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Test & Measurement
Instruments



ENERGY TESTING

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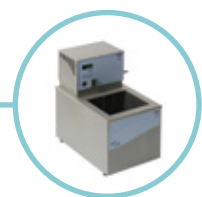
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Introducing Tamson

Founded in 1878, Tamson began as a wholesaler in laboratory equipment in the field of chemistry and physics. By the 1950s the product range had diversified into a field of manufacturing thermostatic baths and circulators for industry. This business generated 70 years of dedicated experience within this specialized field, reflecting upon the success, quality and high performance of Tamson products. We are proud of using the Tamson name which stands for quality, precision and reliability.



In January 1998, the company name changed to Tamson Instruments B.V., when the production and wholesaler departments were separated. In 2008, Tamson Instruments B.V. moved to a new building in Bleiswijk near Rotterdam, The Netherlands. All Tamson products are manufactured in The Netherlands.

Product range

We offer a quality range of cooling and heating circulators. Our robust products provide reliable and very accurate temperature regulation of fluids. An accuracy beyond 0.005 Kelvin can be achieved. The product range provides exact temperature controlling from -85°C to $+250^{\circ}\text{C}$. Our equipment can be found in many diverse areas of research across industrial fields such as petroleum industry, universities, research institutes and quality control laboratories. Our main markets are being found in chemical, quality control and product processing, along with research and development industries.





In this catalogue, the Tamson product range is divided into four groups:

- 1) Energy Testing Equipment
- 2) High Temperature Baths
- 3) Low Temperature Baths
- 4) Accessories

Tamson sets the standard

Tamson Instruments BV is an innovative manufacturer and is ahead in the newest developments and technologies. We develop, design, and produce state-of-the-art thermostatic baths, coolers, circulators and instruments for temperature calibration. Tamson continuously invests into new technology. Our products operate with amazing high accuracy, long life quality, and reliability. As a manufacturer, we continually strive to enhance our products and we are extending our product range in order to better serve our customers needs. In the markets for manual kinematic viscosity and calibration baths we set the standard.

Since October 2017, Tamson Instruments is ISO 9001:2015 certified for the manufacturing and supply of petroleum testing equipment. The Tamson team is very proud to be ISO 9001:2015 certified. We believe that it is a recognition of our hard work to always keep improving our products, as well as our service.

More in-depth technical information regarding the products can be found in the specification sheets and manuals which can be downloaded from our website.

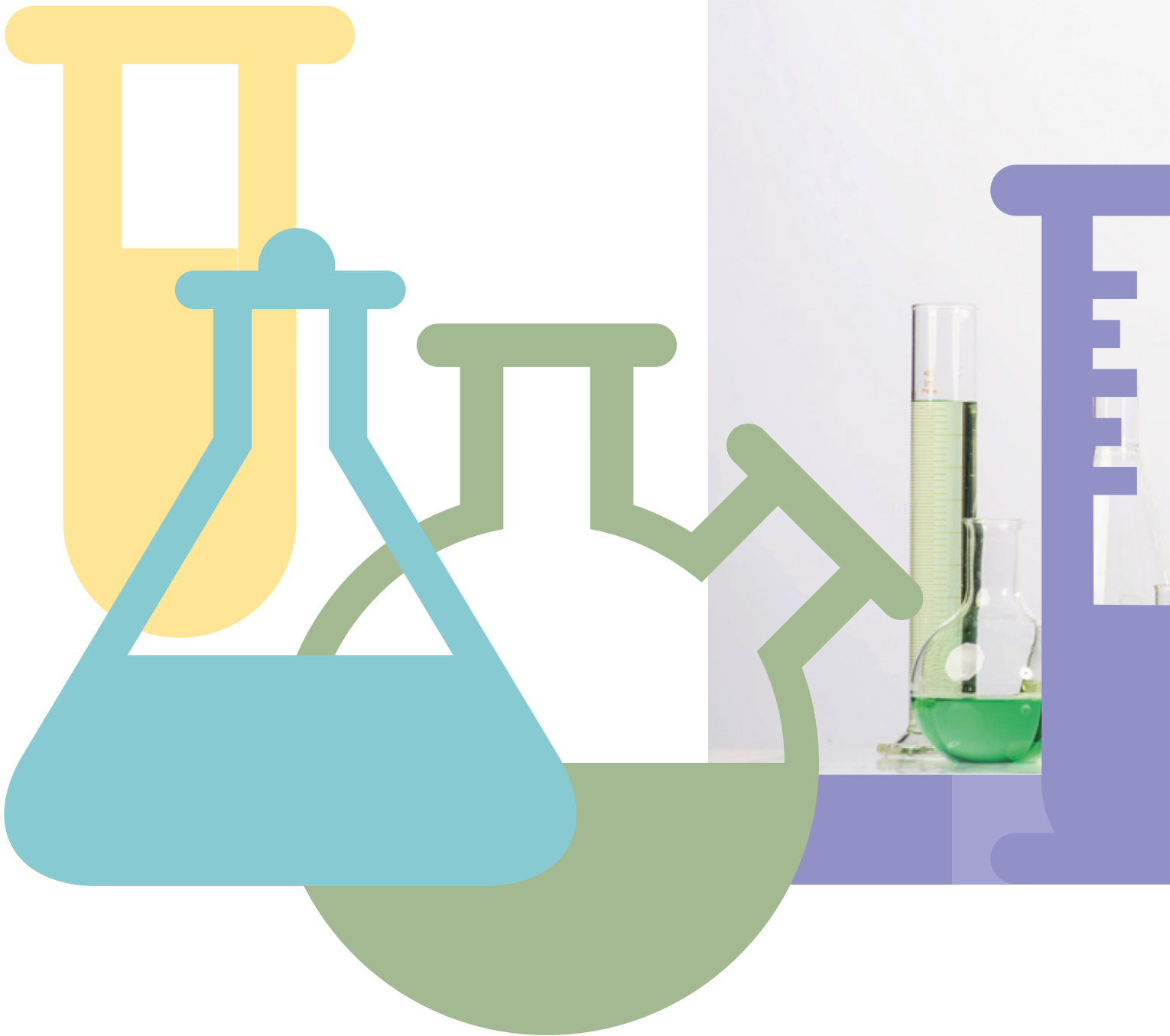
We look forward to receiving your questions, feedback and further requests.

Thank you for reading our catalogue.

Kind regards,

Tamson Instruments B.V.

ENERGY EQUIPMENT



TESTING EQUIPMENT





1.1 ASTM D70 Density of Semi-Solid Asphalt Binder

ASTM D70 - ASTM D70M - ASTM D1429 - IP 190 - ISO 3838 - J15 K2265 - DIN 52004 Procedure A

This test method covers the determination of the relative density and density of semi-solid bituminous materials, asphalt cements, and soft tar pitches by use of a pycnometer. The sample is placed in a calibrated pycnometer. The pycnometer and sample are weighed, then the remaining volume is filled with water. The filled pycnometer is brought to the test temperature, and weighed. The density of the sample is calculated from its mass and the mass of water displaced by the sample in the filled pycnometer.

Main characteristics

The insulation of the bath and electronic design result in a very stable working temperature of $\pm 0.02^\circ\text{C}$. The set point can be set in steps of 0.1°C in the range of 0°C up to 250°C ($-148..482^\circ\text{F}$). The accuracy on the display is displayed in 0.1°C .



TC16 for ASTM D70

Range	..250°C/...482°F
Setting	0.1°C
Stability \pm	0.02 °C
Bath volume	16 L
Opening bath	Position for nine pycnometers
Depth bath	220 mm
Dimension (LxWxH)	480 x 295 x 480 mm
Weight	21 kg

► TC16 **P/N** 00T0671 (230V/50-60Hz) • **P/N** 00T0861 (115V/60Hz)

Necessary accessories		ASTM D70	IP 190
P/N 13T8049	TC16 cover for ASTM D70/IP 190	•	•
P/N 13T8050	Ridge for pycnometer brackets	•	•
P/N 13T8051	Bracket for three Hubbard pycnometers (one piece)	•	
P/N 13T8052	Bracket for three Gay-Lussac pycnometers (one piece)		•

Accessories		ASTM D70	IP 190
P/N 00T0565 P/N 00T0567 P/N 00T0570	TLC15-5 external circulator to cool down the TC16 bath fluid to measure the density @25°C, 20°C or 15°C (below or near ambient temperature)	•	
P/N 12T1075	Set of tubing, connectors, and clamps between TC and TLC baths	•	
P/N 31T0030	Pycnometer Gay-Lussac		•
P/N 31T0031	Pycnometer Hubbard	•	



1.2 ASTM D91 Centrifuge for Petrol and Mineral Oils

ASTM D91 - ASTM D96 - ASTM D893 - ASTM D1796 - ASTM D2273 - ASTM D2709 - ASTM D2711 - ASTM D4007 - ASTM D5546 - API 2542 - API 2548 - BS 4385 - ISO 3734 - ISO 9030 - IP 75 - IP 359 - NFMO 7020

The centrifuge is specially designed for water and sediment determination, as well as characterization of used oils and petroleum features as demulsibility and precipitation.

Main Characteristics

A choice of accessories is available for 6" and 8" 100 mL cone-shaped centrifuge tubes, 6" pear-shaped centrifuge tubes, as well as finger-shaped centrifuge tubes of 12.5 mL.

- Maintenance free induction motor
- TFT touch screen
- Noise level <60 dB
- Automatic rotor recognition, it shows on screen max. RPM, max. RCF and max. capacity avoiding over speed
- Temperature regulation from ambient +5°C to +80°C
- Temperature selectable on °C/°F
- RPM / RCF adjustable along run
- Induction motor, maintenance free



Centrifuge

► Centrifuge **P/N 31T0200** (230V/50-60Hz) • **P/N 31T0220** (115V/60Hz)

Main Characteristics

This test method covers the determination of water and sediment in fuel oils (ASTM D1796) or crude oils (ASTM D4007) by the centrifuge method. The TC16 is according to the requirements of preheating the cone-shaped centrifuge tubes in a waterbath for the mentioned ASTM standards. The bath has place for nine cone-shaped centrifuge tubes. The temperature range is from ambient +5°C to 250°C.

With the leveling platform (P/N 13T8010) the cone-shaped centrifuge tubes can be immersed in vertical position to the 100-mL mark as strictly indicated in the ASTM methods. When not used for preheating purposes, the pump can be used to circulate the bath content to an external application.



**TC16
for ASTM D1796**

Range	..250°C/...482°F
Setting	0.1°C
Stability ±	0.02°C
Bath volume	16 L
Opening bath	9 x Ø 51 mm
Depth bath	220 mm
Dimension LxWxH	480 x 295 x 480 mm
Weight	21 kg

► TC16 for cone-shaped centrifuge tubes **P/N 00T0671** (230V/50-60Hz) • **P/N 00T0861** (115V/60Hz)

Necessary accessory

P/N 13T8010	Leveling platform + holder for nine cone-shaped centrifuge tubes + nine lids
-------------	--



1.3 ASTM D97 Adjustable Cloud and Pour Point Bath

ASTM D97 - ASTM D2500 - ISO 3015 - ISO 3016 - IP 15 - IP 219

The pour point describes a procedure for testing the fluidity of a petroleum product at a temperature. The cloud point is defined as the temperature of a liquid specimen when the smallest observable cluster of wax crystals first appears upon cooling.

Main characteristics

Apparatus to determine the cloud and pour point manually. The TLC40-14 and TCC-B are single and adjustable low-temperature circulator baths. The TLC40-14 offers six positions, the TCC-B offers four positions.

The TLC40-14 has a temperature range from -40°C up to ambient. The TCC-B has a temperature range from -85°C up to ambient. All accessories are supplied by Tamson.



**TCC-B for ASTM D97
or D2500**

- ▶ TLC40-14 **P/N** 00T0520 (230V/50Hz) • **P/N** 00T0522 (230V/60Hz) • **P/N** 00T0525 (115V/60Hz)
- ▶ TCC-B **P/N** 00T0310 (230V/50Hz) • **P/N** 00T0311 (230V/60Hz)

Necessary accessories	
P/N 03T2171	Insulated cover for six positions with insulated lids (one needed) for TLC40-14
P/N 03T2173	Insulated cover for four positions with insulated lids (one needed) for TCC-B
P/N 14T0235	Jacket (up to six needed)
P/N 09T0142	Test jar for manual pour or cloud point (case of 24 pieces)
P/N 31T0421	Felt gasket (pack of ten pieces)
P/N 31T0422	Felt disk (pack of ten pieces)
P/N 31T0013	Cork for test jar P/N 31T0012 or P/N 09T0142 (pack of ten pieces)
P/N 31T0423	Cork for bath thermometer (pack of ten pieces)
P/N 25T0904BW	ASTM thermometer S5C with works certificate
P/N 25T0905TW	Thermometer with blue filling similar to ASTM 6C with works certificate
P/N 25T0946BW	Thermometer with blue filling similar to ASTM 61C with works certificate





1.4 ASTM D130 Copper Corrosion from Petroleum Products

ASTM D130 - ISO 2160 - IP 154 - DIN 51811 - ASTM D4048 - IP 112 - ASTM D7095

This test method covers the detection of the corrosiveness to copper of aviation gasoline, aviation turbine fuel, automotive gasoline, natural gasoline or other hydrocarbons having a Reid vapour pressure no greater than 18 psi.

