Foaming Characteristics of Lubricating Oils

test method

Foaming of lubricating oils in applications involving turbulence, high speed gearing or high volume pumping can cause inadequate lubrication, cavitation, overflow and premature oxidation. The sample is blown with a controlled volume of air at different specified temperatures, including a newer high temperature test at 150°C. The resultant foam is measured at the end of each aeration period and at different intervals afterward. In the high temperature test, the amount of time required for the foam to collapse to "0" after the aeration period is also measured.

foaming characteristics test baths

- Dual-twin models for standard foaming characteristics tests
- High temperature liquid bath for 'Sequence IV' tests
- Automatic time sequence models for both tests
- Custom configurations for specialized applications

Dual Twin Foaming Characteristics Test Apparatus – Performs two tests at 75°F (24°C) and two tests at 200°F (93.5°C). Consists of two 12x18" (30.5x45.7cm) constant temperature baths with 1000mL test cylinders, certified diffusers, air delivery tubes, and flowmeters (94mL/min.) for each sample. Baths are equipped with microprocessor temperature controls, copper immersion heaters and 1⁄20hp circulation stirrers to maintain temperature uniformity of ±1°F (±0.5°C). Microprocessor PID control provides quick temperature stabilization without overshoot and the bath is protected by an overtemperature control circuit that interrupts power should bath temperature exceed a programmed cut-off point. Dual LED displays provide actual and setpoint temperature values in °C/°F format. Test cylinders are held securely in place by quick-locking cams in the bath cover assembly. A separate stainless steel support rack is provided to hold the test cylinders after removal from the bath. Cold bath (24°C) has built-in coils for circulating exit air from the high temperature test cylinders prior to passing to a volume meter, and a separate coil for circulating cooling water or refrigerant when the ambient temperature exceeds the test temperature. Supplied with rubber stoppers and glass air outlet tubes for each cylinder. Bath controls are enclosed in a finished steel base with chemical resistant polyurethane enamel finish.

Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. FTM 791-3213 Aircraft Lubricants Test–Employs more severe conditions, smaller sample, increased air flow, and longer aeration period to test the foaming characteristics of aircraft-turbine lubricants. All models are available on special order for FTM 791-3213 testing. Contact your Koehler Customer Service Representative.

specifications

Conforms to the specifications of: ASTM D892; IP 146; DIN 51566; FTM 791-3211, 791-3213*; NF T 60-129

Temperature Control:
Digital Setpoint and Displays °C/°F switchable
Built-in Overtemperature Cut-off Protection

Included Accessories
Test Cylinders, 1000mL (4)
Diffuser Stones, calibrated and certified (4)
Air Delivery Tube Assemblies (4)
Air Outlet Tubes (4)
Rubber Stoppers (4)
Bath Jars (2)
Support Rack (1)
Acrylic Safety Shield, 18"

K43041 Sequence IV Liquid Foaming Characteristics Apparatus

High Temperature 'Sequence IV' Liquid Foam Test Bath – For two tests at 150°C with a flow rate of 200mL/min. in accordance with ASTM D6082 specifications. Consists of a constant temperature bath with 1000mL test cylinders, certified diffusers, air delivery tubes and flowmeters. Microprocessor PID control provides quick temperature stabilization without overshoot and the bath is protected by an overtemperature control circuit that interrupts power should bath temperature exceed a programmed cut-off point. Dual LED displays provide actual and setpoint temperature values in °C/°F format. Quick response copper immersion heaters provide efficient high temperature operation, and a stirrer unit provides complete circulation for temperature uniformity of better than ±1°F (±0.5°C). Locking cams hold the test cylinders in a vertical position, and a separate rack is provided to hold the cylinders after removal from the bath. For operator safety, an acrylic heat shield surrounds the Borosilicate Glass bath jar. Communications software (RS232, etc.), ramp-to-set and other enhanced features are available as extra cost options. Contact your Koehler representative for information.

