

## Test Methods

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### For information on additional testing methods for fuels:

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



# Oxidation Stability of Gasoline and Aviation Fuels

## Oxidation Stability of Gasoline (Induction Period Method)

## Oxidation Stability of Aviation Fuels (Potential Residue Method)

### Test Method

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

### Oxidation Stability Test Apparatus

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

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



K10500 Oxidation Pressure Vessel

### Oxidation Pressure Vessel

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

### Ordering Information

Oxidation Pressure Vessel

page 80

Oxidation Baths

pages 81-82

Pressure Measurement Equipment

pages 83-84

Accessories

pages 81-82



Oxidata™ Pressure Measurement System

### Ordering Information

Catalog No.

K10500

Oxidation Pressure Vessel

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

# Oxidation Stability of Gasoline and Aviation Fuels

## Solid Block Oxidation Baths

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

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

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

### Specifications

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

Maximum Temperature:

- 2 Unit Liquid Bath: boiling water
- 4-6 Unit Liquid Bath: 250°F (121°C)
- Solid Block Baths: 250°F (121°C)

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



K10491 Solid Block Oxidation Bath

### Ordering Information

Ordering Information					
Type	Catalog No.		Electrical Requirements	Heater Range	Dimensions lwxh, in. (cm)
Water	K10400	2	115V 50/60Hz 17.3A	0-2000W	24x14x24 (61x36x61)
	K10402	vessels	220-240V 50/60Hz 9.0A		
	K10404	4-6 vessels	220-240V 50/60Hz 18.1A	0-3000W	
Solid Block	K10401	2	115V 50/60Hz 12A	0-1300W	15x10x17 (38x25x43)
	K10491	vessels	220-240V 50/60Hz 6A		
	K10403	4	115V 50/60Hz 22A	0-2500W	24x10x17 (61x25x43)
	K10493	vessels	220-240V 50/60Hz 11A		

### Catalog No.

### Accessories

- K10540** Glass Sample Container and Cover with pour out spout
- K10510** Gasket. Replacement composition gasket for K10500 Oxidation Pressure Vessel
- K10551** Pressure Line. For pressurizing Oxidation Pressure Vessel. 6 ft. (1.83m) long, with quick release coupling for needle valve on pressure vessel and threaded fitting for oxygen tank
- K10556** Oxygen Manifold Pressure Relief System  
Connects to oxygen source to prevent overcharging of vessel. Equipped with relief valve to vent at 125psi and 300 series stainless steel 150psi burst disk assembly. Constructed from 300 series stainless steel. Cleaned for oxygen service
- K10520** Wrench. For tightening seal on Oxidation Pressure Vessel
- K10530** Table Socket. Installs in benchtop to aid in tightening seal on Oxidation Pressure Vessel
- K10560** Bronze Tubing  
For connecting pressure recorder to vessel. Flexible seamless helical tubing with protective armor braid and connections. 5 ft (1.52m) long
- K10525** Burst Disk Assembly  
Retrofit kit for Oxidation Pressure Vessel without burst disk assembly
- 250-000-22F** ASTM 22F Thermometer  
Range: 204 to 218°F
- 250-000-22C** ASTM 22C Thermometer  
Range: 95 to 103°C
- 308-000-005** Recorder Charts  
Pack of 100
- 308-001-02R** Recorder Cartridge Pen, Red
- 308-001-02B** Recorder Cartridge Pen, Blue

# Oxidation Stability of Gasoline and Aviation Fuels



K10404 Liquid Oxidation Bath with K10500 Pressure Vessels

## Liquid Oxidation Baths

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

**Liquid Baths**—Two different models, both equipped with low liquid-level controllers in accordance with the latest ASTM specifications. Two-unit water bath can be flush mounted in a table top if desired, and is equipped with an overflow standpipe/drain to maintain the proper depth when the pressure vessels are inserted, and a plated brass reflux condenser to minimize evaporation loss. The four-six unit model can be used with water or oil as a bath medium, and has microprocessor temperature control that provides quick temperature stabilization without overshoot. Dual LED displays provide setpoint and actual temperature values in °C/°F format. A built-in overtemperature control circuit interrupts power should the bath temperature exceed a programmed cut-off point. Both models feature double-wall insulated construction with stainless steel tanks, support racks and port covers. Order thermometer separately. *The 4-6 unit model can be ordered with interchangeable racks for performing the ASTM D942, ASTM D323 and D1298 test methods—please contact your Koehler representative for additional information.*

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

## Ordering Information

### Catalog No.

### Accessories

K10540	Glass Sample Container and Cover with pour out spout
K10510	Gasket. Replacement composition gasket for K10500 Oxidation Pressure Vessel
K10551	Pressure Line. For pressurizing Oxidation Pressure Vessel. 6 ft. (1.83m) long, with quick release coupling for needle valve on pressure vessel and threaded fitting for oxygen tank
K10556	Oxygen Manifold Pressure Relief System Connects to oxygen source to prevent overcharging of vessel. Equipped with relief valve to vent at 125psi and 300 series stainless steel 150psi burst disk assembly. Constructed from 300 series stainless steel. Cleaned for oxygen service
K10520	Wrench. For tightening seal on Oxidation Pressure Vessel
K10530	Table Socket. Installs in benchtop to aid in tightening seal on Oxidation Pressure Vessel
K10560	Bronze Tubing For connecting pressure recorder to vessel. Flexible seamless helical tubing with protective armor braid and connections. 5 ft (1.52m) long
K10525	Burst Disk Assembly Retrofit kit for Oxidation Pressure Vessel without burst disk assembly
250-000-22F	ASTM 22F Thermometer Range: 204 to 218°F
250-000-22C	ASTM 22C Thermometer Range: 95 to 103°C
308-000-005	Recorder Charts Pack of 100
308-001-02R	Recorder Cartridge Pen, Red
308-001-02B	Recorder Cartridge Pen, Blue

## Specifications

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

Maximum Temperature:

- 2 Unit Liquid Bath: boiling water
- 4-6 Unit Liquid Bath: 250°F (121°C)
- Solid Block Baths: 250°F (121°C)

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

## Ordering Information

Type	Catalog No.		Electrical Requirements	Heater Range	Dimensions l x w x h, in. (cm)
Water	K10400	2 vessels	115V 50/60Hz 17.3A	0-2000W	24x14x24 (61x36x61)
	K10402		220-240V 50/60Hz 9.0A		
	K10404	4-6 vessels	220-240V 50/60Hz 18.1A	0-3000W	24x14x29½ (61x36x75)
Solid Block	K10401	2 vessels	115V 50/60Hz 12A	0-1300W	15x10x17 (38x25x43)
	K10491		220-240V 50/60Hz 6A		
	K10403	4 vessels	115V 50/60Hz 22A	0-2500W	24x10x17 (61x25x43)
	K10493		220-240V 50/60Hz 11A		

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

# Oxidation Stability of Gasoline and Aviation Fuels

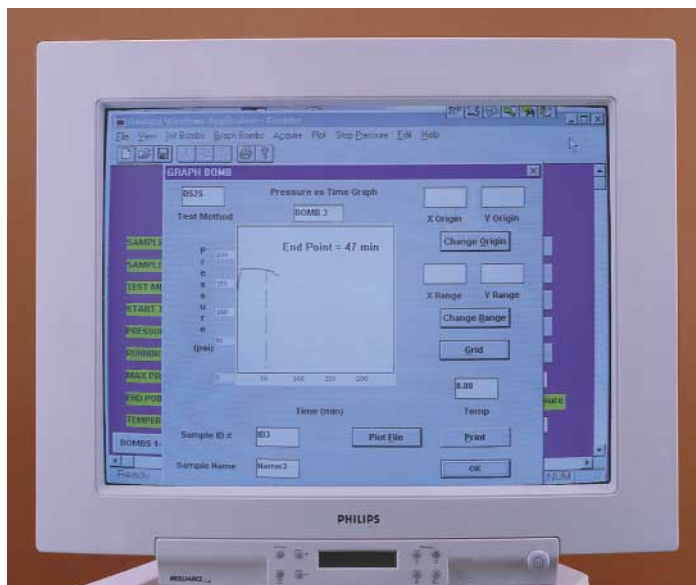
## Oxidata™ Pressure Measurement Systems

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

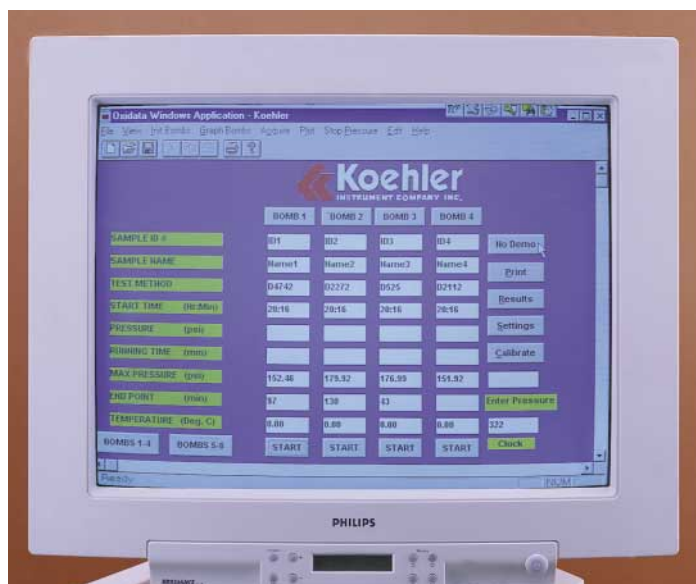
Complete electronic measurement systems for plotting pressure versus time and temperature in oxidation testing of fuels. Each system includes transducers, multiplexer, data acquisition card, software, and mounting and connecting hardware. Systems are available in two, three and four pressure vessel configurations,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

Koehler's pressure measurement systems for fuels oxidation testing features Oxidata™, a high accuracy pressure measurement software package designed exclusively for ASTM oxidation test methods. Designed to run in a Windows® or Windows 95® environment, Oxidata™ monitors up to twelve samples simultaneously, with graphical or tabular display of results. Each channel can be independently configured for any of the applicable ASTM standard test methods without compromising the independence or accuracy of the other channels. Independent start and stop times and user programmable end points add even greater flexibility.

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



*Oxidata™ software automatically detects the break point and induction period.*



## Oxidata™ Features and Specifications

- On line, real time monitoring of up to twelve samples simultaneously –results plot directly to the screen for instant monitoring or printout of results
- Automatic detection and reporting of break point and induction period
- Invalid test indication when a pressure leak is detected
- Menu options for fuels oxidation testing and other ASTM oxidation tests
- Programmable automatic end point detection with graphical and tabular representation
- Each channel can be configured and operated independently with different start/stop times and different ASTM test methods
- Zoom in feature allows for magnification of any plot sector on any channel for a more detailed study
- Monitors and reports temperatures of as many as four baths simultaneously using accessory RTD's, and calculates and displays average temperature for each bath
- Exports data to spreadsheet programs such as Microsoft Excel®, Lotus 1-2-3® etc.
- Temperature and pressure calibration capability
- Data is saved directly to the disk or hard drive during testing to prevent loss of valuable data
- Operates in Windows® and Windows 95® environments

## Included Accessories (for the pressure measurement systems)

Transducers (connects directly to pressure vessel)

Data acquisition card

Multiplexer

Oxidata™ software

RTD probe assembly (1)

Connecting cables and hardware

## Computer Requirements

Processor: 486 or higher

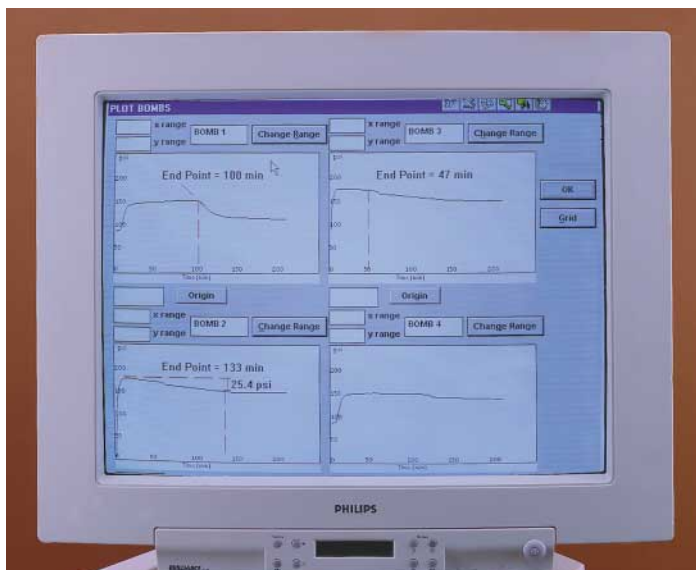
Memory (RAM): 8MB or higher

Speed: 66 MHz or higher

Windows® 3.1 or better, Windows 95®

Disk Space: 1.6MB

# Oxidation Stability of Gasoline and Aviation Fuels



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

## Ordering Information

### Catalog No.

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

### Oxidata™ Pressure Measurement System for Fuels Oxidation

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

### Accessories

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

## Mechanical Pressure Measuring and Recording Equipment

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

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

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

**Oxidata™ Pressure Measurement System**—Please see page 83 for complete product and ordering information on this product.