Main Characteristics

The cover of the corrosion bath has six openings, each supplied with a lid with a hook for suspending a copper corrosion test vessel (P/N 14T0100) or the openings can accommodate test tubes in holders (P/N 14T0102). The temperature range is from ambient +5°C to 250°C. Optional is a cover with nine openings to test nine samples (P/N 03T2311). Alternatively, a TC40 can be used as an 18 position bath.

A 63 position TC40 bath is also available.



Copper Corrosion Bath

Range	..250°C/...482°F
Setting	0.1°C
Stability ±	0.02 °C
Bath volume	16 L
Opening bath	Cover with 6 x 51 Ø mm openings (9 optional)
Depth bath	220 mm
Dimension (LxWxH)	480 x 295 x 480 mm
Weight	21 kg

▶ TC16 (for ASTM D130) **P/N** 31T0671 (230V/50-60Hz) • **P/N** 31T0861 (115V/60Hz)

▶ **For a detailed overview of all accessories, please see the specification sheet.**

Alternative set-up for 18 positions	
P/N 00T0681 or P/N 00T0851	TC40 230V/50-60Hz or TC40 115V/60Hz
P/N 03T2313	Cover with 18 x 51 mm openings
P/N 14T0101	Lid + mounting hook (number of pieces to be ordered separately depending on number of test cylinders)



Test Cylinder

PowerPoint with more details at www.tamson.com



1.5 ASTM D445 How to Select the Appropriate Viscosity Bath?

	TV2000**	TV4000**	TV4000DC **	TV7000DC **	TV2500 (1)** TV3500 (2)**	TV12LT*	TV12LT -80
	Ambient..230°C	Ambient..230°C	Ambient..230°C	Ambient..230°C	Ambient..120°C	-42°C..+20°C	-80C...+20C
Offset	0.005	0.005	0.005	0.005	0.01	0.005	0.005
Stability	±0.01°C	±0.01°C	0.002°C@40°C	±0.01°C	±0.02°C	±0.01°C	±0.01°C
Heating (W)	2800	2800	2400	2400	1400	1200	1200
Built-in light	No	No	No	No	No	Yes	Yes
Removable outside window	Yes	Yes	Yes	Yes	No	Yes	Yes
Bath Volume (L)	20	40	40	70	(1) - 25 (2) - 35	15..18	14
Number of 51mm	3	7 or 8	7 or 8	7 or 8	(1) - 4 (2) - 9	4	3
Opening bath (mm)	130 * 165	260 * 240	260 * 240	260 * 240	(1) - 185 * 155 (2) - 400 * 120	248 * 112	64 * 220
Depth bath (mm)	300	300	300	600	(1) - 300 (2) - 320	300	300
Dimensions (mm) LxWxH	285*465*585	350*590*585	350*590*585	350*630*885	(1) 340*204*600 (2) -	670*425*720	770*380*900
Weight (kg)	40	41	41	61	(1) - 15 (2) - 20	65	76
Stirring	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cooling coil	Yes	Yes	Yes	Yes	Yes	No	No
ASTM Method	D445+D2170	D445+D2170	D445+D2170	D445+ D2162	D445	D445	D445 + D2532
Drain	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Overflow	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Integrated	No	No	No	No	No	Yes	Yes

* -42..+80°C

** With external cooler from +10°C possible



1.6 ASTM D445 High Temperature Viscosity Baths - TV Series

ASTM D445 - ASTM D2162 - ASTM D2170 - ISO 3104 - IP 71 - DIN 51366

This test method specifies a procedure for the determination of the kinematic viscosity of liquid petroleum products, both transparent and opaque, by measuring the time for a volume of liquid to flow under gravity through a calibrated glass capillary viscometer.





Main characteristics

Bath can be operated from ambient +5°C up to +230°C (41..446°F). With the use of the built-in cooling coil and an external Tamson cooling circulator, spans lies 5°C above the temperature of the cold flow of the external cooling circulator. The TV2000, TV4000(DC), and TV7000DC have a bath volume of 20, 40, and 70 litres respectively. The TV2000 has a cover with three openings and lids. The TV4000(DC) and TV7000DC have a cover with seven openings and lids. These openings accommodate glass capillary viscometers in viscometer holders. The TV4000DC has the same specifications as the TV4000, but with a unique stability of 0.002°C at 40°C. The TV7000DC is used to calibrate long thermometers, to calibrate master viscometers or for oxidation stability tests. A bath overflow outlet protects from expanding bath oil when the bath filling is expanding at higher temperatures. A bath drain is standard included. The bath is fitted with a double window of which the front pane is detachable for cleaning purposes.



TV4000

► For a detailed overview of all accessories, please see the specification sheet.

	TV2000	TV4000	TV4000DC	TV7000DC
				
Range	...230°C/...446°F		...180°C/...356°F	
Setting	0.01°C			
Offset ±	0.005°C			
Stability ±	0.01°C	0.01°C	0.002°C @40°C 0.005°C @100°C 0.010°C @150°C	0.01°C
Bath volume	20 L	40 L	40 L	70 L
Number of Ø 51 mm lids	3 (4 optional)	4 + 3 (4 + 4 optional)		
Window	140 x 285 mm	270 x 285 mm		270 x 585 mm
Opening bath (without cover)	130 x 165 mm	260 x 240 mm		260 x 240 mm
Depth bath	300 mm	300 mm		630 mm

- TV2000 **P/N** 00T0782 (230V/50-60Hz) • **P/N** 00T0784 (115V/60Hz)
- TV4000 **P/N** 00T0772 (230V/50-60Hz) • **P/N** 00T0774 (115V/60Hz)
- TV4000DC **P/N** 00T0802 (230V/50-60Hz) • **P/N** 00T0804 (115V/60Hz)
- TV7000DC **P/N** 00T0796 (230V/50-60Hz) • **P/N** 00T0798 (115V/60Hz)

► For Viscosity Accessories, see section 'Viscosity Accessories'.



1.7 ASTM D445 Automated Viscosity: TV4000AKV EASY

ASTM D445 - ISO 3104 - IP 71 - DIN 51366

Main Characteristics

The Tamson TV4000AKV EASY determines kinematic viscosity automated using an Ubbelohde viscometer. The TV4000AKV EASY is a modular system, consisting of a TV4000MKII viscosity bath, a measuring head, the AKV EASY system and a support rack. The apparatus is standard supplied with a single automated measuring channel. Filling and cleaning of the viscometer has to be done manually. Optionally, a dual measurement channel or a single measurement channel with rinsing of the viscometer can be supplied.

The AKV EASY is operated by a user-friendly touch screen. It is further possible to set the amount of runs (tests) per sample. The system determines the best repeatability from the measuring results. The measuring head uses infrared light barriers to measure the flow time for a sample to pass two marks on a calibrated glass capillary viscometer. The TV4000AKV EASY can be operated up to +120°C. With the use of the built-in cooling coil and an external Tamson cooling circulator, span lies 5°C above the temperature of the cold flow of the external cooling circulator. The viscosity measurement range is defined by the used glass capillary viscometers and may vary from 0.3 up to 10,000 mm²/s.

The AKV EASY can save up to eight different viscometers in the system. Charging the viscometer is a very easy task, taking less than a minute. Up to 254 results are saved in the database and can be printed at any time. Up to 99 measurements can be done sequentially without interference from the user. The maximum time between two sequential measurements is four hours. This allows the customer to test how viscosity changes over time. Furthermore, the AKV EASY supports calculation of the dynamic, relative and intrinsic viscosity.

The TV4000AKV EASY is ideal for users that don't run a lot of different samples in a day but also don't want to perform labor intensive manual determinations. The system also reduces operator to operator variability. The apparatus eliminates subjective measurement errors. The great advantage of the AKV EASY is that the system is flexible.

The TV4000AKV EASY is ideal for testing the viscosity of Newtonian fluids such as formulated oils, lubricants, diesel, hydraulic oils, additives, base oils, light fuels, waxes, light crude oils and glycols.



TV4000AKV EASY

Range	...120°C/...248°F
Setting	0.01°C
Offset ±	0.005°C
Stability ±	0.01°C
Bath volume	40 L
Number of channels	One, optionally two
Viscometer	ASTM Ubbelohde
Data output	Printer, database up to 254 measurements

► TV4000AKV EASY **P/N** 00T0825 (230V/50-60Hz) • **P/N** 00T0835 (115V/60Hz)



AKV E/A VISCOMETERS for transparent and opaque liquids.

The glass capillary viscometers supplied for the AKV EASY are completely manufactured according to ASTM D446 and IP 71. The AKV E/A viscometers are further more precisely manufactured than the standard method requires. This guarantees optimal measuring results. In order to use the AKV EASY you will need the viscometers which are solely supplied by Tamson. The following glass capillary viscometers are available as shown in the table below.

UBBELOHDE AKV E/A VISCOMETER for transparent liquids			
P/N 25T0600	Size number 0	Nom. Constant 0.001	Range from 0.3 to 1 mm ² /s
P/N 25T0601	Size number 0C	Nom. Constant 0.003	Range from 0.6 to 3 mm ² /s
P/N 25T0602	Size number 0B	Nom. Constant 0.005	Range from 1 to 5 mm ² /s
P/N 25T0603	Size number 1	Nom. Constant 0.01	Range from 2 to 10 mm ² /s
P/N 25T0604	Size number 1C	Nom. Constant 0.03	Range from 6 to 30 mm ² /s
P/N 25T0605	Size number 1B	Nom. Constant 0.05	Range from 10 to 50 mm ² /s
P/N 25T0606	Size number 2	Nom. Constant 0.1	Range from 20 to 100 mm ² /s
P/N 25T0607	Size number 2C	Nom. Constant 0.3	Range from 60 to 300 mm ² /s
P/N 25T0608	Size number 2B	Nom. Constant 0.5	Range from 100 to 500 mm ² /s
P/N 25T0609	Size number 3	Nom. Constant 1.0	Range from 200 to 1000 mm ² /s
P/N 25T0610	Size number 3C	Nom. Constant 3.0	Range from 600 to 3000 mm ² /s
P/N 25T0611	Size number 3B	Nom. Constant 5.0	Range from 1000 to 5000 mm ² /s
P/N 25T0612	Size number 4	Nom. Constant 10.0	Range from 2000 to 10000 mm ² /s



AKV EASY Upgrade kit

Thousands of TV4000MKII, TV4000DC, TV2000MKII and OEM baths are used in the field worldwide. For these baths, there will be an upgrade kit available. This upgrade kit makes it possible to upgrade the manual viscosity baths to an automated system, using the AKV EASY. By using a special cover, the measuring head, the AKV EASY system and a tower, the customer can upgrade their manual Tamson bath to an automated system.

AKV EASY options		
Viscosity bath	Positions	Cleaning
TV2000	One	No
TV4000	Two	No
TV4000	One	No
TV4000	One	Yes

PowerPoint with more details at www.tamson.com



1.8 ASTM D445 High Temperature Viscosity Baths - TV2500 and TV3500

ASTM D445 - ISO 3104 - IP 71 - DIN 51366 - ASTM D1298

Main Characteristics

The TV2500 or TV3500 bath can be operated from ambient +5°C up to +120°C (41..248°F). With the use of the built-in cooling coil and an external Tamson cooling circulator, span lies 5°C above the temperature of the cold flow of the external cooling circulator. The TV2500 has a bath volume of 25 liters. The TV3500 has a bath volume of 35 liters. The TV2500 offers two rows of two openings with lids. The TV3500 has a cover with nine openings and lids. These openings will accommodate glass capillary viscometers in viscometer holders. A bath overflow outlet protects from expanding bath fluid when the bath filling is too high. A bath drain is standard included.