specifications

Conforms to the specifications of: ASTM D6082

Temperature Control:
Digital Setpoint and Displays °C/°F switchable
Built-in Overtemperature Cut-off Protection

Included Accessories
Test Cylinders, 1000mL (2)
Bath Jar (1)
Diffuser Stones, calibrated and certified (2)
Support Rack (1)
Air Delivery Tube Assemblies (2)
Rubber Stoppers (2)
Air Outlet Tube (2)
Acrylic Safety Shield, 18"

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Foaming Characteristics of Lubricating Oils

ordering information

Model	Catalog No.	Electrical Requirements	Bath Temperature	Air Flow Rate	Bath Capacity	Dimensions lxwxh,in.(cm)	Shipping Information
Dual-Twin	**K43002**	115V 60Hz 15.6A	24°C (75°F) and 93.5°C	94mL/min	9 gal (38.5L) each bath	32.25x15x31.25 (82x38x79.4) Net Weight: 108 lbs (49kg)	Shipping Wgt. 217 lbs (98.4kg) Dimensions 29.6 Cu. ft.
	K43092	220-240V 50/60Hz 8.1A					
Automatic Time Sequence	**K43003**	115V 60Hz 16A	(200°F) (Operator variable)			32.25x15x31.25 (82x38x79.4) Net Weight: 118 lbs (53.5kg)	Shipping Wgt. 227 lbs (103kg) Dimensions: 33 Cu. ft.
	K43093	220-240V 50/60Hz 8A					
Sequence IV Liquid	**K43041**	115V 60Hz 14A	150°C (302°F) (Operator variable)	200mL/min	9 gal (38.5L)	16.75x15x31.25 (42.5x38x79.4) Net Weight: 62 lbs (28.1kg)	Shipping Wgt. 89 lbs (40.4kg) Dimensions 16.3 Cu. ft.
	K43049	220-240V 50/60Hz 7A					

D892 and D6082 Dual Twin Foaming Characteristics Test Apparatus – For four tests in accordance with control ASTM D6082 and ASTM D892 specifications. Dual liquid baths feature digital temperature control for Sequences I through IV. Four flowmeters maintain the required flow rate of 94 and 200mL/min to the air diffusers. Requires the use of an external chiller to perform the Sequence I and III tests at 24°C.

K43092 Dual-Twin Foaming Characteristics Apparatus

specifications

Conforms to the specifications of:
ASTM D892, D6082; IP 146; DIN 51566; FTM 791-3211; NF T 60-129
Temperature Control:
Digital Setpoint and Displays °C/°F switchable
Built-in Overtemperature Cut-off Protection

Included Accessories
Test Cylinders, 1000mL (4)
Diffuser Stones, calibrated and certified (4)
Air Delivery Tube Assemblies (4)
Air Outlet Tubes (4)
Rubber Stoppers (4)
Bath Jars (2)
Support Rack (1)
Acrylic Safety Shield, 18”

Accessories and Additional Ordering Information
For a complete listing of accessories and information on ordering a complete package for ASTM D892 and/or D6082 testing, please contact Koehler Customer Service.

ordering information

Model	Catalog No.	Electrical Requirements	Bath Temperature	Air Flow Rate	Bath Capacity	Dimensions lxwxh,in.(cm)	Shipping Information
D892/D6082 Dual Twin	**K43005**	115V 60Hz 15.6A	**Left (Cold) Bath:** Ambient to 24°C (75°F) External Chiller required to perform Sequence I and III at 24°C **Right (Hot) Bath:** Ambient to 150°C (302°F)	94mL/min and 200mL/min	9 gal (38.5L) each	32.25x15x31.25 (82x38x79.4) Net Weight: 108 lbs (49kg)	Shipping Wgt. 217 lbs (98.4kg) Dimensions: 29.6 Cu. ft.
	K43095	220-240V 50/60Hz 8.1A					

