30 to 580°F
250-004-07F	7F	—	7F CERTIFIED @ ASTM specified test points of 32, 100, 200, 300, 400, 500, 570°F	
250-000-08C	8C	6C	Distillation, High	–2 to +400°C
250-004-08C	8C	6C	8C CERTIFIED @ ASTM specified test points of 0, 100, 200, 300, 370°C	
250-000-08F	8F	—	Distillation, High	30 to 760°F
250-004-08F	8F	—	8F CERTIFIED @ ASTM specified test points of 32, 200, 370, 540, 700°F	
250-000-09C	9C	15C	Pensky-Martens, Low	–5 to +110°C
250-004-09C	9C	15C	9C CERTIFIED @ ASTM specified test points of 0, 35, 70, 105°C	
250-000-09F	9F	15F	Pensky-Martens, Low	20 to 230°F
250-004-09F	9F	15F	9F CERTIFIED @ ASTM specified test points of 32, 100, 160, 220°F	
250-000-10C	10C	16C	Pensky-Martens, High	90 to 370°C
250-004-10C	10C	16C	10C CERTIFIED @ ASTM specified test points of 100, 200, 300, 370C	
250-000-10F	10F	16F	Pensky-Martens, High	200 to 700°F
250-004-10F	10F	16F	10F CERTIFIED @ ASTM specified test points of 212, 390, 570, 700F	
250-000-11C	11C	28C	Open Flash	–6 to +400°C
250-004-11C	11C	28C	11C CERTIFIED @ ASTM specified test points of 0, 100, 200, 300, 370°C	
250-000-11F	11F	28F	Open Flash	20 to 760°F
250-004-11F	11F	28F	11F CERTIFIED @ ASTM specified test points of 32, 200, 370, 540, 700°F	
250-000-12C	12C	64C	Gravity (Density)	–20 to +102°C
250-004-12C	12C	64C	12C CERTIFIED @ ASTM specified test points of –20, –10, 0, +10, 20, 30, 40, 50, 60, 70, 80, 90, 100°C	
250-000-12F	12F	64F	Gravity (Density)	–5 to +215°F
250-004-12F	12F	64F	12F CERTIFIED @ ASTM specified test points of –5, 15, 32, 60, 85, 110, 135, 160, 185, 210°F	

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ASTM Thermometers

Catalog Number	ASTM Designation	IP Reference	Name	Range
250-000-13C	13C	47C	Loss on Heat	155 to 170°C°
250-004-13C	13C	47C	13C CERTIFIED @ ASTM specified test points of 155, 163, 170°C	
250-000-14C	14C	17C	Paraffin Wax Melting Point	38 to 82°C
250-004-14C	14C	17C	14C CERTIFIED @ ASTM specified test points of 40, 50, 60, 70, 80°C	
250-000-14F	14F	17F	Paraffin Wax Melting Point	100 to 180°F
250-004-14F	14F	17F	14F CERTIFIED @ ASTM specified test points of 100, 120, 140, 160, 180°F	
250-000-15C	15C	60C	Softening Point, Low	–2 to +80°C
250-004-15C	15C	60C	15C CERTIFIED @ ASTM specified test points of 0, 20, 40, 60, 80°C	
250-000-15F	15F	—	Softening Point, Low	30 to 180°F
250-004-15F	15F	—	15F CERTIFIED @ ASTM specified test points of 32, 70, 100, 140, 180°F	
250-000-16C	16C	61C	Softening Point, High	30 to 200°C
250-004-16C	16C	61C	16C CERTIFIED @ ASTM specified test points of 30, 60, 90, 120, 150, 180, 200°C	
250-000-16F	16F	—	Softening Point, High	85 to 392°F
250-004-16F	16F	—	16F CERTIFIED @ ASTM specified test points of 90, 140, 190, 240, 290, 340, 390°F	
250-000-17C	17C	—	Saybolt Viscosity	19 to 27°C
250-004-17C	17C	—	17C CERTIFIED @ ASTM specified test points of 21, 25°C	
250-000-17F	17F	—	Saybolt Viscosity	66 to 80°F
250-004-17F	17F	—	17F CERTIFIED @ ASTM specified test points of 70, 77°F	
250-000-18C	18C	23C	Saybolt Viscosity & Reid Vapor	34 to 42°C
250-004-18C	18C	23C	18C CERTIFIED @ ASTM specified test points of 38, 41°C	
250-000-18F	18F	23F	Saybolt Viscosity & Reid Vapor	94 to 108°F
250-004-18F	18F	23F	18F CERTIFIED @ ASTM specified test points of 100, 107°F	
250-000-19C	19C	—	Saybolt Viscosity	49 to 57°C
250-004-19C	19C	—	19C CERTIFIED @ ASTM specified test points of 50, 54°C	
250-000-19F	19F	—	Saybolt Viscosity	120 to 134°F
250-004-19F	19F	—	19F CERTIFIED @ ASTM specified test points of 122, 130°F	
250-000-20C	20C	—	Saybolt Viscosity	57 to 65°C
250-004-20C	20C	—	20C CERTIFIED @ ASTM specified test points of 60, 64°C	
250-000-20F	20F	—	Saybolt Viscosity	134 to 148°F
250-004-20F	20F	—	20F CERTIFIED @ ASTM specified test points of 140, 147°F	
250-000-21C	21C	—	Saybolt Viscosity	79 to 87°C
250-004-21C	21C	—	21C CERTIFIED @ ASTM specified test points of 82, 86°C	
250-000-21F	21F	—	Saybolt Viscosity	174 to 188°F
250-004-21F	21F	—	21F CERTIFIED @ ASTM specified test points of 180, 187°F	
250-000-22C	22C	24C	Saybolt Viscosity & Oxidation Stability	95 to 103°C
250-004-22C	22C	24C	22C CERTIFIED @ ASTM specified test points of 99, 102°C	
250-000-22F	22F	24F	Saybolt Viscosity & Oxidation Stability	204 to 218°F
250-004-22F	22F	24F	22F CERTIFIED @ ASTM specified test points of 210, 212°F	
250-000-23C	23C	—	Viscosity Engler	18 to 28°C
250-004-23C	23C	—	23C CERTIFIED @ ASTM specified test points of 20, 25°C	
250-000-24C	24C	—	Viscosity Engler	39 to 54°C
250-004-24C	24C	—	24C CERTIFIED @ ASTM specified test points of 40, 50°C	
250-000-25C	25C	—	Viscosity Engler	95 to 105°C
250-004-25C	25C	—	25C CERTIFIED @ ASTM specified test points of 95, 100°C	
250-000-26C	26C	—	Stability Test of Soluble Nitro-Cellulose	130 to 140°C
250-004-26C	26C	—	26C CERTIFIED @ ASTM specified test points of 130, 135, 140°C	
250-000-27C	27C	—	Turpentine Distillation	147 to 182°C
250-004-27C	27C	—	27C CERTIFIED @ ASTM specified test points of 155, 165, 175°C	
250-000-28C	28C	31C	Kinematic Viscosity @ 37.8C	36.6 to 39.4°C
250-004-28C	28C	31C	28C CERTIFIED @ ASTM specified test points of 0, 37.8, 39°C	
250-000-28F	28F	—	Kinematic Viscosity @ 100F	97.5 to 102.5°F
250-004-28F	28F	—	28F CERTIFIED @ ASTM specified test points of 32, 100, 102°F	

ASTM Thermometers

Catalog Number	ASTM Designation	IP Reference	Name	Range
250-000-29C	29C	34C	Kinematic Viscosity @ 54.4C	52.6 to 55.4°C
250-004-29C	29C	34C	29C CERTIFIED @ ASTM specified test points of 0, 54.4, 55°C	
250-000-29F	29F	—	Kinematic Viscosity @ 130F	127.5 to 132.5°F
250-004-29F	29F	—	29F CERTIFIED @ ASTM specified test points of 32, 130, 132°F	
250-000-30F	30F	32F	Kinematic Viscosity @ 210F	207.5 to 212.5°F
250-004-30F	30F	32F	30F CERTIFIED @ ASTM specified test points of 32, 210, 212°F	
250-000-31F	31F	—	Reid Vapor	–30 to +120°F
250-004-31F	31F	—	31F CERTIFIED @ ASTM specified test points of –20, +32, 100°F	
250-000-33C	33C	20C	Aniline Point	–38 to +42°C
250-004-33C	33C	20C	33C CERTIFIED @ ASTM specified test points of –35, –20, 0, +20, 40°C	
250-000-33F	33F	—	Aniline Point	–36.5 to +107.5°F
250-004-33F	33F	—	33F CERTIFIED @ ASTM specified test points of –31, –4, +32, 68, 104°F	
250-000-34C	34C	21C	Aniline Point	25 to 105°C
250-004-34C	34C	21C	34C CERTIFIED @ ASTM specified test points of 25, 45, 65, 85, 100°C	
250-000-34F	34F	—	Aniline Point	77 to 221°F
250-004-34F	34F	—	34F CERTIFIED @ ASTM specified test points of 77, 113, 149, 185, 212°F	
250-000-35C	35C	59C	Aniline Point	90 to 170°C
250-004-35C	35C	59C	35C CERTIFIED @ ASTM specified test points of 100, 120, 140, 160, 170°C	
250-000-35F	35F	—	Aniline Point	194 to 338°F
250-004-35F	35F	—	35F CERTIFIED @ ASTM specified test points of 212, 250, 285, 320, 338°F	
250-000-36C	36C	—	Titer Test	–2 to +68°C
250-004-36C	36C	—	36C CERTIFIED @ ASTM specified test points of 0, 15, 30, 45, 65°C	
250-000-37C	37C	77C	Solvents Distillation	–2 to +52°C
250-004-37C	37C	77C	37C CERTIFIED @ ASTM specified test points of 0, 15, 30, 50°C	
250-000-38C	38C	78C	Solvents Distillation	24 to 78°C
250-004-38C	38C	78C	38C CERTIFIED @ ASTM specified test points of 25, 40, 55, 75C	
250-000-39C	39C	79C	Solvents Distillation	48 to 102°C
250-004-39C	39C	79C	39C CERTIFIED @ ASTM specified test points of 50, 65, 80, 100°C	
250-000-40C	40C	80C	Solvents Distillation	72 to 126°C
250-004-40C	40C	80C	40C CERTIFIED @ ASTM specified test points of 75, 90, 105, 125°C	
250-000-41C	41C	81C	Solvents Distillation	98 to 152°C
250-004-41C	41C	81C	41C CERTIFIED @ ASTM specified test points of 100, 115, 130, 150°C	
250-000-42C	42C	82C	Solvents Distillation	95 to 255°C
250-004-42C	42C	82C	42C CERTIFIED @ ASTM specified test points of 100, 150, 200, 250°C	
250-000-43C	43C	65C	Kinematic Viscosity	–51.6 to –34°C
250-004-43C	43C	65C	43C CERTIFIED @ ASTM specified test points of –50, –45, –40, –35, 0°C	
250-000-43F	43F	65F	Kinematic Viscosity	–61 to –29°F
250-004-43F	43F	65F	43F CERTIFIED @ ASTM specified test points of –60, –50, –40, –30, +32°F	
250-000-44C	44C	29C	Kinematic Viscosity @ 20C	18.5 to 21.5°C
250-004-44C	44C	29C	44C CERTIFIED @ ASTM specified test points of 0, 20, 21°C	
250-000-44F	44F	29F	Kinematic Viscosity @ 68F	66.5 to 71.5°F
250-004-44F	44F	29F	44F CERTIFIED @ ASTM specified test points of 32, 68, 70°F	
250-000-45C	45C	30C	Kinematic Viscosity @ 25C	23.6 to 26.4°C
250-004-45C	45C	30C	45C CERTIFIED @ ASTM specified test points of 0, 25, 26°C	
250-000-45F	45F	30F	Kinematic Viscosity @ 77F	74.5 to 79.5°F
250-004-45F	45F	30F	45F CERTIFIED @ ASTM specified test points of 32, 77, 79°F	
250-000-46C	46C	66C	Kinematic Viscosity @ 50C	48.6 to 51.4°C
250-004-46C	46C	66C	46C CERTIFIED @ ASTM specified test points of 0, 50, 51°C	
250-000-46F	46F	66F	Kinematic Viscosity @ 122F	119.5 to 124.5°F
250-004-46F	46F	66F	46F CERTIFIED @ ASTM specified test points of 32, 122, 124°F	

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ASTM Thermometers

Catalog Number	ASTM Designation	IP Reference	Name	Range
250-000-47C	47C	35C	Kinematic Viscosity @ 60C	58.6 to 61.4°C
250-004-47C	47C	35C	47C CERTIFIED @ ASTM specified test points of 0, 60, 61°C	
250-000-47F	47F	35F	Kinematic Viscosity @ 140F	137.5 to 142.5°F
250-004-47F	47F	35F	47F CERTIFIED @ ASTM specified test points of 32, 140, 142°F	
250-000-48C	48C	90C	Kinematic Viscosity @ 82.2C	80.6 to 83.4°C
250-004-48C	48C	90C	48C CERTIFIED @ ASTM specified test points of 0, 82.2, 83°C	
250-000-48F	48F	90F	Kinematic Viscosity @ 180F	177.5 to 182.5°F
250-004-48F	48F	90F	48F CERTIFIED @ ASTM specified test points of 32, 180, 182°F	
250-000-49C	49C	—	Stormer Viscosity	20 to 70°C
250-004-49C	49C	—	49C CERTIFIED @ ASTM specified test points of 20, 35, 50, 70°C	
250-000-50F	50F	—	Gas Calorimeter Inlet	54 to 101°F
250-004-50F	50F	—	50F CERTIFIED @ ASTM specified test points of 55, 60, 65, 70, 75, 80, 85, 90, 95, 100°F	
250-000-51F	51F	—	Gas Calorimeter Outlet	69 to 116°F
250-004-51F	51F	—	51F CERTIFIED @ ASTM specified test points of 70, 75, 80, 85, 90, 95, 100, 105, 110, 115°F	
250-000-52C	52C	—	Butadiene Boiling Point	–10 to +5°C
250-004-52C	52C	—	52C CERTIFIED @ ASTM specified test points of –10, 0, +5°C	
250-000-53C	53C	—	Benzene Freezing Pt	–0.6 to +10.4°C
250-004-53C	53C	—	53C CERTIFIED @ ASTM specified test points of 0, 5, 10°C	
250-000-54C	54C	18C	Congealing Point	20 to 100.6°C
250-004-54C	54C	18C	54C CERTIFIED @ ASTM specified test points of 20, 50, 75, 100°C	
250-000-54F	54F	18F	Congealing Point	68 to 213°F
250-004-54F	54F	18F	54F CERTIFIED @ ASTM specified test points of 70, 120, 170, 210°F	
250-000-56C	56C	—	Bomb Calorimeter	19 to 35°C
250-004-56C	56C	—	56C CERTIFIED @ ASTM specified test points of 19, 21, 23, 25, 27, 29, 31°C	
250-000-56F	56F	—	Bomb Calorimeter	66 to 95°F
250-004-56F	56F	—	56F CERTIFIED @ ASTM specified test points of 66, 70, 74, 78, 82, 88, 92, 95°F	
250-000-57C	57C	—	Tag Closed Tester Low Range	–20 to +50°C
250-004-57C	57C	—	57C CERTIFIED @ ASTM specified test points of –20, 0, 25, +50°C	
250-000-57F	57F	—	Tag Closed Tester Low Range	–4 to +122°F
250-004-57F	57F	—	57F CERTIFIED @ ASTM specified test points of –3, +32, 77, 122°F	
250-000-58C	58C	—	Tank Gauging	–34 to +49°C
250-004-58C	58C	—	58C CERTIFIED @ ASTM specified test points of –30, 0, +25, 45°C	
250-000-58F	58F	—	Tank Gauging	–30 to +120°F
250-004-58F	58F	—	58F CERTIFIED @ ASTM specified test points of –20, +32, 80, 120°F	
250-000-59C	59C	—	Tank Gauging	–18 to +82°C
250-004-59C	59C	—	59C CERTIFIED @ ASTM specified test points of 0, 25, 55, 80°C	
250-000-59F	59F	—	Tank Gauging	0 to 180°F
250-004-59F	59F	—	59F CERTIFIED @ ASTM specified test points of 32, 80, 130, 180°F	
250-000-60C	60C	—	Tank Gauging	77 to 260°C
250-004-60C	60C	—	60C CERTIFIED @ ASTM specified test points of 100, 175, 255°C	
250-000-60F	60F	—	Tank Gauging	170 to 500°F
250-004-60F	60F	—	60F CERTIFIED @ ASTM specified test points of 212, 350, 490°F	
250-000-61C	61C	63C	Petrolatum Melting Point	32 to 127°C
250-004-61C	61C	63C	61C CERTIFIED @ ASTM specified test points of 40, 60, 80, 100, 120°C	
250-000-61F	61F	—	Petrolatum Melting Point	90 to 260°F
250-004-61F	61F	—	61F CERTIFIED @ ASTM specified test points of 100, 150, 200, 250°F	
250-000-62C	62C	—	Reference Standard	–38 to +2°C
250-004-62C	62C	—	62C CERTIFIED @ ASTM specified test points of –37, –30, –20, –10, 0°C	
250-000-62F	62F	—	Reference Standard	–36 to +35°F
250-004-62F	62F	—	62F CERTIFIED @ ASTM specified test points of –35, –15, 0, +15, 32°F	