	TV2500	TV3500
Range	...120°C/...248°F	
Setting	0.01°C	
Stability ±	0.02°C	
Bath volume	25 L	35 L
Number of lids	4	9
Opening lid	Ø51 mm	
Window	230 x 300 mm	415 x 320 mm
Opening bath (without cover)	185 x 155 mm	400 x 120 mm
Depth bath	300 mm	320 mm

- ▶ TV2500 **P/N** 19T1003 (230V/50-60Hz) • **P/N** 19T1004 (115V/60Hz)
- ▶ TV3500 **P/N** 19T1005 (230V/50-60Hz) • **P/N** 19T1006 (115V/60Hz)

- ▶ **For ASTM D1298 (density by hydrometer) you can use the TV2500 in combination with a special cover with three openings (P/N 03T2119) and a TLC10-3 cooling circulator. Alternatively you can use the TV3500 in combination with a special cover with five openings (P/N 03T2128) and a TLC15-5 cooling circulator. Please also see the specification sheet for more information.**

- ▶ **For Viscosity Accessories, see section 'Viscosity Accessories'.**



TV3500



TV2500 for ASTM D1298

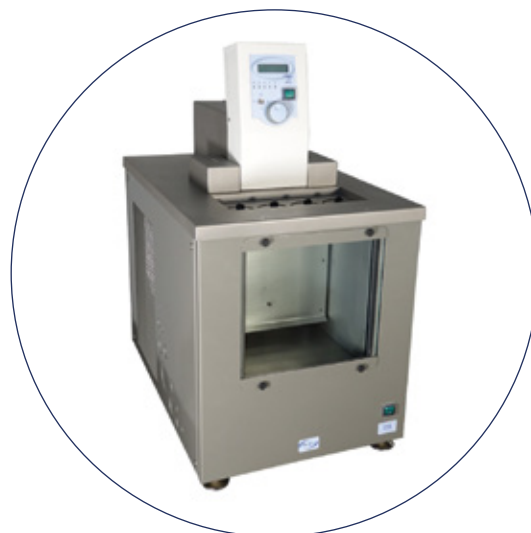
1.9 ASTM D445 Low Temperature Viscosity Bath: TV12LT

ASTM D445 - ISO 3104 - IP 71 - DIN 51366 - IP EM PJ - IEC 61868

This test method specifies a procedure for the determination of the kinematic viscosity of liquid petroleum products, both transparent and opaque, by measuring the time for a volume of liquid to flow under gravity through a calibrated glass capillary viscometer.

Main Characteristics

The TV12LT with integrated cooling is a unique viscosity bath with a small footprint. It can be operated from -42°C up to +20°C (-40..68°F). A range from -42C up to +80C is also available. The TV12LT has a small bath volume of 15 liters and a unique temperature stability. The TV12LT offers one row of four openings with lids. These openings will accommodate glass capillary viscometers in viscometer holders. A permanent LED light is located in the top plate to supply clear light and guarantees optimal visibility inside the bath. A bath overflow outlet protects from expanding bath fluid when the bath filling is too high. A bath drain is standard included. The bath is fitted with two windows of which the front panel is detachable for cleaning purposes. TV12LT is specially designed for kinematic viscosity testing of aviation fuels at sub zero temperatures. The TV12LT also is suitable to calibrate thermometers or other sensors.



TV12LT

Range	-42..+20°C*/-43.6..+68°F
Setting	0.01°C
Offset ±	0.01°C (optional 0.005°C)
Stability ±	0.01°C
Bath volume	15....18 L
Number of lids	4
Window	255 x 230 mm
Opening lid	Ø 51 mm
Opening bath	248 x 112 mm

▶ TV12LT **P/N** 00T0410 (230V/50Hz) • **P/N** 00T0420 (230V/60Hz) • **P/N** 00T0415 (115V/60Hz)

* **Range from -42°C up to +80°C**

▶ TV12LT **P/N** 00T0425 (230V/50Hz) • **P/N** 00T0435 (230V/60Hz) • **P/N** 00T0430 (115V/60Hz)

▶ **For Viscosity Accessories, see section 'Viscosity Accessories'.**

PowerPoint with
more details at
www.tamson.com



1.10 ASTM D445 Low Temperature Viscosity Bath: TV12LT -80

ASTM D445 - ISO 3104 - IP 71 - DIN 51366 - IEC 61865 - ASTM D2532

Main Characteristics

The TV12LT -80 is designed to test kinematic viscosity at very low temperatures. The TV12LT has integrated cooling and can reach temperatures down to -80°C . The TV12LT -80 has three positions for kinematic viscosity tests. The bath is equipped with window heating, to prevent condensation on the window. The stirrer and baffle plates ensure a temperature stability of $\pm 0.01^{\circ}\text{C}$. A bath overflow protects from expanding bath fluid when the bath filling is too high. A bath drain is standard included. The bath is fitted with two windows of which the front window is detachable for cleaning purposes. The TV12LT -80 is also suitable to calibrate thermometers or other sensors.

Due to the cooling technique of the TV12LT -80, the apparatus is very energy efficient. The integrated cooling ensures that the correct cooling capacity is applied. This saves a lot of energy, compared to a setup with a separate viscosity bath and a cold finger thermostat. Also, the TV12LT -80 has a relatively small footprint.



TV12LT -80

Range	$-80^{\circ}\text{C} \dots +20^{\circ}\text{C} / -112^{\circ}\text{F} \dots +68^{\circ}\text{F}$
Setting	0.01°C
Offset \pm	0.01°C (optional 0.005°C)
Stability \pm	0.01°C
Number of lids	3
Opening lid	$\varnothing 51 \text{ mm}$
Length	770 mm
Width	380 mm
Height	900 mm
Weight	76 kg





1.11 ASTM D565 Carbonizable Substances in White Mineral Oil or Paraffin Wax

ASTM D565 - ASTM D612

Main characteristics

The ASTM D565 (mineral oil) and ASTM D612 (paraffin wax) test methods cover the determination whether the sample conforms to the standard quality required for pharmaceutical use as defined by the United States Pharmacopeia, the National Formulary, or the Food and Drug Administration.

For the test, either mineral oil or melted wax is treated with concentrated sulfuric acid (H_2SO_4) and heated under prescribed conditions. The resulting colour is compared with a reference standard to determine whether it passes or fails the test.

A TC16 with temperature range from ambient +5°C to 250°C is suitable for immersing test tubes. The levelling platform (P/N 07T0210) will keep the test tubes above the 10 mL line and is needed as an accessory. A special stainless steel cover (P/N 03T2314) with eight Ø16 mm openings is needed to suspend the test tubes in the bath.

TC16 can be emptied via the standard installed drain on the backside of the apparatus.

► TC16 **P/N** 00T0671 (230V/50-60Hz) • **P/N** 00T0861 (115V/60Hz)



TC16 for ASTM D565



Test tube for ASTM D565/D612

Necessary options for TC16

P/N 07T0210	Levelling platform for TC16
P/N 03T2314	Cover with eight 16 mm openings for ASTM D565/D612 test tubes

Accessories for ASTM D565/D612

P/N 09T0230	Test tube for ASTM D565/D612. Stopper is included. Test tube is delivered with rolled edge.
P/N 31T0040	Colour comparator for ASTM D565/D612.
P/N 08T0001	Can with 20L of silicon oil 200-10 mm ² /s (suitable for 20..150°C)



1.12 ASTM D849 Copper Corrosion by Aromatic

ASTM D849

This test method covers the corrosiveness of industrial aromatic hydrocarbons to a copper strip. A polished copper strip is immersed in 200 mL of specimen in a flask with a condenser and placed in boiling water for 30 minutes. At the end of this period, the copper strip is removed and compared with the ASTM copper strip corrosion standard.

Main Characteristics

This apparatus consists of a six position TC40 circulator bath and it is delivered with six sets of glassware (250 mL flask and condenser) as standard. The standard included cover of the TC40 has six openings, each with a lid. The TC40 is equipped with a levelling platform and two stand rods with six clamps to hold the glassware in a vertical position. The temperature range is from ambient +5°C to 250°C. All accessories for this test method are supplied by Tamson.



ASTM D849 Apparatus

Range	..250°C/...482°F
Setting	0.1°C
Stability ±	0.02°C
Bath volume	40 L
Opening bath	Six openings
Depth bath	200 mm
Dimension (LxWxH)	705 x 375 x 440 mm
Weight	30 kg

► Complete apparatus for ASTM D849 **P/N** 00T2015 (230V/50-60Hz) • **P/N** 00T2016 (115V/60Hz)

Necessary Accessories	
P/N 31T0003	ASTM copper strip corrosion test standard
P/N 31T0007	Copper strip with hole (per one strip)
P/N 31T0320	Soft copper (roll of 30 m)
P/N 31T0000	Multistrip vise, holds up to four strips while polishing
P/N 31T0005	Silicon carbide powder 105-µm (1 kg)
P/N 09T0011	Flat viewing glass tube
P/N 25T0928BW	Thermometer with blue filling similar to ASTM 34C
P/N 08T0001	Can with 20L of silicon oil 200-10 mm ² /s (suitable for 20..150°C)
P/N 25T2154	Thermometer holder
P/N 31T0009	Sanding paper P240 (one piece)





1.13 ASTM D892 Foaming Characteristics of Lubricating Oils

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

This test method 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 for the evaluation of oils in such operating condition.

Main characteristics

The apparatus consists of two foaming baths. Each foaming bath can hold up to four foaming cylinders. Each bath has two cooling coils, so that the baths can be used interchangeably. The baths are delivered with four foaming cylinders, four stoppers, and four calibrated flow meters. The baths are also delivered with a stainless steel bracket to hold the foaming cylinders and stoppers between Sequence II and Sequence III of the test method. The flow meters and optional dryer tower can also be mounted on this rack. The rack comes with a spill tray which can be removed for cleaning purposes. All accessories that are needed for this test method can be supplied by Tamson.



Foaming Dual Bath

► Foaming dual bath **P/N 00T0330** (230V/50-60Hz) • **P/N 00T0331** (115V/60Hz)

Necessary Accessories for ASTM D892

P/N 31T0067	Wet test meter
P/N 11T0036	Vacuum pump 230V (P/N 11T0037 is for 115V/60Hz)
P/N 31T0066W	Mott cylindered metal diffuser, made of sintered five micron porous stainless steel, with works certificate for permeability and porrosivity

Optional Accessories for ASTM D892

P/N 00T0565	TLC15-5 external cooling circulator
P/N 00T0567	
P/N 00T0570	
P/N 12T1075	Tubing with connectors and clamps to be used between the TLC15-5 and the low temperature foaming bath
P/N 31T2044	Gas drying tower
P/N 31T0028	Digital stopwatch 1/100 second
P/N 25T0911BW	ASTM S12C thermometer
P/N 31T0423	Cork for bath thermometer, pack of ten pieces
P/N 00T0220	Bath fluid mineral oil T150, 20 litres
P/N 00T0911	Illuminator Z41 backpanel with mounting frame for foaming bath



High temperature foaming of lubricants

The Tamson Foaming bath can also be used for high temperature foam in accordance with ASTM D6082. Sometimes, this test method is referred to as "Sequence IV". ASTM D6082 covers the determination of the foaming characteristics of lubricating oils at 150°C. The Tamson Foaming bath can be supplied with a range up to +160°C. We can supply a separate apparatus for ASTM D6082, consisting of one bath and a rack with two flowmeters calibrated for ASTM D6082. Alternatively, we can modify the Tamson Foaming Dual bath for ASTM D892 in such a way that it can also be used for ASTM D6082, by extending the temperature range of the bath and calibrate two flowmeters for ASTM D6082 instead of ASTM D892. Custom setups are available upon request. Please contact Tamson for more information.

Digital mass flowmeters

Tamson also supplies a Tamson Foaming Dual bath setup with two digital mass flowmeters instead of four analog flowmeters. We have designed a special rack to mount the two digital mass flow meters and the power supply. The digital mass flow meters can reach up to 200 ml min. Custom made setups are available upon request.

ASTM D1881 Foaming Tendencies of Engine Coolants

The Tamson Foaming bath can also be used to test the Foaming Tendency of Engine Coolants in glassware. We can supply a single foaming bath with a rack with two flowmeters, calibrated for ASTM D1881. Please see our specification sheet for more information.

Primary benefits of Tamson Foaming Bath

- 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



High temperature foaming bath



Rack with digital flowmeter



1.14 ASTM D1298 Density by Hydrometer

ASTM D287 - ASTM D1122 - ASTM D1298 - ASTM D1429-B - ASTM D3142 - ASTM D6822 - IP 160 - ASTM E126 - API 2547 - ISO 3675

This test method covers following laboratory determinations by hydrometer method:

- Density,
- Relative density (specific gravity),
- American Petroleum Institute (gravity of crude petroleum and liquid petroleum products).

Main Characteristics

A Tamson TLC15-5 refrigerator circulates a (cold) flow through the double walls of the cylinders. The TLC15-5 maintains the bath temperature within $\pm 0.25^{\circ}\text{C}$ of the test temperature required by the method. The PTFE valves ensure fast drainage and cleaning of the cylinders. The easy detachable spill tray prevents that portions of the sample are spilled on the workbench. The rack offers full view on the hydrometer. Our special ASTM D1298 support eliminates the problem of mounting brackets or portions of a thermostatic bath blocking the view. The Tamson D1298 apparatus is a complete set-up existing of three jacketed glass cylinders, rack and TLC15-5 circulator. Our system offers an interesting price advantage compared to other solutions based on a combination of a thermostatic bath with an external chiller. The ASTM D1298 set-up can also be used for ASTM D287, ASTM D1429 procedure B, ASTM D3142 or ASTM D6822 test methods.



