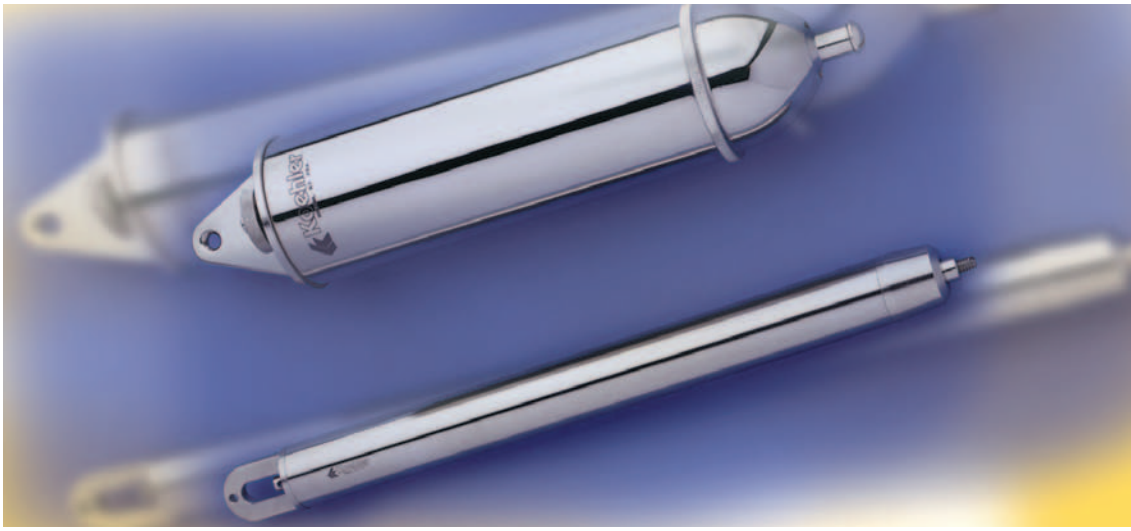
General Test Equipment



Aniline Point and Mixed Aniline Point of Petroleum Products

K10200 Automatic Aniline Point Apparatus

Ordering Information

Catalog No.		Order Qty
Automatic Aniline Point Apparatus		
K10200	Automatic Aniline Point Apparatus, 115V 50/60Hz	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	Pyrex™ 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:
115V 50/60Hz, Single Phase, 0.4A
220-240V 50/60Hz, Single Phase, 0.2A

Included Accessories

Standard Pyrex™ 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 Pyrex™ 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 750W heater and has a positioning well for the Pyrex™ 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
(355-000-001 mineral oil is suitable for this application)
Electrical Requirements:
115V 50/60Hz, Single Phase, 6.5A
220-240 V 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 50/60Hz	1
K10191	Thin Film Aniline Point Apparatus, 220-240V 50/60Hz	
K10020	Powertrol Heater, 115V 50/60Hz	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 Pyrex™ 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 50/60Hz	
K10091	U-Tube Aniline Point Apparatus 220-240V 50/60Hz	1
K10020	Powertrol Heater, 115V 50/60Hz	
K10029	Powertrol Heater, 220-240V 50/60Hz	1

Saybolt Color of Petroleum Products

K13009 Saybolt Chromometer

Specifications

Conforms to the specifications of:
ASTM D156; DIN 51411; FTM 791-101; NF M 07-003

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

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.

Ordering Information

Catalog No.		
K13009	Saybolt Chromometer	1
K13100	Saybolt Wax Chromometer, 115V 50/60Hz	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 and Draincock 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	
280-115-005	Variable Transformer, 115V Regulates heaters of Saybolt Wax Chromometer.	
280-230-003	Variable Transformer, 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

Grades and compares petroleum oils and waxes according to ASTM D1500 specifications. Color discs situated on either side of the sample contain standards conforming to the chromaticity coordinates of ASTM D1500. Rotate the discs by turning dials on the front of the comparator until the sample color matches the color standards and take the reading directly from the dials. Two-disc configuration offers a distinct advantage over single-disc systems—the sample is always bracketed between the next lower and higher color standards allowing the viewer to easily determine the actual sample color. Comparator may also be used to quickly determine if a sample falls between two predetermined color limits.

View the sample from either a standing or sitting position through a prism eyepiece that brings the standards and sample together in a three-field comparison. A detachable prism light shield may be inserted to eliminate any outside light interference. Color corrected filtered halogen light source corresponding to Illuminant C of the CIE system provides clear visibility, assuring accurate readings.

Specifications

Conforms to the specifications of:
ASTM D1500, D6074; IP 196; ISO 2049; FTM 791-102

Included Accessories

Light Shield
Sample Containers (3)
Calibration Certificate

K13200 Petroleum Colorimeter

Dimensions lxwxh,in.(cm)
10x10½x7¼ (25x27x18)
Net Weight: 10 lbs (4.5kg)

Shipping Information

Shipping Weight: 15 lbs (6.8kg)
Dimensions: 2.6 Cu. ft.

Ordering Information

Catalog No.		Order Qty
K13200	Petroleum Colorimeter, 115V 50/60Hz	1
K13290	Petroleum Colorimeter, 220-240V 50/60Hz	
	Accessories	
K13210	Sample Container	
K13222	Replacement Halogen Lamp	

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	

Koehler INSTRUMENT COMPANY, INC.

Portable Automated Colorimeter

K13250 Portable Automatic Colorimeter

Portable Automated Colorimeter

- Conforms to ASTM D156, D1500, D1544, D1209, DIN 6162, and related international test specifications
- Measures up to 5 color ranges
- 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 5 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.

Color Ranges

- Saybolt Color (ASTM D156, ISO 2049, NF M 07-003)
- Mineral Oil Color (ASTM D1500, NF M 60-104)
- 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, D1500, D1544; ISO 4630, 6271; DIN 6162; NF M 07-003; NF T 60-104
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

Ordering Information

Catalog No.	
K13250	Portable Automatic Colorimeter

Accessories

K13251	Printer (w/cable & paper)
K13253	Color Calibration Standards

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.

Specifications

Conforms to the specifications of:
ASTM D156, D1500, D6045, E 308; JIS K2580
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°

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

- Conforms to ASTM D156, D1500, and related specifications
- Spectral range for color measurement: 340-900nm
- Versatile and readily tailored to various applications
- Capable of measuring up to 15 color ranges
- Additional feature allows measurements of solid samples
- Automatic cuvette recognition and measurement
- 11mm cylindrical cuvettes for standard color applications and 50x10mm rectangular cuvettes for lighter "water white" samples are available

Provides photometric color measurements required for purity and quality control testing that are objective, accurate, and consistent over a wide variety of samples. Microprocessor-based unit features a modern optical system with reference beam path (RST-technology) and measures samples in comparison to 15 possible color ranges. The colorimeter is custom configured to user specifications and easily performs single measurement, multi-measurement, color difference, and color strength tests. Tests take less than one minute to complete, and results can be either displayed on LCD screen or sent to an external printer.