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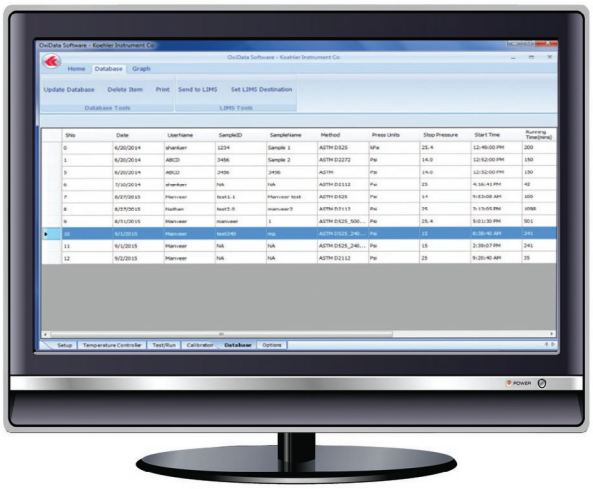
Foaming Characteristics of Lubricating Oils



Advanced Communications Software Package for Data Management

ordering information

Test apparatus for ASTM D892 Sequence I, II and III

catalog no.	description	qty
K43002	Dual Twin Foam Test Apparatus (or K43003 Automatic Time Sequence Model)	1
387-115-001	Air Pump	1
K43025	Diffuser Stone Test Apparatus	1
250-000-12F	ASTM 12F Thermometer (or 250-000-12C ASTM 12C Thermometer)	2
K43026	Wet Test Gas Meter (not required for Alternative Procedure)	1
332-005-005	Drying Tower	1

Test apparatus for ASTM D6082 Sequence IV

K43041	Sequence IV Foam Test Bath	1
K43025	Diffuser Stone Test Apparatus	1
K43026	Wet Test Gas Meter	1
332-005-005	Drying Tower	1
387-115-001	Air Pump	1
250-000-41C	ASTM 41C Thermometer	1

Test apparatus for ASTM D892 and D6082

K43005	D892 and D6082 Dual Twin Foam Test Apparatus	1
K43025	Diffuser Stone Test Apparatus	1
K43026	Wet Test Gas Meter	1
332-005-005	Drying Tower	1
387-115-001	Air Pump	1
250-000-12F	ASTM 12F Thermometer (or 250-000-12C ASTM 12C Thermometer)	2
250-000-41C	ASTM 41C Thermometer	2
250-000-41C	ASTM 41C Thermometer	2

accessories

catalog no.	description
387-115-001	Air Pump, oil-less. Delivers 100% oil-free air. 115V 60Hz
387-230-001	Air Pump, oil-less. 220-240V 50/60Hz
K43026	Wet Test Gas Meter For volume measurements of air leaving the test cylinders. Note: One meter is required for each test cylinder. Not required for the 'Alternative Procedure' - Section 9.1.
332-005-005	Drying Tower. 300mm
K43025	Diffuser Stone Test Apparatus For maximum pore diameter and permeability tests on diffuser stones. Consists of 90cm manometer, 500mL flask, flowmeter, graduate, delivery tube assembly and control valve.
K33031	Refrigerated Recirculator Use with foam test baths for 24°C tests (Sequence I and III). Microprocessor based digital control and quiet running compressor provide reliable operation and accurate control within ±0.5°C. For complete specifications, please contact Koehler Customer Service. 115V 60Hz, 8A
K33032	Refrigerated Recirculator, 220-240V 50Hz, 4A
250-000-12F	ASTM 12F Thermometer. Range: –5 to +215°F
250-000-12C	ASTM 12C Thermometer. Range: –20 to +102°C
250-000-41C	ASTM 41C Thermometer. Range: 98 to 152°C
344-100-01C	Certified Diffuser Stone. Calibrated and certified for compliance with ASTM specifications for pore diameter and permeability
344-100-001	Diffuser Stone, non-calibrated
344-005-001	Stainless Steel 'Mott' Diffuser
344-005-01C	Stainless Steel 'Mott' Diffuser Certified
K43012	Test Cylinder Replacement 1000mL cylinder. Includes retaining ring.

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