## Ordering Information

### Catalog No.

#### Mechanical Recorders

K10570 One-Pen Recorder

K10580 Two-Pen Recorder

#### Pressure Gauge for Aviation Fuel Tests

K10590 Pressure Gauge

# Assessing Distillate Fuel Storage Stability by Oxygen Overpressure

## Test Method

Used for assessing potential storage stability of middle distillate fuels, including fuels with or without stabilizer additives, and freshly refined or previously stored fuels. The sample is aged in a pressurized vessel at constant temperature for 16 hours and, after cooling, the total amount of insoluble products is determined gravimetrically.

## Pressure Vessel

- Conforms to the specification of ASTM D5304
- Four unit and six unit models

Stainless steel pressure vessels accommodate multiple sample containers for determining storage stability of fuels by the oxygen overpressure method. Vessels meet all applicable ASME and ASTM safety requirements for construction and working pressure and maximum operating temperature and are equipped with pressure safety valves factory present at 200psi (1,332kpa). Included with each model are a collapsible glassware rack that installs and removes easily for cleaning, oxygen inlet and outlet valves with quick disconnect fittings and charging hose, pressure gauge and wide-mouth closure with viton O-ring seal.

## Specifications

Conforms to the specifications of:

ASTM D5304

Capacity: Four or six sample containers

Construction: 316 stainless steel, in accordance with ASME specifications

Working Pressure at 90°C: Exceeds ASTM requirements

Safety Relief Valve Setting: 200psi (1,332kPa)

Pressure Gauge: 0-200psi

## Included Accessories

Glassware rack, hinged, for four or six sample containers

Charging Hole with pressure tight crimp and quick disconnect

## Dimensions:

K10600: 8½" high by 9½" round

Net Weight: 14 lbs (6.4kg)

K10601: 15½" high by 9½" round

Net Weight: 17 lbs (8kg)

## Shipping Information:

K10600:

Shipping Weight: 17 lbs (8kg)

Dimensions: 2.6 Cu. Ft.

K10601:

Shipping Weight: 22 lbs (10kg)

Dimensions: 3.5 Cu. Ft.



K10600 Pressure Vessel, 4 Unit

## Ordering Information

Catalog No.		Order Qty
K10600	Pressure Vessel, 4 Unit	1
K10601	Pressure Vessel, 6 Unit	

## Accessories

K10540	Sample Container with lid
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# Existent Gum in Fuels by Jet Evaporation

## Test Method

Gum formed during fuel storage can deposit on induction system surfaces, intake valves, stems and guides. To test for gum content, a 50mL sample is evaporated in an aluminum block bath for a specified period under controlled conditions of temperature and flow of air (aviation and motor gasolines) or steam (aircraft turbine fuel).

## Existent Gum Test Apparatus

Evaporates aircraft turbine fuel and motor and aviation gasoline samples under controlled conditions in accordance with ASTM specifications. Consists of a high temperature evaporation bath with 100mL test beakers and, for aircraft turbine fuels, a steam generator and steam superheater.

## Evaporation Baths

- Conforming to ASTM D381 and related specifications
- Choice of three-unit and six-unit models
- Available with built-in steam superheater
- Microprocessor programmable high accuracy temperature control
- Built-in pressure regulators and air flowmeters

Electrically heated baths for determining existent gum in aircraft turbine fuels by steam-jet evaporation and in motor and aviation gasolines by air-jet evaporation. Fully insulated, aluminum block design assures safe, efficient high temperature operation. Equipped with air/steam pressure regulator with gauge and a flowmeter for adjusting air flow per ASTM specifications. Stainless steel jets deliver air or steam flow to the test wells through removable brass conical adapters. Microprocessor PID control provides quick temperature stabilization without overshoot, and the bath is protected by an overtemperature control circuit that interrupts power should bath temperature exceed a programmed cut-off point. Dual LED displays provide actual and setpoint temperature values in °C/°F format. *Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. Contact your Koehler representative for information.*

**Model K33800 with Built-in Superheater**—Six-unit bath with a built-in thermostatically controlled superheater which delivers dried steam to the bath inlet for steam-jet method testing of aircraft turbine fuels. Has digital-indicating solid state bath temperature control with digital setpoint and display.

**Model K33700**—Six-unit bath without built-in superheater. Controls are housed in a separate cabinet connected to the bath by multi-conductor cable.

**Model K33780**—Three-unit bath without built-in superheater. All controls are housed in the bath cabinet.



K33700 Existent Gum Evaporation Bath

## Specifications

Conforms to the specifications of: ASTM D381; IP 131; ISO 6246; DIN 51784; FTM 791-3302; NF M 07-004

Testing Capacity:

K33800 and K33700: 6 sample beakers

K33780 and K33781: 3 sample beakers

Maximum Temperature: 475°F (246°C)

Temperature Control Stability: ±1°F (±0.5°C)

Bath Configuration: machined aluminum block with multiple cartridge heaters

Heater Range:

K33800 and K33700: 0-3000W

K33780 and K33781: 0-1500W

Superheater: (Model K33800 only)

Superheating chamber and condensate trap constructed of stainless steel

Solid state thermoregulator (0-550°F) Heater Range: 0-1500W

Electrical Requirements:

K33700: 220-240V 50/60Hz, Single Phase, 13.6A

K33800: 220-240V 50/60Hz, Single Phase, 20.4A

K33780: 115V 50/60Hz, Single Phase, 13.0A

K33781: 220-240V 50/60Hz, Single Phase, 6.8A

## Included Accessories

Conical Brass Adapters for air/steam jets

## Dimensions l x w x h, in. (cm)

K33800: 32½ x 20 x 20 (83 x 51 x 51)

K33780: 32½ x 11 x 19 (83 x 28 x 48)

K33700: Bath: 28 x 20 x 16 (71 x 51 x 41)

Control Cabinet:

9 x 8 x 6½ (23 x 20 x 17)

Net Weight:

K33800: 230 lbs (104.3kg)

K33780: 85 lbs (38.6kg)

K33700: 203 lbs (92.1kg)

## Shipping Information

K33800

Shipping Weight: 313 lbs (142kg)

Dimensions: 17.2 Cu. ft.

K33780

Shipping Weight: 140 lbs (63.5kg)

Dimensions: 8.3 Cu. ft.

K33700

Shipping Weight: 271 lbs (123kg)

Dimensions: 13.7 Cu. ft.

## Ordering Information

### Catalog No.

K33800	Existent Gum Evaporation Bath, 6-Unit with Superheater, 220-240V 50/60Hz
K33700	Existent Gum Evaporation Bath, 6-Unit, 220-240V 50/60Hz
K33780	Existent Gum Evaporation Bath, 3-Unit, 115V 50/60Hz
K33781	Existent Gum Evaporation Bath, 3-Unit, 220-240V 50/60Hz

# Existent Gum in Fuels by Jet Evaporation

## Steam Generator

- For steam-jet method testing of aircraft turbine fuels
- Meets output requirements of three-unit and six-unit evaporation baths
- Electrically heated for clean, efficient operation and ease of installation
- Meets applicable ASME, NEC standards; UL listed, CSA approved

Electrically heated boiler provides instantaneous and reserve steam capacity for steam-jet evaporation tests. Easy to install and operate; electrical heating eliminates the need for on-site fuel combustion. Requires only a water feed source and electrical hook-up. Ruggedly constructed, with long life industrial grade copper sheath heating element. Includes a full range of safety features: automatic water level control and low water cut-off; steam safety valve; high-limit pressure cut-out with manual reset; steam pressure gauge.

### Specifications

Output: 51.2 lbs steam/hr at 212°F

Bhp Rating: 1.73

kW Rating: 17

### Dimensions l x w x h, in. (cm)

20x28x36 (51x71x91)

Net Weight: 185 lbs (83.9kg)

### Shipping Information

Shipping Weight: 200 lbs (91kg)

Dimensions: 18 Cu. ft.

### Ordering Information

#### Catalog No.

<b>K33850/208601</b>	Steam Boiler, 208V 60Hz, Single Phase, 87A
<b>K33850/208603</b>	Steam Boiler, 208V 60Hz, Three Phase, 50A
<b>K33850/240601</b>	Steam Boiler, 240V 60Hz, Single Phase, 75A
<b>K33850/240603</b>	Steam Boiler, 240V 60Hz, Three Phase, 43A
<b>K33850/380503</b>	Steam Boiler, 380V 50Hz, Three Phase, 27A
<b>K33850/380603</b>	Steam Boiler, 380V 60Hz, Three Phase, 27A
<b>K33850/415503</b>	Steam Boiler, 415V 50Hz, Three Phase, 25A
<b>K33850/480503</b>	Steam Boiler, 480V 50Hz, Three Phase, 22A

*Other electrical configurations for the Steam Boiler are available.  
Please inquire with Koehler Customer Service for additional information.*



K33810 Steam Superheater

### Accessories

Catalog No.		Order Qty
<b>K33710</b>	Sample Beaker, 100mL spun copper, 50x78mm	6
<b>332-002-017</b>	Sample Beaker, Pyrex™, 100mL	
<b>250-000-03F</b>	ASTM 3F Thermometer Range: 20 to 760°F	2
<b>250-000-03C</b>	ASTM 3C Thermometer Range: -5 to +400°C	
<b>K33810</b>	Steam Superheater Provides dry superheated steam for evaporation baths not equipped with a built-in superheater. Use together with an outside steam source for steam-jet method testing of aircraft turbine fuels. Superheating chamber and condensate trap are constructed entirely of stainless steel. Solid state temperature controller adjusts between 0-550°F. Equipped with steam inlet and outlet connections and condensate drain valve. Steel exterior has a chemical resistant polyurethane enamel finish. Dimensions 5x27x9½" (13x70x24cm). Shipping Weight: 23 lbs (10.4kg) 220-240V 50/60Hz, Single Phase, 6.8A	

### Test Apparatus for Steam Jet Method

#### Ordering Information

Catalog No.		Order Qty
<b>K33800</b>	Existent Gum Evaporation Bath	1
<b>K33850 Series</b>	Steam Boiler	1
<b>K33710</b>	Sample Beaker (or 332-002-017)	6
<b>250-000-03F</b>	ASTM 3F Thermometer. Range: +20 to +215°F	2
<b>250-000-03C</b>	ASTM 3C Thermometer. Range: -5 to +400°C	

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

# Water Vapor Content by Measurement of Dew Point Temperature



K32230 Dew Point Apparatus with K32232 Gauge and ASTM 33C Thermometer

## Test Method

Determines the water vapor content of gaseous fuels by measurement of the dew point temperature, followed by calculation of the water vapor content.