Color Ranges

- Saybolt Color (ASTM D156, ISO 2049, NF M 07-003)
- Mineral Oil Color (ASTM D1500, NF M 60-104)
- Iodine Color
- Hazen Color (APHA Color, Pt/Co Color)
- Gardner Color
- Lovibond®
- European Pharmacopoeia
- Klett Color
- Hess-Ives Color
- Yellowness Index
- CIE-L*, a*, b* Values
- CIE-L*, a*, b* Difference
- Hunter Lab Values
- Chromaticity Coordinates
- Tristimulus Values

Specifications

Conforms to the specifications of:
ASTM D156, D1209, D1500, D1544, D5386, D6045; ISO 2049; ISO 4630, 6271; DIN 5033, 6162, 6174; EN 1557; AOCS Cc 13e; Ph EUR; NF M 07-003; NF T 60-104
Viewing Geometry: 0°/180° (transmission)
Reproducibility: ±0.2% T (referenced to distilled water)
Display: backlit graphical LCD display
Reference Standard: distilled water
Data Output: RS232 port (LIMS ready), serial printer port and 3.5" floppy disk
Spectral Range:
Monochromator: optical concave grating
Receiver: two Si photodiode cells
Color Measurement: 380-720nm in steps of 10nm, X, Y, Z illuminant C and standard observer 2° (DIN 5033)
Photometer: 340-900nm in steps of 1nm
Light Source: halogen lamp 12V/20W
Electrical Requirements:
115-240V 50/60Hz

K13500 Automatic Colorimeter

Dimensions lxwxh,in.(cm)
12¾x14¾x8 (32½x37½x20)
Net Weight: 15.4 lbs (7kg)

Shipping Information

Shipping Weight: 19.8 lbs (9kg)

Ordering Information

Catalog No.	
K13500	Automatic Colorimeter 115-240V, 50/60Hz

Accessories

K13350	Printer (w/cable & paper)
K13503	Barcode Reader
K14460	Windows-based Spectral QC Software
K13253	Color Calibration Standards

Please specify color range choices and/or test methods when ordering. Please inquire with Koehler Customer Service about our advanced models as well as the additional feature which allows for the measurement of solid samples.

Koehler INSTRUMENT COMPANY, INC.

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/m³, 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/m³
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:
115V 50/60Hz, Single Phase, 22A
230V 50/60Hz, Single Phase, 11A

Ordering Information

Catalog No.		Order Qty
K26400	Constant Temperature Hydrometer Bath, 115V	1
K26490	Constant Temperature Hydrometer Bath, 230V	
	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: 115V 50/60Hz, 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 50/60Hz
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. At the heart of the AKF5000 is state of the art ACE (Automatically Compensated Errors) control system. The ACE control system guarantees that the actual electrolysis current produced and the count rate displayed are always correctly synchronised, regardless of changes to the electrolysis cell resistance.

Ordering Information

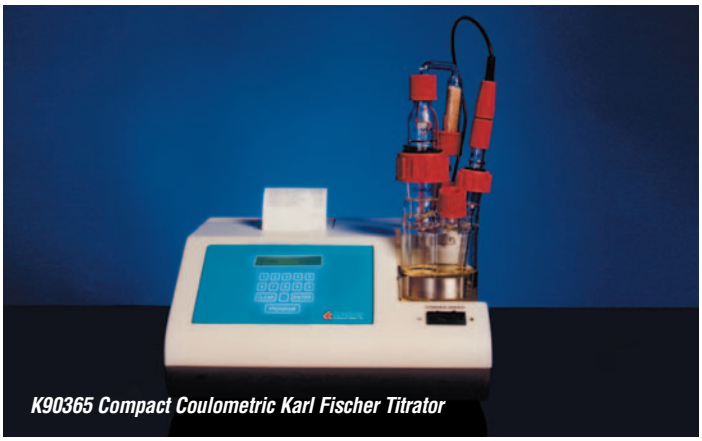
Catalog No.	
K90365	AKF5000 Compact Coulometric Karl Fischer Titrator, 115-240V 50/60Hz

Included Accessories

LDC (Low Drift Cell) 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 (comprises gas inlet, gas outlet, seal ring & cap)
K90365-8	Carry Case
K90365-9	Reagents (Pack of 8 x 100ml anode reagent, 8 x 5ml cathode reagent, 1 x 0.1mg/ml & 1 x 1.0mg/ml water standards)



K90365 Compact Coulometric Karl Fischer Titrator

Specifications and Features

Titration method: Coulometric Karl Fischer titration
Electrolysis control: Patented “ACE” control system
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
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

Koehler INSTRUMENT COMPANY, INC.

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 an incremental 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

Included Accessories

Computer with Data Acquisition Software
Fiber Optic Spectrometer with Multi-Bandpass Detector
High and Low Flow Rate Metering Pumps
Magnetic Stirring Plates
Circulator
Reaction Vessels
Quartz Flow Cell
Glassware
Thermometer Probes

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 50/60Hz
K47190	Automated Flocculation Titrimeter, 230V 50/60Hz

In collaboration with Western Research Institute

Distillation of Petroleum Products at Reduced Pressure

Test Method

The sample is distilled at a controlled, reduced pressure under conditions which provide approximately one theoretical plate fractionation. A distillation curve relating volume distilled and boiling point atmospheric equivalent temperature is prepared.

VDA3000 Vacuum Distillation System

- Conforms to ASTM D1160 and ISO 6616 test specifications

The Koehler VDA3000 Vacuum Distillation System performs reduced pressure distillations of petroleum products in accordance with ASTM specifications. Complete borosilicate glassware system with support panel and base, heating mantle and clamps. Includes vacuum jacketed, strip silvered column with integral primary and secondary condensers and 35/25 spherical joints, PRT thermocouple adapter, PRT Temperature Probe, 500mL quartz distilling flask with thermowell, 200mL water jacketed receiver, vacuum adapter, two Dewar-type cold traps with 10mL graduated receiver and stopcock drain and 35/25 ball adapter for extra cold trap. Finished aluminum panel and base and stainless steel spring leashes. Glassware is assembled by adjustable No. 35 clamps to assure proper alignment to panel and base. Accessory control unit includes digital temperature indicator with selector switch for reading pot temperature or overhead temperature; vacuum gauge; variable controls for heating mantle, and line switch. Control unit is housed in a finished aluminum cabinet.

Vacuum Pump not included.

Specifications

Conforms to the specifications of:
ASTM D1160; ISO 6616

Shipping Information

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

Dimensions lxwxh,in.(cm)

Base/Support Assembly: 12x24x36 (30.5x61x91.4)
Control Unit: 8x10x12 (20.3x2.5x30.5)
Net Weight: 25 lbs (11.3kg)

K80201 Control Unit

Semi-Automatic Vacuum Distilllation instrumentation is available. Please contact Koehler Customer Service for additional information.

Ordering Information

Catalog No.		Order Qty
K80200	VDA3000 Vacuum Distillation System, 115V 50/60Hz	1
K80290	VDA3000 Vacuum Distillation System, 230V 50/60Hz	
K80201	Control Unit, 115V 50/60Hz	1
K80291	Control Unit, 230V 50/60Hz	

Accessories

K80202	Column, vacuum jacketed, strip-silvered, with integral primary and secondary condensers and 35/25 spherical joints
K80203	Receiver, 200mL, water jacketed, with 35/25 joints
K80204	Cold Trap, Dewar-type, with 10mL receiver and stopcock drain
K80205	Vacuum Adapter, with 35/25 joints
K80206	Quartz Flask, 500mL round bottom, with thermowell and 35/25 joint
K80208	Thermocouple Adapter, PRT Type
K80211	Temperature Probe, PRT Type

VDA7000 Automatic Vacuum Distillation System

K87150 Automatic Vacuum Distillation System (VDA 7000)

VDA7000 Automatic Vacuum Distillation System

- Conforms to ASTM D1160 and ISO 6616 test specifications
- Windows®-based software fully automates data acquisition and analysis
- Operating Range: 0.1 to 760 mm Hg
- Test data is displayed in real-time
- Automatic shutdown and cleaning procedures
- Automatic nitrogen degassing at test conclusion
- RS 232 interface for LIMS connection

Ordering Information

Catalog No.	
K87150	VDA7000 Automatic Vacuum Distillation System, 230V 50Hz
K87160	VDA7000 Automatic Vacuum Distillation System, 230V 60Hz

Dimensions lxwxh,in.(cm)
23½x63x35½ (60x160x90)
Net Weight: 220 lbs (100kg)

Shipping Information
Shipping Weight: 374 lbs (170kg)
Dimensions: 190 Cu. ft.