**ASTM D1298
Apparatus**

Range	5°C...60°C	
Setting	0.01°C	
Stability \pm	Better than 0.1°C	
	TLC15-5	Rack
Bath volume	5 L	
Opening bath	85 x 150 mm (effective use)	
Depth bath	150 mm	
Length	420 mm (460 mm incl drain)	360 mm (front to back)
Width	265 mm	320 mm (left to right)
Height	565 mm	800 mm
Weight	30 kg	9 kg (glass parts included)
Power	1100 W (1 heater)	
Ambient temperature	15..28°C	

- ▶ ASTM D1298 apparatus **P/N 00T2000** (230V/50Hz) • **P/N 00T2001** (230V/60Hz) • **P/N 00T2002** (115V/60Hz)
- ▶ An additional rack is available to get an apparatus for six positions with one circulator • **P/N 00T1260**
- ▶ Alternative for this setup is a TV2500 in combination with the TLC10-3. For further information, please see section 1.8.

Accessories

P/N 25T0911BW	ASTM S12C thermometer
P/N 25T2153	Thermometer holder D1298

- ▶ **For hydrometers, please see the specification sheet.**



1.15 ASTM D1384 Corrosion Test for Engine Coolants

ASTM D1384 - ASTM D8040 - ASTM D8485 - SH/T0085

The ASTM D1384, D8040 and D8485 test methods covers a simple beaker-type procedure for evaluating the effects of engine coolants, heat transfer fluids or EV coolants on metal specimens under controlled laboratory conditions. In the test method, specimens of metals typical of those present in engine coolant solutions, heat transfer fluids and EV coolants are totally immersed in aerated engine coolant solutions or heat transfer fluids for 336 hours at 88°C (190°F). The corrosion-inhibitive properties of the test solution are evaluated on the basis of the weight changes incurred by the specimens. These test methods will generally distinguish between coolants or heat transfer fluids that are definitely deleterious from the corrosion standpoint and those that are suitable for further evaluation.

Main Characteristics

This apparatus consists of a six position TC40 circulator bath and it is delivered with six sets of glassware (1000 mL container and condenser) as standard. Also, six flow meters are standard included in the apparatus. The standard included cover of the TC40 has six openings, each with a lid. The TC40 is equipped with a levelling platform and two stand rods with six clamps to hold the glassware in a vertical position. The temperature range is from ambient +5°C to 250°C. All accessories for this test method are supplied by Tamson.



ASTM D1384 Apparatus

Range	..250°C/...482°F
Setting	0.1°C
Stability ±	0.02°C
Bath volume	40 L
Opening bath	Six openings
Depth bath	200 mm
Dimension (LxWxH)	760 x 650 x 880 mm
Weight	30 kg

► Complete apparatus for ASTM D1384 **P/N** 00T2040 (230V/50-60Hz) • **P/N** 00T2041 (115V/60Hz)

Necessary Accessories

P/N 08T0001	Bath fluid silicon oil 200-10, 20 L
P/N 25T0901B	Thermometer similar to ASTM 1C
P/N 31T2060	Air compressor 230V (P/N 31T2061 is for 115V)
P/N 31T2056	Complete set of test specimen
P/N 00T0565	TLC15-5 external cooling circulator
P/N 00T0567	
P/N 00T0570	





1.16 ASTM D1480 Density by Bingham Pycnometer

ASTM D1480 - ASTM D1217

This test method covers two procedures for the measurement of the density of materials which are fluid at the desired test temperature. Its application is restricted to liquids of vapor pressures below 80 kPa (600 mm Hg) and viscosities below 40 000 mm²/s (cSt) at the test temperature. The method is designed for use at any temperature between 20 °C and 100 °C. It can be used at higher temperatures.

For this test method, The liquid sample is introduced into the pycnometer, equilibrated to the desired temperature, and weighed. The density or specific gravity is then calculated from this weight and the previously determined calibration factor, and a correction is applied for the buoyancy of air.

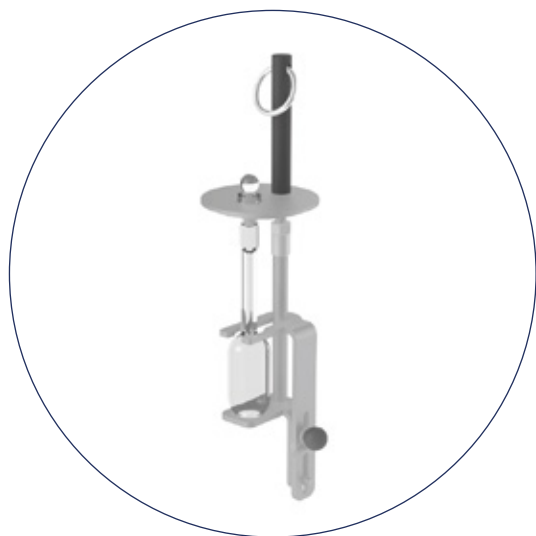
Tamson TV2000 visibility bath is specially designed for tests that require ultra-precise temperature control, or processes that need to be followed visually. The TV2000 can also be used for ASTM D1217 to cover the measurement of the density of pure hydrocarbons or petroleum distillates boiling between 90°C and 110°C that can be handled in a normal fashion as a liquid at the specified test temperatures of 20°C and 25°C.

The cover of the bath has 3 round ø51 mm openings with lids, for suspending Bingham pycnometers in Bingham pycnometer holders. To work at sub-ambient temperatures, use of cooling must be made. Cooling fluid can be pumped through the cooling coil inside the TV2000. The external TLC15-5 can be used for this purpose. The bath is fitted with a double window of which the front pane is detachable for cleaning purposes. The windows are formed with two panes of tempered safety glass separated by 20 mm air space. A bath overflow outlet protects against expanding bath oil when the bath filling is too high.

▶ TV2000 P/N 00T0782 (230V/50-60hz) • P/N 00T0785



TV2000 for ASTM D1480



Bingham pycnometer holder

Necessary accessories

P/N 00T0565	TLC15-5 external cooler to work below ambient temperature 230V/50Hz
P/N 00T0567	TLC15-5 external cooler to work below ambient temperature 230V/60Hz
P/N 00T0570	TLC15-5 external cooler to work below ambient temperature 115V/60Hz
P/N 10T6342	Bingham Pycnometer Holder
P/N 31T0033	Pycnometer Bingham 10 mL
P/N 12T1075	Tubing/Connector/Clamp between TV bath and TLC cooling circulator



1.17 ASTM D1837 Volatility of Liquefied Petroleum Gases

ASTM D1837 – ASTM D2158

This test method is a measure of the relative purity of the various types of liquefied petroleum (LP) gases and helps to ensure suitable volatility performance. The Tamson D1837 apparatus is used to cool down the sample and hold the weathering tube in a vertical position.

Main characteristics

The TCC-B D1837 is a single and adjustable circulator bath with position for one cooling coil. A cover with lid is in the scope of supply. The TCC-B operates from -85°C to $+20^{\circ}\text{C}$ (-121°F to $+68^{\circ}\text{F}$).

Range	$-85^{\circ}\text{C}...+20^{\circ}\text{C}/-121^{\circ}\text{F}...+68^{\circ}\text{F}$
Setting	0.1°C
Stability	0.1°C
Bath volume	13 L
Length	770 mm
Width	380 mm
Height	900 mm
Weight	76 kg

▶ ASTM D1837 apparatus **P/N** 00T0315 (230V/50Hz) • **P/N** 00T0316 (230V/60Hz)



ASTM D1837 Apparatus



1.18 ASTM D1838 Corrosiveness to Copper of LPG

ASTM D1838 - ISO 6251 - IP 411 - BS 6924 - NFM 41007

The test involves the immersion of a polished copper strip in approximately 100 mL of sample. The sample is exposed at a temperature of 37.8°C (100°F) for one hour in a cylinder of suitable working pressure. At the end of this period, the copper strip is removed and rated as one of the four classifications of the ASTM copper corrosion standard.

Main characteristics

The TB30 bath is designed to cover the detection of the corrosiveness to copper of liquefied petroleum gases conforming to ASTM D1838, IP 411, and ISO 6251. The TB30 is specially designed to hold a temperature stable at 37.8°C without the use of an external circulator. The bath is deep enough to accommodate four corrosion test cylinders for LPG in an upright position. The overflow outlet, drain and cooling coil are standard included. The TB30 is standard supplied with two lids with holders for the corrosion test cylinder.



TB30 D1838

Range	..80°C/...167°F
Setting	0.01°C
Stability ±	0.02°C
Bath volume	30 L
Bath opening	163 x 192 mm
Bath depth	460 mm
Dimensions (LxWxH)	258 x 490 x 680

► TB30 **P/N** 00T0065 (230V/50-60Hz) • **P/N** 00T0066 (115V/60Hz)

Necessary accessories

P/N 14T0115	Corrosion test cylinder for LPG
P/N 31T0003	ASTM copper strip corrosion test standard
P/N 31T0007	Copper strip with a 3.2 mm hole (one piece)
P/N 31T0001.100	Sanding paper silicon carbide P220 (100 pieces)
P/N 12T1070	Flexible inert hose
P/N 31T0000	Multistrip vise, holds up to four strips while polishing
P/N 31T0005	Silicon carbide powder 105 um (1 kg)
P/N 09T0011	Flat viewing test tube
P/N 25T0928BW	Thermometer with blue filling similar to ASTM 34C with works certificate
P/N 25T2154	Thermometer holder 425 x 10 mm



1.19 ASTM D2068 Filter Blocking Tendency

ASTM D2068 - IP 387 - IP PM EA/13 - CGSB 3.0 No. 142

This test method covers three procedures for the determination of the filter blocking tendency (FBT) and filterability of middle distillate fuel oils and liquid fuels such as biodiesel and biodiesel blends. The three procedures and associated filter types, are applicable to fuels within the viscosity range of 1.3 to 6.0 mm²/s at 40°C.

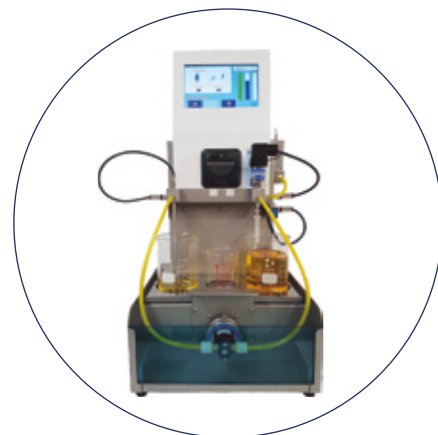
Main Characteristics

The Tamson Filter Blocking Tendency (TFBT) tester is a unique instrument designed to test distillate fuels including gas oil, gas turbine fuel, kerosine, diesel, biodiesel and biodiesel blends. It performs conform to procedures "A" and "B" of the ASTM D2068 / IP 387 methods. The TFBT is microprocessor controlled and provides a simple user interface using a touch screen.

This interface is exceptionally easy to use for selecting different tests, setting parameters and for calibration of the temperature and pressure sensors. The touch screen display provides the operator with test procedure information as well as indicating the selected test method, sample temperature, pressure, volume, and test result.

A printer is integrated to provide a permanent record of the test parameters or to print the test results with a filterability graph.

The fuel sample is drawn from the fuel reservoir by the piston pump. The pressure and temperature of the fuel are continuously monitored while it is pumped through the specified filter into the waste container. The recorded pressure rise, or the volume of pumped sample that causes a specified pressure to be exceeded, are used by the microprocessor to calculate the test result. Standard tests use 300 mL of fuel pumped at 20 mL/min. Verification and re-calibration is simple and secure. It can all be done electronically and this is very accurate compared to using knobs and screwdrivers. The TFBT can be connected to a PC to save the test results in a digital database.



Filter Blocking Tendency

Filter Blocking Tendency Range	1.0 to 30 (low number is best)
Maximum pressure	1500 mBar
Power	40 W
Voltage	85~264V
Frequency	47..63 Hz
Weight	10 kg
Dimensions	280 x 350 x 620
Timers	± 0.001 sec
Temperature	± 0.05°C
Output	Printer and RS232/PC

► TFBT **P/N** 00T0945 (85~264V/47-63Hz)

Necessary accessories for one adapter to test procedures A + B

P/N 24T0064	Pack (98) of filter discs for adapter "A" Whatman GF/A (FBT)
P/N 24T0052	Hose tygon 15 mtrs 3.2 x 6.4 mm
P/N 24T0067	Pack (98) of filter for adapter "B" Whatman syringe GF/A
P/N 24T0043	Silicon anti-splash tubing for procedure "B"



1.20 ASTM D2162 Master viscometers & Viscosity Oil

ASTM D2162

This test method covers the calibration of master viscometers and viscosity oil standards. Both the master viscometers and viscosity oil standards can be used to calibrate routine viscometers. The temperature range for this test method range from 15 °C to 100 °C. The Tamson TV7000DC can be used in combination with the TLC15-5 cooling circulator for this test method.

