

### 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)  |


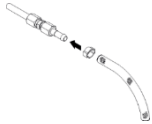

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**Table 2: Required Accessories for ASTM D892**

| 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

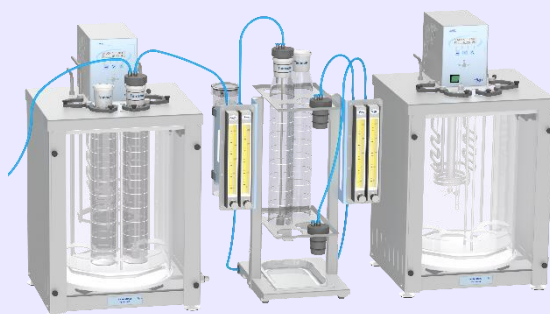
| Item      | Picture   | Suggested quantity | Description  |
|-----------|---|--------------------|--|
| 31T0028   |    | 1                  | Digital stopwatch 1/100 second   |
| 25T0911BW |    | 2                  | ASTM S12C thermometer, range from -20 to +102°C with non-hazardous blue filling and 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. |

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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                             |


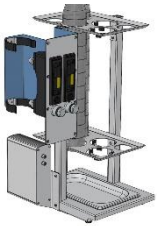





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**Table 5: Apparatus ASTM D892 P/N 00T0332 or P/N 00T0333 consists of the following parts:**

| 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   |
| 09T0223   |  | 2        | Foaming cylinder with NS45/50 joint, 1000 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)  |
| 31T2058   |   | 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   |