ASTM Thermometers

Catalog Number	ASTM Designation	IP Reference	Name	Range
250-000-63C	63C	—	Reference Standard	–8 to +32°C
250-004-63C	63C	—	63C CERTIFIED @ ASTM specified test points of –7, 0, +10, 20, 30°C	
250-000-63F	63F	—	Reference Standard	18 to 89°F
250-004-63F	63F	—	63F CERTIFIED @ ASTM specified test points of 20, 32, 50, 70, 88°F	
250-000-64C	64C	—	Reference Standard	25 to 55°C
250-004-64C	64C	—	64C CERTIFIED @ ASTM specified test points of 0, 25, 35, 45, 55°C	
250-000-64F	64F	—	Reference Standard	77 to 131°F
250-004-64F	64F	—	64F CERTIFIED @ ASTM specified test points of 32, 80, 95, 115, 130°F	
250-000-65C	65C	—	Reference Standard	50 to 80°C
250-004-65C	65C	—	65C CERTIFIED @ ASTM specified test points of 0, 50, 60, 70, 80°C	
250-000-65F	65F	—	Reference Standard	122 to 176°F
250-004-65F	65F	—	65F CERTIFIED @ ASTM specified test points of 32, 125, 145, 160, 175°F	
250-000-66C	66C	—	Reference Standard	75 to 105°C
250-004-66C	66C	—	66C CERTIFIED @ ASTM specified test points of 0, 75, 85, 95, 105°C	
250-000-66F	66F	—	Reference Standard	167 to 221°F
250-004-66F	66F	—	66F CERTIFIED @ ASTM specified test points of 32, 168, 185, 200, 220°F	
250-000-67C	67C	—	Reference Standard	95 to 155°C
250-004-67C	67C	—	67C CERTIFIED @ ASTM specified test points of 0, 100, 110, 130, 150°C	
250-000-67F	67F	—	Reference Standard	203 to 311°F
250-004-67F	67F	—	67F CERTIFIED @ ASTM specified test points of 32, 205, 240, 275, 310°F	
250-000-68C	68C	—	Reference Standard	145 to 205°C
250-004-68C	68C	—	68C CERTIFIED @ ASTM specified test points of 0, 150, 170, 190, 205°C	
250-000-68F	68F	—	Reference Standard	293 to 401°F
250-004-68F	68F	—	68F CERTIFIED @ ASTM specified test points of 32, 300, 340, 370, 400°F	
250-000-69C	69C	—	Reference Standard	195 to 305°C
250-004-69C	69C	—	69C CERTIFIED @ ASTM specified test points of 0, 200, 235, 270, 305°C	
250-000-69F	69F	—	Reference Standard	383 to 581°F
250-004-69F	69F	—	69F CERTIFIED @ ASTM specified test points of 32, 400, 460, 520, 580°F	
250-000-70C	70C	—	Reference Standard	295 to 405°C
250-004-70C	70C	—	70C CERTIFIED @ ASTM specified test points of 0, 300, 335, 370, 400°C	
250-000-70F	70F	—	Reference Standard	563 to 761°F
250-004-70F	70F	—	70F CERTIFIED @ ASTM specified test points of 32, 570, 640, 700, 760°F	
250-000-71C	71C	72C	Oil in Wax	–37 to +21°C
250-004-71C	71C	72C	71C CERTIFIED @ ASTM specified test points of –35, –18, 0, +20°C	
250-000-71F	71F	72F	Oil in Wax	–35 to +70°F
250-004-71F	71F	72F	71F CERTIFIED @ ASTM specified test points of –30, 0, +32, 70°F	
250-000-72C	72C	67C	Kinematic Viscosity @ –17.8C	–19.4 to –16.6°C
250-004-72C	72C	67C	72C CERTIFIED @ ASTM specified test points of –19, –17.8, 0°C	
250-000-72F	72F	67F	Kinematic Viscosity @ 0F	–2.5 to +2.5°F
250-004-72F	72F	67F	72F CERTIFIED @ ASTM specified test points of –2, 0, +32°F	
250-000-73C	73C	68C	Kinematic Viscosity @ –40C	–41.4 to –38.6°C
250-004-73C	73C	68C	73C CERTIFIED @ ASTM specified test points of –41, –40, 0°C	
250-000-73F	73F	68F	Kinematic Viscosity @ –40F	–42.5 to –37.5°F
250-004-73F	73F	68F	73F CERTIFIED @ ASTM specified test points of –42, –40, +32°F	
250-000-74C	74C	69C	Kinematic Viscosity @ –53.9C	–55.4 to –52.6°C
250-004-74C	74C	69C	74C CERTIFIED @ ASTM specified test points of –55, –53.9, 0°C	
250-000-74F	74F	69F	Kinematic Viscosity @ –65F	–67.5 to –62.5°F
250-004-74F	74F	69F	74F CERTIFIED @ ASTM specified test points of –67, –65, +32°F	
250-000-75F	75F	—	Coolant Freezing Point	–35 to +35°F
250-004-75F	75F	—	75F CERTIFIED @ ASTM specified test points of –35, 0, +32°F	

Koehler now offers mercury-free, liquid-in-glass thermometers that have the performance of mercury. Please contact Koehler Customer Service for availability of non-mercury type thermometer of interest. Please note, not all ASTM thermometers are available as non-mercury type.

ASTM Thermometers

Catalog Number	ASTM Designation	IP Reference	Name	Range
250-000-76F	76F	—	Coolant Freezing Point	–65 to +5°F
250-004-76F	76F	—	76F CERTIFIED @ ASTM specified test points of –65, –30, +32°F	
250-000-77F	77F	—	Saybolt Viscosity	245 to 265°F
250-004-77F	77F	—	77F CERTIFIED @ ASTM specified test points of 250, 260°F	
250-000-78F	78F	—	Saybolt Viscosity	295 to 315°F
250-004-78F	78F	—	78F CERTIFIED @ ASTM specified test points of 300, 310°F	
250-000-79F	79F	—	Saybolt Viscosity	345 to 365°F
250-004-79F	79F	—	79F CERTIFIED @ ASTM specified test points of 350, 360°F	
250-000-80F	80F	—	Saybolt Viscosity	395 to 415°F
250-004-80F	80F	—	80F CERTIFIED @ ASTM specified test points of 400, 410°F	
250-000-81F	81F	—	Saybolt Viscosity	445 to 465°F
250-004-81F	81F	—	81F CERTIFIED @ ASTM specified test points of 450, 460°F	
250-000-82C	82C	—	Fuel Rating, Engine	–15 to +105°C
250-004-82C	82C	—	82C CERTIFIED @ ASTM specified test points of 0, 50, 100°C	
250-000-82F	82F	—	Fuel Rating, Engine	0 to 220°F
250-004-82F	82F	—	82F CERTIFIED @ ASTM specified test points of 32, 100, 200°F	
250-000-83C	83C	—	Fuel Rating, Air	15 to 70°C
250-004-83C	83C	—	83C CERTIFIED @ ASTM specified test points of 25, 70°C	
250-000-83F	83F	—	Fuel Rating, Air	60 to 160°F
250-004-83F	83F	—	83F CERTIFIED @ ASTM specified test points of 85, 135°F	
250-000-84C	84C	—	Fuel Rating, Orifice	25 to 80°C
250-004-84C	84C	—	84C CERTIFIED @ ASTM specified test points of 30, 80°C	
250-000-84F	84F	—	Fuel Rating, Orifice	75 to 175°F
250-004-84F	84F	—	84F CERTIFIED @ ASTM specified test points of 100, 150°F	
250-000-85C	85C	—	Fuel Rating, Surge	40 to 150°C
250-004-85C	85C	—	85C CERTIFIED @ ASTM specified test points of 50, 150°C	
250-000-85F	85F	—	Fuel Rating, Surge	100 to 300°F
250-004-85F	85F	—	85F CERTIFIED @ ASTM specified test points of 150, 250°F	
250-000-86C	86C	—	Fuel Rating, Mix	95 to 175°C
250-004-86C	86C	—	86C CERTIFIED @ ASTM specified test points of 100, 175°C	
250-000-86F	86F	—	Fuel Rating, Mix	200 to 350°F
250-004-86F	86F	—	86F CERTIFIED @ ASTM specified test points of 225, 325°F	
250-000-87C	87C	—	Fuel Rating, Coolant	150 to 205°C
250-004-87C	87C	—	87C CERTIFIED @ ASTM specified test points of 160, 200°C	
250-000-87F	87F	—	Fuel Rating, Coolant	300 to 400°F
250-004-87F	87F	—	87F CERTIFIED @ ASTM specified test points of 300, 400°F	
250-000-88C	88C	—	Vegetable Oil Flash	10 to 200°C
250-004-88C	88C	—	88C CERTIFIED @ ASTM specified test points of 40, 100, 150, 200°C	
250-000-88F	88F	—	Vegetable Oil Flash	50 to 392°F
250-004-88F	88F	—	88F CERTIFIED @ ASTM specified test points of 110, 212, 300, 392°F	
250-000-89C	89C	—	Solidification Point	–20 to +10°C
250-004-89C	89C	—	89C CERTIFIED @ ASTM specified test points of –20, –10, 0, +10°C	
250-000-90C	90C	—	Solidification Point	0 to 30°C
250-004-90C	90C	—	90C CERTIFIED @ ASTM specified test points of 0, 10, 20, 30°C	
250-000-91C	91C	—	Solidification Point	20 to 50°C
250-004-91C	91C	—	91C CERTIFIED @ ASTM specified test points of 20, 30, 40, 50°C	
250-000-92C	92C	—	Solidification Point	40 to 70°C
250-004-92C	92C	—	92C CERTIFIED @ ASTM specified test points of 40, 50, 60, 70°C	
250-000-93C	93C	—	Solidification Point	60 to 90°C
250-004-93C	93C	—	93C CERTIFIED @ ASTM specified test points of 60, 70, 80, 90°C	

ASTM Thermometers

Catalog Number	ASTM Designation	IP Reference	Name	Range
250-000-94C	94C	—	Solidification Point	80 to 110°C
250-004-94C	94C	—	94C CERTIFIED @ ASTM specified test points of 80, 90, 100, 110°C	
250-000-95C	95C	—	Solidification Point	100 to 130°C
250-004-95C	95C	—	95C CERTIFIED @ ASTM specified test points of 100, 110, 120, 130°C	
250-000-96C	96C	—	Solidification Point	120 to 150°C
250-004-96C	96C	—	96C CERTIFIED @ ASTM specified test points of 120, 130, 140, 150°C	
250-000-97C	97C	—	Tank Gauging	–18 to +49°C
250-004-97C	97C	—	97C CERTIFIED @ ASTM specified test points of –15, 0, +20, 45°C	
250-000-97F	97F	—	Tank Gauging	0 to 120°F
250-004-97F	97F	—	97F CERTIFIED @ ASTM specified test points of 0, 32, 70, 110°F	
250-000-98C	98C	—	Tank Gauging	16 to 82°C
250-004-98C	98C	—	98C CERTIFIED @ ASTM specified test points of 20, 40, 60, 80°C	
250-000-98F	98F	—	Tank Gauging	60 to 180°F
250-004-98F	98F	—	98F CERTIFIED @ ASTM specified test points of 60, 100, 140, 180°F	
250-000-99C	99C	—	Weathering Test	–50 to +5°C
250-004-99C	99C	—	99C CERTIFIED @ ASTM specified test points of –46, –32, –18, 0°C	
250-000-99F	99F	—	Weathering Test	–58 to +41°F
250-004-99F	99F	—	99F CERTIFIED @ ASTM specified test points of –50, –25, 0, +32°F	
250-000-100C	100C	—	Solidification Point	145 to 205°C
250-004-100C	100C	—	100C CERTIFIED @ ASTM specified test points of 145, 165, 185, 205°C	
250-000-101C	101C	—	Solidification Point	195 to 305°C
250-004-101C	101C	—	101C CERTIFIED @ ASTM specified test points of 200, 250, 300°C	
250-000-102C	102C	83C	Solvents Distillation	123 to 177°C
250-004-102C	102C	83C	102C CERTIFIED @ ASTM specified test points of 125, 140, 155, 175°C	
250-000-103C	103C	84C	Solvents Distillation	148 to 202°C
250-004-103C	103C	84C	103C CERTIFIED @ ASTM specified test points of 150, 165, 180, 200°C	
250-000-104C	104C	85C	Solvents Distillation	173 to 227°C
250-004-104C	104C	85C	104C CERTIFIED @ ASTM specified test points of 175, 190, 205, 225°C	
250-000-105C	105C	86C	Solvents Distillation	198 to 252°C
250-004-105C	105C	86C	105C CERTIFIED @ ASTM specified test points of 200, 215, 230, 250°C	
250-000-106C	106C	87C	Solvents Distillation	223 to 277°C
250-004-106C	106C	87C	106C CERTIFIED @ ASTM specified test points of 225, 240, 255, 275°C	
250-000-107C	107C	88C	Solvents Distillation	248 to 302°C
250-004-107C	107C	88C	107C CERTIFIED @ ASTM specified test points of 250, 265, 280, 300°C	
250-000-108F	108F	—	Saybolt Viscosity	270 to 290°F
250-004-108F	108F	—	108F CERTIFIED @ ASTM specified test points of 275, 285°F	
250-000-109F	109F	—	Saybolt Viscosity	320 to 340°F
250-004-109F	109F	—	109F CERTIFIED @ ASTM specified test points of 325, 335°F	
250-000-110C	110C	93C	Kinematic Viscosity @ 135C	133.6 to 136.4°C
250-004-110C	110C	93C	110C CERTIFIED @ ASTM specified test points of 0, 135, 136°C	
250-000-110F	110F	—	Kinematic Viscosity @ 275F	272.5 to 277.5°F
250-004-110F	110F	—	110F CERTIFIED @ ASTM specified test points of 32, 275, 277°F	
250-000-111C	111C	—	Tar Acid Distillation	170 to 250°C
250-004-111C	111C	—	111C CERTIFIED @ ASTM specified test points of 170, 200, 250°C	
250-000-112C	112C	—	Solidification Benzene	4 to 6°C
250-004-112C	112C	—	112C CERTIFIED @ ASTM specified test points of 0, 4, 5, 6°C	
250-000-113C	113C	89C	Bituminous Materials Softening Point	–1 to +175°C
250-004-113C	113C	89C	113C CERTIFIED @ ASTM specified test points of 0, 50, 100, 150, 175°C	
250-000-113F	113F	89F	Bituminous Materials Softening Point	30 to 350°F
250-004-113F	113F	89F	113F CERTIFIED @ ASTM specified test points of 32, 122, 212, 302, 347°F	

