

Foaming Characteristics of Lubrication Oils

ASTM D892 – ASTM D6082 – IP 146 – ISO 6247 – ASTM D1881



- Bath drain**
- High temperature stability**
- Up to four positions per bath**
- Clamps and rack to hold cylinders**
- Complies to Sequence I – II - III**

Item	Unit	Tamson Foaming Dual Bath
P/N 230V/50-60Hz		00T0330
P/N 115V/60Hz		00T0331
Power 230V	[kW]	2.1
Power 115V	[kW]	1.7
Range	°C (°F)	Ambient .. 100 (212)
Stability	±	0.02°C
Outer bath material		Stainless steel cover, zincor powder coated case and borosilicate glass
Inner bath material		Borosilicate glass jar with stainless steel bottom and drain
Number of baths		2
Cylinders		1000 mL, borosilicate glass
Positions		4 openings per bath
L x W x H Bath	[mm]	380 x 430 x 710
L x W x H Rack	[mm]	300 x 430 x 520
Weight	[kg]	32
CE		Conforms to CE regulation
Heating	[kW]	2.0 (230V) 1.6 (115V)
Bath volume	[L]	Up to 31L per bath

General

ASTM D892 covers the determination of the foaming characteristics of lubricating oils at 24°C and 93.5°C. The tendency of oils to foam can be a serious problem in systems such as high-speed gearing, high-volume pumping, and splash lubrication. Inadequate lubrication, cavitation, and overflow loss of lubricant can lead to mechanical failure. This test method is used in the evaluation of oils for such operating conditions.

Construction

The Tamson D892 apparatus consists of two visibility baths and a rack. One bath is used as a high temperature (normally 93.5°C) bath and one bath is used as low temperature (normally 24°C) bath. A bath is constructed with a glass jar with a diameter of 300 mm and a height of 450 mm. Around the jar is a zincor powder coated case equipped with two glass windows and a stainless steel cover. The jar is equipped with a drain to ensure safe removal of the bath medium. Each bath has two cooling coils and has the capacity to hold up to four 1000 ml graduated glass foam cylinders. Both baths are equipped with a RS232 communication port. Next to the two baths, the apparatus is supplied with a rack to hold up to four foam cylinders when cooling down between sequence II and III. On this rack four flow meters are mounted with space for an optional dryer tower to be mounted on the same rack.

The rack also comes with a spill tray which can be removed for cleaning purposes. The Tamson dual foaming apparatus is standard supplied as shown in table 1 on the next page, suitable for two test positions in each bath. Four flow meters are included. Custom-made configurations are available on request.

Primary benefits of Tamson D892 apparatus

- Up to four positions per bath
- Drain valve to empty bath content
- Rack with clamps to overcome the buoyancy of the foam cylinders
- Stirrer with long shaft for optimal temperature uniformity
- Delrin stoppers instead of rubber stoppers, as rubber stoppers can crack over time
- Levelling feet to ensure the bath spirit is level
- Separate opening in cover to add bath medium to make sure the foaming cylinder is immersed to the 900 mL mark
- Robust zincor powder coated case around glass jar
- Removable outside window panels for cleaning purposes
- Each bath is equipped with two cooling coils and can be used interchangeably
- Thermometer openings in cover
- Stainless steel cover
- Complies to Sequence I – II – III

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Accuracy

The Tamson foaming bath has a very high temperature stability, because it has a stirrer with a long shaft, resulting in better temperature uniformity inside the bath. The set point can be set in steps of 0.01°C (two decimals) in the range of 0°C up to 100°C (148..212°F). The readout is displayed in two decimals.

TLC15-5

To work at 24°C, a TLC15-5 cooling circulator can be used. The TLC15-5 cooling circulator can circulate a cold flow through the cooling coil in the foaming bath.

Safety

The bath conforms to CE regulation. It is further equipped with a mechanical resettable thermostat.

A float is included and will indicate when the bath fluid is too low. The fumes from the test oil and the bath shall be vented in a manner compatible with local government regulations.

Digital mass flow meter

Tamson also supplies an apparatus with two digital mass flow meters. Please see table 5.






ASTM D6082

Tamson also supplies an apparatus that can be used for both ASTM D6082 and D892. Please see table 6.

ASTM D1881

The Tamson Foaming bath can also be used for ASTM D1881 tests. Please see table 7.

