

OXIDATION

Oxidation Characteristics of Inhibited Mineral Oils

Sludging and Corrosion Tendencies of Inhibited Mineral Oils

Oxidation Stability of Distillate Fuel Oil (Accelerated Method)

Oxidation Characteristics of Extreme-Pressure Lubrication Oils

Test Method

Evaluates oxidation stability by subjecting the sample to a temperature of 95°C in the presence of oxygen or dry air. For inhibited mineral oils, the sample is reacted with oxygen in the presence of water and an iron-copper catalyst.

Oxidation Stability Apparatus

- Thirty and sixty-place liquid baths for high volume testing requirements
- Eight and twelve-place liquid baths for benchtop placement
- Twelve-place solid block bath
- Conforming to ASTM and related test method specifications
- Special baths for ASTM D2893 and AOCS CD12-57 tests

For product specifications and ordering information:

30 and 60-place Oxidation Baths - page 121

Solid-Block Oxidation Bath - page 121

Oxidation Cell Glassware and Accessories - page 122

Iron-Copper Catalyst and Thermometers - page 122

Eight and Twelve-Place Oxidation Baths

• Conforming to ASTM and related test method specifications
Constant temperature baths with solid state temperature control, calibrated flowmeters and condenser water manifold for oxidation stability tests on fuels and lubricants. Individual flowmeters and control valves for each oxidation cell deliver air flow at the rate of 3L/h. Condenser water manifold has individual control valves for each cell. Microprocessor PID control provides quick temperature stabilization without overshoot, and the bath is protected by a redundant overtemperature control circuit that interrupts power should bath temperature exceed a programmed cut-off point. Display provides actual setpoint temperature values in °C/°F format. Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. Double-wall insulated baths are equipped with copper immersion heaters and a 1/20 hp circulation stirrer. Stainless steel bath interior has a built-in support rack and overflow/drain to immerse the test cells at the required depth. Order oxidation cell glassware and accessories separately.

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

8-place model: 17½x25x42 (44x64x107)

12-place model: 22x14x42 (57.15x35.56x107)

Shipping Information:

Shipping Weight:

8-place model: 137 lbs (62.1kg)

12-place model: 213 lbs (96.6kg)

Dimensions:

8-place model: 29 Cu. ft.

12-place model: 29 Cu. ft.



K12219 Oxidation Stability Bath

Specifications

Conforms to the specifications of:

ASTM D943, D2274, D2893*, D4310, D6158; AOCS CD12-57**

DIN 51586, 51587; ISO 4263, ISO 12205; NF M 07-047; NF T 60-150

Test Capacity: 8 or 12 oxidation cells

Temperature Range: ambient to 212°F (100°C)

Temperature Control Stability: ±0.2°F (±0.1°C)

Bath Medium: white technical oil

Bath Capacity:

8-place model: 10 gal (37.8L)

12-place model: 19 gal (71.9L)

Electrical Requirements: **CE**

8-place model: 115V 60Hz, Single Phase, 13.0A
220-240V 50/60Hz, Single Phase, 6.8A

12-place model: 115V 60Hz, Single Phase, 32.6A
220-240V 50/60Hz, Single Phase, 17.0A

Ordering Information

Catalog No.

K12200 Oxidation Bath, 8-Unit, 115V 60Hz

K12290 Oxidation Bath, 8-Unit, 220-240V 50/60Hz

K12212 Oxidation Bath, 12-Unit, 115V 60Hz

K12219 Oxidation Bath, 12-Unit, 220-240V 50/60Hz

*Modified versions of this equipment are available for ASTM D2893

**"Oxidation Characteristics of Extreme Pressure Lubricating Oils" and AOCS CD12-57 "Fat Stability-Active Oxygen Method." Information will be furnished upon request.



Digital Flowmeter option is available for this unit.



Software compatible, inquire with Koehler Customer Service.

OXIDATION

30- and 60-Place Oxidation Baths

- Convenient operation and servicing of thirty or sixty test cells
- Complete bath temperature, water level, air flow and condenser water systems

Constant temperature water baths for high volume oxidation stability applications. Provides temperature control, metered air flow and condenser water supply controls for as many as thirty or sixty cells in a single system, eliminating the need for multiple water and electrical feeds and oxygen supply tanks. Microprocessor PID control provides quick temperature stabilization without overshoot, and the bath is protected by a redundant overtemperature control circuit that interrupts power should bath temperature exceed a programmed cut-off point. Display provides actual setpoint temperature values in °C/°F format. Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. A 6 or 12kW heat exchanger with heavy duty magnetic drive circulation pump provides rapid and uniform heat transfer throughout the bath. Bath liquid depth is automatically maintained within ASTM specified tolerances by an electronic water level control system. Two banks of individually controlled flowmeters maintain the required oxygen flow rate to each test cell, and condenser water control valves for each cell are mounted on manifolds along the sides of the bath. A centrally mounted trough collects condenser waste water for convenient disposal or recirculation through an external cooling device. Bath interior is constructed of heavy gauge welded stainless steel. All components are easily accessible for servicing if required. Supplied with a sturdy finished angle-iron frame for floor standing installation. Order oxidation cell glassware and accessories separately.