VDA9000 Automatic Vacuum Distillation System

Test Method

Crude petroleum and/or heavy hydrocarbon samples are distilled under controlled, reduced pressure conditions to determine their value. The test provides samples for analytical studies, engineering and product quality evaluations as well as an estimate of the yields of fractions of various boiling ranges.

VDA9000 Automatic Vacuum Distillation System

- Conforms to ASTM D2892 and D5236 test specifications for True Boiling Point (TBP) and Vacuum Potstill petroleum product distillation test methods
- Windows®-based software fully automates data acquisition and analysis
- Vapor and hydrogen sulfide (H_2S) leak detection and notification system
- Automatic nitrogen degassing at test conclusion
- RS 232 interface for LIMS connection

The Koehler VDA9000 Automatic Vacuum Distillation System performs automated reduced pressure distillations for the fractionation and collection of crude petroleum products and/or high boiling components according to ASTM D2892 and D5236. The system is fully computer automated, featuring an automatic fraction collector equipped with twelve (12) receivers and a built-in internal balance, a distillate volume optical sensor system used for the simultaneous determination of the fractional weight and collected volume for direct distillation rate control, and a separate volume follower system for discharging the fractions into the final receivers with determination of the fraction volume. Under the TBP mode, the following steps are automatically performed: debutanization, atmospheric distillation, and vacuum distillations at 100, 10, and 2 mm Hg. Under the Potstill mode, two distillations are automatically performed at predesignated pressures programmed by the operator between 0.1 and 10 mm Hg. The final test data including the TBP and/or the Potstill distillation curves in weight % and volume % are printed out at the conclusion of the test.

Includes: distillation flask; upper distillation flask insulation jacket; Pt-100 temperature sensors for distillation head and flask; ASTM-compliant column with silvered high vacuum jacket, reflux divider, and packed with 4mm Propak 316 providing approximately 15 theoretical plates; 2400W high-temperature heating mantle with Pt-100 temperature sensor, electrical lifting platform, and integrated stirrer; tower heating mantle for adiabatic operation; volume follower system for automatic control of the distillation rate (mL/min) and heating rate (°C/min) with product discharge and collection system; absolute vacuum detector with stainless steel diaphragm, range 0.01 – 100.0 mm Hg; fraction collector with twenty (20) final receivers and integrated internal balance for measuring the fraction weights; gas trap for the debutanization; cryostat for main condenser, distillate cooler, and volume measuring system with a range of –20° to +60°C; vacuum control valve with automatic motor driven throttle valve; 2-stage vacuum pump with final pressure of 0.005 mbar; pressure drop sensor; mobile mounting frame equipped with all electric and mechanic control elements.

Dimensions lxwxh,in.(cm)
23½x102¼x138¾ (60x260x350)
Net Weight: 1320 lbs (600kg)

Shipping Information
Shipping Weight: 2200 lbs (1000kg)
Dimensions: 570 Cu. ft.

Ordering Information

Catalog No.	
K87250	VDA9000 Automatic Vacuum Distillation System, 400V, 50Hz, 3ø,N,G
K87260	VDA9000 Automatic Vacuum Distillation System, 400V, 60Hz, 3ø,N,G

Please inquire about our custom-designed and other standard models for reduced-pressure distillations, including separate systems for ASTM D2892 or D5236.

Distillation of Petroleum Products

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 0, 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, 1000W 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 0, 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

Dimensions lxwxh,in.(cm)

15¼x18¼x19½ (39x46x50)

Included Accessories

Flask Support Boards A and C
Graduate Support Block

Shipping Information

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

K45090 Front View Distillation Apparatus

Ordering Information

Catalog No.	
Front View Distillation Apparatus	
K45000	Right-Hand Model, 115V 50/60Hz
K45100	Left-Hand Model, 115V 50/60Hz
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 50/60Hz
K45300	Left-Hand Model, 115V 50/60Hz
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)
Centering Stoppers		
K45500	Centering Stopper	125mL Flask
K45520	Centering Stopper	200mL Flask

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; JIS J2254l; NF M 07-002

Electrical Requirements:
120V 50/60Hz 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 45°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 0 - 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 perform tests, process results, and produce 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 0 - 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 0 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, 32mm 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 50/60Hz
K45604	Automatic Distillation Analyzer, 230V 50/60Hz
K45703-TS	Automatic Distillation Analyzer with Touch Screen Display and Integrated PC, 120V 50/60Hz
K45704-TS	Automatic Distillation Analyzer with Touch Screen Display and Integrated PC, 230V 50/60Hz

Accessories

K45634	Distillation Flask, 125mL with Markings
K45635	TFE 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)
K45668-A	Wiper for Condenser Tube
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

Specifications
Conforms to the specifications of:
ASTM D2384, D2747, D2784,
D2785; GPA 2140; IP 243;
ISO 4260; DIN EN 41; NF T 60-142

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.

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, D2785 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 Pyrex™ 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.

Ordering Information

Catalog No.		Order Qty
K47500	Wickbold Apparatus, 115V 50/60Hz	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 50/60Hz	1
K27190	Ramsbottom Carbon Residue Apparatus, 220-240V 50/60Hz	

Accessories

332-007-001	Coking Bulb Pyrex™, 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:
115V 50/60Hz, 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, Hopkins reflux condenser with aspirator, thistle tube, heating tube, 250W heating coil and 400mL Pyrex™ beaker.

Specifications

Conforms to the specifications of:
ASTM D2547; IP 77, 182, 248;
ISO 2083; NF M 07-014, 07-023

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 50/60Hz	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	
250-000-08F	ASTM 8F Thermometer. Range: 30 to 760°F Recommended for testing light distillate oils	1
250-000-08C	ASTM 8C Thermometer. Range: –2 to +400°C	
K80031	Porcelain Crucible	
K80032	Skidmore Crucible, with Monel Cover	
K80033	Monel Crucible, with cover	
K80034	Monel Hood, with bridge	
K80035	Refractory Block	

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 Monel Cover
Monel Crucible, with Cover
Monel Hood, with Bridge
Refractory Block

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 50/60Hz	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 test specifications
- Measures salt content, conductance, and temperature of crude oil samples, and pH measurements of aqueous samples
- Portable for field or laboratory testing with up to 8 hours of continuous operation from internal Ni-Cd rechargeable batteries (extended battery-powered operation option available)
- 18-bit analog-to-digital converter for high precision
- 24Kb RAM dedicated for data storage (about 500 test results)
- Data can be easily uploaded in a comma delimited format to a PC with Windows® 95/98/NT-based software via an RS232 serial data port

Determines the salt content, conductance, and temperature of crude oil samples according to ASTM D3230 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 µS 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.

K23000 Electrometric Salt Determinator

Dimensions lxwxh,in.(cm)
12x20x12 (30½x51x30½)
Net Weight: 6 lbs (2¾kg)

Shipping Information
Shipping Weight: 9 lbs (4kg)
Dimensions: 2.3 Cu. ft.

Ordering Information

Catalog No.	
K23000	Electrometric Salt Determinator, 115V 50/60Hz
K23090	Electrometric Salt Determinator, 230V 50/60Hz

Koehler INSTRUMENT COMPANY, INC.