## Dew Point Apparatus

- Rugged construction
- Stainless steel sample chamber with incorporated "target mirror"

The Dew Point Apparatus consists of a closed stainless steel dew point chamber containing a highly polished stainless steel "target mirror" and sample inlet and outlet control valves. The chamber is chilled by refrigerant following through the outer cooling jacket, preventing any refrigerant contact with the test sample. The thermometer is inserted into the mirror support structure, providing the temperature of the "target mirror." As the sample flows in the chamber and is deflected across the surface of the mirror, the temperature at which condensation collects on the mirror is recorded as the dew point of the sample.

## Specifications

Conforms to the specifications of:  
ASTM D1142

## Dimensions

l x w x h, in. (cm)  
3 1/2 x 6 x 12 1/4 (9 x 15 x 32.5)

Net Weight: 6 1/2 lbs (3kg)

## Shipping Information

Shipping Weight: 11 lbs (5kg)  
Dimensions: 2.5 Cu. ft.

## Ordering Information

Catalog No.		Order Qty
K32230	Dew Point Apparatus	1

### Accessories

K32231	Pressure Gauge, 0 to 23 psi	1
K32232	Pressure Gauge, 0 to 230 psi	
K32233	Pressure Gauge, 0 to 2300 psi	
250-000-33F	ASTM 33F Thermometer, range: -36.5 to +107.5°F	1
250-000-33C	ASTM 33C Thermometer, range: -38 to +42°C	
250-000-114F	ASTM 114F Thermometer, range: -112 to +70°F	
250-000-114C	ASTM 114C Thermometer, range: -80 to +20°C	

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

# Copper Strip Corrosion by Liquefied Petroleum (LP) Gases

## Test Method

Tests the corrosiveness of LPG to copper by immersion of a polished test strip in the sample inside a test cylinder at elevated temperature. After one hour the test strip is removed and compared against the ASTM Copper Strip Corrosion Standards.

## LPG Copper Strip Corrosion Test Apparatus

- Conforms to ASTM D1838 and related specifications
- Four-sample testing capability

Consists of LPG Corrosion Test Cylinders, Water Bath, Copper Strips, Polishing Materials and the ASTM Copper Strip Corrosion Test Standards.

**LPG Corrosion Test Cylinders**—Stainless steel cylinder with ¼" needle valves for purging and admitting LPG samples. Dip tube with hook suspends copper strip in sample. Knurled, threaded cap with O-ring gasket hand tightens to a positive seal. Withstands hydrostatic test pressure of 1000 psig (6895kPa).

**LPG Corrosion Test Water Bath**—Thermostatically controlled water bath submerges four LPG Corrosion Test Cylinders in an upright position. Controls temperature at 100 ±1°F (37.8 ±0.5°C) per ASTM specifications. Soxhlet reflux condenser and constant water level device maintain proper working depth. Polished stainless steel double-wall construction. Fully insulated.



K39900 LPG Corrosion Test Bath



K40000 LPG Corrosion Test Cylinder

## Ordering Information

Catalog No.		Order Qty
K40000	LPG Corrosion Test Cylinder	4
K39900	LPG Corrosion Test Water Bath, 115V 50/60Hz	1
K39990	LPG Corrosion Test Water Bath, 220-240V 50/60Hz	1
<b>Accessories</b>		
K40200	Copper Strip for LPG 12.5x1.5-3.0x75mm with 3.2mm hole per ASTM specifications	4
K40100	Connecting Tubing Sulfur-free plastic-lined tubing for connection of test cylinder valve to sample source. With ¼" stainless steel and aluminum connectors. 24" long	1
K25100	ASTM Copper Strip Corrosion Test Standards Colored reproductions of tarnished strips encased in a plastic plaque.	1
380-240-001	Silicone Carbide Paper, 240-grit For polishing copper strips prior to testing. Pack of 50 sheets	1
380-150-000	Silicone Carbide Grain, 150-grit For final polishing of copper strips prior to testing. 1 lb package	1
K25000	Polishing Vise Holds copper strip firmly in place without marring the edges. Stainless steel, mounted on a composition base	1
K25090	Multi-Strip Polishing Vise Similar to K25000 but capable of holding four strips at a time	1
250-000-12F	ASTM 12F Thermometer. Range: -5 to +215°F	1
250-000-12C	ASTM 12C Thermometer. Range: -20 to +102°C	1

## Specifications

Conforms to the specifications of:

ASTM D1838; GPA 2140; ISO 6251

Water Bath Specifications:

Capacity: four (4) LPG Corrosion Test Cylinders

Maximum Temperature: 221°F (105°C)

Temperature Control Stability: ±1°F (±0.5°C)

Heater Range: 0-750W

Bath Medium: 3.8 gal (14.4L) Water

Electrical Requirements:

115V 50/60Hz, Single Phase, 6.5A

220-240V 50/60Hz, Single Phase, 3.4A

## Shipping Information

Shipping Weight: 27 lbs (12.2kg)

Dimensions: 5.3 Cu. ft.

## Dimensions l x w x h, in. (cm)

12x10x24 (30x25x61)

Net Weight: 19 lbs (8.6kg)

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

# Copper Corrosion from Petroleum Products

## Test Method

The Copper Strip Tarnish Test assesses the relative degree of corrosivity of petroleum products, including aviation fuels, automotive gasoline, natural gasoline, solvents, kerosene, diesel fuel, distillate fuel oil, lubricating oil and other products. A polished copper strip is immersed in 30mL of sample at elevated temperature. After the test period, the strip is examined for evidence of corrosion and a classification number from 1-4 is assigned based on a comparison with the ASTM Copper Strip Corrosion Standards. For aviation fuels and natural gasoline the sample tube is placed inside a stainless steel bomb during testing.

## Test Bomb Baths

Thermostatically controlled water bath immerses Copper Strip Corrosion Test Bombs at the required depth per ASTM specifications. Use for testing aviation gasoline, aviation turbine fuel and natural gasoline. Fully insulated, double-wall stainless steel construction. Soxhlet reflux condenser and constant water level device maintain proper working depth. Choice of four-bomb and eight-bomb models. Optional removable test tube rack converts four-bomb model for testing of products not requiring corrosion bomb.

**Specifications:** Conforms to the specifications of: ASTM D130; IP 154 FSPT DT-28-65; ISO 2160; DIN 51759; FTM 791-5325; NF M 07-015

Testing Capacity:

- K25310/K25319: four (4) copper strip corrosion test bombs
- K25320/K25329\*: eight (8) copper strip corrosion test bombs  
\*or sixteen (16) test tubes with optional test rack  
(Catalog No. K25309) installed

Maximum Temperature: 221°F (105°C)

Temperature Control Stability: ±1°F (± 0.5°C)

Heater Range: 0-750W

Bath Medium: 5 gal (18.9L) water

Electrical Requirements: 115V 60Hz, Single Phase, 7.5A

220-240V 50/60Hz, Single Phase, 4A

## Included Accessories

Rubber Stoppers for bomb openings (4)

## Dimensions: l x w x h, in. (cm)

4-bomb model: 12x10x21 (30x25x53)

8-bomb model: 16x11½x21 (41x29x54)

Net Weight:

4-bomb model: 18½ lbs (8.4kg)

8-bomb model: 24 lbs (10.9kg)

## Shipping Information

Shipping Weight:

4-bomb model: 41 lbs (18.6kg)

8-bomb model: 45 lbs (20.4kg)

Dimensions:

4-bomb model: 5.3 Cu. ft.

8-bomb model: 5.5 Cu. ft.



K25330 Copper Strip Test Tube Bath with 332-004-004 Test Jars

## Test Tube Bath

Constant temperature bath immerses 16 test tubes for copper strip tarnish tests of products not requiring a test bomb, including: diesel fuel, fuel oil, automotive gasoline, Stoddard solvent, kerosene and lubricating oil. Microprocessor temperature controller has °C/°F switchable digital setpoint and display. Operator and equipment are protected by an overtemperature control circuit which automatically interrupts power to the unit should bath temperature exceed a programmed cut-off point. *Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. Contact your Koehler representative for information.* Welded stainless steel double-wall construction with built-in support rack. Fully insulated.

## Specifications

Conforms to the specifications of:

ASTM D130, D6074, D6158; FSPT DT-28-65; IP 154; ISO 2160; DIN 51759; FTM 791-5325; NF M 07-015

Capacity: 16 test tubes

Maximum Temperature: 190°C (374°F)

Temperature Control Stability: ±1°C (±2°F)

Heater Range: 0-750W

Bath Medium: 5 gal (18.9L) water or high temperature heater transfer fluid

Electrical Requirements: 115V 50/60Hz, Single Phase, 7.5A

220-240V 50/60Hz, Single Phase, 4A

## Dimensions: l x w x h, in. (cm)

15½x12½x14 (39x32x36)

Net Weight: 27 lbs (12.2kg)

## Shipping Information

Shipping Weight: 45 lbs (20.4kg)

Dimensions: 12.8 Cu. ft.

## Ordering Information

### Catalog No.

K25310	Bath for Copper Strip Corrosion Test Bombs, 4-Unit, 115V 50/60Hz
K25319	Bath for Copper Strip Corrosion Test Bombs, 4-Unit, 220-240V 50/60Hz
K25320	Bath for Copper Strip Corrosion Test Bombs, 8-Unit, 115V 50/60Hz
K25329	Bath for Copper Strip Corrosion Test Bombs, 8-unit, 220-240V 50/60Hz
K25309	Optional Test Tube Rack for 4-Bomb Bath

Please refer to page 99 for photograph of K25310 Series Corrosion Baths.

## Ordering Information

### Catalog No.

K25330	Copper Strip Test Tube Bath, 115V 50/60Hz
K25339	Copper Strip Test Tube Bath, 220-240V 50/60Hz
K25312	Vented Cork (16)

# Copper Corrosion from Petroleum Products

## Copper Strip Corrosion Test Bomb

- For aviation fuels and natural gasoline

Precision machined stainless steel bomb inserts in copper corrosion bath for testing aviation fuels and natural gasoline. Withstands test pressure of 100psi (689kPa) per specifications. Threaded cap with O-ring gasket and knurled circumference tightens by hand to a positive seal. A 1/8" groove in the bomb threads permits safe, gradual release of pressure when opening the bomb.

### Specifications

Conforms to the specifications of:

ASTM D130, D6074, D6158; IP 154; ISO 2160; DIN 51759; FTM 791-5325; NF M 07-015

Net Weight: 1 lb (.45kg)

### Shipping Information:

Shipping Weight: 2 lbs (.91kg)

### Ordering Information

Catalog No.	Description
K25200	Copper Strip Corrosion Test Bomb
<b>Accessories</b>	
K25080	Copper Test Strips 12.5x1.5-3.0mm x 75mm to ASTM specifications
332-004-004	Test Tube 25 x 150mm
332-004-002	Viewing Test Tube Protects copper strip during inspection or storage
K25100	ASTM Copper Strip Corrosion Standards Colored reproductions of tarnished strips encased in a plastic plaque
380-150-001	Silicone Carbide Paper, 150-grit For polishing of copper strips prior to testing. Pack of 50 sheets.
380-240-001	Silicone Carbide Paper, 240-grit For polishing of copper strips prior to testing - Pack of 50 sheets
380-150-000	Silicone Carbide Grain, 150-grit For final polishing of copper strips prior to testing - 1 lb package
K25000	Polishing Vise Holds copper strip firmly in place without marring the edges. Stainless steel, mounted on a composition base
K25090	Multi-Strip Polishing Vise Similar to K25000 but capable of holding four strips at a time
250-000-12F	ASTM 12F Thermometer. Range: -5 to +215°F
250-000-12C	ASTM 12C Thermometer. Range: -20 to +102°C

## Silver Corrosion Test

Please refer to page 99 for information.