Main characteristics

The Tamson TV7000DC is specially designed for tests that require ultra-precise temperature control, or processes that need to be followed visually. The TV7000DC is fitted with double windows in front and rear walls. The windows are formed with two panes of tempered safety glass separated by 20 mm air space. Visibility through the bath is excellent.

The TV7000DC has seven positions and sufficient depth to suspend master viscometers in the bath. The stirrer and DC heaters provide an excellent stability in the bath. The overall accuracy of the TV7000DC is within $\pm 0.007^\circ\text{C}$. A TLC15-5 cooling circulator can be connected to the TV7000DC to reach sub-ambient temperatures.

▶ TV7000DC **P/N** 00T0796 (230V/50-60Hz) • **P/N** 00T0798 (115V/60Hz)

Range	[°]	Ambient.. 180C /356F
Setting	[°C]	0.01
Stability±	[°C]	0.01
Bath volume	[L]	70
Window		270 x 585
Opening bath	[mm]	260 x 240



TV7000DC



TLC15-5



1.21 ASTM D2170 Kinematic Viscosity of Asphalts

ASTM D2170 - EN/ISO 12595

This test methods covers procedures for the determination of kinematic viscosity of liquid asphalts (bitumens), road oils and distillation residues of liquid asphalts (bitumens) all at 60°C (140°F) and of asphalt cements at 135°C (275°F).

Main characteristics

The Tamson TV2000 and TV4000 viscometer baths are specially designed for tests that require ultra-precise temperature control, or tests that need to be followed visually. Both models are fitted with double windows in front and rear walls. The windows are formed with two panes of tempered safety glass separated by 20 mm air space. Visibility through the bath is excellent. The well insulated and reliable Tamson baths are ideal to use at high temperatures. For more information about the baths, please see the ASTM D445 section in this catalogue.



TV2000 for ASTM D2170

- ▶ TV2000 P/N 00T0782 (230V/50-60Hz) • P/N 00T0784 (115V/60Hz)
- ▶ TV4000 P/N 00T0772 (230V/50-60Hz) • P/N 00T0774 (115V/60Hz)

Accessories		TV2000	TV4000
P/N 00T0908	Illuminator Z41 80~230V/50-60Hz (backpanel)	•	•
P/N 10T6090	8 channel stop-watch	•	•
P/N 08T0001	Can with 20L of silicon oil 200-10 mm ² /s (suitable for 20..150°C)	1 can	2 cans
P/N 00T0239	ASTM thermometer holder	•	•
P/N 25T0940BW	Thermometer with blue filling similar to ASTM 47C	•	•
P/N 25T0981GW	Thermometer with gallium filling similar to ASTM 34C	•	•
P/Ns 25T0802 to 25T0813	CFO viscometers, please see section 4.1	•	•
P/Ns 25T0890 to 25T0899	Zeitfuchs Cross Arm, please see section 4.1	•	•
P/Ns 25T1030 to 25T1040	BS/IP/RF viscometers, please see section 4.1	•	•
P/N 06T1724	Stopper CFO/ZRA (pack of 12 pieces)	•	•
P/N 25T1069	Pipet for BS/IP/RF viscometer	•	•
P/N 10T6071	Cannon Fenske Opaque viscometer holder	•	•
P/N 10T6327	Zeitfuchs Cross Arm viscometer holder	•	•
P/N 10T6051	BS/IP/RF viscometer holder	•	•
P/N 02T0203	Spill tray	•	
P/N 02T0201	Spill tray		•



1.22 ASTM D2171 Viscosity of Bitumen by Vacuum Viscometer

ASTM D2171 - IP 222 - EN 12596 - AASHTOT202

This test method covers procedures for the determination of viscosity of asphalt (bitumen) by vacuum capillary viscometers at 60°C. It is applicable to materials having viscosities in the range from 0.0036 to over 20,000 Pa.

Main Characteristics

The Tamson Vacuum System (TVS) is designed for precise measurement and control of vacuum at 300 mm Hg below atmospheric pressure. The TVS is equipped with an internal vacuum pump. The internal set points for the instrument gauge are preset at Tamson to regulate vacuum at 300 ± 0.5 mm Hg below atmospheric pressure (the vacuum required in ASTM D2171). These set points may be altered to fit the user's specific needs within the TVS operating range of 0 to 320 mm Hg below atmospheric pressure.

In asphalt laboratories the TVS may be used in conjunction with Cannon-Manning, Asphalt Institute, and Modified Koppers vacuum viscometers for measurement of highly viscous materials such as asphalt cement at 60°C (140°F) according to ASTM D2171. The TVS is also useful in other laboratory systems where accurate measurements and control of vacuum is required.

For ASTM D2171 Tamson supplies a TV4000, a TVS and a four position Tamson Vacuum Manifold (TVM). With this system, four vacuum viscometers can be used. For more information about the TV4000, please see section 1.6.

- ▶ TVS **P/N** 00T0940 (85~230V)
- ▶ TVM **P/N** 00T0941
- ▶ TV4000 **P/N** 00T0772 (230V/50-60Hz) • **P/N** 00T0774 (115V/60Hz)



TV4000 with TVS and Manifold

(Necessary) options		ASTM D2171
P/N 00T0772	TV4000 viscosity bath (230V/50-60Hz)	•
P/N 00T0940	Tamson vacuum system (85~240V/50-60Hz)	•
P/N 00T0941	Tamson vacuum manifold for four positions with tubing	•
P/N 24T0046	Silicone tubing	•

PowerPoint with more details at
www.tamson.com



1.23 ASTM D2440 Oxidation Stability of Mineral Transformer Oil

ASTM D2440 - IP 306 - IP 307 - IEC 61125

The oxidation stability test of mineral transformer oils is a method for assessing the amount of sludge and acid formed in a transformer oil when the oil is tested under prescribed conditions. Good oxidation stability is necessary to improve the service life of the oil. Oils that meet the requirements tend to minimize electrical conduction, ensure acceptable heat transfer, and preserve system life.

For this test, a test specimen of mineral insulating oil is placed in an oil receptacle together with a copper catalyst coil to simulate the ageing of the sample. The sample is in the bath at 110°C for 72 or 164 hours. During this time, oxygen is constantly bubbled through the sample. After this procedure, the oil is evaluated by measuring the amount of sludge and acids formed.

Main characteristics

The Tamson ASTM D2440 apparatus consists of one liquid bath equipped with six sets of calibrated flowmeters and six sets of glassware. The flowmeters have a fine adjustable needle valve, to ensure the correct amount of oxygen is supplied. A dryer tower is also supplied and can be mounted on the side of the bath. The liquid bath is well insulated and all wetted parts are made from stainless steel to withstand high working temperatures. The stainless steel parts can easily be cleaned.



ASTM D2440 Apparatus

► ASTM D2440 apparatus **P/N 00T2060** (230V/50-60Hz) • **P/N 00T2061**(115V/60Hz)

Necessary Accessories	
P/N 08T0001	Bath fluid silicon oil 20..150°C 20 L
P/N 25T0934B	Thermometer with blue filling, similar to ASTM 41C
P/N 31T2111	Catalyst copper coil ext ø 16 mm, 50 mm height, pack of 10 pcs for ASTM D2440
P/N 31T2112	Catalyst copper coil ext ø 17 mm, 50 mm height, pack of 10 pcs for IEC 61125
P/N 31T2041	Refilling for dryer (P/N 31T2044), 5 lbs, 8 mesh
P/N 31T2110	Oil receptacle and head





1.24 ASTM D3231 Phosphorus in Gasoline

ASTM D3231

This test method covers the determination of phosphorus generally present as pentavalent phosphate esters or salts, or both, in gasoline. Organic matter in the sample is decomposed by ignition in the presence of zinc oxide. The residue is dissolved in sulfuric acid and reacted with ammonium molybdate and hydrazine sulfate. The absorbance of the Molybdenum Blue complex is proportional to the phosphorus concentration in the sample and is read at approximately 820 nm in a 5 cm cell.

Main Characteristics

Tamson supplies a constant temperature bath for this test method. The constant temperature bath is equipped with a levelling platform to hold up to eight 100 mL volumetric flasks submerged to the mark. The volumetric flasks are heated to a temperature between 82.2°C and 87.8°C for the entire period of sample heating.



ASTM D3231 Apparatus

Range	..200°C/...392°F
Setting	0.1°C
Stability ±	0.02°C
Bath volume	20 L
Opening bath	Eight openings
Depth bath	150 mm
Dimension (LxWxH)	555 x 375 x 425 mm

► Constant temperature bath for ASTM D3231 **P/N** 00T2030 (230V/50-60Hz) • **P/N** 00T2031 (115V/60Hz)

Necessary Accessories

P/N 31T0044	Volumetric flasks with glass stopper (pack of two pieces)
P/N 25T0928BW	Thermometer similar to ASTM 34C with works certificate
P/N 25T2154	Thermometer holder, 425 x 10 mm



1.25 ASTM D4807 Sediment in Crude Oil Membrane Filtration

ASTM D4807 - MPMS, Chapter 10.8

This test method covers the determination of sediment in crude oils by membrane filtration. This test method has been validated for crude oils with sediments up to approximately 0.15 mass %.

Main characteristics

The Tamson TC16 circulator pumps the bath content filled with bath oil through the jacketed (double wall) funnel to maintain the crude oil sample at 90°C. Necessary filter support, clamp, rubber stopper, 1000 mL vacuum filtering flask, glass T-piece with ground wire, insulated tubing with connectors, stand with clamps, membrane filters, and a vacuum pump are included in P/Ns 00T2010 and 00T2011.

The TC16 is standard equipped with a levelling platform and a cover with rings to place a beaker inside the TC16 to preheat the toluene (required for the test) to 90°C. The use of the TC16 for this application is a safer way to preheat the toluene as the mechanical safety thermostat of the liquid bath can be set slightly above the setpoint of the TC16. Thus the D4807 apparatus is much safer than using a hot plate to preheat the toluene.



ASTM D4807 Apparatus

Range	...250°C/...482°F
Setting	0.1°C
Stability ±	0.02°C
Bath volume	16 L
Opening bath	180 x 210 mm
Depth bath	220 mm
Dimension LxWxH	480 x 294 x 480 mm
Weight	21 kg

▶ ASTM D4807 apparatus complete **P/N 00T2010** (230V/50-60Hz) • **P/N 00T2011** (115V/60Hz)

Optional for TC16

P/N 08T0001	Silicon oil 200-10 mm ² /s 20 ltrs transparent
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Accessories for ASTM D4807

P/N 21T0230	Oven 230V/50-60Hz
P/N 21T0240	Analytical balance (230V/50Hz)
P/N 21T0250	Desiccator with lid and knob, DN100
P/N 21T0251	Desiccator plate DN100, 90 mm, porcelain
P/N 25T0928BW	Thermometer with blue filling similar to ASTM 34C
P/N 25T2154	Thermometer holder 425x10 mm
P/N 08T0001	Can with 20L of silicon oil 200-10 mm ² /s (suitable for 20..150°C)



1.26 ASTM D4870 Total Sediment in Residual Fuels

ISO 10307 - IP 375 - IP 390 (proc. A) - ASTM D4870

Tamson supplies products for this total sediment test in residual fuels. Both the sediment tester itself and the oil bath which is needed for thermal and chemical ageing of the samples are supplied by Tamson.

Main characteristics

The total sediment tester is a benchtop model with two test stations. On request we can supply a benchtop model with four or six test stations. The total sediment tester has stainless steel filter holders and is very easy to use. The waste of the total sediment tester is collected outside the unit. This makes the unit very safe, because the user does not have to go with his hand inside the unit to collect the waste.

Tamson manufactures two baths for thermal and chemical ageing of the samples. The cover (P/N 03T2310) of the TC16 offers six openings for air wells. The cover (P/N 03T2312) of the TC40 offers fifteen openings for air wells. Cover needs to be bought separately as an accessory. Air wells, conical flasks, condensers and stoppers can be bought from Tamson as well. The temperature range of the ageing baths is from ambient +5°C to 250°C. Please see the specification sheet for more information about the TC16 and TC40.