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ASTM Thermometers

Catalog Number	ASTM Designation	IP Reference	Name	Range
250-000-114C	114C	14C	Aviation Fuel Freezing Point	–80 to +20°C
250-004-114C	114C	14C	114C CERTIFIED @ ASTM specified test points of –75, –60, –40, 0°C	
250-000-114F	114F	—	Aviation Fuel Freezing Point	–112 to +70°F
250-004-114F	114F	—	114F CERTIFIED @ ASTM specified test points of –103, –76, –40, +32°F	
250-000-115C	115C	—	Beckman Differential	0 to 6°C CERTIFICATION DOES NOT APPLY
250-000-116C	116C	—	Bomb Colorimeter	18.9 to 25.1C°
250-004-116C	116C	—	116C CERTIFIED @ ASTM specified test points of 19, 20, 21, 22, 23, 24, 25°C	
250-000-117C	117C	—	Bomb Calorimeter	23.9 to 30.1°C
250-004-117C	117C	—	117C CERTIFIED @ ASTM specified test points of 24, 25, 26, 27, 28, 29, 30°C	
250-000-118C	118C	—	Kinematic Viscosity @ 30C	28.6 to 31.4°C
250-004-118C	118C	—	118C CERTIFIED @ ASTM specified test points of 0, 30, 31°C	
250-000-118F	118F	—	Kinematic Viscosity @ 86F	83.5 to 88.5°F
250-004-118F	118F	—	118F CERTIFIED @ ASTM specified test points of 32, 86, 88°F	
250-000-119C	119C	—	Coolant Freezing Point	–38.3 to –30°C
250-004-119C	119C	—	119C CERTIFIED @ ASTM specified test points of –38, –30, 0°C	
250-000-119F	119F	—	Coolant Freezing Point	–37 to –22°F
250-004-119F	119F	—	119F CERTIFIED @ ASTM specified test points of –36, –22, +32°F	
250-000-120C	120C	92C	Kinematic Viscosity @ 40C	38.6 to 41.4°C
250-004-120C	120C	92C	120C CERTIFIED @ ASTM specified test points of 0, 40, 41°C	
250-000-121C	121C	32C	Kinematic Viscosity @ 100C	98.6 to 101.4°C
250-004-121C	121C	32C	121C CERTIFIED @ ASTM specified test points of 0, 100, 101°C	
250-000-122C	122C	94C	Brookfield Viscosity	–45 to –35°C
250-004-122C	122C	94C	122C CERTIFIED @ ASTM specified test points of –45, –40, -35°C	
250-000-123C	123C	95C	Brookfield Viscosity	–35 to –25°C
250-004-123C	123C	95C	123C CERTIFIED @ ASTM specified test points of –35, –30, -25°C	
250-000-124C	124C	96C	Brookfield Viscosity	–25 to –15°C
250-004-124C	124C	96C	124C CERTIFIED @ ASTM specified test points of –25, –20, –15°C	
250-000-125C	125C	97C	Brookfield Viscosity	–15 to –5°C
250-004-125C	125C	97C	125C CERTIFIED @ ASTM specified test points of –15, –10, –5°C	
250-000-126C	126C	71C	Kinematic Viscosity @ –26.1C	–27.4 to –24.6°C
250-004-126C	126C	71C	126C CERTIFIED @ ASTM specified test points of –27, -26.1, 0°C	
250-000-126F	126F	71F	Kinematic Viscosity @ –15F	–17.5 to –12.5°F
250-004-126C	126F	71F	126F CERTIFIED @ ASTM specified test points of –17, –15, +32°F	
250-000-127C	127C	99C	Kinematic Viscosity @ -20C	–21.4 to –18.6°C
250-004-127C	127C	99C	127C CERTIFIED @ ASTM specified test points of –21, –20, 0°C	
250-000-128C	128C	33C	Kinematic Viscosity @ 0C	–1.4 to +1.4°C
250-004-128C	128C	33C	128C CERTIFIED @ ASTM specified test points of 0, 1°C	
250-000-128F	128F	33F	Kinematic Viscosity @ 32F	29.5 to 34.5°F
250-004-128F	128F	33F	128F CERTIFIED @ ASTM specified test points of 32, 34°F	
250-000-129C	129C	36C	Kinematic Viscosity @ 93.3C	91.6 to 94.4°C
250-004-129C	129C	36C	129C CERTIFIED @ ASTM specified test points of 0, 93.3, 94°C	
250-000-129F	129F	36F	Kinematic Viscosity @ 200F	197.5 to 202.5°F
250-004-129F	129F	36F	129F CERTIFIED @ ASTM specified test points of 32, 200, 202°F	
250-000-130C	130C	—	Tank Gauging	–7 to +105°C
250-004-130C	130C	—	130C CERTIFIED @ ASTM specified test points of 0, 35, 70, 105°C	
250-000-130F	130F	—	Tank Gauging	20 to 220°F
250-004-130F	130F	—	130F CERTIFIED @ ASTM specified test points of 32, 100, 160, 220°F	
250-000-132C	132C	—	Kinematic Viscosity @ 150C	148.6 to 151.4°C
250-004-132C	132C	—	132C CERTIFIED @ ASTM specified test points of 0, 150, 151°C	

Glass Apparatus for ASTM Test Methods

C70 Determination of the Percentage of Voids and Surface Moisture in Fine Aggregates

K00C70 Specific Gravity Flask, Chapman, graduated at 200mL and 375-450mL

C128 Determination of Specific Gravity of Hydraulic Cement, Sand, Powdered Materials

K0C128 Specific Gravity Flask, Le Chatelier, 250mL, 17mL Bulb, Graduated Neck

C135 Determination of Specific Gravity of Pigments, Drying Oils, Varnishes, Resins, etc.

KD0C135-10 Pycnometer, 10mL, with Thermometer and Cap
KD0C135-25 Pycnometer, 25mL, with Thermometer and Cap
KD0C135-50 Pycnometer, 50mL, with Thermometer and Cap
KD0C135-100 Pycnometer, 100mL, with Thermometer and Cap

C188 Determination of Specific Gravity of Hydraulic Cement, Sand, Other Powdered Materials

K0C128 Specific Gravity Flask, Le Chatelier, 250mL, 17mL Bulb, Graduated Neck

D20 Distillation of Bituminous Products

K00D20-300 Flask, Distillation, 300mL, Side Arm, 10mm ID x 220mm
K00D20-500 Flask, Distillation, 500mL, Side Arm, 10mm ID x 220mm

D29 Analysis of Dry Shellac and Shellac Varnishes

K00D29-125 Iodine Flask, 125mL, S/T 24/40 Mercury Seal w/Hollow Stopper
K00D29-250 Iodine Flask, 250mL, S/T 24/40 Mercury Seal w/Hollow Stopper
K00D29-300 Iodine Flask, 300mL, S/T 24/40 Mercury Seal w/Hollow Stopper
K00D29-500 Iodine Flask, 500mL, S/T 24/40 Mercury Seal w/Hollow Stopper
K00D29-1000 Iodine Flask, 1000mL, S/T 24/40 Mercury Seal w/Hollow Stopper

D70 Specific Gravity and Density of Semi-Solid Bituminous Materials

K00D70 Pycnometer Bottle, 24-30mL, Uncalibrated

D115 Determination of Specific Gravity of Solid (Bituminous) Materials, Asphalt Cements, and Soft Tar Pitches

K0D115-750 Specific Gravity Flask, 750mL, w/Capillary Stem and Cap
K0D115-750 Specific Gravity Flask, 1000mL, w/Capillary Stem and Cap`

D153 Determination of Specific Gravity of Pigments, Drying Oils, Varnishes, Resins, etc.

K0C135-10 Pycnometer, 10mL, with Thermometer and Cap
K0C135-25 Pycnometer, 25mL, with Thermometer and Cap
K0C135-50 Pycnometer, 50mL, with Thermometer and Cap
K0C135-100 Pycnometer, 100mL, with Thermometer and Cap

D215 Determination of Carbon Dioxide and Sulfur Dioxide in Carbonates

K0D215 Alkalimeter, Knorr, 250mL Flask, S/T 24/40 and S/T 16

D297 Direct Determination of Isoprene Polymer Using Heating Mantles.

K0D297 Rubber Distillation System consisting of 500mL Steam Generating Flask, 100mL Digestion Flask, Claisen Head, Spray Bulb, Condensing Adapter, two 500mL Receiving Flasks, and Condenser (supplied **without heat mantles**)

D301 Determination of Consistency of Soluble Nitrocellulose by Falling Ball Method

K0D301 Falling Ball Viscosity Tube, 1" x 14", graduated 10" apart, with 5 Steel Balls, .312" OD

D322 Determination of Dilution in Crankcase Oil

K0D322-5 Distillation Receiver, S/T 24/40, graduated 5mL in 0.1mL divisions
K0D322-12 Distillation Receiver, S/T 24/40, graduated 12.5mL x 0.1 divisions

D369 Determination of Specific Gravity

K0D369-1 Specific Gravity Bottle, Gas-Lussac, 1mL, Unadjusted
K0D369-2 Specific Gravity Bottle, Gas-Lussac, 2mL, Unadjusted
K0D369-5 Specific Gravity Bottle, Gas-Lussac, 5mL, Unadjusted
K0D369-10 Specific Gravity Bottle, Gas-Lussac, 10mL, Unadjusted

D402 Distillation of Cut-Back Asphaltic (Bituminous) Products

K0D402-F Flask, Distillation, 500mL, Side arm 13x220mm
K0D402-C Condenser, Liebig, Plain, 300mm
K0D402-A Adapter, Glass, 105 Degree, 18mm ID x 5mm ID

D422 Soil Testing Hydrometer Cylinders

K0D422-1000 Hydrometer Cylinder, 1000mL TC, 460mm tall
K0D422-1205 Hydrometer Cylinder, graduated 1130 and 1205mL, 460mm tall

D453 Determination of Tar Acid

K0D453 Separatory Funnel, Tar Acid, S/T 19 Stopper, 2mm Stopcock, Graduated Stem between Bulbs, 65 to 100mL in 0.2mL divisions

D555 Iodine Determination

K00D29-125 Iodine Flask, 125mL, S/T 24/40 Mercury Seal w/Hollow Stopper
K00D29-250 Iodine Flask, 250mL, S/T 24/40 Mercury Seal w/Hollow Stopper
K00D29-300 Iodine Flask, 300mL, S/T 24/40 Mercury Seal w/Hollow Stopper
K00D29-500 Iodine Flask, 500mL, S/T 24/40 Mercury Seal w/Hollow Stopper
K00D29-1000 Iodine Flask, 100mL, S/T 24/40 Mercury Seal w/Hollow Stopper

D565 Carbonizable Substances in White Mineral Oil

K0D565 Test Tube, Ground Stopper, 15x140, graduated 5 and 10mL

D612 Carbonizable Substances in Parafin Wax

K0D565 Test Tube, Ground Stopper, 15x140, graduated 5 and 10mL

D789 Determination of Relative Viscosity of Polymer Solution in Formic Acid Solution

K0D789 Viscometry Apparatus, consisting of 25mL Pipette, 50mL Flask with S/T 19/22 joints, and Pipette Adapter

Glass Apparatus for ASTM Test Methods

D848 Acid Wash Color of Industrial Aromatic Hydrocarbons

K0D848-A	Sample Bottle, 1 ounce capacity, flat bottom, square, glass stoppered and graduated at 7mL and 28mL
K0D848-B	Individual Color Standard Bottle, 1 ounce capacity, flat bottom, square, glass stoppered, with a Specified number (0-14)
K0D848-C	Set of Fifteen (15) Color Standard Bottles numbered 0-14, empty
K0D848-D	Individual Color Standard Bottle, filled with specific number solution
K0D848-E	Set of Fifteen(15) Color Standard bottles (0-14) filled
K0D848-F	Color Standard Set with Case, lighted white plexiglass, full set of color standards sealed in bottles, and two sample bottles

D854 Determination of Specific Gravity

K0D369-1	Specific Gravity Bottle, Gas-Lussac, 1mL, Unadjusted
K0D369-2	Specific Gravity Bottle, Gas-Lussac, 2mL, Unadjusted
K0D369-5	Specific Gravity Bottle, Gas-Lussac, 5mL, Unadjusted
K0D369-10	Specific Gravity Bottle, Gas-Lussac, 10mL, Unadjusted

D888 Determination of Dissolved Oxygen in Water

K0D888	Gas Collecting Tube, McLean type, 500mL, 3mm Stopcocks, graduated 2mL on Tube Ends

D889 Determination of Volatile Oil in Rosin

K0D889	Distillation Receiver, 5mL in 0.1mL divisions, S/T 24/40

D891 Determination of Specific Gravity of Liquid Chemicals, Halogenated Organic Solvents,Ethylene Glycols, Propylene Glycols

K0D891-25	Specific Gravity Bottle for Volatile Liquids, 25mL, Jacketed
K0D891-50	Specific Gravity Bottle for Volatile Liquids, 50mL, Jacketed

D914 Testing Ethylcellulose and Methylcellulose

K0D914	Apparatus for Testing Ethylcellulose

D941 Density and Relative Density (Specific Gravity) of Liquids by Lipkin Bicapillary Pycnometer

K0D941	Pycnometer, side-arm type, 4.5 ±0.5mL, Weight less than 30g

D1015 Freezing Points of High Purity Hydrocarbons

KD1015-FT	Freezing Point Tube, Glass, with Hi-Vac Stopcock

D1016 Purity of Hydrocarbons from Freezing Points

KD1015-AS	Apparatus for Obtaining Sample, consisting of Dewar Flask, 50mL Condensing Tube, 3-way Stopcock, and Connecting Tubes 10mm OD with S/J 18/7 Ball and Socket Joints
KD1015-NG	Distilling Apparatus for Gaseous Substances, consisting of two Dewar Flasks, Distilling Tube, and Receiver
KD1015-NL	Distilling Apparatus for Normally Liquid Substances, consisting of Dewar Flask, Receiver, and 200mL Flask with Cap

D1018 Hydrogen in Petroleum Fractions

KD1018-A	Absorber Only, Turner Type
KD1018-B	Lamp Burner, S/T 14/20 Joints, Concentric Tubes
KD1018-CH	Hydrogen Determination Chimney
KD1018-D-1	Erlenmeyer Flask, 14/10 S/T Outer Joint, 25mL
KD1018-D-2	Standard Burner, 14/10 S/T Inner Joints
KD1018-D-3	Chimney for Lamp Hydrogen Apparatus
KD1018-E	Absorption Bulbs
KD1018-F	Drierite U-Tube

D1065 Determination of Unsaponifiable Matter In Gum and Wood Rosin

KD1065	Extraction Apparatus, Ether, S/T 24/40, 400mm Condenser, 250mL Flask

D1072 Total Sulfur in Fuel Gases

KD1072-B	Burner, S/T 14/10 Joint, Gas
KD1266-C	Chimney, S/T 14/10 and S/T 24/40 Joints
KD1266-A	Absorber, S/T 24/40 Joints, Parallel Chambers, AU Shape
KD1266-ST	Spray Trap, S/T 24/40 Joint, 65mm OD

D1091 Phosphorus Lubricating Oils s in And Additives

KD1091	Flask, Kjeldahl, Digestion, 300mL, with Ground Glass Stopper

D1093 Centrifuge Tube, 100mL

K00D96-8	Centrifuge Tube, Conical, A8-Inch (203mm), 100mL

D1120 Determination of Equilibrium Boiling Point of Engine Antifreezes Miscible With Water

KD1120	Distillation Apparatus, 100mL Flask, 200mm Condenser, S/T 19/38

D1168 Testing Hydrocarbon Waxes for Electrical Insulation

KD1168	Dilatometer, 0-2mL in 0.02mL divisions, S/T 14/20 Joint, 2mm Stopcock

D1173 Test For Foaming Properties of Surface-Active Agents

KD1173	Pour Foam Test Apparatus, Ross-Miles, 200mL Pipette, Receiver graduated at 50mL and 250mL, Teflon Stopcocks, 2mm and 6mm Bore, Jacketed

D1217 Density and Relative Density of Liquids By Bingham Pycnometer

KD1217-P	Pycnometer, Bingham type, Stoppered, 25mL 1.0 - 1.1mm neck
KD1217-PC	Pycnometer Cleaning Apparatus, Hot Chromic Acid, consisting of 3-way Stopcock with Joint Inside Chamber

D1266 Sulfur in Petroleum Products (Lamp)

KD1266-A	Absorber, S/T 24/40 Joints, Parallel Chambers, AU shape
KD1266-C	Chimney, S/T 14/10 and S/T 24/40 Joints
KD1266-ST	Spray Trap, S/T 24/40 Joint, 65mm OD
KD1266-SF	Standard Flask, 25mL, S/T 14/10 Joint, with Hooks
KD1266-FA	Flask for Aromatic Samples with Side Arm
KD1266-SB	Standard Burner, S/T 14/10 Joints
KD1266-BA	Burner for Aromatic Samples

D1347 Standard Method of Testing Methylcellulose

KD914	Apparatus for Testing Ethylcellulose

D1394 Jones-Blair Reductor

KD1394	Column, Jones-Blair Reductor, 19mm ID x 450mm Long, 4mm stpk

Glass Apparatus for ASTM Test Methods

D1480 Density and Relative Density of Viscous Materials by Bingham Pycnometer

KD1480 Pycnometer, Bingham Type, Stoppered, 2mm ID neck, 10mL

D1481 Density and Relative Density of Viscous Materials by Lipkin Bicapillary Pycnometer

KD1481 Pycnometer, Side-Arm Type, Weight less than 35 grams, 10mL

D1505 Density Gradient Determination

KD1505-C Density Gradient Column, Jacketed, 38mm ID x 44" long
KD1505-F Density Float (specify exact density and color identification)

D1541 Iodine Flasks

K00D29-125 Iodine Flask, 125mL, S/T 24/40 Mercury Seal w/Hollow Stopper
K00D29-250 Iodine Flask, 250mL, S/T 24/40 Mercury Seal w/Hollow Stopper
K00D29-300 Iodine Flask, 300mL, S/T 24/40 Mercury Seal w/Hollow Stopper
K00D29-500 Iodine Flask, 500mL, S/T 24/40 Mercury Seal w/Hollow Stopper
K00D29-1000 Iodine Flask, 1000mL, S/T 24/40 Mercury Seal w/Hollow Stopper

D1607 Sampling Nitrogen Dioxide in Small Concentrations

KD1607 Gas Bubbler Apparatus, S/T 29/42, S/J 18/7, Coarse Pencil Frit

D1638 Specific Gravity of Pigments, Drying Oils, Varnishes, Resins, etc.