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

### Test Apparatus for Aviation Fuels and Natural Gasoline

Catalog No.	Description	Order Qty
K25310	Bath for Copper Strip Corrosion Test Bombs, 115V	1
K25319	Bath for Copper Strip Corrosion Test Bombs, 220-240V	1
K25200	Copper Strip Corrosion Test Bomb	4
K25080	Copper Strips	4
332-004-004	Test Tube	4
332-004-002	Viewing Test Tube	4
K25100	ASTM Copper Strip Corrosion Standard	1
380-240-001	Silicone Carbide Paper, 240-grit	1
380-150-001	Silicone Carbide Paper, 150-grit	1
380-150-000	Silicone Carbide Grain, 150-grit	1
K25000	Polishing Vise	1
250-000-12F	ASTM 12F Thermometer	1
250-000-12C	ASTM 12C Thermometer	1

### Test Apparatus for Diesel Fuel, Fuel Oil, Automotive Gasoline, Stoddard Solvent, Kerosene and Lubricating Oil

Catalog No.	Description	Order Qty
K25330	Copper Strip Test Tube Bath, 115V (or K25339 Bath, 220-240V)	1
K25080	Copper Strips	16
332-004-004	Test Tube	16
332-004-002	Viewing Test Tube	16
K25100	ASTM Copper Strip Corrosion Standard	1
380-240-001	Silicone Carbide Paper 240-grit	1
380-150-001	Silicone Carbide Paper, 150-grit	1
380-150-000	Silicone Carbide Grain, 150-grit	1
K25090	Multi-Strip Polishing Vise	1
250-000-12F	ASTM 12F Thermometer	1
250-000-12C	ASTM 12C Thermometer	1



K25200 Copper Strip Corrosion Bomb with K25100 and K25080

# Vapor Pressure of Petroleum Products and LP Gases

## Vapor Pressure of Petroleum Products (Reid Method) and Liquefied Petroleum Gases (LPG Method)

### Test Method

Vapor pressure is a critical factor in the handling and performance of liquid petroleum and liquefied petroleum gas (LPG) products. The vapor pressure of automotive gasolines is subject to governmental regulation for pollution control purposes.

### Reid Vapor Pressure Cylinders

- Conform to ASTM D323, D1267 and related specifications
- One-opening and two-opening types

Polished stainless steel test cylinders for vapor pressure tests of liquid petroleum products, volatile crude oil and liquefied petroleum gas (LPG). Consists of upper chamber and lower chamber in required 4:1 volume ratio. O-ring gaskets provide tight seal between chambers and at gauge coupling. One-opening type is for gasoline and other products having a Reid Vapor Pressure below 26psi (180kPa). Two-opening type is for liquid products having a Reid Vapor Pressure above 26psi (ASTM D323) and for LPG (ASTM D1267). Lower chamber of two-opening apparatus includes straight-through ball valve and 1/4" needle valve. For LPG testing, order two-opening type apparatus and accessory bleeder valve assembly.

### Specifications:

Conforms to the specifications of: ASTM D323, D1267; GPA 2140; IP 69, 161; ISO 3007, 4256; DIN 51616, 51754; FTM 791-1201  
Hydrostatic Test (two-opening type): Withstands 1000psi (6894kPa) gauge hydrostatic pressure per ASTM D1267 specifications

### Included Accessories

Threaded 1/4" Gauge Coupling  
O-ring Seals (2)

### Shipping Information

Shipping Weight: 7 lbs (3.2kg)



K11500

K11201

### Ordering Information

#### Catalog No.

**K11500** Reid Vapor Pressure Cylinder, One-Opening Type  
**K11201** Reid Vapor Pressure Cylinder Two-Opening Type  
**K11202** Bleeder Valve Assembly for LPG tests with K11201 test cylinder

## Reid Vapor Pressure Gauges

- Conforming to ASTM D323, D1267 and related specifications
- Dual psi/kPa scale on a 4 1/2" diameter dial
- Accurate to within 0.5% of scale range
- Micrometer adjustable pointer

Ruggedly constructed Bourdon type gauge designed especially for the Reid Vapor Pressure test. Heavy duty rotary brushed stainless steel movement. Lightweight aluminum case with corrosion-resistant finish and heavy duty brass non-sparking handle. Includes blow-out disc and 1/4" NPT male thread connection.

### Ordering Information

Catalog No.	Range psi/kPa	Figure Intervals psi/kPa	Interval Graduations psi/kPa
311-005-002	0-5psi*	0.5psi*	0.05psi*
311-015-002	0-15/0-100	1.0/10	0.1/1.0
311-030-002	0-30/0-200	5.0/20	0.5/2.0
311-060-002	0-60/400	5.0/50	0.2/2.5
311-100-002	0-100/700	10/50	0.5/2.5
311-250-001	0-250/1750	25/100	1.0/20
311-600-003	0-600/4200	50/250	2.0/25

\*0-5psi gauge does not have a kPa scale.



311-250-001 RVP Gauge

# Vapor Pressure of Petroleum Products and LP Gases

## Reid Vapor Pressure Data Acquisition System

Windows®-based electronic pressure measurement software designed for ASTM Reid Vapor Pressure test methods. Monitors up to eight pressure vessel channels, graphing pressure and RVP data in real-time for each channel. Each channel can be run independently and configured for the pressure ranges of 0-50, 0-200, and 0-1000 psi. Pressure values can be reported in psi or kPa. Software automatically exports results into Microsoft® Excel for data analysis and storage.

### Ordering Information

Catalog No.		Order Qty
K11401	RVP Data Acquisition System, 115V 50/60 Hz	1
K11491	RVP Data Acquisition System, 230V 50/60 Hz <i>Includes software, data acquisition card, and multiplexer box. Requires one pressure transducer for each pressure vessel.</i>	
K11404-50	RVP Pressure Transducer, 0-50 psi	1-8
K11404-200	RVP Pressure Transducer, 0-200 psi	1-8
K11404-1000	RVP Pressure Transducer, 0-1000 psi	1-8

## 4 Unit Reid Vapor Pressure Bath

- Conforms to ASTM D323, D1267 and related specifications
- Free standing or flush-mount benchtop installation
- Microprocessor programmable high accuracy temperature control

Constant temperature water baths designed for Reid Vapor Pressure determinations of liquid petroleum products and liquefied petroleum gases (LPG). Immerses vapor pressure apparatus at the proper depth per ASTM specifications. Controls bath temperature with  $\pm 0.2^\circ\text{F}$  ( $\pm 0.1^\circ\text{C}$ ) precision. Microprocessor PID control provides quick temperature stabilization without overshoot, and the bath is protected by an overtemperature control circuit that interrupts power should bath temperature exceed a programmed cut-off point. Dual LED displays provide actual and setpoint temperature values in  $^\circ\text{C}/^\circ\text{F}$  format. Double-wall construction with fiberglass insulated stainless steel tank. A sturdy 1" (25mm) flange permits flush-mount benchtop installation for easy access to the bath interior. Built-in holders suspend test cylinders at the required depth. Equipped with overflow stand pipe/drain.

### Specifications

Conforms to the specifications of:

ASTM D323, D1267; GPA 2140; IP 69, 161; ISO 3007, 4256;

DIN 51616, 51754; FTM 791-1201; NF M 07-007, 41-010

Capacity: 1 to 4 vapor pressure apparatus, one- or two-opening type

Temperature Control Stability:  $\pm 0.2^\circ\text{F}$  ( $\pm 0.1^\circ\text{C}$ )

Maximum Temperature:  $212^\circ\text{F}$  ( $100^\circ\text{C}$ )

Bath Medium: 13.7 gal (51.9L) water

Electrical Requirements:

115V 50/60Hz, Single Phase, 18.8A

220-240V 50/60Hz, Single Phase, 9.4A

**Dimensions** l x w x h, in. (cm)

15x15x36 (38.1x38.1x91.5)

Net Weight: 67 lbs (30.4kg)

### Shipping Information

Shipping Weight: 105 lbs (47.7kg)

Dimensions: 14 Cu. ft.

### Ordering Information

Catalog No.	
K11450	Reid Vapor Pressure Bath, 4-Unit, 115V 50/60Hz
K11459	Reid Vapor Pressure Bath, 4-Unit, 220-240V 50/60Hz <i>Photograph, thermometers, and additional accessories for Reid Vapor Pressure testing appear on page 94.</i>



Reid Vapor Pressure Data Acquisition System

## 21-Unit Reid Vapor Pressure Bath

- Conforms to ASTM D323, 1267 and related specifications
- Digital electronic temperature control
- Automatic water level control maintains proper immersion depth

Constant temperature water bath immerses twenty-one test cylinders for vapor pressure tests on liquid products and liquefied petroleum gas (LPG). Electronic level control automatically maintains the proper immersion depth per ASTM specifications. Heating system employs a 6kW stainless steel heat exchanger with a heavy duty circulating pump to provide rapid heat-up, even heat distribution and ease of servicing. Convenient digital setpoint and display permits rapid selection of any bath liquid temperature within the operating range. A built-in overtemperature limit control protects against accidental overheating. Bath interior and internal components are constructed of heavy gauge stainless steel. Control panel is shielded by a hinged acrylic cover. Includes sturdy angle-iron base with corrosion resistant polyurethane finish. Order pressure gauges and cylinders separately.

### Specifications

Conforms to the specifications of: ASTM D323, D1267; GPA 2140;

IP 69, 161; ISO 3007, 4256; DIN 51616, 51754; FTM 791-1201

Testing Capacity: 21 vapor pressure test cylinders

Temperature Range:  $212^\circ\text{F}$  ( $100^\circ\text{C}$ )

Temperature Control Stability:  $\pm 0.2^\circ\text{F}$  ( $\pm 0.1^\circ\text{C}$ )

Heater Range: 0-6000W

Bath Medium: 58 gal (219.5L) water

Electrical Requirements:

220-240V 50Hz, Single Phase, 28A

220-240V 60Hz, Single Phase, 28A

**Dimensions** l x w x h, in. (cm)

Overall: 48x22x36 (122x56x91)

### Ordering Information

Catalog No.	
K11415	Reid Vapor Pressure Bath, 21-Unit, 220-240V 50Hz
K11416	Reid Vapor Pressure Bath, 21-Unit, 220-240V 60Hz

## Vapor Pressure of Petroleum Products and LP Gases



K11459 Reid Vapor Pressure Bath

Test apparatus for liquid products (ASTM D323) requires:  
 Test Cylinders, one or two-opening type  
 Pressure Gauges  
 Constant Temperature Bath  
 Bath Thermometer  
 Transfer Connection  
 Manometer  
 Manometer Adapter

### Ordering Information

Catalog No.	Description
250-000-18F	ASTM 18F Thermometer Range: 94 to 108°F
250-000-18C	ASTM 18C Thermometer Range: 34 to 42°C
250-000-65F	ASTM 65F Thermometer Range: 122 to 176°F
250-000-65C	ASTM 65C Thermometer Range: 50 to 80°C
K11810	Transfer Connection Consists of threaded brass cap, delivery tube and sampling tube. Use for removing liquid from the sample container in accordance with ASTM specifications
371-000-002	Mercury Manometer Graduated in cm (1mm div.) and inches (0.1" div.). For checking pressure gauge reading of up to 15psi
K112B-1-0-12	Manometer Adapter Attaches to pressure gauge for checking with mercury manometer
AS568-210	O-ring Seal For coupling between air and gas chambers on K11500 and K11201 vapor pressure bombs
AS568-113	O-ring Seal For gauge and bleeder valve assembly connections on K11500 and K11201 vapor pressure bombs
K40100	Flexible Tubing Sulfur-free plastic lined tubing with ¼" stainless steel and aluminum connectors. For charging LPG test cylinder.