Total sediment tester

- ▶ TC16 ageing bath **P/N 00T0671** (230V/50-60Hz) • **P/N 00T0861** (115V/60Hz)
- ▶ TC40 ageing bath **P/N 00T0681** (230V/50-60Hz) • **P/N 00T0851** (115V/60Hz)
- ▶ Total sediment tester **P/N 31T0050**

Necessary accessories for Total sediment tester

P/N 31T0055	Vacuum pump with PTFE coated diaphragm 230V (P/N 31T0056 is for 115V)
P/N 31T0060	Steam generator for total sediment tester 230V (P/N 31T0061 is for 115V)
P/N 31T0062	Whatman filter media, GF/A, 47mm, pack of 100
P/N 31T0064	Waste container complete, 2 L

Necessary accessories for ageing bath

		TC16	TC40
P/N 03T2310	Top cover for TC16. Six openings Ø62 mm with lids and one thermometer opening	•	
P/N 03T2312	Top cover for TC40. Fifteen openings Ø62 mm with lids and one thermometer opening		•
P/N 14T0230	Air well, cylinder Ø55 mm inside and 120 mm in length	•	•
P/N 14T0232	Top lid for air well with 10 mm opening	•	•
P/N 08T0001	Can with 20L of silicon oil 200-10 mm ² /s (suitable for 20..150°C)	•	•
P/N 25T0921BW	ASTM thermometer S22C (low hazardous to ship)	•	•
P/N 31T0423	Cork stopper for thermometer	•	•
P/N 31T0014	Conical flask, 50 mL narrow mouth, pack of 10	•	•
P/N 31T0015	Condenser air, made of borosilicate glass, pack of 10	•	•
P/N 31T0016	Rubber stopper, unbored for conical flask, pack of 10	•	•
P/N 31T0017	Cork stopper, bored centrally for the air condenser, pack of 10	•	•



1.27 ASTM D5853 Pour Point of Crude Oils

ASTM D5853

This test method covers the determination of the pour point temperatures of crude oils down to -36°C . For this test methods, baths are needed to preheat the sample. One oil bath is needed to preheat the sample at $+105^{\circ}\text{C}$ in a pressure vessel and one water bath can be used to preheat the sample in a pour point jar at $+48^{\circ}\text{C}$ or at a temperature 12°C higher than the expected pour point, whichever is higher. Tamson also supplies a single adjustable pour point bath, please see the ASTM D97 section in this catalogue.

Main Characteristics

The cover of the bath has six openings, each supplied with a lid with a hook for suspending a pressure vessel (P/N 14T0100) or the openings can accommodate pour point jars in holders (P/N 14T0109). The temperature range is from ambient $+5^{\circ}\text{C}$ to 250°C . Optional is a cover with nine openings to heat nine samples (P/N 03T2311). Alternatively, a TC40 can be used as an 18 position bath.

Range	..250°C/...482°F
Setting	0.1°C
Stability ±	0.02 °C
Bath volume	16 L
Opening bath	Cover with 6 x 51 Ø mm openings (9 optional)
Depth bath	220 mm
Dimension (LxWxH)	480 x 295 x 480 mm
Weight	21 kg

- ▶ TC16 (for ASTM D130) **P/N** 31T0671 (230V/50-60Hz) • **P/N** 31T0861
- ▶ **For Accessories, see the specification sheet.**



Pour Point of Crude Oils



Test Cylinder



1.28 ASTM D6468 Stability of Middle Distilled Fuels

ASTM D6468 - Dupont F21- Octel F31 - IP 467

This test method covers relative stability of middle distillate fuels under high temperature aging conditions with limited air exposure. Tamson supplies baths for the thermal ageing of the samples.

Main characteristics

The separately to order cover of the bath has six openings with lids. The openings can accommodate test tubes (P/N 09T0012) in holders (P/N 14T0103). Optional is a cover with nine openings and lids. The temperature range is from ambient +5°C to 250°C. Alternatively a TC40 for 18 positions can be supplied.



TC16 for ASTM D6468

	TC16	TC40
Range	...250°C/...482°F	
Setting	0.1°C	
Stability ±	0.02°C	
Bath volume	16 L	40 L
Opening bath	180 x 210 mm	420 x 275 mm
Depth bath	220 mm	200 mm
Dimension LxWxH	480 x 295x 480 mm	705 x 375 x 480 mm
Weight	21 kg	30 kg

- ▶ TC16 **P/N** 00T0671 (230V/50-60Hz) • **P/N** 00T0861 (115V/60Hz)
- ▶ TC40 **P/N** 00T0681 (230V/50-60Hz) • **P/N** 00T0851 (115V/60Hz)

Necessary accessories		TC16	TC40
P/N 09T0012	Test tube 25 x 200 mm	•	•
P/N 14T0103	Test tube holder for test tube 25 x 200 mm (P/N 09T0012)	•	•
P/N 08T0001	Can with 20L of silicon oil 200-10 mm ² /s (suitable for 20..150°C)	•	•
P/N 25T0975BW	Thermometer with blue filling similar to ASTM 102C with works certificate	•	•
P/N 25T2154	Thermometer holder, 425 x 10 mm	•	•
P/N 13T8000	Cover TC16 with six openings	•	
P/N 03T2311	Cover TC16 with nine openings	•	
P/N 03T2313	Cover TC40 with eighteen openings		•

Accessories	
P/N 31T0410	Membrane filter holder
P/N 31T0405	1000 mL heavy walled vacuum flask
P/N 11T0031	Vacuum pump with gauge (230V/50Hz)
P/N 31T0412	Filter paper, pack of 100
P/N 31T1000	Reflection meter, includes Y search unit, green filter, calibration standard



1.29 ASTM D7501 Cold Soak Filtration Test of Biodiesel

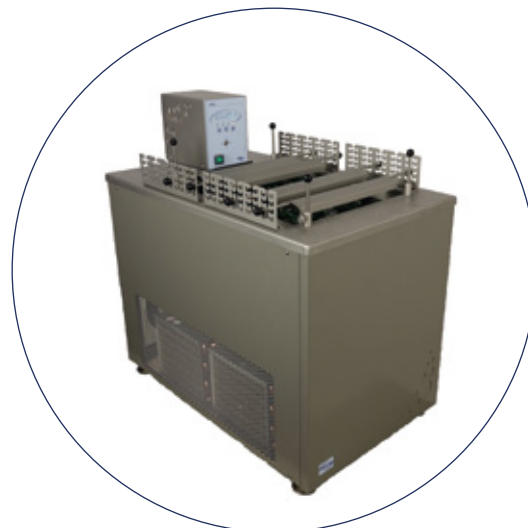
ASTM D7501 - IP PM EA - CEN N403 - CGSB 3.0 No. 142

For this test 300 mL of biodiesel (B100) is stored at $4.5 \pm 0.5^\circ\text{C}$ ($40 \pm 1^\circ\text{F}$) for 16 hours, allowed to warm to $25 \pm 1^\circ\text{C}$ ($77 \pm 2^\circ\text{F}$), and vacuum filtered through a single $0.7 \mu\text{m}$ glass fiber filter at controlled vacuum levels of 70–85 kPa.

Main characteristics

TLB50 bath (see also section 3.6 TLB50) is specially designed to condition the biodiesel samples in 500 mL jars at 4.5°C for sixteen hours. The TLB50 bath can also be used to maintain the samples at $+25^\circ\text{C}$ after the cold soak test. The bath is delivered with levelling platform, rack to hold up to 12 bottles, rails and brackets to prevent bottles from floating.

Filtration kit (P/N 31T2000) is delivered completely with 0.7 micron filters (100 pieces), glass filter funnel and clamp, filter forceps, one litre safety flask, one litre receiving flask, 500 mL graduated cylinder, ten petri dishes, ten watch glasses, glass piece with earth lead, two stoppers with hole (two pieces), stopwatch, and tubing.



TLB50

► TLB50 **P/N** 00T0082 (230V/50Hz) • **P/N** 00T0081 (115V/60Hz) • **P/N** 00T0083 (230V/60Hz)

Necessary accessories

P/N 31T2000	Filtration kit: 0.7 micron filters, glass filter funnel and clamp, filter forceps, one litre safety flask, one litre receiving flask, 500 mL graduated cylinder, ten petri dishes, ten watch glasses, earth leads, two stoppers with hole, stopwatch and tubing.
P/N 11T0033	Vacuum pump 230V (P/N 11T0034 is for 115V/60Hz)
P/N 25T0944BW	Thermometer with blue filling similar to ASTM 57C with works certificate
P/N 00T0239	Thermometer holder
P/N 31T0018	500 mL bottle (set of 10 bottles)
P/N 13T8046	Tripod complete with clamps (two needed)



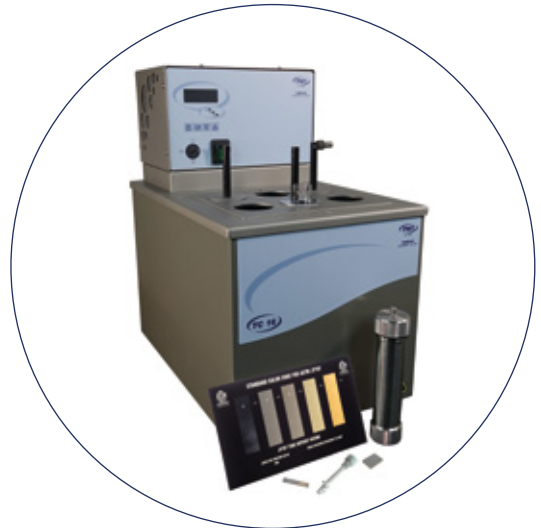
1.30 ASTM D7667 Silver Corrosion Test of Fuels

IP 227 - ASTM D4818 - ASTM D7667 - ASTM D7671 - IP 611

This test method specifies a method for the determination of the corrosive tendencies towards silver of aviation turbine fuel, automotive spark ignition engine oils, and automotive gasoline. The result is classified as an integer in the range 0 to 4.

Main Characteristics

The corrosion bath offers place for six test positions. The standard included cover of the bath has six openings, each supplied with a lid with a hook for suspending a copper corrosion test vessel (P/N 14T0100) or the openings can accommodate test tubes in holders (P/N 14T0102). The temperature range is from ambient +5°C to 250°C. Optional is a cover with nine openings to test nine samples (P/N 03T2311). When not used for silver corrosion tests, the pump can be used to circulate the bath content to an external application. Alternatively, a TC40 can be used as an 18 position bath.



Silver Corrosion bath

Range	..250°C/..482°F
Setting	0.1°C
Stability ±	0.02°C
Bath volume	16 L
Opening bath	6 x Ø51 mm (9 optional)
Depth bath	220 mm
Dimension (LxWxH)	480 x 295 x 480 mm
Weight	21 kg

- ▶ TC16 (for silver corrosion) • P/N 31T0671 (230V/50-60Hz) • P/N
- ▶ For accessories, see the specification sheet.



Test cylinder



1.31 CEC L-48-00 (B) Oxidation stability of Lubricating Oils used in Automotive Transmissions

CEC L-48-00 (B)

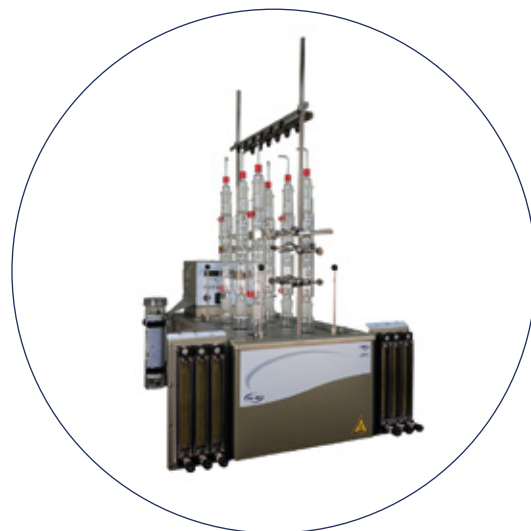
The CEC L-48-00 (B) test method covers the oxidation stability of lubricating oils used in automotive transmissions by artificial ageing. CEC L-48-00 assesses resistance of lubricants to high temperature oxidation and the ability to resist oil degradation and sludging. A lubricant is heated and aerated under controlled conditions.

Main characteristics

The apparatus consists of a six position TC40 circulator bath and it is standard delivered with six sets of glassware. The cover of the bath has six openings with lids. Stand-rods with clamps to hold the glassware in the same position, flowmeters and tubing are standard included. The temperature range of the bath is from ambient +5°C to 250°C. Other accessories for this test method are supplied by Tamson, please see below.

Accuracy

The insulation of the bath and electronic design result in a very stable working temperature of $\pm 0.02^\circ\text{C}$. The set point can be set in steps of 0.1°C in the range of 0°C up to 250°C ($148..482^\circ\text{F}$). The readout is displayed in 0.1°C . The controller has an internal accuracy of 0.01°C .