Water & Sediment in Crude Oil & Fuel Oils by Centrifuge Method

Test Method

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

Oil Test Centrifuge

- Choice of long, short or pear rotor assembly to accommodate corresponding centrifuge tubes
- Accommodates four (4) centrifuge tubes of 6 or 8" conical ASTM types, long, short or pear-shaped tubes
- Automatic control of acceleration ramp, centrifugation speed, and timing functions
- Digital speed and temperature displays
- Doubly-insulated to reduce heat loss
- Self balancing, quiet operation
- Sliding stainless steel lid
- Explosion resistant

Fully automatic bench top centrifuge designed expressly for petroleum testing applications. Accommodates four (4) centrifuge tubes of ASTM long (8"), short (6") cone or pear-shaped tubes with the use of appropriate rotor assembly. Molded PTFE supports provide for maximum protection and easy positioning of tubes. Quiet running unit features elastic suspension of the drive motor for self-balancing operation. Voltage compensating circuitry ensures constant operating speed in the event of voltage fluctuations at the main power supply. Includes automatic electronic braking system and safety interlocks.

Specifications

Conforms to the specifications of:
ASTM D91, D96, D893, D1796, D2273, D2709, D2711, D4007; IP 75, 145, 359; API 2542, 2548; ISO 3734; DIN 51793; NF M 07-020
Capacity: Four (4) oil test centrifuge tubes: long, short or pear-shaped tubes (100 mL)
Maximum Speed: 1850 rpm
Maximum RCF: 865 (pear-shaped); 900 (short); 940 (long)
Timer: 0 to 99:99:99 (hh:mm:ss)
Set Speed: 200-1850rpm
Speed Readout: 0-1850rpm
Temperature Control: ambient to 93°C
Temperature Readout: Digital
Brake: Automatic Electronic
Safety Features: Powers off when power is interrupted; Lid stays locked when motor is spinning; Motor will not start when lid is open
Explosion resistant in accordance to the specifications of Group D, Class 1, Division 2 Areas

Electrical Requirements:

115V 50/60Hz, 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.

K61092 Oil Test Centrifuge

Ordering Information

Catalog No.	
K61002	Oil Test Centrifuge, 115V 50/60Hz with integrated heating system and Long Tube Rotor Assembly
K61092	Oil Test Centrifuge, 230V 50/60Hz with integrated heating system and Long Tube Rotor Assembly

Accessories

K61101	Centrifuge Tubes, Long, 100mL, 8", marked in mL (ASTM D91, D893, D1796, D4007)
K61106	Centrifuge Tubes, Long, 100mL, 8", marked in 200 parts (ASTM D96)
K61110	Centrifuge Tubes, Long, 100mL, 8", marked in mL every 1mL above 10mL (ASTM D4007)
K61112	Centrifuge Tubes, Long, 100mL, 8", marked in 200 parts every 2 parts above 20 parts (ASTM D4007)
K61149	Rotor Assembly for Short Tubes
K61102	Centrifuge Tubes, Short, 100mL, 6", marked in 200 parts every 4 parts above 20mL (ASTM D96)
K61105	Centrifuge Tubes, Short, 100mL, 6", marked in mL (ASTM D96)
K61107	Centrifuge Tubes, Short, 100mL, 6", marked in mL every 2mL above 10mL (ASTM D96)
K61108	Centrifuge Tubes, Short, 100mL, 6", marked in 200 parts (ASTM D96)
K61122	Rotor Assembly for Pear-Shaped Tubes
K61104	Centrifuge Tubes, Pear-Shaped, 100mL, marked in mL
K61152	Trace Sediment Tube (ASTM D2273), pack of 3
K61111	Cork Stopper for Centrifuge Tube

Portable Oil Test Centrifuge

ASTM D96, accommodates two 6" conical tubes, 12VDC power requirement, Max. RCF 1050, Max. RPM 2200

Ordering Information

Catalog No.	
K61094	Portable Oil Test Centrifuge, 12V DC

Programmable Muffle Furnace

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 Muffle Furnace

- Three capacity options
- Up to 12 heating/cooling ramps or dwell periods available
- Achieves 2 to 4 complete air changes per minute

The Koehler Programmable Muffle Furnace combines microprocessor control with state-of-the-art construction and forced draft capability. They are ideal for ashing a variety of samples, including petroleum products, food, pharmaceuticals, chemicals, and paper. They can also be used as standard muffle furnaces for firing or annealing glass or ceramic specimens, solid-state inorganic reactions, rock and mineral fusions, sample drying, and tempering.

Ordering Information

Catalog No.	
K24110	Programmable Muffle Furnace, 0.14 cu. ft., 208-240V, 50/60Hz Single Phaswe, 7.1A
K24120	Programmable Muffle Furnace, 0.58 cu. ft., 208-240V, 50/60Hz Single Phaswe, 12.5A
K24130	Programmable Muffle Furnace, 1.26 cu. ft., 208-240V, 50/60Hz Single Phaswe, 19.2A

Specifications

Conforms to the specifications of:
ASTM D482, D1026, D3174, D4422; IP 4, IP 163; ISO 3987, ISO 6245; NF M 07-045; DIN 51352, DIN 51575
Capacity: 0.14, 0.58 and 1.26 cu. ft. (0.004, 0.016, 0.036m3)
Temperature Range: Ambient to 1125°C (2057°F)
Setpoint Repeatability: ±1°C (±2°F)
Setpoint Accuracy: ±4°C (±7°F)
Temperature Uniformity:
0.14 cu. ft. model: ±5°C (±9°F)
0.58 cu. ft. model: ±8°C (±14°F)
1.26 cu. ft. model: ±10°C (±18°F)
Number of Air Exchanges Per Minute:
0.14 cu. ft. model: 4
0.58 cu. ft. model: 3
1.26 cu. ft. model: 2
Electrical Requirements:
208-240V, 50/60Hz
Dimensions lxwxh,in.(cm)
0.14 cu. ft. models: 19.4x14.5x19.5 (49x37x50)
Net Weight: 60 lbs (27kg)
0.58 cu. ft. models: 23.4x21.5x21.5 (59x55x55)
Net Weight: 90 lbs (41kg)
1.26 cu. ft. models: 23.4x21.55x28.5 (59x55x72)
Net Weight: 110 lbs (50kg)

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: 1/20 hp impeller
Working Depth: Oil Bath: 12" (30.5cm)
Ice Bath: 10½" (26.7cm)

Ordering Information

Catalog No.		Order Qty
K26500	Thermometer Calibration Bath, 115V 50/60Hz	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

Koehler INSTRUMENT COMPANY, INC.

Micro GC - Refinery Gas Analyzer and Natural Gas Analyzer

The Micro GC combines micro-machined injectors and detectors and high resolution capillary columns into a compact, modular gas chromatgraph. It analyzes the individual components in sample gas and provides detailed reports of properties including composition, calorific value and density up to 10 times faster than a conventional GC system. The hardware combined with Data System software and LAN interfacing, provides a powerful system complete with calorific value BTU or Mega Joule/m3) calculations and reporting according to GPA, ASTM and ISO standards. There is no need to change the detector range to compensate for wide fluctuations in component concentration normally present in gas samples of various sources and types. Analysis of pressurized liquid samples, which are gases under standard temperature and pressure, is possible using optional sample conditioners.

Test Method

Fast and accurate measurement of the composition and heating value of gas is demonstrated using a portable GC. The Gas Analyzer measures the individual components and calculates physical properties such as specific gravity and heating value in approximately 100 to 160 seconds.