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

Test apparatus for liquefied petroleum gases (ASTM D1267) requires:  
 Test Cylinders, two-opening type  
 Bleeder Valve Assemblies  
 Pressure Gauges  
 Constant Temperature Bath  
 Bath Thermometer  
 Flexible Tubing

## Wax Appearance Point of Distillate Fuels

### Test Method

Detects the formation of wax crystals in burner fuels, diesel fuels and turbine engine fuels at low temperatures. The sample is cooled at a specified rate while being agitated. The temperature at which wax first appears is the wax appearance point.

### Wax Appearance Point Apparatus

- Conforms to ASTM D3117 specifications

For detection of separated solids in burner fuels, diesel fuels and turbine engine fuels. Similar to K29700 Freezing Point Apparatus. Includes jacketed sample tube, motorized stirrer assembly, outer vacuum flask, clamps and stand.

### Ordering Information

Catalog No.	Description	Order Qty
K29760	Wax Appearance Point Apparatus, 115V 60Hz	1
K29768	Wax Appearance Point Apparatus, 220-240V 50Hz	
K29769	Wax Appearance Point Apparatus, 220-240V 60Hz	
250-000-06F	ASTM 6F Thermometer. Range: -112 to +70°F	1
250-000-06C	ASTM 6C Thermometer. Range: -80 to +20°C	

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

# Smoke Point of Kerosene and Aviation Turbine Fuel

## Test Method

Smoke point is an indicator of the combustion qualities of aviation turbine fuels and kerosene. The fuel sample is burned in the Smoke Point Lamp, and the maximum flame height obtainable without smoking is measured.

## Smoke Point Lamp

- Conforms to ASTM D1322 and related specifications

Burns fuel samples under controlled conditions for smoke point determinations of aviation turbine fuels and similar products. Consists of brass lamp body with chimney; gallery; 0-50mm black glass scale with white markings; brass plated door with curved glass window; candle socket; and plated brass candle with wick tube and air vent. Mounted on a cast iron base with aluminum support rod.

### Ordering Information

Catalog No.		Order Qty
K27000	Smoke Point Lamp	1
<b>Accessories</b>		
K27021	Extracted Cotton Wicks Prepared in accordance with ASTM D1322 (7.2) requirements. Packed in a sealed tube with desiccant. Case of 12	
K27020	Cotton Wicks, pack of 12	
K27050	Sighting Device Installs on chimney of Smoke Point Lamp. Eliminates parallax	1
K27060	Wick Insertion Tool Facilitates insertion of cotton wick into wick tube	1
K27065	Wick Trimmer Use together with K27060 Insertion Tool to place wick at the correct height in the wick tube, free of twists and frayed ends.	1
K27010	Interchangeable Candle	



*K27000 Smoke Point Apparatus with K27065 Wick Trimmer and K27050 Sighting Device*

## Specifications

Conforms to the specifications of:  
ASTM D1322; ISO 3014; IP 57;  
DIN 51406; FTM 791-2107; NF M 07-028

## Included Accessories

Cotton Wicks, non-extracted (6)

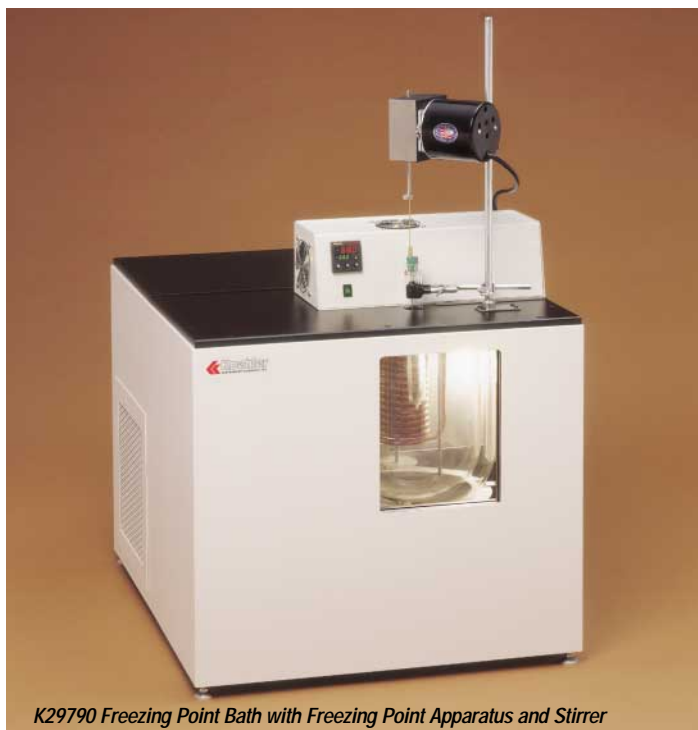
## Dimensions

dia.xh,in.(cm)  
7x18½ (18x47)  
Net Weight: 10 lbs (4.5kg)

## Shipping Information

Shipping Weight: 16 lbs (7.3kg)  
Dimensions: 5 Cu. ft.

# Freezing Point of Aviation Fuels



K29790 Freezing Point Bath with Freezing Point Apparatus and Stirrer

## Test Method

The freezing point of an aviation fuel is the lowest temperature at which the fuel remains free of solid hydrocarbon crystals that can restrict the flow of fuel. The temperature of the fuel in the aircraft tank normally falls during flight depending upon aircraft speed, altitude, and flight duration. The freezing point of the fuel must be lower than the minimum operational tank temperature. The test determines the temperature below which solid hydrocarbon crystals form in aviation fuels. The sample is cooled with continuous stirring in a Dewar-type sample tube until crystals appear.

## Refrigerated Freezing Point Bath

- Improved design with enhanced performance and safety features
- Operating range to  $-100^{\circ}\text{F}$  ( $-73^{\circ}\text{C}$ )
- Microprocessor PID digital temperature control
- Dual digital displays show setpoint and actual bath temperature
- Selectable temperature scale – Fahrenheit or Celsius
- Conforms to ASTM D2386 and related specifications

Redesigned constant temperature bath for freezing point determinations on fuel samples at temperatures as low as  $-100^{\circ}\text{F}$  ( $-73^{\circ}\text{C}$ ). Accommodates K29700 Freezing Point Apparatus and accessory stirrer. Microprocessor PID circuitry provides precise, reliable temperature control within ASTM specified tolerances. Simple push button controls and dual digital displays permit easy setting and monitoring of bath temperature. Bath medium is contained in a clear, evacuated Dewar flask, and glare-free fluorescent backlighting provides excellent visibility when working with the freezing point samples. Air-cooled hermetic compressors provide efficient operation with the use of CFC-free refrigerants. Temperature control uniformity is assured by means of a motorized stirrer which provides complete circulation without turbulence. Cabinet construction is polyester-epoxy finished steel with a chemical-resistant composite top surface. Working (top) surface includes port and mounting plate for K29700 Freezing Point Apparatus and accessory stirrer. Bath rests on adjustable leveling feet.

## Specifications

Conforms to the specifications of:

ASTM D2386; IP 16; ISO 3013; DIN 51421; FTM 791-1411; NF M 07-048

Temperature Range: Ambient to  $-100^{\circ}\text{F}$  ( $-73^{\circ}\text{C}$ )

Temperature Control Accuracy and Uniformity: Exceeds ASTM requirements throughout the operating range

Display:  $0.1^{\circ}\text{C}/^{\circ}\text{F}$  resolution

## Electrical Requirements:

- 115V, 60Hz, Single Phase, 18.3A
- 220-240V, 50Hz, Single Phase, 10.0A
- 220-240V, 60Hz, Single Phase, 10.0A

## Dimensions lwxh,in.(cm)

35x26x31 (89x66x78.75)

Net Weight: 259 lbs (117.75kg)

## Shipping Information

Shipping Weight: 373 lbs (169.5kg)

Dimensions:  $23\frac{3}{4}$  Cu. ft.

## Ordering Information

Catalog No.	Description	Order Qty
K29790	Refrigerated Freezing Point Bath 115V 60Hz, Single Phase, 18.3A	1
K29795	Refrigerated Freezing Point Bath 220-240V 50Hz, Single Phase, 10.0A	
K29796	Refrigerated Freezing Point Bath 220-240V 60Hz, Single Phase, 10.0A	
K29700	Freezing Point Apparatus, ASTM D2386	1
K29750-1-7	Stirrer Motor, 115V 60Hz	1
K29758-0-7	Stirrer Motor, 220-240V 50Hz	
K29759-1-7	Stirrer Motor, 220-240V 60Hz	

## Accessories

250-000-114C	ASTM 114C Thermometer. Range: $-80$ to $+20^{\circ}\text{C}$	1
K29720	Moistureproof Collar, Type A Use in place of brass packing gland to prevent condensation of moisture.	
K29721	Moistureproof Collar, Type B Use to prevent condensation.	

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

# Automated Freezing Point of Aviation Fuels

## New Automated Freezing Point System

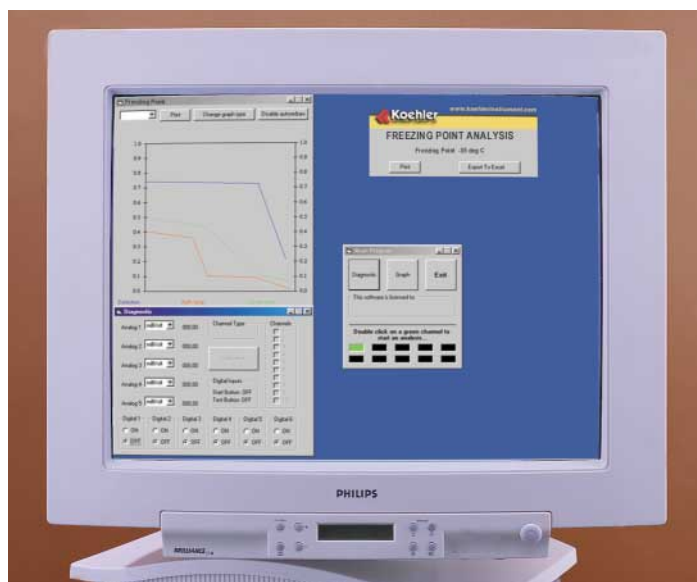
- Conforms to ASTM D2386 and related specifications
- Direct cooling system eliminates the need for solvent cooling baths
- One-stage cooling system provides temperatures as low as  $-35^{\circ}\text{C}$  and a two-stage cooling system down to  $-70^{\circ}\text{C}$
- Single start/stop push button makes system simple to use
- Minimal installation required to set-up software and instrumentation

**Freezing Point Detection**—The freezing point detection system provides automated sample testing with the accuracy and repeatability in accordance with ASTM D2386 and related international test methods. The sample is cooled in the test chamber with constantly stirring. The sophisticated dynamic measurement system emits a light pulse every  $0.5^{\circ}\text{C}$  from a coaxial fiber optic cable positioned above the test sample. The light pulse is then reflected off the silvered-bottom test jar to an optical sensor. The advanced software package analyzes the response of the light pulse. The initial appearance of crystallization is monitored by light scattering. The sample is then warmed up, and the temperature at which the hydrocarbon crystals disappear is recorded as the freezing point. All clear and transparent fuels are readily measured by the detection system, regardless of sample color.

**Advanced Software Package**—The Windows®-based software package can control either a stand-alone system or provides multiple analyzer networking with a single network control station. All analytical parameters are graphed and displayed in real-time as well as recorded in Microsoft® Excel file format. The software monitors the operation and performance of all the analyzer components for proper data measurement, including the solenoid valves, cooling system, other moving parts, as well as the Pt-100 temperature probes and the pressure sensors. The calibration curves for each probes and sensors are displayed individually and saved to the hard disk with date and time of test.