K0C135-10 Pycnometer, 10mL, with Thermometer and Cap
K0C135-25 Pycnometer, 25mL, with Thermometer and Cap
K0C135-50 Pycnometer, 50mL, with Thermometer and Cap
K0C135-100 Pycnometer, 100mL, with Thermometer and Cap

D1839 Amyl Nitrate in Diesel Fuels

KD1839-F Flask, Distilling, 300mL, S/T 24/40 Joint
KD1839-DC Distillate Collector, S/T 24/40 Joints
KD1839-C Condenser, Allihn, 300mm, S/T 24/40 Joint
KD1839-VF Volumetric Flask, 100mL, Stoppered
KD1839-FF Funnel for Volumetric Flask

D1949 Separation of Tetraethyllead and Tetramethyllead in Gasoline

KD1949-F Flask, 200mL, S/T 24/40 Joint
KD1949-DC Distilling Column, 12mm IDx300, Vacuum Jacketed (w/o Beads)
KD1949-C Condenser, Liebig type, S/T 10/30 Top Joint, 100mm

D1963 Specific Gravity of Pigments, Drying Oils, Varnishes, Resins, etc.

K0C135-10 Pycnometer, 10mL, with Thermometer and Cap
K0C135-25 Pycnometer, 25mL, with Thermometer and Cap
K0C135-50 Pycnometer, 50mL, with Thermometer and Cap
K0C135-100 Pycnometer, 100mL, with Thermometer and Cap

D1966 Determination of Water and Sediment By Centrifuge Method

KD1966 Centrifuge Tube, Pear-Shape, 100mL with Lower Stem Graduated to 1.5mL in 0.1mL divisions

D2001 Depentanization of Gasoline and Naphthas

KD2001-A Distillation Column, Jacketed, 13mm ID
KD2001-B Reflux Condenser Head for Distillation Column
KD2001-C Trap for Light End Depentanization
KD2001-D Receiver, Graduated, 12.5mL, S/T 19/38 Male Joint
KD2001-E Dewar Flask, for Immersion of Receiver
KD2001-F Flask, Distilling, 100mL, R.B., S/T 24/40 Joint

D2002 Isolation of Representative Saturates Fractions from Low-Olefinic Petroleum Naphthas

KD2002-C-1 Alternate Analytical Absorption Column, w/top adapter
KD2002-C Absorption Column, Analytical, Water Jacketed
KD2002-ER Eluant Reservoir, 250mL, S/J 28/15 Joints with Stopper
KD2002-R Receiver, 10mL with TFE Stopcock and S/T 14/35 Joint

D2003 Isolation of Representative Saturates Fraction from High-Olefinic Petroleum Naphthas

KD2003-AC Absorption Column, Water Jacketed, S/J 28/15 and S/T 14/35 Joints
KD2003-R Receiver, Graduated, 10mL, S/T 14/35 Joint, TFE Stopcock

D2007 Characteristic Groups in Rubber Extender and Processing Oils and other Petroleum-Derived Oils by the Clay-Gel Absorption Chromatographic Method

KD2007-C Clay-Gel Percolating Column (2 required), S/T 24/40, Fritted Disc
KD2007-F Distillation Flask, 3-neck, 500mL, S/T 24/40 Joint, for Extraction
KD2007-H Distillation Head with Vigreaux Column, S/T 24/40, TFE Stopcock
KD2007-CT Connecting Tube from Flask to Column, S/T 24/40 *(If ordered with Flask, Head, and Column, Tube can be supplied custom fitted. Otherwise user must heat glass tube to soften and align and conform to fit properly, or install a flexible connection device such as teflon bellows or slip-fit teflon tubing sleeve).*
KD2007-RC Reflux Condenser, S/T 24/40, Friedrichs
KD2007-B Beaker, Anticreep, 150mL
KD2007-APC Azobenzene Percolation Column, 12x600mm, 125mL Reservoir
KD2007-MV Teflon Metering Stopcock for Azobenzene Percolation Column

D2036 Determination of Cyanides in Water

KD2036 Complete Distillation Apparatus, consisting of 1000mL 2-neck Flask, Cold Finger Condenser, Absorber Trap, Inlet Tube

D2111 Determination of Specific Gravity of Liquid Chemicals, Halogenated Organic Solvents Ethylene Glycols and Propylene Glycols

K0D891-25 Specific Gravity Bottle for Volatile Liquids, 25mL, Jacketed
K0D891-50 Specific Gravity Bottle for Volatile Liquids, 50mL, Jacketed

D2162 Basic Calibration of Master Viscometers And Viscosity Oil Standards

KD2162-C1 Cannon Master Viscometer, Approximately 0.001-0.003cSt/s
KD2162-C3 Cannon Master Viscometer, Approximately 0.003-0.009cSt/s
KD2162-U1 Ubbelohde Master Viscometer, Approximately 0.001-0.003cSt/s
KD2162-U3 Ubbelohde Master Viscometer, Approximately 0.003-0.009cSt/s

Glass Apparatus for ASTM Test Methods

D2184 Determination of Isotopic Concentration of Heavy Water.

KD2184-P Pycnometer, 25mL, S/T 7/15 Stopper
KD2184-MS2 Matched Set of two Pycnometers

D2352 Determination of Carbon Dioxide and Sulfur Dioxide in Carbonates

K0D215 Alkalimeter, Knorr, 250mL Flask, S/T 24/40 and S/T 16

D2363 Testing of Hydroxpropyl Methylcellulose

KD2363 Complete apparatus for Steam Distillation including Steam Boiler Tube with Inlet Adapter, 25mL Boiling Flask with Side Neck, Vigreaux Column, 110mm long Liebig Type Condenser, and Vertical Adapter for delivery (S/T 14/20 Joints) (boiler has S/T 24/40 joints)

D2385 Hydrogen Sulfide and Mercaptan Sulfur In Natural Gas (Cadmium Sulfate Iodometric Titration Method)

KD2385-GWB Gas Washing Bottle, 70x280mm, Coarse Fritted Disc, S/T 24/40
KD2385-ST Spray Trap, S/T 24/40 Joint, 65mm OD Bulb

D2420 Hydrogen Sulfide in LP Gases by Lead Acetate Method

KD2420 Apparatus including Cylinder, Stoppers, Watch Glass and Glass Rod

D2533 Vapor-Liquid Ratio of Spark-Ignition Engine Fuels

KD2533 Buret, Vapor-Liquid Ratio, Graduated 0 - 35mL

D2549 Separation of Representative Aromatics and Nonaromatics Fractions of High-Boiling Oils by Elution Chromatography

KD2549-C2 Chromatographic Column, 10x760mm, 100mL bulb, for 2 gram
KD2549-C10 Chromatographic Column, 15x1150mm, 200mL bulb, for 10 gram

D2569 Distillation of Pitch

KD2569-F Flask, Distillation, 300mLx131mm tall w/side arm 10x220mm
KD2569-F Condenser, Air, 13x360mm

D2619 Hydrolytic Stability of Hydraulic Fluids (Beverage Bottle Method)

K00D96-8 Centrifuge Tube, Conical, A8-Inch (203mm), 100mL

D2717 Thermal Conductivity of Liquids

KD2717 Thermal Conductivity Cell, Platinum Resistance Thermometer

D2748 Determination of Pyridine Bases in Acids

KD2748 Distillation Apparatus Consisting of 1000mL Boiling Flask, Bulb Trap Adapter, Connection Adapter, 600mm Liebig Type Condenser, and Lower Drip Adapter, S/T 24/40 Joints

D2780 Solubility of Fixed Gases in Liquids

KD2780-PS Ambient Pressure Saturator, Glass, 1000mL, S/T 27 Joint, PTFE Stopcock w/O-Rings, Upper Head for Gas Inlet, Outlet and Dispersion Element, and Heating Mantel and Thermocouple wire x 6 ft long
KD2780-ES Gas Extraction System consisting of KD2780-ES1 through KD2780-ES7
KD2780-ES1 Reflux Condenser, Liebig, S/T 24/40, 300mm
KD2780-ES2 Gas Extraction Chamber, 60 x 280mm, S/J 12/2 Joints
KD2780-ES3 Boiler Flask, 500mL, Round Bottom, S/J 35/25 Socket Joint, with Adapter, 35/25 x 12/2 S/J Joint
KD2780-ES4 Gas Buret, Water Jacketed, 100mL, with 3-Way, TEE Bore Stopcock and S/J 12/2 Joint
KD2780-ES5 Leveling Bulb, 500mL
KD2780-ES6 Connecting Manifold with 3 - TFE 120 Degree Stopcocks
KD2780-ES7 Manometer, Open End, 1-Meter, S/J 12/2 Connection

D2879 Vapor Pressure-Temperature Relationship and Initial Decomposition Temperature of Liquids by Isoteniscope

KD2879 Isoteniscope Pressure Manometer, 8mm Od x 500mm w/bulb

D2886 Vacuum Trap

KD2886 Vacuum Trap, 22x125mm, Inlet & Outlet Arms 10mm OD

D2892 Distillation of Crude Petroleum (15- Theoretical Plate Column)

Quotations submitted on request. Specify Type, Scale, and Sizes of Components Required.

D2910 Extraction Apparatus

KD2910 Complete Extraction Apparatus consisting of 3000 mL Solvent Flask, Extractor Body with Extraction Chamber, Siphon Tube, Removable Filter and Top Lid, and Allihn Condenser 250mm. Joints are S/T 45/50

D2912 Oxidant Content of Atmosphere

KD2912 Impinger, Midget, S/T 24/40, 25mm Body, 5mm Inlet, 1mm Nozzle, Body Graduated 0-25mL in 5mL Divisions

D2913 Mercaptan Content of Atmosphere

KD2913 Impinger, Midget, S/T 24/40, 25mm Body Graduated to 25mL in 5mL Divisions, 5mm ID inlet, Coarse Fritted Pencil at Tip

D2914 Oxidant Content of Atmosphere

KD2912 Impinger, Midget, S/T 24/40, 25mm Body, 5mm Inlet, 1mm Nozzle, Body Graduated 0-25mL in 5mL Divisions

D2972 Determination of Arsenic in Water

KD2972 Arsenic Determination Apparatus consisting of 125mL Erlenmeyer Flask, Scrubber Tube, and Absorber Tube, S/T 24/40 and S/J 12/2

D3120 Trace Quantities of Sulfur in Light Liquid Petroleum Hydrocarbons by Oxidative Microcoulometry

KD3120 Pyrolysis Tube, Quartz, S/J 18/9 Ball exit, 6mm Inlets, Septum

D3234 Abrasion Resistance of Petroleum Wax Coatings

KD3234-T Glass Tube, 1" ID x 12" Long, with Support Device for #12 Sieve
KD3234-S Screen Sieve, Size #12, cut 1" Diameter
KD3234-F Separatory Funnel, 500mL, 4mm TFE Stopcock, Stem Cut Short

Glass Apparatus for ASTM Test Methods

D3242 Acidity in Aviation Turbine Fuel
KD3242 Titration Flask, 500mL, Erlenmeyer Shape, with Inlet Tube

D3246 Sulfur in Petroleum Gas By Oxidative Microcoulometry
KD3120 Pyrolysis Tube, Quartz, S/J 18/9 Ball exit, 6mm Inlets, Septum

D3431 Trace Nitrogen in Liquid Petroleum Hydrocarbons (Microcoulometric Method)
KD3120 Pyrolysis Tube, Quartz, S/J 18/9 Ball exit, 6mm Inlets, Septum

D3505 Density of Liquid Hydrocarbon Materials
K0D941 Pycnometer, Side Arm Type, 4.5 ±0.5mL, Weight less than 30g

D3608 Sampling Low Concentrations of Nitrogen Dioxide
KD1607 Gas Bubbler Apparatus, S/T 29/42, S/J 18/7, Coarse Pencil Fit

D3712 Analysis of Oil-Soluble Petroleum Sulfonates by Liquid Chromatography
KD3712-C Chromatographic Column, 22 x 300mm w/250mL Reservoir, 28/15
KD3712-P Pycnometer for Determining Specific Gravity, 50mL ±1.0mL

D3825 Dynamic Surface Tension by the Fast-Bubble Technique
KD3825 Glass Bubbler Unit, Jacketed, without Pressure Transducer

D3831 Manganese in Gasoline by Atomic Absorption Spectrometry
KD3831 Automatic Pipette, 9.0mL, with Auto-zero and TFE Stopcock

D3867 Test for Nitrite-Nitrate in Water
KD3867 Cadmium Reduction Column, 5x200mm, 85mL Reservoir

D3904 Oil from Oil Shale (Resource Evaluation by the USBM Fischer Assay Procedure)
KD3904-R Receiver, 100mL Centrifuge Tube, Pear Shape
KD3904-A Adapter, S/T 24/40, to Receive Product from Retort
KD3904-C Condenser, Allihn, 300mm, S/T 24/40

D3907 Testing Fluid Cracking Catalysts by Microactivity Test
KD3907-R Glass Reactor body, 18mmx376mm, S/T 28/15 and 12/5 O-ring Joints
KD3907-PR Product Receiver, Liquid, S/T 12/5 O-ring Joints

D3908 Hydrogen Chemisorption on Supported Platinum on Alumina Catalysts by Volumetric Vacuum Method.
KD3908 Sample Cell, S/T 10/30 Joints, 2mm Vacuum Stopcocks

D3945 Shear Stability of Polymer-Containing Fluids Using a Diesel Injector Nozzle
KD3945-CV Cooling Vessel, Jacketed, 25mm IDx180mm long, TFE Stopcock
KD3945-FR Fluid Reservoir, 250mL, w/Distributor Plate and 3-way Stopcock

D4006 Water in Crude Oil by Distillation
KD4006-A Distillation Trap, 5mL in 0.05
KD4006-B Drying tube for Distillation Apparatus
KD4006-C Condenser, 400mm, Liebig, S/T 24/40
KD4006-F Flask, 1000mL, S/T 24/40, Round Bottom

D4180 Vibratory Packing Density of Formed Catalyst Carriers
KD4180 Feed Funnel, 100mm x 20mm ID

D4484 Inorganic Particles in Marine Residual Fuel Oils by Selective Centrifugal Separation
KD2709 Centrifuge Tube, Conical, 100mL, Tip Graduated to .05mL in .01 Divisions

D4486 Kinematic Viscosity of Volatile and Reactive Liquids
KD4486 Viscometer for Vulnerable Liquids (specify approximate constant)

D4512 Vibrated Apparent Packing Density of Fine Catalyst Particles and Powder
KD4180 Feed Funnel, 100mm x 20mm ID

D4629 Organically Bound Trace Nitrogen in Liquid Petroleum Hydrocarbons by Oxidative Combustion and Chemilluminescence Detection
KD4629 Pyrolysis Tube, Quartz, S/J 18/9 Ball outlet, 6mm Inlets, Septum

D4814 Automotive Spark-Ignition Engine Fuel
KD2533 Buret, Vapor-Liquid Ratio, Graduated, 0-35mL

D4871 Guide for Universal Oxidation/Thermal Stability Test Apparatus
KD4871-TC Test Cell, 38 x 300mm, S/T 34/45 Joint
KD4871-C Condenser, Allihn, 330mm, S/T 34/45 Joint, Top 9mm ID
KD4871-G11 Gas Inlet Tube, 8x850mm with Capillary Tip (no Support Ring)
KD4871-G11A Alternate Gas Inlet Tube, 8x850mm with Capillary Tip but w/Support Ring
KD4871-G12 Gas Inlet Tube, 8x455mm, Capillary Tip, Top Bent 90 Degrees
KD4871-BH Basic Head, S/T 34/45 Joint, Septum Port, Screw Cap Joint
KD4871-1H Intermediate Head, S/T 34/45, 170mm long, Septum Port
KD4871-SH Sampling Head, S/T 34/45 x 175mm long, Septum Port
KD4871-SR Support Ring, 9.5mm IDx12.7mm ODx7mm long with 4 Hooks
KD4871-SP Spacer Ring, 9.5 mm ID x 12.7mm OD x 7mm Long

Standardized Metal Test Specimens

For those specimens not previously mentioned in this catalog, following is a list, by test method, of available standardized metal test specimens. Please contact Koehler Customer Service for additional information.