Features & Benefits

- Conforms to ASTM D3588, ISO 6976, and GPA 2172 test specifications
- Compatible with highly pressurized (liquefied) gases with heated vaporizer accessory
- Compact size
- Fixed volume injector on GC gives results with high precision, repeatability, and accuracy
- Analysis times up to 30 times faster than a conventional GC
- Modular design for easy maintenance

Specifications

Conforms to the specifications of:
ASTM D3588; ISO 6976; GPA 2172
Operating Conditions: 0-50°C,
5-95%RH, up to 15,000ft altitude
Column Heater Range:
Ambient + 15°C to 180°C
Detector: Thermal Conductivity (TCD),
240 nL internal volume
Repeatability: 0.2%RSD
Linear Dynamic Range:
10_6 ±10%
Compatible with Helium, Argon
(min. input pressure 80±2psig).
Electrical Requirements:
100-240V 50/60Hz 200VA

Refinery Gas Analyzer

Refinery gas samples are delivered to the sample inlet of the GC after passing through a sample conditioning system, which selectively removes any liquid fractions and particulate matter from the sample. This ensures that only gas phase sample is delivered to the RGA. An internal vacuum pump draws this conditioned sample into each channel's micro injector, when then injects the mixture onto each of the capillary columns for analysis. A complete analysis of hydrogen, saturated and olefinic hydrocarbons (C1-C5, and C6+ grouped peaks), plus fixed gases (O2, N2, CO, and CO2) is performed. Precise retention times and component areas translate into accurate component identification and quantification of the individual components present in refinery gas. Four chromatographic modules are optimized and integrated to quickly separate and measure the individual components in refinery gas. Critical performance parameters such as sample volume, temperature and carrier gas pressure are precisely controlled to produce accurate and reliable measurements independent of ambient temperature and pressure. vaporization for gas introduction into the analyzer.

Ordering Information

Catalog No.	
K47300	Refinery Gas Analyzer, 100-240V 50/60Hz
	Accessories
K47310	Pressure reducer
K47311	Heated regulator for gas sampling
K47320	Refinery Gas Analyzer standard gas mixture

K47200/K47300

Natural Gas Analyzer

This analyzer is applicable to natural gas samples from wellhead to pipeline-quality gas and Liquefied Petroleum Gas (LPG). Additionally, the analyzer can handle Y-Grade Liquefied Natural Gas (LNG). Samples are easily introduced using sample cylinders, Tedlar bags or by direct connection to the pipeline or wellhead sampling points. Two chromatographic modules are optimized and integrated to quickly separate and measure the individual components in natural gas. The analyzer quickly separates and measures the permanent gases and hydrocarbons present using an optimized, dual-channel portable gas chromatograph. This powerful, yet easy-to-use configuration is equally applicable to a wide range of sample types including pipeline gas, wellhead gas, LPG and Y-grade liquefied natural gas. Wellhead samples, or samples taken directly from the gas well, often contain significant amounts of hydrogen sulfide, yet there are no interferences and H2S can be measured from 50 PPM to 30 mol%. The portable GC uses digital signal processing with an expanded dynamic range.

For analysis of LPG, a heated vaporizer provides the backpressure necessary to ensure representative sampling and vaporization for gas introduction into the analyzer.

For Y-Grade LNG, a de-methanized natural gas liquid under pressure which contains significant amounts of C6 plus material, an optional Heated Vaporizer interface is used to maintain sample integrity and provide the heat necessary to ensure complete sample.

Ordering Information

Catalog No.	
K47200	Natural Gas Analyzer, 100-240V 50/60Hz
	Accessories
K47210	Pressure reducer
K47211	Heated regulator for gas sampling
K47220	Natural Gas Analyzer standard gas mixture
K47230	Laptop Computer

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 ⅓rpm 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: ⅓rpm
Electrical Requirements: 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.

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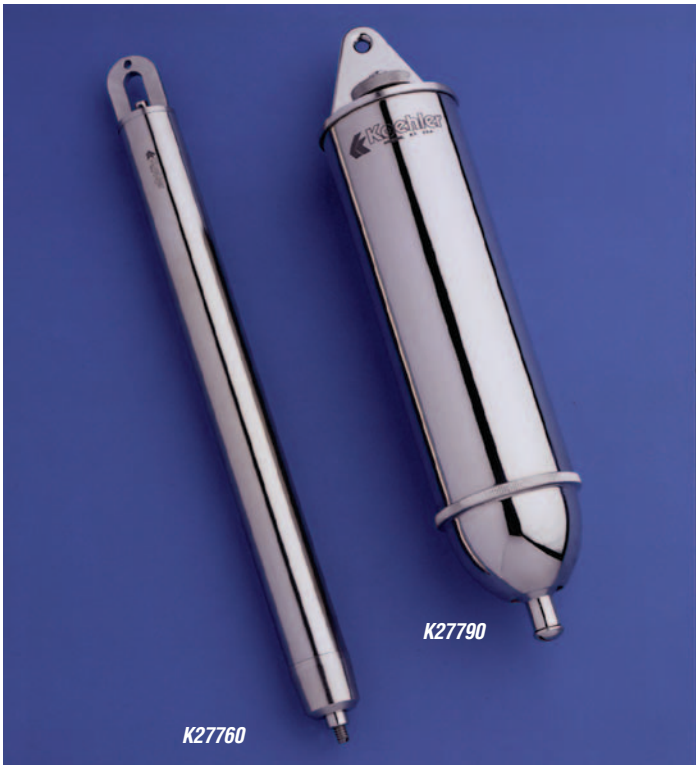


Sampling of Petroleum and Petroleum Products

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

K27400
Drum Thief

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

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

Tank Car Gauging Pole

- Meets ASTM D1085 specifications
- 36" or 32⅛" in length, with ⅛" graduations

Ordering Information

Catalog No.	
K28000	Tank Car Gauging Pole, 36"
K28010	Tank Car Gauging Pole, 32⅛"

Koehler INSTRUMENT COMPANY, INC.

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.

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)

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 50/60Hz	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.

Melting 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

K90104	Glass slides and cover slips (pack of 100)

K90100 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:
115V, 60Hz, Single Phase
220V, 50Hz, Single Phase

Koehler INSTRUMENT COMPANY, INC.

General Purpose Baths

Constant Temperature Water Baths

- Three models, ranging from 3 liter to 22 liter capacity
- Microprocessor controller with LED display of setpoint and actual temperature to 0.1°C, and redundant overtemperature control
- Temperature stability within ±0.2°C
- Built-in timer with RS232 port

Economical constant temperature water baths in a range of sizes for a variety of laboratory applications. Convenient digital temperature control provides °C/°F switchable LED setpoint and display to 0.1°C, and temperature stability to within ± 0.2°C. A separate adjustable thermostat provides overtemperature protection. The bath reservoir is constructed of 304 series stainless steel. Utilizes water as the bath medium and the heaters will not burn out if the bath should run dry. Optional hinged, removable acrylic cover tilts to permit condensate to flow back into the bath and is gabled to accommodate sample containers of a variety of different shapes and sizes. Available flat bath covers with set of rings can be used for the evaporation of liquids and solvents and melting of solids or to accommodate sample containers of different sizes. Drain is included with all models to facilitate emptying of the bath liquid. Bath exterior is constructed of galvanized steel with an powder coating finish.