**Cooling System**—For various user applications, the automated freezing point system is available with either one-stage cooling for temperatures as low as  $-35^{\circ}\text{C}$  or two-stage cooling for temperatures as low as  $-70^{\circ}\text{C}$ . The direct cooling system requires no solvent cooling bath and thus eliminates operator exposure to solvents used in standard cooling systems. The direct system is capable of rapid cooling, approaching  $-70^{\circ}\text{C}$  bath temperatures in approximately 15 minutes, and utilizes less electricity than in standard cooling systems. The rapid cooling feature combined with a consistent cooling profile system provides repeatable results with high test reproducibility.

**Multiple Configuration System**—These automated sample cooling and physical property measurement systems can be configured with up to six test positions with one of five possible test heads at each position: cloud point, pour point, cloud & pour point, freezing point, and cold filter plugging point. Standard and customized multiple configuration systems are readily available. Please refer to pages 101 and 133 about cloud point, pour point, and cold filter plugging point product descriptions. *Please inquire with Koehler Customer Service about product specifications and ordering information.*



Advanced Software Package for Data Management

### Specifications

Conforms to the freezing point specifications of:

ASTM D2386; IP 16; ISO 3013

Electrical Requirements:

115V 60Hz, Single Phase

220V 50Hz, Single Phase

**Dimensions** lwxhx, in.(cm)

(for the KLA-35 system)

28x23x28 (72x59x71)

Net Weight: 205 lbs (93kg)

### Included Accessories

Internal built-in direct refrigeration system

One- or two-stage cooling system

Interface Cells

Operating Software

Acquisition Board

Cord Cable without plug

Interface Cables

Test Jars

### Ordering Information

#### Catalog No.

**KLA-1** Automatic Cloud Point System (one-head unit)

**KLA-2** Automatic Pour Point System (one-head unit)

**KLA-3** Automatic Cloud/Pour Point System (one-head unit)

**KLA-4** Automatic Cold Filter Plugging Point System (one-head)

**KLA-5** Automatic Freezing Point System (one-head unit)

*Please specify voltage and cooling requirements when ordering.*

*When ordering a multiple configuration system with up to six heads, please specify each measurement head with its associated catalog number using the lowest possible number combination.*

*For example, a two-head cloud point and cloud/pour point system would be **KLA-13** and not **KLA-31**, and a three-head cloud point, pour point, and freezing point system would be **KLA-125** and not **KLA-152**, **KLA-215**, **KLA-251**, **KLA-512**, or **KLA-521**.*

**PC Configuration**—Operation of the software package requires the use of a PC, which should be ordered separately. *Please inquire with Koehler Customer Service if assistance is needed in procuring a PC.* The PC should have the following minimum requirements: Pentium III 800 MHz processor, 128 MB RAM, 2 GB hard drive, CD-ROM, Windows® 95/98 operating system, Microsoft® Excel, Windows® keyboard, monitor, mouse, graphic and video cards.

# Antirust Properties of Petroleum Products Pipeline Cargoes



**K30160NACE Rust Preventing Characteristics Bath**

## Specifications

Conforms to the specifications of:

NACE TM-01-72; ASTM D665\*, D6158, D3603\*;

IP 135; ISO 7120; DIN 51585; FTM 791-4011; NF T 60-151

Testing Capacity: Six (6) 400mL sample beakers

Maximum Temperature: 104°C (220°F)

Temperature Control Stability: ±0.5°C (±1°F)

Heater Range: 0-1500W

Drive Motor: explosion proof ball bearing type

Bath Medium: 11 gal (41.6L) white technical oil

Electrical Requirements:

115V 60Hz, Single Phase, 13.0A

220-240V 50Hz, Single Phase, 6.8A

220-240V 60Hz, Single Phase, 6.8A

## Included Accessories

Steel Test Specimens (6)

Type 2 Plastic Specimen Holders (6)

Plastic Beaker Covers (6)

## Dimensions lwxhxh, in. (cm)

32½x14½x27 (83x36x69)

Net Weight: 79 lbs (35.8kg)

## Shipping Information

Shipping Weight: 150 lbs (68.0kg)

Dimensions: 16.2 Cu. ft.

*This equipment has been modified for safe operation when testing volatile petroleum products in accordance with NACE Standard Test Method TM-01-72.*

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

## Test Method

Used to control corrosion in product pipelines caused by moisture condensed from gasoline and distillate fuels. Antirust properties are determined by immersing a polished steel test specimen in a stirred mixture of the sample and distilled water held at constant temperature.

## Rust Preventing Characteristics Oil Bath

- Conforms to NACE TM-01-72, ASTM D665\* and D3603\* specifications
- Accommodates six sample beakers
- Microprocessor temperature control with digital display and overtemperature protection

Six-place constant temperature bath with stirrers for rust preventing characteristics tests. Stirs sample-water mixtures at 1000rpm and controls temperature with ±0.5°C (±1°F) stability. Immerses test beakers at the proper depth per NACE specifications. Microprocessor temperature control has °C/°F switchable digital setpoint and display. Operator and equipment are protected by an overtemperature control circuit which automatically interrupts power to the unit should bath temperature exceed a programmed cut-off point. Stainless steel stirrer paddles are driven at 1000rpm by an improved pulley drive-roller bearing arrangement. Paddles move to a raised position for placement of sample beakers in the bath. Stainless steel bath includes perforated support shelf for beakers and cover plate. Long lasting polyester drive belt improves reliability. Drive train components are protected by a removable steel guard. All exterior surfaces have stainless steel or chemical resistant polyurethane enamel finishes.

*\*To order this equipment for ASTM and equivalent test methods, please turn to page 128.*

## Ordering Information

Catalog No.		Order Qty
<b>Rust Preventing Characteristics Oil Bath</b>		
<b>K30160NACE</b>	Rust Preventing Characteristics Oil Bath, 115V 60Hz	1
<b>K30165NACE</b>	Rust Preventing Characteristics Oil Bath, 220-240V 50Hz	
<b>K30166NACE</b>	Rust Preventing Characteristics Oil Bath, 220-240V 60Hz	
<b>Accessories</b>		
<b>332-002-007</b>	Test Beaker, 400mL, for NACE TM-01-72	6
<b>250-000-09F</b>	ASTM 9F Thermometer Range: 20 to 230°F	7
<b>250-000-09C</b>	ASTM 9C Thermometer Range: -5 to +110°C	
<b>K30130</b>	Chuck for polishing test specimens Includes locknut and shaft for mounting on accessory drive motor	1
<b>K30150</b>	Drive Motor Drives K30130 Chuck. Mounted on base.	
	115V 60Hz	1
<b>380-100-001</b>	Silicone Carbide Paper, 100 grit For preliminary grinding and final polishing of test specimens. Pack of 50	1
<b>Test Specimens</b>		
<b>K30110</b>	Steel Test Specimens for ASTM D665/ NACE TM-01-72. Machined to ASTM/NACE specifications. Without holder	
<b>K30100</b>	Test Specimen with Type 2 PMMA Holder for ASTM D665/NACE TM-01-72	
<b>K30101</b>	Test Specimen with Type 2 PTFE Holder	

# Silver Corrosion by Aviation Turbine Fuels

## Test Method

Tests the corrosiveness of aviation turbine fuels towards silver. A polished silver strip is immersed in a fuel sample at elevated temperature. After a specified test period, the strip is removed from the sample, washed and evaluated for corrosion.

## Water Bath for Silver Corrosion

- Conforms to IP 227 specifications
- Six sample capability

Fully insulated, thermostatically controlled water bath with constant water level device. Use together with K25370 Bath Conversion Kit to immerse six 350mL test tubes for silver strip corrosion tests. Stainless steel, double-wall construction.

### Ordering Information

Catalog No.		Order Qty
K25310	Water Bath, 115V 50/60Hz	1
K25319	Water Bath, 220-240V 50/60Hz	1
K25370	Bath Conversion Kit for IP 227	1
<b>Accessories</b>		
K25360	Glassware Set for IP 227 Includes cold-finger condenser, glass cradle and 350mL test tube	6
K25280	Silver Test Strip Conforming to IP 227 specifications	6
K25282	ASTM D3241-IP 323 Color Standard	1
250-000-12C	ASTM 12C Thermometer Range: -20 to +102°C	1
K25000	Polishing Vise Holds silver strip firmly in place without marring the edges. Stainless steel, mounted on a composition base	1
380-240-001	Silicone Carbide Paper, 240-grit For final polishing of strips prior to testing. Pack of 50 sheets	1
380-150-001	Silicone Carbide Paper, 150-grit For polishing strips prior to testing. Pack of 50 sheets	1
380-150-000	Silicone Carbide Grain, 150-grit For polishing ends and sides of strips prior to testing. 1 lb package	1

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



K25310 Constant Temperature Bath

## Specifications

Conforms to the specifications of:  
 IP 227; ASTM D130, D6074, D6158; FSPT DT-28-65; IP 154; ISO 2160;  
 DIN 51759; FTM 791-5325  
 Testing Capacity: 6 samples for silver strip corrosion testing  
 Maximum Temperature: 221°F (105°C)  
 Temperature Control Stability: ±1°F (±0.5°C)  
 Heater Range: 0-750W  
 Bath Medium: 5 gal (18.9L) water  
 Electrical Requirements:  
 115V 50/60Hz, Single Phase, 7.5A  
 220-240V 50/60Hz, Single Phase, 4A

## Shipping Information

Shipping Weight: 29 lbs (13.2kg)  
 Dimensions: 5.3 Cu. ft.

# Cold Filter Plugging Point of Distillate Fuels



K45950 Cold Filter Plugging Point Bath

## Test Method

Determines the low temperature flow characteristics of automotive diesel fuels and gas oils, including samples with flow improving additives, by measuring the temperature at which the sample ceases to flow through a wire mesh filter under standard test conditions.

## Cold Filter Plugging Point Test Equipment

- Conforms to ASTM D6371, IP 309 and DIN 51428 specifications
- Choice of mechanically refrigerated or dry ice cooled bath

Consists of Cold Filter Plugging Point Apparatus, Vacuum System and Cooling Bath.

**Cold Filter Plugging Point Apparatus**—Includes Pyrex™ test jar with graduation, brass jacket with plastic support ring, plastic stopper, plastic insulating ring and spacer, pipette and brass filter unit with stainless steel fine wire mesh screen.

**Vacuum System**—Connects to Cold Filter Plugging Point Apparatus to draw sample through filter screen. Consists of U-tube Manometer (without mercury), three-way stopcock, air vent tube, cork stopper with elbows, and large glass bottle. Vacuum pump is not included.

**Cooling Baths**—Choice of mechanically refrigerated or dry-ice cooled baths. Mechanically refrigerated model utilizes a cascade hermetic cooling system to attain temperatures as low as -90°F (-68°C). Cold Filter Plugging Point Apparatus inserts in composition top plate of bath. Insulated stainless steel tank and polished stainless steel cabinet.

Dry-ice model includes insulated copper interior and steel exterior with corrosion resistant polyurethane enamel finish. Composition top plate suspends Cold Filter Plugging Point Apparatus in freezing mixture at the required depth. Handles on exterior permit easy emptying of freezing mixture. Supplied with thermometer holder.

## Specifications

Conforms to the specifications of:  
ASTM D6371; IP 309; DIN 51428  
Electrical Requirements:  
Mechanically Refrigerated Baths  
115V 60Hz, Single Phase, 6A  
220-240V 50Hz, Single Phase, 3A

## Dimensions\*in.(cm):

Refrigerated Model (lwxhx):  
35x26x31 (89x66x78.75)  
Net Weight: 259 lbs (117.75kg)  
Dry-Ice Model (dia.xh):  
12x12 (30x30)

\*Cooling Bath

## Shipping Information

Shipping Weight:  
Refrigerated Model: 373 lbs (169.5kg)  
Dry-Ice Model: 19 lbs (8.6kg)

Dimensions:

Refrigerated Model: 23¼ Cu. ft.  
Dry-Ice Model: 3 Cu. ft.