Test Method No.

Federal Test Methods

791-2503
791-2504
791-3007
791-3462
791-3805
791-3810
791-3814
791-4001
791-4011
791-5304
791-5305
791-5306
791-5307
791-5308
791-5309
791-5310
791-5311
791-5312
791-5314
791-5315
791-5321
791-5322
791-5323
791-5324
791-5325
791-5329
791-5331
791-6503
791-7001

ASTM Methods

D115
D609
D849
D897
D1261
D1275
D1384
D1402
D2266
D2511
D2570
D2596
D2619
D2688
D2783
D2847
D3810
D4635
D4871
E8
F483
F484
F519

Military Standards (MIL)

MIL-A-7866
MIL-A-8243
MIL-B-81705
MIL-C-6529
MIL-C-11796
MIL-C-15074
MIL-C-19853A
MIL-C-16173
MIL-C-22230
MIL-C-23411
MIL-C-25769H
MIL-C-46113
MIL-C-81309A
MIL-L-6085
MIL-L-7808
MIL-L-7870
MIL-L-8937
MIL-L-23398
MIL-L-23699
MIL-L-23699B
MIL-L-25017C
MIL-L-46000
MIL-L-46010
MIL-L-B1329
MIL-R-81294
MIL-R-25143A
MIL-S-8660

Spare Parts

Spare parts are generally available from stock for immediate shipment from our manufacturing facility in Bohemia, New York. The parts listings in this section are for customers who may wish to maintain a stock of spares at their facility for several years of operation. This may be of particular interest to overseas customers. Suggested quantities are in parentheses ( ).

Please note: The parts listed in this section are for current equipment models at the time of printing. When ordering spare parts for new equipment from this catalog, substitutions may be made by Koehler to reflect engineering changes. Koehler will provide written notification of any changes before processing your order. When ordering spare parts for existing equipment, please specify the model number and serial number of your equipment. This will insure that the correct parts are supplied.

K10020 Powertrol Heater, 115V.....Page 43
225-115-002 Heater 1000W (1)
010-115-005 Wattstat, 115V

K10029 Powertrol Heater, 220-240V.....Page 43
225-230-002 Heater, 1000W (1)
010-230-005 Wattstat, 230V

K10090 U-Tube Aniline Apparatus, 115V.....Page 43
K10050 Belt (1)
K10060 Pyrex U-Tube (1)
279-063-002 Bulb (1)
288-115-001 Motor (1)
289-002-001 Bearings (4)

K10091 U-Tube Aniline Apparatus, 220-240V.....Page 43
K10050 Belt (1)
K10060 Pyrex U-Tube (1)
279-063-002 Bulb (1)
K10091-09000 Motor, Modification (1)
289-002-001 Bearings (4)

K10190 Thin Film Aniline Apparatus, 115V.....Page 43
K10050 Belt (1)
K10120 Pyrex Pump Body (1)
K10130 Thin Film Tube (1)
279-063-002 Bulb (1)
288-115-001 Motor (1)
289-002-001 Bearings (2)

K10191 Thin Film Aniline Apparatus, 220-240V.....Page 43
K10050 Belt (1)
K10120 Pyrex Pump Body (1)
K10130 Thin Film Tube (1)
279-063-002 Bulb (1)
289-002-001 Bearings (2)
K10091-09000 Motor, Modification (1)

K10200 Automatic Aniline Apparatus, 115V.....Page 42
K10220 Heating & Cooling Tube (1)
K102-5S Flexible Drive Shaft (1)
280-115-001 Powerstat (1)
288-115-001 Motor (1)
279-115-001 Indicator Light Bulb (2)
278-010-001 Fuse, 10A (1)
K102-20 Heater Coil (1)
289-001-001 Bearings (2)

K10290 Automatic Aniline Apparatus, 220-240V.....Page 42
K10220 Heating & Cooling Tube (1)
K102-5S Flexible Drive Shaft (1)
280-115-001 Powerstat (1)
288-115-001 Motor (1)
279-115-001 Indicator Light Bulb (2)
278-010-001 Fuse, 10A (1)
K102-20 Heater Coil (1)
289-001-001 Bearings (2)
240-230-001 Transformer (1)

K10400 Oxidation Stability Bath, 2-Unit, 115V.....Pages 81, 82
K10400-11001 Heater, 2000W
379-001-001 Liquid Level Switch

K10401 Oxidation Stability Bath, 2 Unit, 115V.....Pages 81, 82
220-120-007 Cartridge Heater, 250W (6)
265-122-002 RTD Temperature Probe, 3 in., 2 Wire
265-122-003 RTD Temperature Probe, 3 in., 3 Wire
278-020-004 Fuse, 20A
278-001-002 Fuse, 1A
278-104-002 Fuse, 0.25A

K10402 Oxidation Stability Bath, 2-Unit, 220-240V.....Pages 81, 82
K10402-11001 Heater, 2000W
379-001-001 Liquid Level Switch

K10403 Oxidation Stability Bath, 4-Unit, 115V.....Pages 81, 82
220-120-007 Cartridge Heater, 250W (10)
265-122-002 RTD Temperature Probe, 3 in., 2 Wire
265-122-003 RTD Temperature Probe, 3 in., 3 Wire
278-030-002 Fuse, 30A
278-001-002 Fuse, 1A
278-104-002 Fuse, 0.25A

K10404 Oxidation Stability Bath, 6 Unit, 220-240V.....Pages 81, 82
K70519 RTD Temperature Probe, 12 in.
265-600-001 RTD Temperature Probe, 4 in.
278-020-004 Fuse, 20A
278-001-002 Fuse, 1A
278-104-002 Fuse, 0.25A

K10491 Oxidation Stability Bath, 2-Unit, 220-240V.....Pages 81, 82
220-240-006 Cartridge Heater, 250W (6)
265-122-002 RTD Temperature Probe, 3 in., 2 Wire
265-122-003 RTD Temperature Probe, 3 in., 3 Wire
278-020-004 Fuse, 20A
278-001-002 Fuse, 1A
278-104-002 Fuse, 0.25A

K10493 Oxidation Stability Bath, 4-Unit, 220-240V.....Pages 81, 82
220-240-006 Cartridge Heater, 250W (10)
265-122-002 RTD Temperature Probe, 3 in., 2 Wire
265-122-003 RTD Temperature Probe, 3 in., 3 Wire
278-020-004 Fuse, 20A
278-001-002 Fuse, 1A
278-104-002 Fuse, 0.25A
091-032-001 Relay, Solid State, 4-32 V DC, 20A
275-103-024 Temperature Controller, 100-240V, 1 out

Spare Parts (Continued)

K10500 Oxidation Pressure Vessel.....Page 80
K10510 Composition Gaskets
K105-0-12 Relief Tube
260-102-005 Rupture Disc, Alum with Liner
260-104-015 Burst Disc Holder
461-001-001 Silicone Vacuum Grease

K10901 Oxidation Bath, 115V.....Page 152-153
K70519 RTD Temperature Probe, 12 in.
265-600-001 RTD Temperature Probe, 4 in.
278-030-002 Fuse, 30A
278-001-002 Fuse, 1A
278-104-002 Fuse, 0.25A
275-103-024 Temperature Controller, 100-240V, 1 out

K10991 Oxidation Bath, 220-240V.....Page 152-153
K70519 RTD Temperature Probe, 12 in.
265-600-001 RTD Temperature Probe, 4 in.
278-020-004 Fuse, 20A
278-001-002 Fuse, 1A
278-104-002 Fuse, 0.25A
275-103-024 Temperature Controller, 100-240V, 1 out

K11201 Reid Vapor Pressure Bomb for LPG.....Page 92
AS568-210 O-ring (1)
AS568-113 O-ring (1)

K11415/K11416 Reid Vapor Pressure Bath, 21-Unit, 220-240V, 50Hz and 60Hz.....Page 93
235-240-005 Heater, 6000W (1)
265-400-002 RTD Temperature Probe (1)

K11450 Reid Vapor Pressure Bath, 4-Unit, 115V.....Page 93
K11450-0-1 Heater, 2000W, 115V
K70519 RTD Temperature Probe, 12 in.
278-020-004 Fuse, 20A
278-001-002 Fuse, 1A
K23700-03013A Motor, 115V 60Hz
275-103-020 Temperature Controller, 100-240V, 2 out

K11459 Vapor Pressure Bath, 4-Unit, 220-240V.....Page 93
K11459-0-1 Heater, 2000W, 230V
K70519 RTD Temperature Probe, 12 in.
278-020-004 Fuse, 20A
278-001-002 Fuse, 1A
K23700-03014A Motor, 230V 50/60Hz
275-103-020 Temperature Controller, 100-240V, 2 out

K12100 Oxidation Stability Bath, 115V.....Page 123
K121-0-17 Heater, 750W, 115V (1)
K70519 RTD Temperature Probe, 12 in.
265-600-001 RTD Temperature Probe, 4 in.
278-020-004 Fuse, 20A
278-001-002 Fuse, 1A
278-104-002 Fuse, 0.25A
K23700-03013A Motor, 115V, 60Hz (1)
275-103-024 Temperature Controller, 100-240V, 1 out

K12190 Oxidation Stability Bath, 220-240V.....Page 123
K121A-0-17 Heater, 750W, 230V (1)
288-230-002 Motor, 230V, 50/60Hz (1)
K70519 RTD Temperature Probe, 12 in.
265-600-001 RTD Temperature Probe, 4 in.
278-020-004 Fuse, 20A
278-001-002 Fuse, 1A
278-104-002 Fuse, 0.25A
275-103-024 Temperature Controller, 100-240V, 1 out

K12200 Oxidation Stability Bath, 8-Unit, 115V.....Page 120
K122-2-15B Heater, 750W, Inner, 115V (1)
K122-2-15C Heater, 750W, Outer, 115V (1)
K23700-03013A Motor, 115V 60Hz (1)
K70519 RTD Temperature Probe, 12 in.
265-600-001 RTD Temperature Probe, 4 in.
278-020-004 Fuse, 20A
278-001-002 Fuse, 1A
278-104-002 Fuse, 0.25A
275-103-024 Temperature Controller, 100-240V, 1 out

K12201 Solid Block Oxidation Bath, 220-240V.....Page 121
091-240-003 Relay, 120/240V, 25A
265-400-004 RTD Probe, 10 in.
220-240-009 Heater, 750W, 220V (6)

K12212 Oxidation Stability Bath, 12-Unit, 115V.....Page 120
K122-12-2-22A Heater, 1500W, back, 115V (1)
K122-12-2-22B Heater, 1500W, middle, 115V (1)
K122-12-2-22C Heater, 750W, front, 115V (1)
K70519 RTD Temperature Probe, 12 in.
265-600-001 RTD Temperature Probe, 4 in.
K23700-03013A Motor, 115V 60Hz (1)
K23300-03009 Stirrer Shaft
091-032-004 Relay, Solid State, 32 V DC
278-040-001 Fuse, 40A, Time Delay CLSG
275-103-027 Temperature Controller, 100-240V

K12219 Oxidation Stability Bath, 12-Unit, 220-240V.....Page 120
K122-12A-2-22A Heater, 1500W, back, 220V (1)
K122-12A-2-22B Heater, 1500W, middle, 220V (1)
K122-12A-2-22C Heater, 750W, front, 220V (1)
K70519 RTD Temperature Probe, 12 in.
265-600-001 RTD Temperature Probe, 4 in.
278-030-002 Fuse, 30A
278-001-002 Fuse, 1A
278-104-002 Fuse, 0.25A
K23700-03014A Motor, 230V 50/60Hz (1)
275-103-024 Temperature Controller, 100-240V, 1 out

K12290 Oxidation Stability Bath, 8-Unit, 220-240V.....Page 120
K122A-2-15B Heater, 750W, Inner, 230V (1)
K122A-2-15C Heater, 750W, Outer, 230V (1)
K70519 RTD Temperature Probe, 12 in.
265-600-001 RTD Temperature Probe, 4 in.
278-020-004 Fuse, 20A
278-001-002 Fuse, 1A
278-104-002 Fuse, 0.25A
K23700-03014A Motor, 230V 50/60Hz (1)
275-103-024 Temperature Controller, 100-240V, 1 out

Spare Parts (Continued)

K12300 Series Oxidation Stability Bath, 220-240V, 50 and 60Hz ..Page 121
Model Numbers K12330, K12339, K12300, K12395
235-240-005 Heater, 6000W, 240V
265-400-002 RTD Temperature Probe, 12 in.

K13009 Saybolt Chromometer .....Page 44
K13018 Gasket (pkg. of 12)
K13020 Color Standard (Full) (2)
K13029 Color Standard (Half) (1)
K13032 Glass Set, Turret & Draincock Assembly
K13061 Glassware Set with Connections
K13090 Frosted Mirror without Base (1)
K13012 Graduated Tube Gasket

K13100 Saybolt Wax Chromometer, 115V .....Page 44
K13018 Gasket (pkg. of 12)
K13020 Color Standard (Full) (1)
K13029 Color Standard (Half) (1)
K13033 Glass Set, Turret and Graduated Tube
K13090 Frosted Mirror without Base (1)
K131-0-26 Cartridge Heater, 115V (1)
K131-0-28 Strip Heater, 200W, 115V (1)
AS568-211 O-ring (2)

K13190 Saybolt Wax Chromometer, 220-240V .....Page 44
K13018 Gasket (pkg. of 12)
K13020 Color Standard (Full) (1)
K13029 Color Standard (Half) (1)
K13033 Glass Set, Turret and Graduated Tube
K13090 Frosted Mirror without Base (1)
K131A-0-26 Cartridge Heater, 50W, 230V (1)
K131A-0-28 Strip Heater, 200W, 230V (1)
AS568-211 O-ring (2)

K13900 Cleveland Flash Tester, 115V.....Page 36
K138-1-17 Insulation Plate (1)
225-115-002 Brick Heater, 1000W, 115V (1)
AS568-008 O-ring (1)
010-115-005 Wattstat, 115V (1)

K13990 Cleveland Flash Tester, 220-240V .....Page 36
K138-1-17 Insulation Plate (1)
225-230-002 Brick Heater, 1000W, 230V (1)
AS568-008 O-ring (1)
010-230-004 Wattstat, 230V (1)

K14600 Tag Electric Closed Tester, 115V.....Page 35
190-120-001 Ring Heater, 200W (1)
010-115-005 Wattstat, 115V (1)

K14670 Tag Electric Closed Tester, 220-240V .....Page 35
190-240-009 Ring Heater, 150W (1)
010-230-004 Wattstat, 230V (1)

K15600 Tag Electric Open Cup Flash Tester, 115V .....Page 37
190-120-001 Ring Heater, 200W (1)
K138-0-11 Valve Stem (2)
K156-0-1A Flame Test Burner and Pilot Assembly (1)

K15670 Tag Electric Open Cup Flash Tester, 220-240V.....Page 37
190-240-009 Ring Heater, 150W (1)
K138-0-11 Valve Stem (2)
K156-0-1A Flame Test Burner and Pilot Assembly (1)

K16000 Pensky-Martens Flash Tester, Gas.....Page 34
K160-9 Flexible Stirrer Shaft (1)
K16220-0-6 Drive Belt for Stirrer Motor

K16200 Pensky-Martens Flash Tester, 115V .....Page 34
225-115-002 Brick Heater, 1000W (1)
K160-9 Flexible Stirrer Shaft (1)
K16220-0-6 Drive Belt for Stirrer Motor