CEC L-48-00 Apparatus

Range	..250°C/...482°F
Setting	0.1°C
Stability \pm	0.02°C
Bath volume	40 L
Opening bath	Six openings
Depth bath	200 mm
Dimension (LxWxH)	760 x 650 x 880 mm
Weight	30 kg

► Complete apparatus for CEC L-48-00 (B) **P/N 00T2050** (230V/50-60Hz) • **P/N 00T2051** (115V/60Hz)

Accessories

P/N 00T0238	Bath fluid silicon oil 550, 20 L
P/N 31T2038	Thermocouple to measure sample temperature
P/N 31T2060	Air compressor 230V (P/N 31T2061 is for 115V)
P/N 31T2042	Dryer with 2 x 8 mm hose barbs
P/N 31T2041	Refilling for dryer (P/N 31T2042)
P/N 00T0782	TV2000MKII viscosity bath, please see section 1.6



1.32 CEC L-109-14 Oxidation Test for Engine Oils Operating in the Presence of Biodiesel Fuels

CEC L-109-14

This test method covers the oxidation test for engine oils operating in the presence of biodiesel fuels. As it is expected that more biodiesel will be blended with diesel in the future, the objective of this oxidation test is to provide preventive protection against the consequences of biodiesel induced engine oil oxidation. The selected test conditions should take the different usage patterns and engine hardware of passenger cars and commercial vehicles into account.

Main Characteristics

This apparatus consists of a six position TC40 circulator bath and it is delivered with six sets of glassware (500 mL flask and condenser) as standard. Also, six flow meters are standard included in the setup. The standard included cover of the TC40 has six openings, each with a lid. The TC40 is equipped with a levelling platform and two stand rods with six clamps to hold the glassware in a vertical position. The temperature range is from ambient +5°C to 250°C. All accessories for this test method are supplied by Tamson.



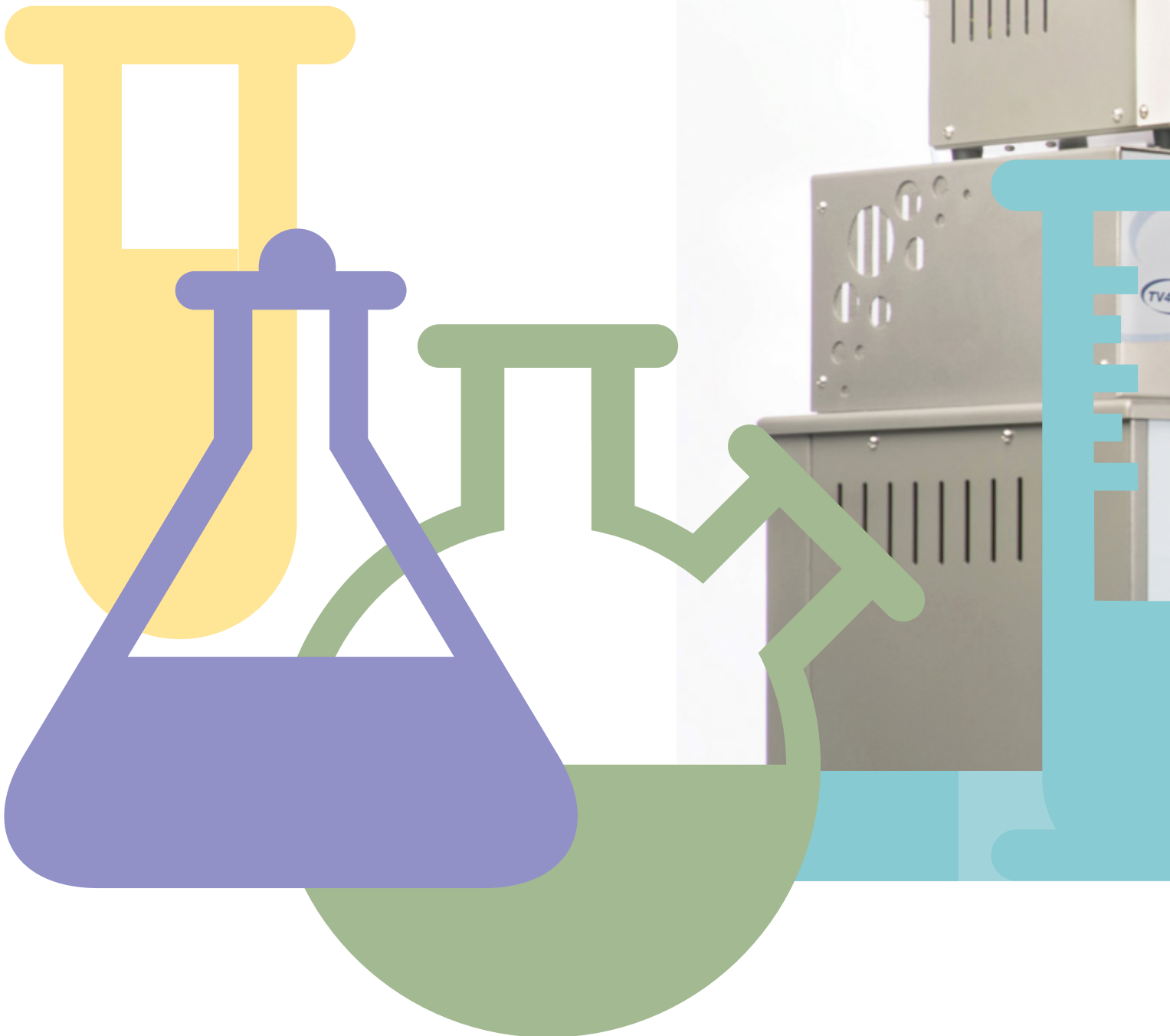
**CEC L-109-14
Apparatus**

Range	..250°C/...482°F
Setting	0.1°C
Stability ±	0.02°C
Bath volume	40 L
Opening bath	Six openings
Depth bath	200 mm
Dimension (LxWxH)	760 x 650 x 880 mm
Weight	30 kg

► Complete apparatus for CEC L-109-14 **P/N** 00T2020 (230V/50-60Hz) • **P/N** 00T2021 (115V/60Hz)

Accessories	
P/N 00T0238	Bath fluid silicon oil 550, 20 L
P/N 31T2038	Thermocouple to measure sample temperature
P/N 31T2060	Air compressor 230V (P/N 31T2061 is for 115V)
P/N 31T2042	Dryer with 2 x 8 mm hose barbs
P/N 31T2041	Refilling for dryer (P/N 31T2042)
P/N 00T0782	TV2000MKII viscosity bath, please see section 1.6

HIGH BAT



TEMPERATURE HS






2.1 Tamson Circulator – TC Line

Main Characteristics




The Tamson TC baths can be used in the laboratory to heat samples to a certain temperature. The baths can be supplied with various temperature ranges and sizes. The baths are equipped with a pump to circulate the bath content to an external application, such as glassware that needs to be temperature controlled. The accuracy on the display is displayed in 0.1°C. However, the controller has an internal accuracy of 0.01°C. Two decimal readout is also available via the RS232 and the free Tamcom software. Due to the friction-heat of the stirring mechanism and when using a top lid, the minimum temperature lies approximately 5°C above the ambient temperature. When using the standard built-in cooling coil the minimum temperature lies approximately 5°C above the temperature of the cooling liquid. In general the minimum temperature is around 10°C.

	TC20B
	
Range	...200°C/...392°F
Setting	0.1°C
Stability ±	Better then 0.02°C
Bath volume	20 L
Opening bath (round edge)	300 x 320mm
Depth bath	150 mm
Pump (mBar)	Max pressure 300
Pump (L/min)	
Dimension LxWxH	555 x 375 x 425 mm
Weight	13 kg



TC Line

- ▶ TC16 **P/N** 00T0671 (230V/50-60Hz) • **P/N** 00T0861 (115V/60Hz)
- ▶ TC40 **P/N** 00T0681 (230V/50-60Hz) • **P/N** 00T0851 (115V/60Hz)
- ▶ TC58 **P/N** 00T0691 (230V/50-60Hz) • **P/N** 00T0881 (115V/60Hz)
- ▶ TC20B **P/N** 00T0160 (230V/50-60Hz) • **P/N** 00T0165 (115V/60Hz)
- ▶ **For Accessories, see the specification sheet.**

	TC16	TC40	TC58
			
Range	...250°C/...482°F		
Setting	0.1°C		
Stability ±	0.02°C		
Bath volume	16 L	40 L	58 L
Opening bath	180 x 210 mm	420 x 275 mm	420 x 275 mm
Depth bath	220 mm	200 mm	300 mm
Dimension LxWxH	480 x 295 x 480 mm	705 x 375 x 440 mm	705 x 375 x 590 mm
Weight	21 kg	30 kg	35 kg

2.2 Tamson Thermostatic Unit - TTU-A and Tamson Bracket - TB

The Tamson Thermostatic Unit (TTU) can be used for heating and/or circulating purposes. The bath fluid is heated via a micro-processor controlled heating element. Tamson offers thermostatic controllers as a replacement unit or as a "plug and play" unit to heat a bath or application. Tamson also manufactures the Tamson Bracket (TB), a thermostatic head with a mounting bridge that can be fitted onto all tanks with a maximum opening of 452 mm.

Main characteristics

A choice for different applications is offered:

- Stirring with short or long shaft
- Heating with or without boost heater
- Circulating and pumping
- Below ambient temperature regulation using a cooling coil

The set point of the TTU is adjustable in steps of 0.01°C. The overall system accuracy is better than $\pm 0.02^\circ\text{C}$ but depends on the application. Readout can be switched between °C or °F. When equipped with a pump, the pump pressure is 300 mBar and seven liters per minute (no counter pressure).

The set point of the TB can be set in steps of 0.1°C in the range of 0°C up to 200°C (32..392°F). The accuracy of the display is displayed in 0.1°C. However, the controller has an internal accuracy of 0.01°C. Two decimal readout is also available via the RS232 and the free Tamcom software.

- ▶ Long shaft, stirrer, cooling coil
- ▶ Short shaft, stirrer and pump
- ▶ Short shaft, stirrer and boost heater
- ▶ Tamson Bracket

- ▶ P/N 19T1010 (230V/50-60Hz)
- ▶ P/N 19T1011 (115V/60Hz)
- ▶ P/N 19T3110 (230V/50-60Hz)
- ▶ P/N 19T3111 (115V/60Hz)
- ▶ P/N 19T3120 (230V/50-60Hz)
- ▶ P/N 19T3121 (115V/60Hz)
- ▶ P/N 00T0380 (230V/50-60Hz)
- ▶ P/N 00T0385 (115V/60Hz)



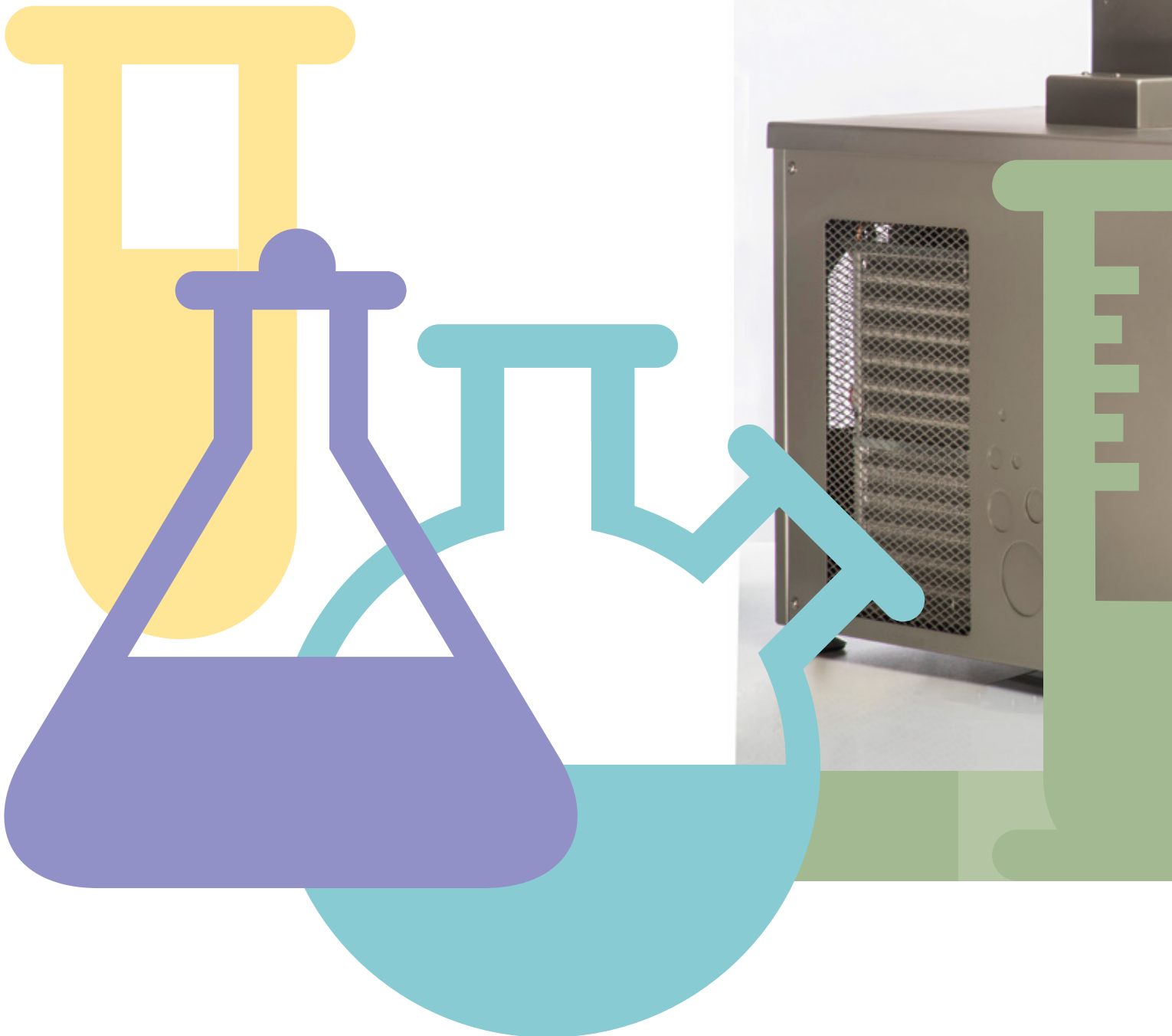
TTU-A
P/N 19T1010 & P/N 19T3110

	TTU-A	TB
Range 200°C	
Used materials inside bath	Stainless steel, brass bearings	
Setting	0.01°C	0.1°C
Stability \pm	0.01°C	0.03°C
Heating	1400 W or 2800 W	1100 W
Weight	4 kg	4 kg