## Ordering Information

Catalog No.		Order Qty
<b>Cold Filter Plugging Point Apparatus</b>		
K45900	Cold Filter Plugging Point Apparatus	1
<b>Vacuum System</b>		
K45920	Vacuum System	1
<b>Cooling Bath</b>		
K45950	Mechanically Refrigerated Cold Filter Plugging Point Bath, 115V 60Hz	1
K45995	Mechanically Refrigerated Cold Filter Plugging Point Bath, 220-240V 50Hz	1
K45910	Cooling Bath	
<b>Accessories</b>		
250-000-05C	ASTM 5C Thermometer Range: -38 to +50°C	1
250-000-06C	ASTM 6C Thermometer Range: -80 to +20°C	1

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

# Automated Cold Filter Plugging Point of Distillate Fuels

## New Automated Cold Filter Plugging Point System

- Conforms to ASTM D6371 and related specifications
- Direct cooling system eliminates the need for solvent cooling baths
- One-stage cooling system provides temperatures as low as  $-35^{\circ}\text{C}$  and a two-stage cooling system down to  $-70^{\circ}\text{C}$
- Single start/stop push button makes system simple to use
- Minimal installation required to set-up software and instrumentation

**Cold Filter Plugging Point Detection**—The cold filter plugging point detection system provides automated sample testing with the accuracy and repeatability in accordance with ASTM D6371 and related international test methods. The sample is cooled according to the pre-selected temperature profile. A 20 mbar vacuum is applied at specific intervals to the sample across a 45 micron mesh filter into the aspiration glass cell assembly. If it takes more than 60 seconds for the sample to reach the upper barrier detector or more than 60 seconds to return below the detector upon release, then the test is completed and the cold filter plugging point has been reached.

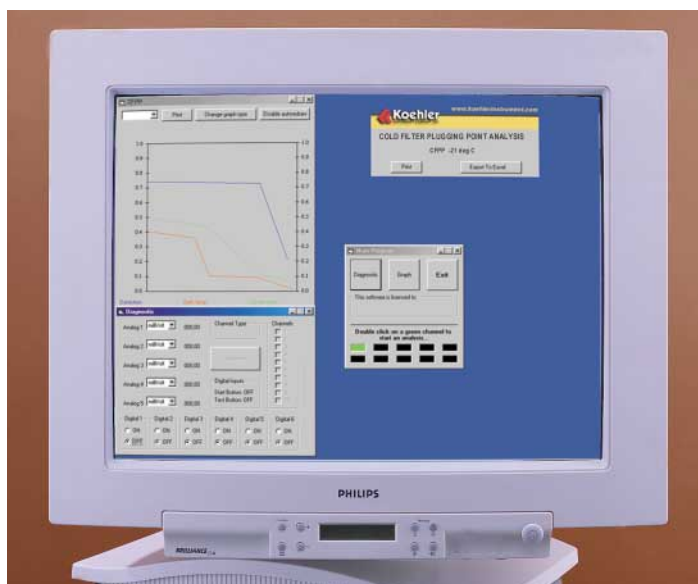
**Advanced Software Package**—The Windows<sup>®</sup>-based software package can control either a stand-alone system or provides multiple analyzer networking with a single network control station. All analytical parameters are graphed and displayed in real-time as well as recorded in Microsoft<sup>®</sup> Excel file format. The software monitors the operation and performance of all the analyzer components for proper data measurement, including the solenoid valves, cooling system, other moving parts, as well as the Pt-100 temperature probes and the pressure sensors. The calibration curves for each probes and sensors are displayed individually and saved to the hard disk with date and time of test.

**Cooling System**—For various user applications, the automated cold filter plugging point system is available with either one-stage cooling for temperatures as low as  $-35^{\circ}\text{C}$  or two-stage cooling for temperatures as low as  $-70^{\circ}\text{C}$ . The direct cooling system requires no solvent cooling bath and thus eliminates operator exposure to solvents used in standard cooling systems. The direct system is capable of rapid cooling, approaching  $-70^{\circ}\text{C}$  bath temperatures in approximately 15 minutes, and utilizes less electricity than in standard cooling systems. The rapid cooling feature combined with a consistent cooling profile system provides repeatable results with high test reproducibility.

**Multiple Configuration System**—These automated sample cooling and physical property measurement systems can be configured with up to six test positions with one of five possible test heads at each position: cloud point, pour point, cloud & pour point, freezing point, and cold filter plugging point. Standard and customized multiple configuration systems are readily available. Please refer to pages 97 and 133 about cloud point, pour point, and freezing point product descriptions. *Please inquire with Koehler Customer Service about product specifications and ordering information.*



KLA-34 Automated Cloud/Pour Point and CFPP System



Advanced Software Package for Data Management

### Specifications

Conforms to the cold filter plugging point specifications of:

ASTM D6371; IP 309; EN 116

Electrical Requirements:

115V 60Hz, Single Phase

220V 50Hz, Single Phase

**Dimensions** l x w x h, in. (cm)

(for the KLA-34 system)

28x23x28 (72x59x71)

Net Weight: 205 lbs (93kg)

### Included Accessories

Internal built-in direct refrigeration system

One- or two-stage cooling system

Interface Cells

Operating Software

Acquisition Board

Cord Cable without plug

Interface Cables

Test Jars

### Ordering Information

#### Catalog No.

**KLA-1** Automatic Cloud Point System (one-head unit)

**KLA-2** Automatic Pour Point System (one-head unit)

**KLA-3** Automatic Cloud/Pour Point System (one-head unit)

**KLA-4** Automatic Cold Filter Plugging Point System (one-head)

**KLA-5** Automatic Freezing Point System (one-head unit)

*Please specify voltage and cooling requirements when ordering.*

*When ordering a multiple configuration system with up to six heads, please specify each measurement head with its associated catalog number using the lowest possible number combination.*

*For example, a two-head cloud point and cloud/pour point system would be **KLA-13** and not **KLA-31**, and a three-head cloud point, pour point, and freezing point system would be **KLA-125** and not **KLA-152**, **KLA-215**, **KLA-251**, **KLA-512**, or **KLA-521**.*

**PC Configuration**—Operation of the software package requires the use of a PC, which should be ordered separately. *Please inquire with Koehler Customer Service if assistance is needed in procuring a PC.* The PC should have the following minimum requirements: Pentium III 800 MHz processor, 128 MB RAM, 2 GB hard drive, CD-ROM, Windows<sup>®</sup> 95/98 operating system, Microsoft<sup>®</sup> Excel, Windows<sup>®</sup> keyboard, monitor, mouse, graphic and video cards.

# Octane Analyzer For Unleaded Gasolines

## Test Method

Determines the Pump Octane Number (AKI), Research Octane Number (RON), and Motor Octane Number (MON) of unleaded gasolines, and Cetane Number for diesel fuels.

## Portable Octane Analyzer

- Test results equivalent to ASTM D2699 and D2700 test methods
- Measures all grades of unleaded gasoline
- Displays results in 20 seconds
- Directly measures octane number for  $\{(R+M)\}/2$ , RON and MON
- Optional feature for cetane number determination of diesel fuels
- Includes RS-232 output, built-in printer and LCD display
- Results traceable to official knock engine laboratory

Measures octane number via near-infrared (NIR) transmission spectroscopy utilizing 14 near-infrared emitting diodes with narrow bandpass filters, a silicon detector system, and a fully integrated microprocessor. Simple octane number determination requires three easy steps: sampling a background signal, acquiring two absorption spectra of the gas sample, and then acquiring a second background signal. Analyzer is pre-calibrated for unleaded gasoline and ethanol-blended fuels, and can be calibrated for up to eight additional fuel types.

The analyzer is small, lightweight, and operates on "AA" batteries or AC. Before each reading, the unit standardizes itself to assure accuracy. The octane number is printed with time and date on the built-in printer. All data can be downloaded via the RS232 port to an external computer.

## Specifications

Accuracy and repeatability equivalent to ASTM approved CFR engines test methods (ASTM D2699, D2700)

Sample Holder: Sealed, cubical glass container (75mm optical path length)

Sample Volume: 8 Ounces (approx. 225 mL)

Pre-calibrated for unleaded gasoline & ethanol-blended fuels. (Analyzer can be calibrated for up to 8 additional fuel types.)

Battery operated (6 AA batteries)

## Included Accessories

IBM Compatible Software

RS232 Cable

Aluminum Carrying Case

5 Rolls of paper

3 Sample Holders

Light Cover

6 AA Batteries

6 Sample Holder Labels

## Dimensions

 lxxh,in. (cm)

13½x4½x2½ (34x11½x6¼)

Net Weight: 12 lbs (5.5kg)

## Shipping Information

23x17x8½ (58½x43¼x22)

Shipping weight: 25 lbs (11.5kg)



K88600 Portable Octane Analyzer

## Ordering Information

Catalog No.		Order Qty
K88600	Portable Octane Analyzer	1

## Accessories

K88601	Printer Paper, 10 Rolls
K88603	Sample Holder (additional)
K88604	Sample Holder (Box of 12)
K88605	Light Shield
K88606	RS232 Cable
K88607	Aluminum Sample Carrying Case w/12 Sample Holders
K88608	Sample Holder Lids, 12
K88609	Sample Holder Labels, 6
K88610	25 Sample Memory

## Optional Features

K88612	Cetane Number
K88602	Additional Fuel Calibration

# Density/Relative Density of Light Hydrocarbons by Pressure Thermohydrometer

## Test Method

Density and relative density measurements of light hydrocarbons, including LPG, are used for transportation, storage and regulatory purposes. The measurement is made by floating a thermohydrometer in a sample that has been introduced into a pressure cylinder.

## Pressure Hydrometer Cylinder

- Conforms to ASTM D1657 and related specifications
- Built-in safety relief valve

Transparent plastic cylinder mounted between machined aluminum end plates and surrounded by stainless steel safety guard. Use together with ASTM 310H Thermohydrometer to determine density or relative density of LPG and light hydrocarbons. Equipped with inlet, outlet and vapor vent valves for admitting sample and purging cylinder. End plates have positive sealing buna-N O-rings and are joined by sturdy steel support rods. Top plate detaches easily without tools for insertion or removal of thermohydrometer. Safety relief valve prevents unsafe pressure build-up inside cylinder. Mounted on a finished steel base.

### Specifications

Conforms to the specifications of:  
 ASTM D1657; GPA 2140;  
 IP 235; ISO 3993; NF M 41-008  
 Safety relief valve: 200psi (1.4MPa)

### Dimensions

dia.xh,in.(cm)  
 8½x23¾ (21x60)  
 Net Weight: 5 lbs (2.3kg)

### Ordering Information

Catalog No.	Description
K26150	Pressure Hydrometer Cylinder
<b>Accessories</b>	
251-000-001	ASTM 101H Thermohydrometer Nominal Relative Density Range: 0.500 to 0.650 Standard Temperature, °F: 60/60 Temperature Range, °F: 30 to 90
251-000-004	ASTM 310H Thermohydrometer Density Range kg/m <sup>3</sup> : 500-650 Standard Temperature, °C: 15 Temperature Range, °C: 0 to 35



K26150 Pressure Hydrometer Cylinder

## Constant Temperature Water Bath

- Conforms to ASTM D1657 and related specifications
- Mechanically refrigerated for convenient sub-ambient temperature operation

Immerses two Pressure Hydrometer Cylinders at 60°F (15°C) for density and relative density determinations of LPG and other light hydrocarbons. Mechanically refrigerated cooling system maintains sub-ambient temperature. Thermistor activated solid state temperature controller and 750W copper immersion heater maintain bath temperature with ±0.5°F (±0.2°C) stability. A ½ hp ball bearing stirrer circulates the bath medium to assure temperature uniformity. Stainless steel tank is fiberglass insulated. Equipped with overflow standpipe/drain. Steel exterior has a durable polyurethane enamel finish.