K16270 Pensky-Martens Flash Tester, 220-240V.....Page 34
225-230-002 Brick Heater, 1000W (1)
K160-9 Flexible Stirrer Shaft (1)
K16220-0-6 Drive Belt for Stirrer Motor

K17100 Wax Coating Device, 115V .....Page 177
190-120-009 Ring Heater, 200W (1)
K171-0-12 Doctor Rod Assembly
280-115-004 Variable Transformer

K17190 Wax Coating Device, 220-240V .....Page 177
190-120-009 Ring Heater, 200W (1)
K171-0-12 Doctor Rod Assembly
240-230-001 Stepdown Transformer (1)

K17200 Type A Blocking Plate, 115V .....Page 177
236-115-001 Strip Heater, 250W (1)

K17290 Type A Blocking Plate, 220-240V.....Page 177
236-230-001 Strip Heater, 250W (1)

K17300 Type B Blocking Plate, 115V .....Page 177
K173-0-11A Heater, 100W (1)
K173-0-11C Heater, 300W (1)
288-115-001 Motor (1)

K17390 Type B Blocking Plate, 220-240V.....Page 177
K173-0-11B Heater, 100W (1)
K173-0-11D Heater, 300W (1)
288-230-002 Motor (1)

K17500 Wax Melting Point Apparatus.....Page 178
K175-0-5 Cork, Sample Thermometer (1)
K175-0-6 Cork, Bath Thermometer (1)
285-000-006 Cork without hole (1)
K175-0-8 Sample Tube (1)

K17600 Oil Solvent Extractables Content Apparatus, 115V .....Page 179
K176-1-0-26 Glass Manifold (1)
279-115-006 Lamp, 100W, 115V (1)
332-003-004 15mL Weighing Bottle (4)

K17690 Oil Solvent of Extractables Content Apparatus, 220-240V.....Page 179
K176-1-0-26 Glass Manifold (1)
279-230-004 Lamp, 100W, 230V (1)
332-003-004 15mL Weighing Bottle (4)

K17970/K17979 Corrosion Preventive Properties Apparatus, 115V and 220-240V.....Page 154
K17910 Test Bearings (3)
K17930 Containers/Lids (3)
K179-0-6 Spring
K179-0-8 Lockscrew
288-115-036 Motor, 115/230V, 60Hz

K17980/K17989 Corrosion Preventive Properties Apparatus, 115V and 220-240V.....Page 154

AS568-224	O-ring (3)
AS568-329	O-ring (3)
360-115-015	Motor Speed Control
289-004-002	Outboard Bearing Set (3)
288-115-053	Motor, 1/4 hp, 130 V DC and Resistor

K18000 Manual Grease Working Machine .....Page 28

22H-308-20C	Wing Screws (6)

K18100 Series Mechanical Grease Workers, Single-Unit, 115V and 220-240V.....Pages 26, 28

Model Numbers K18100, K18110, K18119

289-001-002	Ball Bearing (1)
320-115-001	Counter
050-001-006	Start/Stop Switch
050-001-007	Proximity Switch
K180-1-0-11	Clamp Spring (2)
271-015-001	Thermal Circuit Breaker, 15A

K18190 Series Mechanical Grease Workers, Double-Unit, 115V and 220-240V.....Page 28

Model Numbers K18190, K18191, K18192

289-001-002	Ball Bearing (2)
320-115-001	Counter
050-001-006	Start/Stop Switch
050-001-007	Proximity Switch
K180-1-0-11	Clamp Spring (4)
271-015-001	Thermal Circuit Breaker, 15A

K18200 Water Spray Apparatus, 115V, 60Hz .....Page 163

301-002-006	Timing Belt (1)
K182-0-10	Heater, 750W (1)
K18210	Stainless Steel Test Panel
275-250-003	Electronic Temperature Controller
356-001-005	Gear Pump
039-104-00B	Snubber, Brass
165-308-001	Leveling Foot (4)
288-115-015	Motor 115V, 60Hz, 1/3 hp

K18290/K18295 Water Spray Apparatus, 220-240V, 50Hz and 60Hz .....Page 163

301-002-006	Timing Belt (1)
K182A-0-10	Heater, 750W (1)
K18210	Stainless Steel Test Panel
275-250-003	Electronic Temperature Controller
356-001-005	Gear Pump
039-104-00B	Snubber, Brass
165-308-001	Leveling Foot (4)
288-115-012	Motor 115/230V, 60Hz, 1/3 hp
288-115-010	Motor, 220-240V, 50Hz

K18300/K18320 Roll Stability Tester, Single/Double Unit, 115V.....Pages 27, 156

325-000-025	#25 Chain (30")
237-115-002	Heater, Finned, Strip, 600W, 115V (2)
265-600-001	RTD Temperature Probe, 4 in. (1)
289-001-012	Ball Bearing (7)
AS568A-117-V01	Viton O-Ring
AS568A-154-V01	Viton O-Ring
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
091-032-001	Relay, Solid State, 4-32V DC, 20A
275-103-020	Temperature Controller, 100-240V, 2 out

K18305 Series Roll Stability Tester, Single/Double-Unit, 220-240V, 50Hz .....Page 156

Model Numbers K18305, K18306, K18325, K18326

325-000-025	#25 Chain (30")
237-240-004	Heater, Finned, Strip, 600W, 240V (2)
265-600-001	RTD Temperature Probe, 4 in. (1)
091-032-001	Relay, Solid State, 4-32VDC, 20A
275-103-020	Temperature Controller, 100-240V, 2 out
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
K18348-13000	Motor Fan
AS589A-117-V01	Viton O-Ring
AS568A-154-V01	Viton O-Ring

K18340 Roll Stability Tester, 4-Unit, 115V, 60Hz.....Page 156

237-115-001	Heater, Finned, Strip, 1000W, 115V (2)
265-600-001	RTD Temperature Probe, 4 in. (1)
289-001-012	Ball Bearing (17)
289-001-022	Ball Bearing (17)
091-032-001	Relay, Solid State, 4-32VDC, 20A
288-115-035	Motor, Gear, 115V, 60Hz, 83rpm
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
AS589A-117-V01	Viton O-Ring
AS568A-154-V01	Viton O-Ring
275-103-020	Temperature Controller, 100-240V, 2 out

K18345/K18346 Roll Stability Tester, 4-Unit, 220-240V, 50Hz and 60Hz .....Page 156

275-103-020	Temperature Controller, 100-240V, 2 out
265-600-001	RTD Temperature Probe, 4 in. (1)
K18348-13000	Motor, Fan
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
AS589A-117-V01	Viton O-Ring
AS568A-154-V01	Viton O-Ring
288-230-009	Motor, Gear, 230V, 50Hz, 70rpm

K18500 High Temperature Wheel Bearing Tester, 115V, 60Hz .....Page 161

215-115-001	Heater, 1200W, 115V (1)
288-115-004	Fan Motor (1)
K185-0-42	Cabinet Thermocouple (1)
288-018-021	Spindle Thermocouple (1)
289-004-001	Inboard Bearing Set
289-004-002	Outboard Bearing Set
K185-1-66	Motor, modification

K18590/K18595 High Temperature Wheel Bearing Tester, 220-240V, 50Hz and 60Hz .....Page 161

215-230-001	Heater, 1200W, 230V (1)
288-115-004	Fan Motor (1)
278-010-001	Fuse, 10A (5)
278-015-001	Fuse, 15A (5)
278-020-003	Fuse, 20A (5)
K185-0-42	Cabinet Thermocouple (1)
288-018-021	Spindle Thermocouple (1)
289-004-001	Inboard Bearing Set
289-004-002	Outboard Bearing Set

K18700 Leakage Tendencies of Automotive Wheel Bearing Greases, 115V, 60Hz ..... Page 160

275-103-020	Temperature Controller, 100-240V, 2 out
200-115-006	Coil Heater, 1000W (2)
301-004-002	Vee Belt (60Hz) (1)
288-115-027	Motor
265-122-002	RTD Temperature Probe, 3 in. (1)

K18790 Leakage Tendencies of Automotive Wheel Bearing Greases, 220-240V, 60Hz ..... Page 160

200-230-006	Coil Heater, 1000W (2)
301-004-002	Vee Belt (60Hz) (1)
265-122-002	RTD Temperature Probe, 3 in. (1)
288-115-027	Motor
275-103-020	Temperature Controller, 100-240V, 2 out

K18795 Leakage Tendencies of Automotive Wheel Bearing Greases, 220-240V, 50Hz ..... Page 160

200-230-006	Coil Heater, 1000W (2)
301-004-005	Vee Belt (50Hz) (1)
265-122-002	RTD Temperature Probe, 3 in. (1)
288-230-005	Motor, 50Hz

K18850 Series Low Temperature Torque Apparatus, 220-240V, 50Hz and 60Hz ..... Page 159

Model Numbers K18850, K18851, K18852, K18853, K18854, K18855, K18860, K18861, K18862, K18863, K18864, K18865

301-002-007	Timing Belt (2)
265-000-002	Spindle Thermocouple (2) For all D4693 models
289-007-001	Boston 5F x ⅞ Flanged Bearing (4)
360-108-001	Strain Gauge (2)
K18860-0-16	Small Bearing Set (2) For all D4693 models
K18860-0-24	Large Bearing Set (2) For all D4693 models
288-230-007	Motor, 230V, 50/60Hz, 1/15 hp, 1.4A (1)

K18910 Constant Temperature Air Cabinet, 115V ..... Page 165

K23700-03013A	Motor, 115V, 60Hz
K189-1-0-17	Heater, 115V, 50W
283-120-002	Solenoid Valve, 115V (2)
265-400-002	RTD Temperature Probe
275-103-023	Temperature Controller, 100-240V
278-001-002	Fuse, 1A, Slo-blo

K18919 Constant Temperature Air Cabinet, 220-240V ..... Page 165

288-230-002	Motor, 230V
K189-1A-0-17	Heater, 230V, 100W
283-240-001	Solenoid Valve, 230V (2)
265-400-002	RTD Temperature Probe
275-103-023	Temperature Controller, 100-240V
278-001-002	Fuse, 1A, Slo-blo

K19200 Water Washout Tester, 115V, 60Hz ..... Page 162

K192-4-4	Heater, 380 W, 115V (1)
301-004-008	Vee Belt, 22"
301-004-007	Vee Belt, 37"
289-001-009	Ball Bearing (2)
289-001-006	Test Bearing (3)
K192-4-3	Thermoregulator
K192-2-5	Flowmeter
288-115-027	Motor
AS568-214	O-ring (2)
356-001-005	Water Pump
K192-1-8	Bearing Housing Gasket

K19290 Water Washout Tester, 220-240V, 60Hz ..... Page 162

K192A-4-4	Heater, 380W, 220V (1)
301-004-008	Vee Belt, 22"
301-004-007	Vee Belt, 37"
289-001-009	Ball Bearing (2)
289-001-006	Test Bearing (3)
AS568-214	O-ring (2)
K192-1-8	Bearing Housing Gasket
K192-4-3	Thermoregulator
K192-2-5	Flowmeter
288-115-027	Motor
356-001-005	Water Pump

K19295 Water Washout Tester, 220-240V, 50Hz ..... Page 162

K192A-4-4	Heater, 380W, 220V (1)
301-004-003	Vee Belt, 37", 50 Hz (1)
288-230-005	Motor, 110/220V, 50Hz

K19400 High Temperature Dropping Point Apparatus, 115V ..... Page 151

220-120-001	Heater (cartridge), 750W, 120V (1)
279-115-002	Lamp (1)
278-001-002	Fuse, 1A
265-203-001	Temperature Probe, Type "K", 3⁄16 dia x 4"
K194EB	Test Tube 13x100mm (10)
K194EC	Cup Support (10)
275-103-023	Temperature Controller, 100-240V
091-240-002	Solid State Relay, 25A, 90-240V

K19410 High Temperature Dropping Point Apparatus, 220-240V ..... Page 151

220-240-001	Heater (cartridge), 750W, 240V (1)
279-115-002	Lamp (1)
278-001-002	Fuse, 1A
265-203-001	Temperature Probe, Type "K" (1)
K194EB	Test Tube 13x100mm (10)
K194EC	Cup Support (10)
275-103-023	Temperature Controller
091-240-002	Solid State Relay, 25A, 90-240V

K19490 Dropping Point Apparatus, 115V ..... Page 150

K19492	Test Tube with Indentations
K19493	Thermometer Cork
K194A-0-7	Bath Thermometer Cork
332-002-005	400mL Beaker
010-115-005	Wattstat, 115V
225-115-002	Heater Element, 1000W, 115V
288-115-001	Motor

K19491 Dropping Point Apparatus, 220-240V ..... Page 150

K19492	Test Tube with Indentation
K19493	Thermometer Cork
K194A-0-7	Bath Thermometer Cork
332-002-005	400mL Beaker
010-230-004	Wattstat, 230V
225-230-002	Heater Element, 1000W, 230V
K19491-0-12	Motor, 230V, 50/60Hz, 1/40 hp

K19500 Penetrometer ..... Page 24

332-005-008	5" diameter Watch Glass (1)
K195-11	Plunger Drop Cushion
K195-23	Plunger Release Spacer
K195-24	Plunger Release Lever (1)
K195-29	Teflon Inserts

Spare Parts (Continued)

K21404/K21494 Automatic Saybolt Viscosity Timing Sensor .....Page 16
K21404-03009 Sensor Assembly
K21404-23000 Cabinet Power Supply
K21404-03013 Flask Holder Assembly

K21410 Saybolt Viscometer Bath, 115V .....Page 16
K21410-0-15 Heater, 1200W, 115V (2)
K23700-03013A Motor, 115V, 60Hz (1)
265-500-001 RTD Temperature Probe, 12 in.
265-600-001 RTD Temperature Probe, 4 in.
278-020-004 Fuse, 20A
278-001-002 Fuse, 1A
278-104-002 Fuse, 0.25A

K21420 Saybolt Viscometer Bath, 220-240V.....Page 16
K21420-0-15 Heater, 1200W, 230V (2)
K23700-03014A Motor, 230V, 50/60Hz (1)
265-500-001 RTD Temperature Probe, 12 in.
265-600-001 RTD Temperature Probe, 4 in.
278-020-004 Fuse, 20A
278-001-002 Fuse, 1A
278-104-002 Fuse, 0.25A

K22600/K22610 Pressure Viscometer, 115V and 220-240V.....Page 157
K226-0-20 Cylinder Gasket (6)
K226-0-21 Capillary Gasket (8)
265-000-001 Thermocouple (3)
288-115-014 Motor, 115/230V 60Hz (1)
349-000-009 Coupling Spider (1)

K22615 Pressure Viscometer, 220-240V, 50Hz.....Page 157
K226-0-20 Cylinder Gasket (6)
K226-0-21 Capillary Gasket (8)
265-000-001 Thermocouple (3)
288-230-005 Motor, 115/230V, 50Hz (1)
349-000-009 Coupling Spider (1)

K22680 Series Grease Mobility Tester, 115V and 220-240V .....Page 158
Model Numbers K22680, K22685, K22686
K226-0-20 Cylinder Gasket (2)
K226-0-21 Capillary Gasket (1)

K22690 Series Low Temperature Pressure Viscometer, 115V and 220-240V, 50Hz and 60Hz .....Page 157
Model Numbers K22690, K22695, K22696
320-000-003 Counter
288-115-014 Motor, 115/230V, 60Hz
288-230-005 Motor, 115/230V, 50Hz
K226-0-22 Capillary Set, No. 1-8
265-000-001 Thermocouple (3)
AS568-231 O-ring

K22751 Digital Refrigerated Kinematic Viscosity Bath, 115V.....Page 7
091-032-001 Solid State Relay, 4-32VDC, 20A
288-115-058 Stirrer Motor, 115V, 60Hz
335-115-004 Condenser Fan Motor, 115V
220-120-009 Heater (Cartridge), 500W, 115V
279-115-009 Fluorescent Lamp, 50W, 120V
278-020-004 Fuse, 20A
278-001-002 Fuse, 1A
278-104-002 Fuse, 0.25A
265-500-001 RTD Temperature Probe
271-030-005 Switch, Circuit Breaker, 30A