Table 1: Apparatus ASTM D892 P/N 00T0330 or P/N 00T0331 consists of the following parts:

P/N	Picture	Quantity	Description
00T0325		2	Tamson foaming bath, 230V/50-60Hz. Thermostatic bath with temperature range from ambient till 100°C. Equipped with float and drain. Cover has four openings with clamps to insert four foam cylinders. Bath is equipped with a rack to hold the foam cylinders. Two additional openings are available for thermometers. Another opening can be used to add bath fluid. Bath is equipped with two cooling coils
00T0326			Tamson foaming bath, 115V/60Hz. Thermostatic bath with temperature range from ambient till 100°C. Equipped with float and drain. Cover has four openings with clamps to insert four foam cylinders. Bath is equipped with a rack to hold the foam cylinders. Two additional openings are available for thermometers. Another opening can be used to add bath fluid. Bath is equipped with two cooling coils
31T0094		1	Stainless steel bracket to hold four foaming cylinders and four stoppers. The rack is delivered with four calibrated flowmeters and connectors, which can be mounted on the rack. Each flowmeter is delivered with a works certificate. Rack is including leakage tray. Also, the optional dryer tower can be mounted on the rack
09T0223		4	Foaming cylinder with NS45/50 joint, 1000 ml, borosilicate glass, graduated
31T0160		4	Delrin stopper with O-rings for foam cylinder with opening for air inlet tube and a second opening for air outlet tubing. Stopper is including quick connectors and inlet tube
34T0000		1	Blue PU tubing 6 mm, 50 meter. Setup delivered with tube cutter (P/N 34T0005)

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Table 2: Required Accessories for ASTM D892










Item	Picture	Suggested quantity	Description
31T0067		1	Wet test meter (volume measuring device), for accurate measuring of the gas volumes required by the test method
11T0036		1	Pressure pump with valve 230V/50-60Hz
11T0037			Pressure pump with valve 115V/60Hz
31T0066W		4	Mott cylindered metal diffuser, made of sintered five micron porous stainless steel, with work certificate for permeability and porosity

Table 3: Optional Accessories for ASTM D892

Item	Picture	Suggested quantity	Description
00T0565		1	Cooling circulator TLC15-5 – 230V/50Hz
00T0567			Cooling circulator TLC15-5 – 230V/60Hz
00T0570			Cooling circulator TLC15-5 – 115V/60Hz
12T1075		1	Tubing with connectors and clamps to be used between the TLC15-5 and the low temperature foaming bath
31T2044		1	Gas drying tower, 75 mm x 289 mm, with 1/8" stainless steel NPT fittings and connectors to mount on D892/D6082 rack (P/N 31T0094 or 31T0095)

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Continued table 3: Optional Accessories for ASTM D892			
Item	Picture	Suggested quantity	Description
31T0028		1	Digital stopwatch 1/100 second
25T0911BW		2	ASTM S12C thermometer, range from -20 to +102°C with non-hazardous blue filling and works certificate
31T0423		1	Cork for bath thermometer, pack of ten pieces
00T0220		2	Bath fluid mineral oil T150, 20 litres transparent, 80..150°C
00T0911		2	Illuminator "Z41" backpanel (85 ~ 230V/50-60Hz) with mounting frame for foaming bath
31T0066		4	Mott cylindrical metal diffuser, made of sintered five micron porous stainless steel. This gas diffuser is supplied without certificate. For a certificate please use P/N 31T0066W
31T2072		1	Airflow meters suitable for a flow rate of 94 ml/m. Supplied with works calibration certificate and one-on-one hose connection, when not using the dual bath
31T0070		1	Diffuser washer with integrated pump (230V/50-60Hz), designed to clean and dry stone and metal diffusers. Delivered with 4 test cylinders and stoppers, a glass bottle for solvent recovery, a bracket and connection tubes.
31T0071		1	Verification kit for gas diffuser

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Table 4: Consumables for five years of operation:

Item	Picture	Quantity	Description
09T0223		4	Foaming cylinder with NS45/50 joint, 1000 ml, borosilicate glass, graduated.
24T0400		10	Upper O-ring 38 mm I.D. for stopper (P/N 31T0160)
24T0401		10	Lower O-ring 36 mm I.D for stopper (P/N 31T0160)
28T4163		4	Push-in fitting short, L-shaped, 6 mm O.D. for stopper (P/N 31T0160)
28T4508		4	Messing connector 6mm hose 1/8" for stopper (P/N 31T0160)
34T0048		5	Hose adapter 6mm O.D. to G1/4" quick fit
34T0061		3	Hose adapter T-shaped 6mm O.D. to G1/4" quick fit
31T2041		1	Refilling for dryer (P/N 31T2042), 5 lbs, 8 mesh








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Table 5: Apparatus ASTM D892 P/N 00T0332 or P/N 00T0333 consists of the following parts:

P/N	Picture	Quantity	Description
00T0325		2	Tamson foaming bath, 230V/50-60Hz. Thermostatic bath with temperature range from ambient till 100°C. Equipped with float and drain. Cover has four openings with clamps to insert four foam cylinders. Bath is equipped with a rack to hold the foam cylinders. Two additional openings are available for thermometers. Another opening can be used to add bath fluid. Bath is equipped with two cooling coils
00T0326			Tamson foaming bath, 115V/60Hz. Thermostatic bath with temperature range from ambient till 100°C. Equipped with float and drain. Cover has four openings with clamps to insert four foam cylinders. Bath is equipped with a rack to hold the foam cylinders. Two additional openings are available for thermometers. Another opening can be used to add bath fluid. Bath is equipped with two cooling coils
31T0099		1	Stainless steel bracket to hold four foaming cylinders and four stoppers. The rack is delivered with two digital mass flow meters and connectors, which can be mounted on the rack. Rack is including leakage tray. Also, the optional dryer tower can be mounted on the rack
09T0223		4	Foaming cylinder with NS45/50 joint, 1000 ml, borosilicate glass, graduated
31T0160		4	Delrin stopper with O-rings for foam cylinder with opening for air inlet tube and a second opening for air outlet tubing. Stopper is including quick connectors and inlet tube
34T0000		1	Blue PU tubing 6 mm, 50 meter. Setup delivered with tube cutter (P/N 34T0005)

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Table 6: Apparatus ASTM D892/D6082 P/N 00T0335 or P/N 00T0336 consists of the following parts:			
P/N	Picture	Quantity	Description
00T0325		2	Tamson foaming bath, 230V/50-60Hz. Thermostatic bath with temperature range from ambient till 160°C. Equipped with float and drain. Cover has four openings with clamps to insert four foam cylinders. Bath is equipped with a rack to hold the foam cylinders. Two additional openings are available for thermometers. Another opening can be used to add bath fluid. Bath is equipped with two cooling coils
00T0326			Tamson foaming bath, 115V/60Hz. Thermostatic bath with temperature range from ambient till 160°C. Equipped with float and drain. Cover has four openings with clamps to insert four foam cylinders. Bath is equipped with a rack to hold the foam cylinders. Two additional openings are available for thermometers. Another opening can be used to add bath fluid. Bath is equipped with two cooling coils
31T0095		1	Stainless steel bracket to hold four foaming cylinders and four stoppers. The rack is delivered with four calibrated flowmeters (two flowmeters calibrated to 94 ml, two flowmeters calibrated to both 94 ml and 200 ml) and connectors, which can be mounted on the rack. Each flowmeter is delivered with a works certificate. Rack is including leakage tray. Also, the optional dryer tower can be mounted on the rack
09T0223		4	Foaming cylinder with NS45/50 joint, 1000 ml, borosilicate glass, graduated
31T0160		4	Delrin stopper with O-rings for foam cylinder with opening for air inlet tube and a second opening for air outlet tubing. Stopper is including quick connectors and inlet tube
34T0000		1	Blue PU tubing 6 mm, 50 meter. Setup delivered with tube cutter (P/N 34T0005)

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Table 7: Suggested apparatus for ASTM D1881 tests:

P/N	Picture	Quantity	Description
00T0325		1	Tamson foaming bath, 230V/50-60Hz. Thermostatic bath with temperature range from ambient till 100°C. Equipped with float and drain. Cover has four openings with clamps to insert four foam cylinders. Bath is equipped with a rack to hold the foam cylinders. Two additional openings are available for thermometers. Another opening can be used to add bath fluid. Bath is equipped with two cooling coils
00T0326			Tamson foaming bath, 115V/60Hz. Thermostatic bath with temperature range from ambient till 100°C. Equipped with float and drain. Cover has four openings with clamps to insert four foam cylinders. Bath is equipped with a rack to hold the foam cylinders. Two additional openings are available for thermometers. Another opening can be used to add bath fluid. Bath is equipped with two cooling coils
31T0097		1	Stainless steel bracket to hold four foaming cylinders and four stoppers. The rack is delivered with two calibrated flowmeters (1000 mL) and connectors, which can be mounted on the rack. Each flowmeter is delivered with a works certificate. Rack is including leakage tray. Also, the optional dryer tower can be mounted on the rack
09T0224		2	Foaming cylinder D1881 with NS45/50 joint, 500 ml, borosilicate glass, graduated
31T0160		2	Delrin stopper with O-rings for foam cylinder with opening for air inlet tube and a second opening for air outlet tubing. Stopper is including quick connectors and inlet tube
34T0000		1	Blue PU tubing 6 mm, 50 meter. Setup delivered with tube cutter (P/N 34T0005)
31T2060		1	Pump air compressor 230V/50-60Hz
31T0068W		2	Norton stone diffuser, with work certificate for permeability and porosity
25T0911BW		2	ASTM S12C thermometer, range from -20 to +102°C with non-hazardous blue filling and works certificate
31T0423		1	Cork for bath thermometer, pack of ten pieces
31T0028		1	Digital stopwatch 1/100 second