### Specifications

Conforms to the specifications of: ASTM D1657; IP 235; ISO 3993  
 Controller Sensitivity: ±0.5°F (±0.2°C)  
 Capacity: two (2) K26150 cylinders  
 Electrical Requirements:  
 115V 60Hz, Single Phase, 12.5A  
 220-240V 50 or 60Hz, Single Phase, 6.4A

### Dimensions

lxwxh,in.(cm)  
 Bath interior: 12x18x22(30x46x56)  
 Overall: 18x20x49 (46x51x124)  
 Net Weight: 158 lbs (71.7kg)

### Shipping Information

Shipping Weight: 186 lbs (84.4kg)  
 Dimensions: 15.4 Cu. ft.

### Ordering Information

Catalog No.	Description
K25900	Constant Temperature Water Bath, 115V 60Hz
K25990	Constant Temperature Water Bath, 220-240V 60Hz
K25995	Constant Temperature Water Bath, 220-240V 50Hz
<b>Accessories</b>	
250-000-12F	ASTM 12F Thermometer. Range -5 to +215°F
250-000-12C	ASTM 12C Thermometer. Range -20 to +102°C

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

# Hydrocarbon Types in Liquid Petroleum Products



K41506 Fluorescent Indicator Absorption Apparatus

## Test Method

Determines saturates, olefins and aromatics in petroleum fractions that distill below 315°C.

## Fluorescent Indicator Absorption Apparatus

- Conforms to ASTM D1319 specifications
- Quick connections for columns for faster set-up and analysis
- Integrated vibration system for dry silica gel packing
- Two, four, or six column models available

A complete system for conducting FIA analyses of a single or up to six samples simultaneously. Each system is complete with an upper multi-position air pressure manifold with independently-operated gauges, pressure regulators and ball O-ring joints allowing for individual pressure control at each column. Each pressure regulator may be set at any point from 0-15 psi and will maintain the set pressure regardless of changes in back pressure. An integral pressure gauge on each station continuously registers the active pressure on each column. The ball O-ring connection system connects the pressure regulators to the upper columns, and the proper seal is achieved by applying moderate clamping pressure of stainless steel clamps without utilizing any grease. Convenient O-ring compression type fittings simplify the connection of the analyzer tubes (3mm OD x 1200mm) to the upper columns. The internal geometry of the fittings is optimized for transition between tubing diameters, and a simple twist of the connection fitting releases the analyzer tube. O-ring compression type fittings are also used to cap the end of each analyzer tube with the column support tips. The tips contain an internal porous polyethylene disc in order to support the silica gel packing in each analyzer tube. An integrated electric vibration system is mounted to the upper chassis so that the columns can be vibrated to facilitate the dry gel packing procedure, and features an on/off and amplitude selector switch. The complete unit also includes a 1mL syringe with 4" needle, two gel bottles for pouring silica gel, extra O-rings, stainless steel ball-and-socket joint clamps, and two mounting brackets with screws for stabilizing chassis.

## Specifications

Conforms to the specifications of:  
ASTM D1319; IP 156; NF M 07-024

## Included Accessories

Syringe, 1mL  
Bottles (2)  
O-Rings  
Ball-and-Socket Joint Clamps  
Mounting Brackets (2)

## Dimensions lwxh,in. (cm)

8x26x82 (20x66x208)  
Net Weight: 100 lbs (45.5kg)

## Shipping Information

Shipping Weight: 121 lbs (55kg)  
Dimensions: 12 Cu. ft.

## Ordering Information

Catalog No.	
K41502	Fluorescent Indicator Absorption Apparatus, Two-Position, 115V 50/60Hz
K41592	Fluorescent Indicator Absorption Apparatus, Two-Position, 230V 50/60Hz
K41504	Fluorescent Indicator Absorption Apparatus, Four-Position, 115V 50/60Hz
K41594	Fluorescent Indicator Absorption Apparatus, Four-Position, 230V 50/60Hz
K41506	Fluorescent Indicator Absorption Apparatus, Six-Position, 115V 50/60Hz
K41596	Fluorescent Indicator Absorption Apparatus, Six-Position, 230V 50/60Hz

## Propane Dryness Test - Cobalt Bromide Method

### Test Method

Provides an indication of the dryness of Commercial Propane and Propane HD5 by colorimetric indication on a pass/fail basis.

### Propane Dryness Tester

- Conforms to GPA 2140 specifications

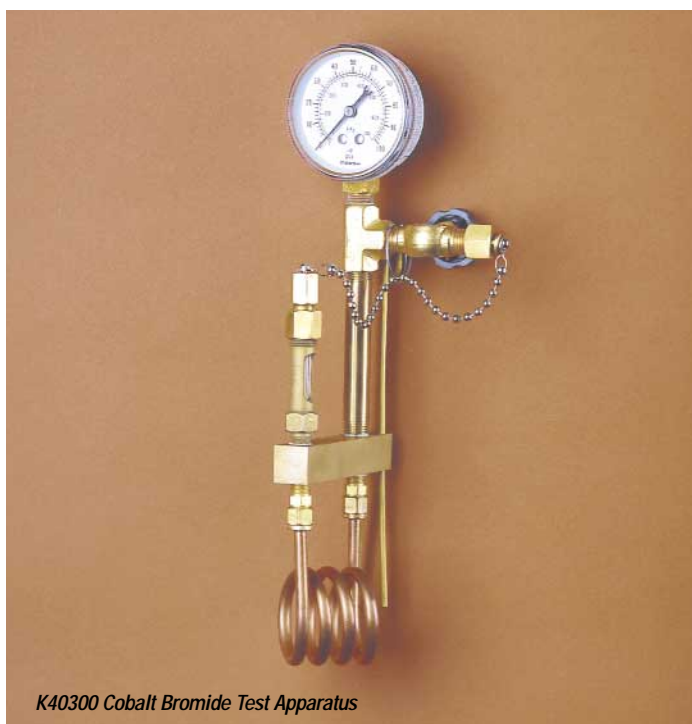
Tests for moisture in propane or other LPG vapors by exposing the sample to a cobalt bromide indicator at specified pressures. Pass/fail results are based upon color changes, if any, as specified by GPA 2140. Apparatus consists of a cobaltous bromide indicator with visible glass tube, 0-100psi pressure gauge, needle valve to regulate gas flow, threaded connector for attachment to propane container and copper cooling coil which immerses in accessory cooling jar. Includes twelve (12) cotton indicator plugs impregnated with cobalt bromide.

### Shipping Information

Shipping Weight: 2 lbs (.91kg)

#### Ordering Information

Catalog No.	Description
K40300	Cobalt Bromide Test Apparatus
K40310	Cobalt Bromide Plugs Cotton wool impregnated with cobaltous bromide and mounted in a plastic tube. Package of one dozen.
332-001-005	Pyrex™ Cooling Jar 117mm dia.x 229mm h



K40300 Cobalt Bromide Test Apparatus

## Volatility and Residues in Liquefied Petroleum (LP) Gases

### Volatility of Liquefied Petroleum (LP) Gases Residues in Liquefied Petroleum (LP) Gases

#### Test Method

The volatility of liquefied petroleum (LP) gases is determined by allowing a pre-cooled sample to weather under specified conditions and observing the temperature when 95% has evaporated. Residues in LP gases are determined by weathering of a pre-cooled sample and determination of the volume remaining at 100°F (37.8°C).

### Precooling Apparatus

- Conforms to ASTM and GPA specifications

Consists of brass cooling vessel with built-in 20 ft. (6m) copper cooling coil. Includes compression fittings and 1/8" needle valve at the downstream end.

#### Ordering Information

Catalog No.	Description
K48100	Precooling Apparatus
<b>Accessories</b>	
332-010-001	Weathering Tube, 100mL
339-000-001	Stand, for weathering tube
337-000-002	Clamp, for weathering tube
338-000-001	Clamp Holder
362-001-001	Syringe, 1mL (ASTM D2158)
K481-0-5	Needle, 8"/203mm (ASTM D2158)
250-000-99F	ASTM 99F Thermometer, Range: -55 to +41 °F
250-000-05F	ASTM 5F Thermometer, Range: -36 to +120 °F
250-000-05C	ASTM 5C Thermometer, Range: -38 to +50 °C
250-000-57F	ASTM 57F Thermometer, Range: -4 to +122 °F
250-000-57C	ASTM 57C Thermometer, Range: -20 to +50 °C



K48100 Precooling Apparatus

### Specifications

Conforms to the specifications of: ASTM D1837; D2158; GPA 2140; ISO 13757

**Dimensions:** \*dia.xh,in.(cm) 3x11¾ (7.6x29.9)

\*Cooling Vessel

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

## Additional Accessories

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

### **Oxidation Stability of Gasoline (Induction Period Method) ..... Pages 80-84**

ASTM D525; IP 40; DIN 51780; FTM 791-3352

Corrosion Resistant Steel Forceps  
Oven  
Distilled Water  
Chromic Acid or equivalent detergent cleaning solution  
Toluene  
Acetone  
Oxygen

### **Oxidation Stability of Aviation Fuels (Potential Residue Method) ..... Pages 80-84**

ASTM D873; IP 138; DIN 51799; FTM 791-3354

Corrosion Resistant Steel Forceps  
Drying Oven  
Filtering Crucible  
Oxygen  
Toluene  
Distilled Water  
Acetone

### **Existent Gum in Fuels by Jet Evaporation ..... Page 86-87**

ASTM D381; IP 131; ISO 6246; DIN 51784; FTM 791-3302

Analytical Balance  
Desiccator  
Filtering Funnel, Sintered Glass  
n-Heptane  
Air Supply (for Air-Intake Method)  
Toluene  
Acetone  
Graduated Cylinder  
Chromic Acid or equivalent detergent cleaning solution  
Distilled Water  
Oven

### **Copper Strip Corrosion by Liquefied Petroleum (LP) Gases ..... Page 89**

ASTM D1838; GPA 2140; ISO 6251

Acetone  
2,2,4-Trimethylpentane  
Cotton Wool

### **Copper Corrosion From Petroleum Products by the Copper Strip Tarnish Test ..... Pages 90-91**

ASTM D130; FSPT DT-28-65; IP 154; ISO 2160; DIN 51759; FTM 791-5325

Filter Paper  
Cotton Wool  
Isooctane or volatile, sulfur-free hydrocarbon solvent  
Stainless Steel Forceps  
Stoddard Solvent  
Kerosene

### **Vapor Pressure of Petroleum Products (Reid Method) ... Pages 92-94**

ASTM D323, D1267; GPA 2140; IP 69, 161; ISO 3007, 4256; DIN 51616, 51754; FTM 791-1201

Dead-Weight Tester  
Petroleum Naphta  
Acetone  
Air Supply

### **Wax Appearance Point of Distillate Fuels ..... Page 94**

ASTM D3117

Isopropanol  
Solid Carbon Dioxide  
Liquid Nitrogen

### **Freezing Point of Aviation Fuels ..... Page 96-97**

ASTM D2386; IP 16; ISO 3013; DIN 51421; FTM 791-1411

Ethanol  
Methanol  
Solid Carbon Dioxide  
Liquid Nitrogen  
Acetone  
Isopropanol

### **Silver Corrosion by Aviation Turbine Fuels ..... Page 99**

IP227; ASTM D130; FSPT DT-28-65; IP 154; ISO 2160, DIN 51759; FTM 791-5325

2,2,4-Trimethylpentane  
Ashless Filter Paper  
Stainless Steel Forceps  
Cotton Wool

### **Antirust Properties of Petroleum Products Pipeline Cargoes ..... Page 98**

NACE TM-0172

Naphtha or Acetone  
Chromic Acid

### **Cold Filter Plugging Point of Distillate Fuels ..... Pages 100-101**

ASTM D6371; IP 309; DIN 51428

Heptane  
Lintless Filter Paper  
Vacuum Pump

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