K22752/K22754 Digital Refrigerated Kinematic Viscosity Bath, 220-240V.....Page 7
091-032-001 Solid State Relay
288-230-020 Motor, 230V, 50/60Hz
335-230-001 Condenser Fan Motor, 230V
220-240-013 Heater, 500W, 230V (2)
265-500-001 RTD Temperature Probe
279-115-009 Fluorescent Lamp, 50W, 120V
278-020-004 Fuse, 20A
278-001-002 Fuse, 1A
278-104-002 Fuse, 0.25A
271-030-005 Switch, Circuit Breaker, 30A

K22753 Digital Refrigerated Kinematic Viscosity Bath, 115V.....Page 7
091-032-001 Solid State Relay
288-115-058 Motor, 115V, 60Hz
335-115-004 Condenser Fan Motor, 115V
220-120-009 Heater, 500W, 115V (2)
265-500-001 RTD Temperature Probe
279-115-009 Fluorescent Lamp, 50W, 120V
278-020-004 Fuse, 20A
278-001-002 Fuse, 1A
278-104-002 Fuse, 0.25A
271-025-001 Switch, Circuit Breaker, 25A

K23700/K23800 Series Kinematic Viscosity Baths, 115V, 60Hz.....Pages 4-5
Model Numbers K23700, K23702, K23706, K23708, K23800, K23802
K23700-02003 RTD Temperature Probe
278-104-002 Fuse, 0.25A
279-115-009 Fluorescent Lamp, 50W, 120V
335-115-005 Fan, 115V, 50/60Hz, 53CFM
332-001-001 Borosilicate Glass Jar, 12"x12"
332-001-003 Borosilicate Glass Jar, 12"x18"
K23700-03006 Heater, 1250W, 115V, For Standard Temperature Models
K23800-03006 Heater, 1700W, 115V, For High Temperature Models
K23700-03013A Motor, 115V 60Hz
275-103-027 Temperature Controller, 100-240V

K23700/K23800 Series Kinematic Viscosity Baths, 220-240V, 50Hz/60Hz.....Pages 4-5
Model Numbers K23790, K23792, K23796, K23798, K23890, K23892
K23700-02003 RTD Temperature Probe
278-104-002 Fuse, 0.25A, Slo-blo
278-101-002 Fuse, 1A
278-101-004 Fuse, 20A
279-115-009 Fluorescent Lamp, 50W, 120V
335-230-005 Fan, 230V, 50/60Hz, 53CFM
332-001-001 Borosilicate Glass Jar, 12"x12"
332-001-003 Borosilicate Glass Jar, 12"x18"
K23700-03015 Heater, 1250W, 230V, For Standard Temperature Models
K23800-03015 Heater, 1700W, 230V, For High Temperature Models
K23700-03014A Motor, 230V 50/60Hz

K23702-OS, K23792-OS, K23708-OS, K23798-OS Kinematic Viscosity Bath .....Pages 5
360-030-001 Amplifier, 110-30 VDC, blue led
275-600-007 Touch Screen Interface, PLC
275-600-005 Controller, PLC, 100-240 VAC
K23702OS-03038 Holder, Reflector

K25310/K25320 Copper Strip Corrosion Test Bath, 4-Unit and 8-Unit, 115V .....Pages 90, 91, 99
K253-1-0-8 Heater, 750W (K25310) (1)
K253-2-0-8 Heater, 750W (K25320) (1)
191 RTD Probe Assembly
275-250-003 Electronic Temperature Control

Spare Parts (Continued)

K25319/K25329 Copper Strip Corrosion Test Bath, 4-Unit and 8-Unit, 220-240V.....Pages 90, 91, 99

K253-1A-0-8	Heater, 750W (K25319) (1)
K253-2A-0-8	Heater, 750W (K25329) (1)
191	RTD Probe Assembly
275-250-003	Electronic Temperature Control

K25330 Test Tube Bath, 115V.....Pages 90, 91, 131, 155

K346-0-3	Heater, 750W, 115V (1)
K23700-03013A	Motor, 115V 60Hz
K70519	RTD Temperature Probe, 12 in.
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
091-032-001	Relay, Solid State, 4-32V DC, 20A
275-103-020	Temperature Controller, 100-240V, 2 out

K25339 Test Tube Bath, 220-240V.....Pages 90, 91, 131, 155

K346A-0-3	Heater, 750W, 230V (1)
K70519	RTD Temperature Probe, 12 in.
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
K23700-03014A	Motor, 230V 50/60Hz
091-032-001	Relay, Solid State, 4-32V DC, 20A
275-103-020	Temperature Controller, 100-240V, 2 out

K25900 Constant Temperature Water Bath, 115V 60Hz.....Page 103

K25900-0-15	Heater, 750W (1)
010-500-003	Temperature Probe, 500Ω (1)
K23700-03013A	Motor, 115V 60Hz
010-115-002	Type “B” Controller
010-010-002	Potentiometer
356-115-001	Pump

K25990/K25995 Constant Temperature Water Bath, 220-240V, 50Hz and 60Hz.....Page 103

K25990-0-15	Heater, 1000W (1)
010-500-003	Temperature Probe 500Ω (1)
K23700-03014A	Motor, 230V 50/60Hz
010-115-002	Type “B” Controller
010-010-002	Potentiometer
356-115-001	Pump

K26150 Pressure Hydrometer Cylinder.....Page 103

AS568-032	O-Ring, Buna 'N' (2)
K26015	Lucite Cylinder
260-104-001	Pressure Relief Valve, 1/4"
K26150-0-6	Neoprene Cushion (2)

K26200 Constant Temperature Hydrometer Bath, 115V.....Page 50

K262-0-10	Heater, 500W (1)
354-001-002	Rheostat (1)

K26290 Constant Temperature Hydrometer Bath, 220-240V.....Page 50

K262A-0-10	Heater, 500W (1)
354-001-002	Rheostat (1)

K26400 Constant Temperature Hydrometer Bath, 115V.....Page 50

K26400-1-5	Heater, 1500W (1)
K26400-1-5A	Heater, 1000W (1)
K70519	RTD Temperature Probe, 12 in.
265-600-001	RTD Temperature Probe, 4 in.
091-032-002	Relay, Solid State, 4-32 V DC, 30A
275-103-024	Temperature Controller, 100-240V, 1 out

K26490 Constant Temperature Hydrometer Bath, 220-240V.....Page 50

K26490-1-5	Heater, 1500W (1)
K70519	RTD Temperature Probe, 12 in.
265-600-001	RTD Temperature Probe, 4 in.
091-032-001	Relay, Solid State, 4-32 V DC, 20A
275-103-024	Temperature Controller, 100-240V, 1 out

K26500 Thermometer Calibration Bath, 115V.....Page 63

K26500-0-15	Heater, 750W (1)
265-500-001	RTD Temperature Probe (1)
288-115-001	Motor (1)
091-032-001	Relay, Solid State, 4-32V DC, 20A
275-103-025	Temperature Controller, 100-240V

K26590 Thermometer Calibration Bath, 220-240V.....Page 63

K26500-0-15A	Heater, 750W (1)
265-500-001	RTD Temperature Probe (1)
288-230-010	Motor 230V 50/60Hz (1)
275-103-025	Temperature Controller, 100-240V

K27000 Smoke Point Lamp.....Page 95

K27040	Replacement Window (1)
K270-0-22	Scale (1)

K27100 Ramsbottom Carbon Residue Apparatus, 115V.....Page 59

230-115-001	Heater, 2400W (1)
265-203-001	Temperature Probe, Type “K”, 3⁄16 dia x 4”
278-030-002	Fuse, 30A
278-001-002	Fuse, 1A
278-104-002	Fuse, 0.25A
091-032-002	Relay, Solid State, 4-32V DC, 30A
275-103-024	Temperature Controller, 100-240V, 1 out

K27190 Ramsbottom Carbon Residue Apparatus, 220-240V.....Page 59

230-230-002	Heater, 2400W (1)
265-203-001	Temperature Probe, Type “K”, 3⁄16 dia x 4”
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
278-104-002	Fuse, 0.25A
091-032-001	Relay, Solid State, 4-32V DC, 20A
275-103-024	Temperature Controller, 100-240V, 1 out

K28300 Bending Apparatus.....Page 173

K283-0-14	Test Panel (12)

K28310 Cooling Apparatus.....Page 173

K28310-0-1	Large Stopper
K28310-0-2	Small Stopper
K28310-0-3	Inner Flask
K297-0-1	Vacuum Flask
332-014-001	Funnel

K29300 High Temperature Evaporation Loss Apparatus.....Page 149

190-240-003	Ring Heater, 500W, 240V (2)
220-240-002	Cartridge Heater, 650W (2)
265-203-001	Temperature Probe, Type "K", 4 in., (2)
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
278-104-002	Fuse, 0.25A
010-230-004	Wattstat (2)
K293-0-12	Thermocouple (2)
K293-0-20	Flowmeter (2)

Spare Parts (Continued)

K29400 Evaporation Loss Bath, 115V ..... Page 148

K294-0-1	Heater, 1000W (1)
K23700-03013A	Motor, 115V 60Hz
K70519	RTD Temperature Probe, 12 in.
265-600-001	RTD Temperature Probe, 4 in.
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
278-104-002	Fuse, 0.25A
091-032-001	Relay, Solid State, 4-32V DC, 20A
275-103-024	Temperature Controller, 100-240V, 1 out

K29490 Evaporation Loss Test Bath, 220-240V ..... Page 148

K294A-0-1	Heater, 1000W (1)
K23700-03014A	Motor, 230V 50/60Hz
K70519	RTD Temperature Probe, 12 in.
265-600-001	RTD Temperature Probe, 4 in.
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
278-104-002	Fuse, 0.25A
091-032-001	Relay, Solid State, 4-32V DC, 20A
275-103-024	Temperature Controller, 100-240V, 1 out

K29700 Freezing Point Apparatus ..... Page 96

K297-0-1	Vacuum Flask (1)
K297-0-2	Sample Tube (Jacketed) (1)
K297-0-8	Cork Strip (1)
K297-0-5	#2 Neoprene Stopper

K29750/K29758/K29759 Freezing Point Apparatus (ASTM D1177), 115V and 220-240V ..... Page 68

K29750-1-1	200mL Tube (1)
332-003-012	2 quart Dewar Flask (1)

K29760/K29768/K29769 Wax Appearance Point Apparatus, 115V and 220-240V ..... Page 94

K297-0-1	Vacuum Flask (1)
K29760-0-2	Sample Tube (1)

K29900/K29990 Lead Corrosion Apparatus, 220-240V, 50Hz and 60Hz ..... Page 130

K23700-03014A	Bath Motor, 230V 50/60Hz (1)
K299-0-45A	Outer Heater, 500W (1)
K299-0-45B	Middle Heater, 500W (1)
K299-0-45C	Inner Heater, 2000W (1)
265-600-001	RTD Temperature Probe, 4 in.
K70519	RTD Temperature Probe, 12 in.
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
278-104-002	Fuse, 0.25A
091-032-001	Relay, Solid State, 4-32 V DC, 20A
275-103-024	Temperature Controller, 100-240V, 1 out

K30160/K30161 Rust Preventing Characteristics Oil Bath, 115V, 60Hz ..... Pages 98, 128

K301A-0-5	Heater, 1500W (1)
301-005-001	Belt (1)
288-115-056	Motor, 115V 60Hz (1)
265-600-001	RTD Temperature Probe, 4 in.
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
278-104-002	Fuse, 0.25A
275-103-024	Temperature Controller, 100-240V, 1 out

K30165/K30167 Rust Preventing Characteristics Oil Bath, 220-240V, 50Hz ..... Page 98, 128

301-005-001	Belt (1)
K301A-1-0-5	Heater, 1500W (1)
288-230-001	Motor, 230V 50Hz (1)
265-600-001	RTD Temperature Probe, 4 in., 600F
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
278-104-002	Fuse, 0.25A
091-032-001	Relay, Solid State, 4-32 V DC, 20A
275-103-024	Temperature Controller, 100-240V, 1 out

K30166/K30168 Rust Preventing Characteristics Oil Bath, 220-240V, 60Hz ..... Page 98, 128

301-005-001	Belt (1)
K301A-1-0-5	Heater, 1500W (1)
288-230-003	Motor, 230V 60Hz (1)
265-600-001	RTD Temperature Probe, 4 in.
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
278-104-002	Fuse, 0.25A
091-032-001	Relay, Solid State, 4-32V DC, 20A
275-103-024	Temperature Controller, 100-240V, 1 out

K31956 Connection Apparatus ..... Page 176

K319-0-6	Condenser
363-102-003	½ ID Latex Tubing, 2"
K319-0-9	Tube Connecting Cork
K319-0-10	Thermometer Cork (2)
K319-0-7	End Tube
K319-0-8	Borosilicate Glass Tube

K33700 Existent Gum Evaporation Bath, 6-Unit, 220-240V ..... Page 86

220-240-008	Cartridge Heater, 500W (6)
265-203-001	Temperature Probe, Type "K", 3⁄16 dia x 4"
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
K337-2-14	Flowmeter
091-032-001	Relay, Solid State, 4-32V DC, 20A
275-103-020	Temperature Controller, 100-240V, 2 out

K33780 Existent Gum Evaporation Bath, 3-Unit, 115V ..... Page 86

190-120-005	Heater, Ring, 500W, 120V (3)
265-122-002	RTD Temperature Probe
090-120-014	Relay, SPDT, 120V, 20A
K337-2-14	Flowmeter
275-103-020	Temperature Controller, 100-240V, 2 out
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
091-032-001	Relay, Solid State, 4-32V DC, 20A

K33781 Existent Gum Evaporation Bath, 3-Unit, 220-240V ..... Page 86

190-240-003	Heater, Ring, 500W, 240V (3)
265-122-002	RTD Temperature Probe
091-032-001	Relay, Solid State, 4-32V DC, 20A
K337-2-14	Flowmeter
275-103-020	Temperature Controller, 100-240V, 2 out
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A

K33800 Existent Gum Evaporation Bath w/Superheater, 220-240V ....Pages 86, 87

278-002-001	2A Fuse (2)
220-240-008	Cartridge Heater, 500W (6)
220-240-003	Superheater Cartridge Heater, 1500W (1)
265-203-001	Temperature Probe, Type "K", 3/16 dia x 4"
275-103-032	Temperature Controller, 100-240V
K337-2-14	Flowmeter
275-550-001	Superheater Temperature Controller
265-550-002	RTD Temperature Probe
091-032-001	Relay, Solid State, 90-240V, 20A

K33810 Steam Superheater, 220-240V ....Page 87

220-240-003	Cartridge Heater, 1500W (1)
265-550-002	RTD Temperature Probe (1)

K34000/K34010 Viscometer Cleaning & Drying Apparatus ....Page 9

261-104-001	Filter (1)
AS568-015	O-ring (1)

K35000 Corrosion and Oxidation Stability Apparatus, 220-240V...Page 124

220-240-006	Cartridge Heater, 250W (14)
265-203-001	Temperature Probe, Type "K", 3/16 dia x 4" (2)
K350-0-23	Test Tube (6)
K350-0-24	Air Tube (6)
K350-0-25	Condenser (6)
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
278-104-002	Fuse, 0.25A
091-032-001	Relay, Solid State, 4-32 V DC, 20A
275-103-024	Temperature Controller, 100-240V, 1 out

K34700 Brookfield Viscosity Air Bath, 115V 60Hz ....Page 14

278-001-002	Fuse, 1A
278-020-004	Fuse, 20A
278-104-002	Fuse, 0.25A
288-115-059	Motor 115V
091-032-001	Relay, Solid State, 4-32V DC, 20A
271-040-002	Circuit Breaker, 40A

K34701/K34702 Brookfield Viscosity Air Bath, 230V 50/60Hz.....Page 14

278-001-002	Fuse, 1A
278-020-004	Fuse, 20A
278-104-002	Fuse, 0.25A
288-230-020	Motor, 230V 50/60Hz
091-032-001	Relay, Solid State, 4-32V DC, 20A

K35200 Humidity Cabinet for Rust Protection, 115V, 60Hz ....Page 65

K352-0-22	Heater, 750W (2)
191	RTD Probe Assembly

K35295/K35296 Humidity Cabinet for Rust Protection, 220-240V, 50Hz and 60Hz ....Page 65

K352A-0-22	Heater, 750W (2)
191	RTD Probe Assembly

K39103 Stirrer ....Page 112

289-002-015	Flange Bearing (2)
289-002-014	Bearing (1)
K39100-23021	Stirrer Motor