Specifications

Conforms to the specifications of:

ASTM D943, D2274, D2893*, D4310, D6158; ISO 4263, 12205

AOCS CD12-57*; DIN 51586, DIN 51587; NF M 07-047; NF T 60-150

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

Oxygen Flow Rate: 3L/h to each test cell, individually controlled

Bath Capacity:

30-place model: 60 gal (227L)

60-place model: 114 gal (432L)

Electrical Requirements: **CE**

30-place model: 220-240V 50/60Hz, Single Phase, 28A

60-place model: 220-240V 50/60Hz, Single Phase, 54A

Other electrical configurations are available upon request.

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

30-place model: 43x55x52 (109x140x132)

60-place model: 43x78x52 (109x198x132)

Shipping Information

Shipping Weight:

30-place model: 892 lbs (404.6kg)

60-place model: 995 lbs (451.3kg)

Dimensions:

30-place model: 94 Cu. ft.

60-place model: 148 Cu. ft.

Ordering Information

Catalog No.

K12330 30-Place Oxidation Stability Bath, 220-240V 60Hz

K12339 30-Place Oxidation Stability Bath, 220-240V 50Hz

K12300 60-Place Oxidation Stability Bath, 220-240V 60Hz

K12395 60-Place Oxidation Stability Bath, 220-240V 50Hz

Photograph, thermometers, and additional accessories for oxidation stability testing appear on page 122.

**Modified versions of this equipment are available for ASTM D2893 "Oxidation Characteristics of Extreme Pressure Lubricating Oils" and AOCS CD12-57 "Fat Stability Active Oxygen Method." Information will be furnished upon request.*

Available option for 30- and 60-place Oxidation Baths—temperature/pressure recorder with built-in alarms for low pressure and over/under temperature. Please call or write for specifications and ordering information.

 **Software compatible, inquire with Koehler Customer Service.**



Advanced Communications Software Package for Data Management

12-Place Solid-Block Oxidation Bath

- Accommodates twelve oxidation cells
- Microprocessor digital temperature control

Constant temperature aluminum block oxidation bath with flowmeters and condenser water manifold for twelve cells. Insulated solid block design provides efficient operation at temperatures of up to 450°F (232°C). Microprocessor temperature control unit features digital setpoint and display and built-in overtemperature protection. Includes individual flowmeters and control valves for each cell, delivering air flow at the rate of 3L/h. Condenser water manifold has individual control valves for each cell. Order oxidation cell glassware and accessories separately.

Specifications

Conforms to the specifications of:

ASTM D943, D2274, D2893*, D4310, D6158; AOCS CD12-57*;

DIN 51586, 51587; ISO 4263, 12205; NF M 07-047; NF T 60-150

Testing Capacity: 12 oxidation cells

Maximum Temperature: 450°F

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

Air Flow Rate: 3L/h

Electrical Requirements: 220-240V 50/60Hz, Single Phase, 16A **CE**

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

30x10x43 (76x25x109)

Net Weight: 345 lbs (156.5kg)

Shipping Information

Shipping Weight: 440 lbs (199.6kg)

Dimensions: 12 Cu. ft.

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

Ordering Information

Catalog No.

K12201 12-Place Solid Block Oxidation Bath, 220-240V 50/60Hz



Digital Flowmeter option is available for this unit.

**Modified versions of this equipment are available for ASTM D2893 "Oxidation Characteristics of Extreme Pressure Oils" and AOCS CD12-57 "Fat Stability-Active Oxygen Method." Information will be furnished upon request.*

OXIDATION



*K12300 60-Place Oxidation Bath
Shown with optional pressure-temperature recorder*

Oxidation Cell Glassware and Accessories

Iron-Copper Catalyst

For ASTM D943 and D4310

Ordering Information

Catalog No. K12281	Oxidation Cell Assembly for ASTM D943 and D4310 Includes oxidation cell, condenser, oxygen delivery tube, thermometer bracket, oil level indicator strip, syringe sampling tube, sampling tube holder, spacer, PTFE stopper and O-rings
K122-0-18	Oxygen Delivery Tube
K122-0-19	Oxidation Test Tube
K122-0-20	Condenser
K122-0-21	Thermometer Bracket
K122-0-22	Oil Level Indicator Strip
K122-0-23	Syringe Sampling Tube Holder
K122-0-27	PTFE Stopper
K122-0-28	Syringe Sampling Spacer
K122-0-30	Syringe Sampling Tube
AS568-009-V14	O-rings

For ASTM D2274, order one each K122-0-18 Oxygen Delivery Tube, K122-0-19 Oxidation Test Tube, and K122-0-20 Condenser for each cell.

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



Ordering Information

Catalog No. K12210	Catalyst Coil Low-metalloid steel wire and electrolytic copper wire wound in a double spiral conforming to ASTM specifications. Packed in a sealed glass tube with a nitrogen atmosphere. Ready for use.
K24000	Wire Coiling Mandrel Mounts on bench for winding steel and copper wire into catalyst coils meeting ASTM specifications.
K12250	Steel Wire Low metalloid steel wire, 0.0625" (1.59mm) diameter, for catalyst coils. Supplied in 1000 ft (304.8m) lengths.
K12260	Copper Wire Electrolytic copper wire, 0.064" (1.63mm) diameter, for catalyst coils. Supplied in 1000 ft (304.8m) lengths.
380-100-001	Silicone Carbide Paper Used to polish steel and copper wire prior to winding into catalyst coils. 100 grit.

Thermometers

Ordering Information

Catalog No. 250-002-001	Oxidation Cell Thermometer Range: 80 to 100°C. For ASTM D943 and D4310.
250-000-40C	ASTM 40C Thermometer Range: 72 to 126°C. For constant temperature baths.