Specifications

Temperature control: 0.1°C setpoint and C°/F° switchable LED display
Temperature stability: ±0.2°C
Temperature range: 25 to 100°C (20 to 100°C with cooling accessory)
Electronic timer: 0:01 to 9:59 hours

K33203 Constant Temperature Water Bath

Ordering Information

Catalog No.	Capacity	Electrical Requirements	Overall Dimensions lxwxh,in.(cm)	Inside Dimensions lxwxh,in.(cm)
K33201	3-8 liter	115V 60Hz, 8.7A	11½x11½x12½	10½x9x5½
K33202	(0.8-2.1 gal)	230V 50Hz, 8.7A	(29.2x29.2x31.8)	(26.7x22.9x14)
K33203	5-12 liter	115V 60Hz, 8.7A	15¾x11½x12½	10½x13½x5½
K33204	(1.3-3.2 gal)	230V 50Hz, 8.7A	(40x29.2x31.8)	(26.7x34.3x14)
K33205	8-22 liter	115V 60Hz, 8.7A	22x13x13¾	11½x19½x7
K33206	(2.1-5.8 gal)	230V 50Hz, 8.7A	(55.9x33x34.9)	(29.2x49.5x17.8)

Accessories

Acrylic Covers

K33201-0	Acrylic Cover for K33201/K33202 Baths
K33203-0	Acrylic Cover for K33203/K33204 Baths
K33205-0	Acrylic Cover for K33205/K33206 Baths

Flat Bath Covers with Ring Sets

K33201-1	1-Hole Cover (7.5 in./19cm hole diameter) and 1 Ring Set for K33201/K33202 Baths
K33201-4	4-Hole Cover (3.6 in./9.2cm hole diameter) and 4 Ring Sets for K33201/K33202 Baths
K33203-6	6-Hole Cover (3.6 in./9.2cm hole diameter) and 6 Ring Sets for K33203/K33204 Baths
K33205-2	2-Hole Cover (7.5 in./19cm hole diameter) and 2 Ring Sets for K33205/K33206 Baths
K33205-6	6-Hole Cover (4.5 in./11.5cm hole diameter) and 6 Ring Sets for K33205/K33206 Baths

Other General Purpose Baths Available.

Koehler also offers both Ultra Low Temperature (–95 to 0°C) and Heating (–88 to +100°C) Circulators. These powerful systems feature dual-stage semi-hermetic compressors, full range cooling at all temperatures for faster cool down times, heavy duty refrigeration tubing, CFC-free refrigerants, high flow pressure & suction pump system designed for large external systems, adjustable high/low temperature warning and shut-off functions, low liquid level alarm, LED temperature display, and a digital RS-232 interface. Please inquire with Koehler Customer Service about any additional or ordering information.

General Purpose Baths

Constant Temperature Circulating Baths

- Three Models with operating ranges up to 100, 200, or 250°C
- Bath capacities ranging from 3 to 12 liters
- Redundant safety temperature control and low liquid cut-off
- Built-in cooling coil for counter cooling

Standard Model–Constant temperature circulating bath with analog temperature controller, large LED display, and an operating range to 100°C with ±0.03°C stability. Choice of 3-4.5L or 7.5-12L bath capacities. Circulator has adjustable pumping speeds (3 to 15 Lpm), and hose-barb fittings for external circulation. A separate adjustable thermostat provides safety cutoff. Bath exterior is constructed of galvanized steel with an acrylic enamel finish.

Elite Model–Similar in design and construction to the standard model, but features a microprocessor-based temperature controller with drift compensation, an operating range to 200°C, an improved temperature stability of ±0.01°C, an RS-232 interface, visual and audible overtemperature warning, and low liquid level protection.

Ultra Model–Similar in design and construction to the elite model, but features a programmable controller with self-optimizing Intelligent Cascade Control (ICC), Integrated Programmer (6 profiles, up to 60 steps), 4-line interactive LCD display, an operating range to 250°C, pumping speed up to 20 Lpm, an RS-232/485 interface, and an external port for a Pt-100 sensor.

Specifications

Temperature Range: (with built-in counter-cooling option)
Standard model: 20°C to 100°C
Elite model: 20°C to 200°C
Ultra model: 20°C to 250°C
Temperature Stability:
Standard model: ±0.03°C Elite and Ultra models: ±0.01°C

K33213 Constant Temperature Circulating Bath

Ordering Information

Catalog No.	Model	Electrical Requirements	Bath Capacity	Working Dimensions lxwxh,in.(cm)	Dimensions lxwxh,in.(cm)	Shipping Information
K33209	Standard	115V 60Hz, 8.7A	3-4.5 liter (0.8-1.2 gal)	6x6x6 (15.2x15.2x15.2)	7x13x14 (17.8x33x35.6)	13 lbs (6kg)
K33210		230V 50Hz, 8.7A				
K33211	Elite	115V 60Hz, 8.7A	3-4.5 liter (0.8-1.2 gal)	6x5x6 (15.2x12.7x15.2)	8x15x16 (20.3x38.1x40.6)	20 lbs (9.1kg)
K33212		230V 50Hz, 8.7A				
K33213	Ultra	115V 60Hz, 8.7A	3-4.5 liter (0.8-1.2 gal)	5.9x5.1x5.9 (15x13x15)	8x15x16 (37.5x27.6x39.4)	26 lbs (11.8kg)
K33214		230V 50Hz, 8.7A				
K33215	Standard	115V 60Hz, 8.7A	7.5-12 liter (2.0-3.2 gal)	8x8.5x6 (20.3x21.6x15.2)	18x12x17 (45.7x30.5x43.2)	35 lbs (15.9kg)
K33216		230V 50Hz, 8.7A				
K33217	Elite	115V 60Hz, 8.7A	7.5-12 liter (2.0-3.2 gal)	8x8.5x6 (20.3x21.6x15.2)	18x12x17 (45.7x30.5x43.2)	35 lbs (15.9kg)
K33218		230V 50Hz, 8.7A				
K33219	Ultra	115V 60Hz, 8.7A	7.5-12 liter (2.0-3.2 gal)	8x8.5x6 (20.3x21.6x15.2)	18x12x17 (45.7x30.5x43.2)	40 lbs (18.1kg)
K33220		230V 50Hz, 8.7A				

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
- 750 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 (750 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.

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 50/60Hz, 750W
K42001	Utility Heater, 115V 50/60Hz, 1250W
K42090	Utility Heater, 230V 50/60Hz, 750W
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.

Three models are available. Model K27500 conforms to ASTM D1218 (maximum temperature 30ºC) and measures to the fourth decimal place refractive index or tenth place in percent solids. 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.	
K27500	Automatic Petroleum Refractometer for D1218 110-240V 50/60Hz
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: 1.32000 to 1.70000nD for K27500
- Refractive Index: 1.29000 to 1.70000nD for K27550 and K27560 (nD - Sodium D-Line Refractive Index)

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

Precision:
- Standard Mode: ±0.1% Solids ± 0.0001nD for K27500
- Standard Mode: ±0.02% Solids ± 0.00002nD for K27550 and K27560
- 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

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.

Remaining Useful Life Evaluation for Oil Condition Monitoring

Test Method

The portable Remaining Useful Life Evaluation Routine (RULER®) instrument measures the oxidative resistance levels of mineral and synthetic hydrocarbon oils, ester-based and biodegradable oils. Utilizing voltammetric techniques, the RULER® quantitatively analyzes the relative concentrations of antioxidants in new and used oils in order to monitor the depletion rates of the antioxidant protection package in the oil. The RULER® can be used proactively in order to determine proper oil change intervals and to extend oil change intervals through timely antioxidant additive replenishments. In addition, the RULER® can be used to quantify antioxidant levels of incoming and stored oil supplies and to detect abnormal operating conditions prior to equipment failure signalled by abrupt antioxidant depletion rates.