K39179 Conditioning Bath ....Page 112

K26490-1-5	Control Heater, 1500W (2)
K70519	RTD Temperature Probe, 12 in.
288-230-002	Motor
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
278-104-002	Fuse, 0.25A
091-032-001	Relay, Solid State, 4-32V DC, 20A
271-025-004	Circuit Breaker, 25A

K39190/K39199 Digital Demulsibility Characteristics Bath, 115V and 220-240V....Page 112

265-500-001	RTD Temperature Probe
279-115-002	Lamp
K39180-0-10	Heater, 1000W, 115V
K39189-0-10	Heater, 1000W, 230V
332-001-003	Borosilicate Glass Jar, 12"x18"
K23700-03013A	Stirrer Motor, 115V 60Hz
K23700-03014A	Motor, 230V 50/60Hz

K39900 LPG Copper Corrosion Water Bath, 115V ....Page 89

K253-1-0-8	Heater, 750W (1)
275-250-003	Electronic Temperature Controller
191	RTD Probe Assembly

K39990 LPG Copper Corrosion Water Bath, 220-240V....Page 89

K253-1A-0-8	Heater, 750W (1)
275-250-003	Electronic Temperature Controller
191	RTD Probe Assembly

K40000 LPG Corrosion Test Cylinder....Page 89

AS568-218	O-ring (1)

K42000/K42090 Powertrol Heater, 115V/230V ....Pages 61, 72, 172

225-115-002	Heater, 1000W, 115V
225-230-002	Heater, 1000W, 230V
010-115-005	Wattstat, 115V
010-230-004	Wattstat, 230V

K43002 Dual Twin Foaming Characteristics Apparatus, 115V....Page 109

K43012	Cylinder and Holder Assembly (4)
265-400-002	RTD Temperature Probe (2)
K43002-0-9	Heater, Outer, 750W (1)
K43002-0-11	Heater, Inner, 750W (1)
K23700-03013A	Motor, 115V 60Hz (2)
275-103-029	Temperature Controller, 100-240V (2)
091-120-001	Relay, Solid State, 120V (2)
K430-0-13	Air Outlet Elbow (4)
K430-0-8	Rubber Stopper (4)
278-001-002	Fuse, 1A

K43003 Automatic Time Sequence Foaming Characteristics, 115V....Page 109

K430-0-8	Rubber Stopper (4)
275-103-029	Temperature Controller, 100-240V (2)
265-400-002	RTD Temperature Probe (2)
K23700-03013A	Motor, 115V 60Hz (2)
050-002-001	Line Switch (2)
K430-0-13	Air Outlet Elbow (4)
K43002-0-9	Heater, Outer, 750W (1)
K43002-0-11	Heater, Inner, 750W (1)
K43012	Cylinder and Holder Assembly (4)
092-240-001	Timer (3)
278-001-002	Fuse, 1A
091-120-001	Relay, Solid State, 120 V

K43025 Diffuser Stone Tester.....Page 110
332-003-011 Flask 500mL
K43025-0-5 Stopper
338-000-001 Clamp Holder (2)
337-000-008 Clamp Extension (2)
332-002-016 Graduated Cylinder, 250mL

K43041 Sequence IV Foaming Characteristics Apparatus, 115V.....Page 109
K43012 Cylinder and Holder Assembly (2)
K43002-0-9 Heater, Outer, 750W (1)
K43002-0-11 Heater, Inner, 750W (1)
265-400-002 RTD Temperature Probe (1)
K430-0-8 Rubber Stopper (2)
275-103-023 Temperature Controller, 100-240V
K23700-03013A Motor, 115V 60Hz
091-240-002 Relay, Solid State, 90-240V, 25A
090-120-010 Relay, 120V
278-001-002 Fuse, 1A

K43049 Sequence IV Foaming Characteristics Apparatus, 220-240V.....Page 109
K43012 Cylinder and Holder Assembly (2)
K43092-0-9 Heater, Outer, 750W (1)
K43092-0-11 Heater, Inner, 750W (1)
K430-0-8 Rubber Stopper (2)
275-103-023 Temperature Controller, 100-240V
265-400-002 RTD Temperature Probe
K23700-03014A Motor, 230V 50/60Hz
090-240-012 Relay, 240V
091-240-004 Relay, Solid State, 240V
278-001-002 Fuse, 1A

K43092 Dual Twin Foaming Characteristics Apparatus, 220-240V.....Page 109
K43012 Cylinder and Holder Assembly (4)
265-400-002 RTD Temperature Probe (2)
K43092-0-9 Heater, Outer, 750W (1)
K43092-0-11 Heater, Inner, 750W (1)
K23700-03014A Motor, 230V 50/60Hz (2)
275-103-029 Temperature Controller, 100-240V (2)
090-240-012 Relay, 240V (2)
K430-0-13 Air Outlet Elbow (4)
091-240-004 Relay, Solid State, 240V
K430-0-8 Rubber Stopper (4)

K43093 Automatic Time Sequence Foaming Characteristics, 220-240V.....Page 109
K430-0-8 Rubber Stopper (4)
265-400-002 RTD Temperature Probe (2)
K23700-03014A Motor, 230V 50/60Hz
091-240-004 Relay, Solid State, 240V (2)
050-002-001 Line Switch (2)
K430-0-13 Air Outlet Elbow (4)
K43092-0-11 Heater, Inner, 750W (1)
K43092-0-9 Heater, Outer, 750W (1)
K43012 Cylinder and Holder Assembly (4)

K45000 Front View Distillation Apparatus, Right-Hand, 115V.....Page 55
225-115-003 Brick Heater, 1250W (1)

K45090 Front View Distillation Apparatus, Right-Hand, 220-240V.....Page 55
225-230-003 Brick Heater, 1250W (1)

K45100 Front View Distillation Apparatus, Left-Hand, 115V.....Page 55
225-115-003 Brick Heater, 1250W (1)

K45190 Front View Distillation Apparatus, Left-Hand, 220-240V.....Page 55
225-230-003 Brick Heater, 1250W (1)

K45200 Group 4 Distillation Apparatus, Right-Hand, 115V.....Page 55
K452-0-3 Heater (condenser), 300W (1)
225-115-003 Brick Heater, 1250W (1)
265-550-004 RTD Probe 0.25 OD x 90 deg. bend

K45290 Group 4 Distillation Apparatus, Right-Hand, 220-240V.....Page 55
K452A-0-3 Heater (condenser), 300W (1)
225-230-003 Brick Heater, 1250W (1)
265-550-004 RTD Probe 0.25 OD x 90 deg. bend

K45300 Group 4 Distillation Apparatus, Left-Hand, 115V.....Page 55
K452-0-3 Heater (condenser), 300W (1)
225-115-003 Brick Heater, 1250W (1)
265-550-004 RTD Probe 0.25 OD x 90 deg. bend

K45390 Group 4 Distillation Apparatus, Left-Hand, 220-240V.....Page 55
K452A-0-3 Heater (condenser), 300W (1)
225-230-003 Brick Heater, 1250W (1)
265-550-004 RTD Probe 0.25 OD x 90 deg. bend

Main Part: K45603, K45604, K45703-TS, K45704-TS Automatic Distillation Analyzer.....Page 57
090-240-022 Relay, 230 Vac 10A plug in power
354-040-003 Triac, 40 amp, 600V
220-240-016 Cartridge Heater 300W, 240V
K45658 Heating Element
K45658-A Ceramic Coil Support, set 4pc.
K45662-A Fuse, 6.3A Time Lag F220-Pk 10

K45900 Cold Filter Plugging Point Apparatus.....Page 100
K459-0-7 Pipette (1)
K459-0-13B Filter (1)
AS568-008 O-ring (2)

K46000 Cloud and Pour Point Chamber.....Page 132
K460-1-6 Cover (1)
K460-1-7B Copper Cup (4)
K460-0-8 Thermometer Holder (4)
K46120 Disc (Cork) Bottom (4)
AS568-219 O-ring (4)
AS568-131 O-ring (4)

K46100 Series Refrigerated Cloud and Pour Point, 115V and 220-240V, 50Hz and 60Hz ..... Page 132
Model Numbers K46100, K46195, K46196

K46100-03002	Foam Covers
K46100-03030	Copper Test Jacket
091-032-003	Relay
265-400-005	RTD Temperature Probe
275-103-030	Temperature Controller, 1 out
283-120-006	Solenoid Coil, 120-208-240V
283-308-002	Solenoid Valve
278-001-002	Fuse, 1A

K46300 Series Refrigerated Cloud and Pour Point, 115V and 220-240V, 50Hz and 60Hz ..... Page 132
Model Numbers K46300, K46395, K46396

K46300-03002	Foam Covers
K46100-03030	Copper Test Jacket
091-032-003	Relay
265-400-005	RTD Temperature Probe
275-103-031	Temperature Controller, 1 out
283-120-006	Solenoid Coil, 120-208-240V
283-308-002	Solenoid Valve
278-001-002	Fuse, 1A

K46600/K46690 Dual Extraction Apparatus, 115V and 220-240V ..... Page 60

354-001-003	Rheostat (1)

K47000 Autoignition Apparatus, 220-240V ..... Page 39

K470-0-1-10	Thermocouple (1)
K470-0-1-15	Thermocouple (3)
332-003-007	500mL Flask (1)

K47500 Wickbold Apparatus, 115V ..... Page 58

311-015-003	Pressure Gauge (1)
290-010-001	Pressure Regulator (1)
037-108-00B	Toggle Valve (1)
261-104-001	Filter (1)

K47590 Wickbold Apparatus, 220-240V ..... Page 58

311-015-003	Pressure Gauge (1)
290-010-001	Pressure Regulator (1)
037-108-00B	Toggle Valve (1)
261-104-001	Filter (1)
240-230-001	Stepdown Transformer (1)

K50100/K50190 Panel Coking Test Apparatus ..... Page 135

275-103-029	Temperature Controller, 100-240V
360-115-014	Motor Control
360-115-009	Tachometer
360-000-002	Digital Pick Up
K299-4-52	Flowmeter
K185-0-66	Motor
381-115-002	Electronic Timer, 115V
381-240-001	Electronic Timer, 240V
265-203-002	Thermocouple
236-115-003	Strip Heater, 400W, 115V
236-230-003	Strip Heater, 400W, 240V
332-017-001	Separatory Funnel, 500mL
220-240-010	Cartridge Heater, 300W, 240V
220-120-008	Cartridge Heater, 300W, 115V
091-240-002	Relay, Solid State, 90-240V, 25A
278-104-003	Fuse, 6A (1)
278-003-001	Fuse, 3.15A
278-002-001	Fuse, 2A (1)
278-001-002	Fuse, 2A (2)

K56100 Cigre Bath, 115V ..... Page 126

190-120-009	Ring Heater, 200W (4)
230-115-002	Band Heater, 600W (1)
AS568-213	O-ring (24)
K56110	Oxidation Tubes and Absorption Tubes 12 Sets (2 per set)
265-122-002	RTD Temperature Probe, 3 in., 2 Wire
265-122-003	RTD Temperature Probe, 3 in., 3 Wire
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
278-104-002	Fuse, 0.25A

K56190 Cigre Bath, 220-240V ..... Page 126

190-240-008	Ring Heater, 200W (4)
230-230-003	Band Heater, 600W (1)
AS568-213	O-ring (24)
K56110	Oxidation Tubes and Absorption Tubes 12 Sets (2 per set)
265-122-002	RTD Temperature Probe, 3 in., 2 Wire
265-122-003	RTD Temperature Probe, 3 in., 3 Wire
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
278-104-002	Fuse, 0.25A

K70000 Oxidation Bomb ..... Page 114

K70050-00000	Silicone O-ring (qty. depends on usage)
K70060	Valve (1)

K70200/K70290 2-Unit RBOT Bath, 220-240V, 50Hz and 60Hz ..... Page 116

K702-0-8	Control Heater, 1000W (1)
K702-0-8A	Continuous Heater, 1000W (1)
K702-0-8B	Control Heater, 750W (1)
AS568-345-V14	O-Ring, Viton (2)
K700B-0-41	Drive Shaft Seal (8)
K702-CHAIN	Chain Kit (1)
050-230-002	Switch
K700B-0-43	Ball Bearing (2)
K70519	RTD Temperature Probe, 12 in.
265-600-001	RTD Temperature Probe, 4 in.
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
278-104-002	Fuse, 0.25A

K70300/K70390 3-Unit RBOT Bath, 220-240V, 50Hz and 60Hz ..... Page 116

K703-0-8	Heater, 1000W (2)
K703-0-8A	Control Heater, 750W (1)
301-004-001	Vee Belt (1)
AS568-345-V14	O-Ring, Viton (3)
K700B-0-41	Drive Shaft Seal (12)
K703-CHAIN	Chain Kit (1)
K700B-0-43	Ball Bearing (3)
288-115-009	Motor, 1/2 hp
050-230-002	Switch
K70519	RTD Temperature Probe, 12 in.
265-600-001	RTD Temperature Probe, 4 in.
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
278-104-002	Fuse, 0.25A

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K70400/K70490 4-Unit RBOT Bath, 220-240V, 50Hz and 60Hz.....Page 116

K704-0-8	Heater, 1000W (4)
301-004-001	Vee Belt (1)
AS568-345-V14	O-Ring, Viton (4)
K700B-0-43	Ball Bearing (4)
K700B-0-41	Drive Shaft Seal (16)
K704-CHAIN	Chain Kit (1)
288-115-009	Motor, 1/2 hp
050-230-002	Switch
K70519	RTD Temperature Probe, 12 in.
265-600-001	RTD Temperature Probe, 4 in.
278-020-004	Fuse, 20A
278-001-002	Fuse, 1A
278-104-002	Fuse, 0.25A

K87100/K87190 Automatic Pensky-Martens Closed Cup Flash Point Tester.....Pages 33

K87100-5	Stirring Connection Cable
K87100-6	Detection Cable
K87100-7	PT 100 Probe
K87100-8	Electric Ignitor (consumable)
K87100-9	Roll of Printer Paper (consumable)

K87400/K87490 Automatic Cleveland Open Cup Flash Point Tester .....Pages 33

K87400-3	Heating Element 1000W
K87400-4	Electric Ignitor (consumable)
K87400-5	Roll of Printer Paper (consumable)
K87400-8	Insulated Plate-Mobile
K87400-9	PT 100 Probe

K88600 Portable Octane Analyzer.....Pages 102

K88603	Sample Holder
K88615	Serial to USB adapter
K88608	Sample holder covers, 12

K95500/K95590 Digital Penetrometer .....Pages 24, 25, 27

277-001-001	Fuse Holder and Cap
278-004-001	Fuse, 4A
459-012-001	Battery, 12V (1)
K95500-02001	Light Assembly

KLA-1-TS Automatic Cloud Point System .....Page 133

KLA-1S-008-04	Calibrated glass cell for cloud (silver bottom)
KLA-1S-008-041	“O” ring for CP test jar
KLA-1S-008-06	Fiber optic for cloud point
KLA-1S-008-12	PT100 product w/ connector (white)

KLA-2-TS Automatic Pour Point System .....Pages 133

KLA-2S-008-04	Pour Point glass cell
KLA-2S-008-041	“O” ring for PP test jar
KLA-2S-008-12	PT100 product w/ connector (white)
KLA-2S-008-13	PT100 detection w/ connector (brown)

KLA-3-TS Automatic Cloud/Pour Point System.....Pages 133

KLA-3S-008-06	Fiber optic for Cloud Point
KLA-3S-008-12A	PT100 product w/ connector (blue)
KLA-2S-008-13	PT100 detector w/ connector (brown)
KLA-1S-008-04	Calibrated Glass Cell for Cloud Point (silver bottom)

KLA-4-TS Automatic Cold Filter Plugging Point System .....Pages 101

KLA-4S-008-04	CFPP calibrated glass cell
KLA-4S-008-041	“O” ring for CFPP test jar
KLA-4S-008-12	PT100 product w/ connector
KLA-4S-008-13	Calibrated aspiration pipette
KLA-4S-013-01	Filter assembly
KLA-4S-013-02	Filter
KLA-4S-1232	“O” ring (small) for CFPP filter
KLA-4S-1288	“O” ring for CFPP filter

KLA-5-TS Automatic Freezing Point System.....Pages 97

KLA-5S-008-07	Fiber optic for Freezing point
KLA-5S-008-12A	Removable freezing glass cell

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Koehler
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1595 SYCAMORE AVENUE
BOHEMIA, NEW YORK 11716-1796

1-800-878-9070 (IN U.S. ONLY)

TEL: +1 631 589 3800
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