Remaining Useful Life Evaluation Routine (RULER®)

- *Patented* electrochemical measurement technique
- Conforms to ASTM D6810 and D6971
- Compact and completely portable hand-held unit
- Windows® CE-based simple touch screen operation
- Durable for use in harsh and industrial environments
- 320 x 240 pixel LCD backlit touch screen with automatic contrast
- Stores over 100 tests in memory
- Quick data communication and downloading laptop and desktop computers
- Integrated charge status/low-battery indicator with intelligent fast charge
- Long-life lithium-ion battery with power backup

The RULER® Instrument

The *patented* RULER® technology is a portable oil analysis instrument that quickly measures the levels of antioxidants in petroleum- and synthetic-based oils, greases, and industrial fluids. Designed to provide rapid and accurate evaluations of lubricant oxidation stability and remaining antioxidant concentration, the RULER® is ideal for field testing, maintenance facilities, and oil analysis laboratories as part of a proactive oil condition monitoring program.

The Role of Antioxidants

The antioxidants added to lubricants are vital to fluid integrity and are specially formulated for each type of application, accounting for the various exposures to heat, atmospheric oxygen, and water. Under normal machine operating conditions, radical oxidation would typically degrade any lubricant without a protective additive package. This could result in sludge and deposit formation, filter blockages, oil thickening, and an increase in oil acidity. The antioxidants present in the additive package will significantly limit oil degradation from occurring but will be depleted in the process. Therefore, it is imperative to know the status of the antioxidants in oils being used in service.

Conventional Measurement Techniques

Many conventional laboratory techniques such as kinematic viscosity, total acid number (TAN), infrared (IR) data, and wear metal analysis are used for measuring the extent of oil degradation. These techniques only begin to show significant changes in the physical and chemical properties of the oils when a majority of the antioxidants have been depleted and the oil has begun to substantially degrade, approaching the end of its useful life. This is a point where machine wear and failure may become a severe problem. However, to ensure that a lubricant is not used past the end of its useful life, periodic oil changes are inherently conservative which results in discarding lubricant that is still suitable for use.

Remaining Useful Life Evaluation Routine (RULER®)

The RULER® Measurement Technology

The RULER® instrument quantitatively determines the remaining utility of the lubricant by measuring the remaining concentrations of the antioxidants. The rate of antioxidant depletion over time can be monitored and used to predict proper oil change intervals as well as detect abnormal equipment operation prior to machine breakdown. These important assessments can be easily made by field personnel from the data acquired and analyzed by the RULER® instrument. The results are then presented directly on the touch screen. In addition, the RULER® Data Management Software (R-DMS®) system, which is part of the RULER® package, enhances this monitoring process and can be utilized on a desktop or laptop computer.

The measurement principal of the RULER® is based upon linear voltammetry, where this *patented* electrochemistry technique can evaluate a wide range of antioxidants without any interference from water, fuel, soot, dirt, metal, silt, or other contaminants. The analysis of an oil sample requires the addition of less than 0.5 mL of oil to an electrolytic test solution and insertion of the RULER® probe into the solution. The instrument applies a voltage ramp across the three-electrode sensing system in the probe. At specific voltage values, the antioxidants will become chemically excited and create an oxidation current that is recorded by the instrument. A plot of oxidation current versus voltage, known as a voltammagram, is displayed on the touch screen. The results can then be readily analyzed using the RULER® instrument software and interpreted by the field operator to determine if any immediate maintenance action is necessary or to plan for the next appropriate oil change interval.

The RULER® Data Management Software (R-DMS®)

Utilizing the RULER® Data Management Software (R-DMS®) on a desktop or laptop computer, the resulting data for each test site can be easily tracked over time, enabling the user to identify normal trends for any given piece of equipment. Variations from these trends can be indicative of changes in system operating conditions causing the accelerated oxidation of the lubricant. The R-DMS® software package can maintain a large database of test results, display multiple test results, export data to other formats, and incorporate trending data from other techniques such as viscosity, acid number, infrared (IR) data, and wear metal analysis to provide a complete condition monitoring package. Therefore, with complete information about lubricant quality, determinations can be easily made regarding oil change intervals or additive reinforcement to extend the life of the lubricant.

Remaining Useful Life Evaluation for Oil Condition Monitoring

The RULER® Test Solutions

The *patented* test solutions formulated specifically for RULER® analysis optimize the measurement of specific antioxidants in any given class of oils. These RULER® test solutions are provided in 7mL glass vials which attach easily to the RULER® test probe, have been identified by different colored caps, and are convenient for field and remote testing. Each vial contains 5mL of a specific test solution and 1g of specially prepared sand. After an oil sample is added to the test solution and the vial is shaken, the oil and debris will adhere to the sand and the antioxidants will remain in the solution for RULER® analysis. The shelf life of the RULER® solutions is at least one year from the date of manufacture.

The RULER® test solutions are available in four main classes: **red**, **green**, **blue**, and **yellow**. The **red** solutions have been designed for aviation oil applications, which includes ester-based turbine oils. The **green** solutions have been designed for general applications, which include phosphate ester-based oils, gear, compressor and hydraulic oils, greases, and transformer oils. The **blue** solutions have been designed for combustion engine applications, which include gear oils, gasoline and diesel crankcase oils, and marine oils. The **yellow** solutions have been designed for rust and oxidation applications, which include mineral-based steam and gas turbine oils, phosphate ester-based oils, gear oils, compressor and hydraulic oils, gasoline and diesel crankcase oils, marine oils, greases, and transformer oils. The **black** solutions are for RULER® Acid Number (RAN).

Specifications

CE certified
Communication Ports:
  Standard RS-232 port
Operating Temperature Range:
  –30°C to +50°C
  –22°F to +122°F
Power Supply:
  Rechargeable lithium-ion battery pack
  Rechargeable lithium-manganese backup battery pack
Electrical Requirements:
  120V 50/60Hz
  220V 50/60Hz

Included Accessories

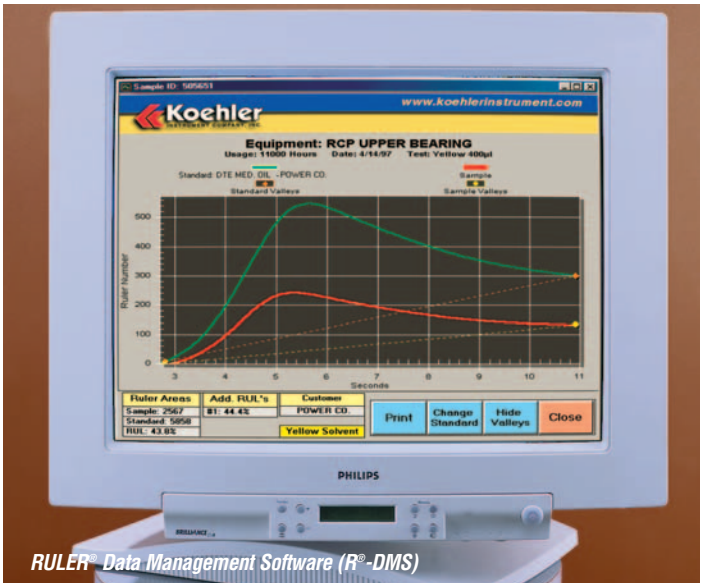
Cable and Communication Software
R-DMS® Software Package (RULER® Data Management Software)
RULER® Probe
Carrying Case for RULER® instrument and accessories
Micropipettor with disposable tips
Alcohol pads
Tissue Wipes
Instruction Manual

Dimensions: lxwxh,in.(cm)

  24.8x10.4x6.1 (9.75x4.1x2.4)
Net Weight: 1.9 lbs (0.85kg)

Shipping Information

Shipping Weight: 10 lbs (4.5kg)
Dimensions: 2 Cu. ft.



RULER® Data Management Software (R®-DMS)

Ordering Information

Catalog No.		Order Qty
RULER® Instrument		
K320S-200	RULER® Instrument, 115V 50/60Hz	1
K320S-290	RULER® Instrument, 220V 50/60Hz	

Accessories

RULER® Test Solutions - Vials

One case of RULER® test solution vials consists of 144 glass vials filled with 1g of sand and 5mL of the test solution. Choose from the following solutions based upon your application. Please contact Koehler Customer Service with any questions about ordering the test solutions.

K131-144	Red - Aviation Applications	1
K132-144	Green - General Applications	
K133-144	Blue - Combustion Engine Applications	
K134-144	Yellow - Rust and Oxidation Applications	
K137-144	Black - RAN	

RULER® Test Solutions - Bottles

The RULER® test solutions are also available in 500mL bottles. Glass vials filled with 1g of sand are also needed to perform the proper analysis. Choose from the following solutions based upon your application. Please contact Koehler Customer Service with any questions about ordering the test solutions.

K131-500	Red - Aviation Applications	1
K132-500	Green - General Applications	
K133-500	Blue - Combustion Engine Applications	
K134-500	Yellow - Rust and Oxidation Applications	
K137-250	Black - RAN 250mL bottle	
K144SW	Glass vials with sand, box of 200	1
K144SB	Glass vials for RAN, box of 100	

Optional Accessories

K144C	Alcohol pads, 1000 individually sealed pads	1
K115	Tissue wipes, box of 300	1
K120-100T	Adjustable Multirange Micropipettor 20, 25, 50, 100µL	1
K120-500T	Adjustable Multirange Micropipettor 200, 250, 300, 500µL	
K121-100T	Pipettor Tips for K120-100T	1
K121-500T	Pipettor Tips for K120-500T	

Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter

K88800 Automatic 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.

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

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

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

Oil Insyte In-Line Continuous Monitoring System

The Oil Insyte Continuous Monitoring System with in-line sensing capability is ideally suited to measure additive package performance and accelerate development of new oil formulations in gasoline and diesel engines. Measuring the leading indicators of oil wear in real-time at temperatures up to 150˚C under GF-4 or PC-10 like conditions ensure compliance with tougher emission standards and fuel economy requirements. A unique operating methodology that does not require calibration and is independent of an oil's viscosity & composition provides a common scale for easy side-by-side comparison of results taken months (or even years) apart and assigned a relative order of performance.

An Oxidation System independently measures additive depletion and oxidation for ensuring maximum lubricant performance in gasoline engines by examining the interdependence between the two. A Soot System measures soot contamination for measuring additive package performance in diesel engines by determining the amount of free soot (vs. dispersant contained soot) present in the oil.

Designed to fit in test facility engines, each system consists of a disposable sensing element, a mechanical interface (that secures to the oil reservoir) and a signal conditioning unit with an easy to read LCD that displays the condition of the oil. Values for oxidation, additive depletion, and temperature are displayed on the Oxidation system. Values for soot and temperature are displayed on the Soot System.

Dimension & Operating Limits

Sensor Element
HxWxD: 3⅛"x ⅛"x 2¾"
(7.9x.15x6.98 cm)
Operating temperature limits
(Soot System): +10˚ to 150˚C ± 5%
Operating temperature limits
(Oxidation System):
+70˚ to 150˚C ±5%
Functional temperature limits
(Soot & Oxidation Systems):
-50˚ to 150˚C ±5%
Weight: 5.3 g

Conditioning Unit

120V AC Power Supply
15' (4.57 m) sensor signal cable
HxWxD: 3½"x 3¼"x 6"
(8.89x8.25x15.25 cm)
Weight: 356 g

Mechanical Interface

Thread: ½" x 20" NPT;
Overall length: 2¾"
Internal depth: 1¾"
O-ring: Viton
Weight: 58 g

Specifications

Soot System

Soot[1]: ±1% @ 150˚C in diesel oils

[1] Values for soot are optimized for oil measuring 0-10% soot, by weight. Repeatability is represented as an absolute value, i.e., a sensor reading of 10% has a repeatability range of 9 – 11%. Soot determination depends on the oil's percent saturated relative contamination (SRC), i.e., "free soot". Minimum levels of detection can vary with the composition and the additive package of the oil.

Oxidation System

Oxidation[2]: ±15% @ 150˚C in automotive oils
Additive depletion[3]: ±5% @ 150˚C in automotive oils

[2] Values for oxidation are optimized for oils measuring between 10 – 50 OD/cm by infrared (IR) spectroscopy where OD is defined in units of optical density and 25 OD/cm is considered the oil change point for automotive oils. Repeatability is represented as an absolute value, i.e., a sensor reading of 8.0 has a repeatability range of 6.8 – 9.2. Minimum levels of detection can vary with the composition and additive package of the oil.

[3] Values for additive depletion (conductivity) are optimized for oil measuring between 175 – 225 pmho / cm @ 25˚C by a dielectric analyzer. Repeatability is represented as an absolute value, i.e., a sensor reading of 7.0 has a repeatability range of 6.65 – 7.35. Minimum levels of detection can vary with the oil composition and additive package of the oil.

Ordering Information	
Catalog No.	
K32100	Complete Oil Insyte Oxidation System
K32105	Complete Oil Insyte Soot System

Screening Fuels in Soils

Test Method

A sample of soil is extracted with isopropyl alcohol, and the extract is filtered. The ultraviolet absorbance of the extract is measured at 254 nm. If the contaminant fuel is available for calibration, the approximate concentration of contamination is calculated. If the contaminant fuel type is known, but the contaminant fuel is not available for calibration, an estimate of the contaminant concentration is determined using average response factors. If the nature of the contaminant fuel is not known, the absorbance value is used to indicate the presence or absence of fuel contamination. Calcium oxide is added to the soil as a conditioning agent to minimize interferences from humid materials and moisture present in the soil. Particulate interferences are removed by passing the extract through a filter.

Diesel Dog Soil Test Kit

- Utilizes ultraviolet photometer for detection of heavier fuels
- Works with wet or dry soils
- Provides accurate test results regardless of operating temperature
- Self-contained portable kit

The Diesel Dog Soil Test Kit combines advanced technology with a new method to detect and measure fuel contamination in soils, bringing you an easy, safe and economical way to analyze samples in the field. The simple testing procedure utilizes isopropyl alcohol rather than ozone-depleting chlorofluorocarbons for soil extraction. The extract is then placed in the photometer and measures the concentration of the fuel at 254nm. The Diesel Dog Soil Test Kit is specially designed to test for heavier fuels. It uses a new method approved by ASTM making it useful for federal compliance activities. The Diesel Dog Soil Test Kit can be used by anyone who needs to map ground contamination or guide cleanup activities, such as environmental contractors, consultants, and laboratories conducting field analyses. Other users are gas and electric utilities, emergency response teams, and environmental agencies. The kit is designed and constructed for use in tank farms, refineries, oil production fields, railroad yards, manufactured gas sites, automotive salvage yards, and underground storage and heating oil tank sites.

Specifications

Conforms to the specifications of: ASTM D583

Ordering Information	
Catalog No.	
K47150	Diesel Dog Soil Test Kit

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.

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 45-47

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
n-Hexadecane
Nitrogen
Balance
Air or Carbon Dioxide Supply
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