Tamson Bracket

LOW BAT



TEMPERATURE HS





3.1 How to select the appropriate cooler?

	TLC10-3	TLC15-5	TLC30-5	TLC40-14	TCC-B	TLB50
Temperature range	-10..+60°C (Optional -10..+120°C)	-15..+60°C (Optional -15..+120°C)	-30..+60°C (Optional -30..+120°C)	-40..+20°C	-85°C.. ambient	-5°C..+80°C
Setting (°C)	0.01	0.01	0.01	0.1	0.1	0.01
Stability ±	Better than	Better than	Better than	Better than	Better than	0.02°C
Heating (W)	1100	1100	1100	1550	1400	1400
Heaters	1	1	1	1	1	1
Bath Volume (L)	3.5	5	5	14..15	11	50
Opening bath (mm)	40*115	85*150	85*150	240*170	155*110	310*400
Depth bath (mm)	150	150	150	150	240	290
Pump pressure (mBar)	270 max	300 max	300 max	300 max	1000 max	Optional 300 max
Pump capacity (L/min)	7 max (optional 10)	7 max (optional 10)	7 max (optional 10)	7 max (optional 16)	16 max	Optional 7 max
Heat removal °C (WATT)	@50° - 320 @0° - 100 @-10° - 50	@2° - 250 @-7° - 200 @-10° - 150 @-12° - 75	@15° - 200 @0° - 170 @-3° - 150 @-25° - 100	@-10° - 1220 @-20° - 880 @-30° - 520 @-40° - 250	@-73°- 350 @-84°- 250	@-5° - 180 @10° - 250 @30° - 330
Dimensions(LxWxH)	355*195*410	420*265*565	420*265*565	810*460*770	770*380*780	720*440*720





3.2 Tamson Cooling Circulators - TLC Line TLC10-3

The TLC10-3 has been developed to be used as general purpose circulator and it can be used in various applications where cooling is needed. Experiments, refractometers, rotary-evaporators, distillation units, water baths, viscosity baths, flash point testers are applications for which the TLC10-3 can be used.

Main Characteristics

The apparatus holds a small bath containing 3.5 litres and the filling opening measures 40 x 120 mm. Due to its special design the system is extremely quiet, compact and saves costly laboratory space. Readout is in degrees °C or in °F. The bath comes standard with RS232 communication and when using the free software tool Tamcom, it provides temperature logging or a predefined temperature set point curve. A pump provides circulation in the bath or via an external circuit. The pump offers seven litres per minute with a maximum counter pressure of 300 mBar.



TLC10-3

Range	-10..60°C* / 14..140°F
Setting	0.01°C
Stability ±	Better than 0.05°C
Heating	1100 W
Bath volume	3.5 L
Opening bath	40 x 120 mm
Depth bath	150 mm
Pump (mBar)	Max pressure 300
Pump (L/min)	Max flow 7
Dimension LxWxH	360 x 200 x 560 mm
Weight	18 kg
Heat removal	See section 3.1

* On request the TLC10-3 can have a working range from -10..120°C

▶ TLC10-3 **P/N** 00T0050 (230V/50Hz) • **P/N** 00T0051 (230V/60Hz) • **P/N** 00T0052 (115V/60Hz)

Manuals see
www.tamson.com



3.3 Tamson Cooling Circulators – TLC Line TLC15-5, TLC30-5



The TLC15-5 and TLC30-5 have been developed to be used as general purpose circulator and they can be used in various applications where cooling is needed. Examples are experiments, refractometers, rotary-evaporators, distillation units, water baths, viscosity baths, flash point testers, foaming tests and ductility tests.

Main Characteristics

The apparatus holds a small bath containing five litres and the filling opening measures 85 x 150 mm. Due to its special design the system is extremely quiet, compact and saves costly laboratory space. Readout is in degrees °C or in °F. A pump provides circulation in the bath or to an external circuit. The pump offers seven litres per minute with a maximum counter pressure of 300 mBar.



TLC15-5

	TLC15-5	TLC30-5
		
Range	-15..60°C*/-5..140°F	-30..60°C**/-5..140°F
Setting	0.01°C	
Stability ±	Better than 0.02°C	
Bath volume	5 L	
Opening bath	85 x 150 mm	
Depth bath	150 mm	
Pump (mBar)	Max pressure 300	
Pump (L/min)	Max flow 7	
Dimension LxWxH	420 x 265 x 565 mm	
Weight	30 kg	
Heat removal	See section 3.1	

* On request the TLC15-5 can have a working range from -15..120°C

** On request the TLC30-5 can have a working range from -30..120°C

- ▶ TLC15-5 **P/N** 00T0565 (230V/50Hz) • **P/N** 00T0567 (230V/60Hz) • **P/N** 00T0570 (115V/60Hz)
- ▶ TLC30-5 **P/N** 00T0555 (230V/50Hz) • **P/N** 00T0562 (230V/60Hz) • **P/N** 00T0560 (115V/60Hz)





3.4 Tamson Cooling Circulators – TLC Line TLC40-14

The TLC40-14 cooling circulator can be used for multiple heat removal purposes such as replacement of tap water, fast cool down, flash point, distillation, density or cloud and pour point testing. Also, this unit can be used to cool down water baths and viscosity baths which have a large bath volume.

Main Characteristics

The apparatus holds a bath containing 14 litres and the filling opening measures 240 x 170 mm. Due to its special design the system is extremely quiet, compact and saves costly laboratory space. The minimum temperature which can be reached with the TLC40-14 is -40°C. Readout is in degrees °C or in °F. A pump provides circulation in the bath or pumps the flow to an external circuit. The pump offers 16 litres per minute with a maximum counter pressure of 1 Bar.



TLC40-14

Range	-40..+20°C/-40..+68 °F
Reading	Standard °C, °F on request
Used materials inside bath	Stainless steel 304, brass bearings
Setting	0.1°C
Stability ±	Better than 0.05°C
Heating	1550 W
Bath volume	14 .. 15 L
Opening bath	240 x 170 mm
Depth bath	150 mm
Pump (mBar)	Max 1 Bar
Pump (L/min)	Max flow 16
Dimension LxWxH	810 x 460 x 770 mm
Weight	65 kg
Heat removal	See section 3.1

► TLC40-14 **P/N** 00T0520 (230V/50Hz) • **P/N** 00T0522 (230V/60Hz) • **P/N** 00T0525 (115V/60Hz)



3.5 Tamson Cool Cube

Main Characteristics

The TCC comprises of a two stage compressor system which is switched in cascade. The unit is low noise. The TCC-B model has an internal bath and can be closed with a lid. The lid can be removed to insert a product inside the bath fluid. Alternatively, the standard integrated pump can be used to circulate the bath fluid to an external application. The TCC-B can cool down to -85C.



TCC-B

	TCC-B
Practical working temperature	-85°C/-126°F
Body	Top lid stainless steel, powder coated Zincor frame
Height + Display	660 mm
Height casing without display	610 mm
Width	380 mm
Depth	830 mm
Depth with distance spacers	920 mm
Power	1200 Watt

► TCC-B **P/N** 00T0310 (230V/50Hz) • **P/N** 00T0311 (230V/60Hz)





3.6 Tamson Low Temperature Bath TLB50

TLB50 is a thawing bath for sample preparation. The bath has an operating range of -5°C up to 80°C. The bench top bath with integrated cooling can replace the combination of a water bath with an external cooling circulator. This not only saves bench space, but also save costs because of its high cooling efficiency.

Main characteristics

The TLB50 has a wide bath opening and several options like a fixed or split levelling platform and an adjustable rack for placing different sized sample bottles. The primary use of the TLB50 is sample pre-conditioning. Before most samples are analysed, they require to be conditioned to a specified temperature as described in specific test methods i.e.:

- ASTM D323 Reid vapor pressure test between 0 to 1°C (32 to 34°F),
- ASTM D5 penetration tests for bitumen,
- ASTM D86 sample preparation,
- Long-term storage of gasoline <10°C or <20°C (<50°F or 68°F).

The set point is adjustable in steps of 0.01°. The overall system accuracy is better than ± 0.02°C. Readout can be switched between °C or °F. Due to a specific cooling construction, the unit switches to an energy friendly operating mode when reaching the desired bath set point temperature. In comparison to standard equipment this can save up to 600 Watt. When cooling down to the desired bath temperature the bath switches to maximum cooling power.



TLB50

Range	-5..+80°C/23..+176°F
Reading	°C or °F menu selectable
Setting	0.01°C
Stability ±	0.02°C
Uniformity ±	0.02°C
Heating	1400 W
Heaters	1
Bath volume	50 L
Opening bath L x W	310 x 400 mm
Depth	290 mm
Dimensions LxWxH	720 x 440 x 720 mm
Weight	65 kg
Power	Nominal 800 W Maximum 3000 W
Ambient condition	18 .. 23°C

- ▶ TLB50 **P/N** 00T0072 (230V/50Hz) • **P/N** 00T0071 (115V/60Hz) • **P/N** 00T0073 (230V/60Hz)
- ▶ TLB50 with pump **P/N** 00T0076 (230V/50Hz) • **P/N** 00T0075 (115V/60Hz) • **P/N** 00T0077 (230V/60Hz)
- ▶ **For Accessories, see the specification sheet.**

ACCES



SORIES





For the determination of kinematic viscosity of transparent and opaque Newtonian liquids according to ASTM D446 - ISO 3105 - IP 71, and BS 188.

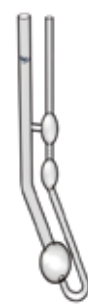
Glass capillary viscometers with ISO 17025 certificate

UBBELOHDE VISCOMETER for transparent liquids			
P/N 25T0814	Size 0	Nom. Constant 0.001	Range from 0.3 to 1 mm ² /s
P/N 25T0815	Size 0C	Nom. Constant 0.003	Range from 0.6 to 3 mm ² /s
P/N 25T0816	Size 0B	Nom. Constant 0.005	Range from 1 to 5 mm ² /s
P/N 25T0817	Size 1	Nom. Constant 0.01	Range from 2 to 10 mm ² /s
P/N 25T0818	Size 1C	Nom. Constant 0.03	Range from 6 to 30 mm ² /s
P/N 25T0819	Size 1B	Nom. Constant 0.05	Range from 10 to 50 mm ² /s
P/N 25T0820	Size 2	Nom. Constant 0.1	Range from 20 to 100 mm ² /s
P/N 25T0821	Size 2C	Nom. Constant 0.3	Range from 60 to 300 mm ² /s
P/N 25T0822	Size 2B	Nom. Constant 0.5	Range from 100 to 500 mm ² /s
P/N 25T0823	Size 3	Nom. Constant 1.0	Range from 200 to 1000 mm ² /s
P/N 25T0824	Size 3C	Nom. Constant 3.0	Range from 600 to 3000 mm ² /s
P/N 25T0825	Size 3B	Nom. Constant 5.0	Range from 1000 to 5000 mm ² /s
P/N 25T0826	Size 4	Nom. Constant 10	Range from 2000 to 10000 mm ² /s
P/N 25T0827	Size 4C	Nom. Constant 30	Range from 6000 to 30000 mm ² /s
P/N 25T0828	Size 4B	Nom. Constant 50	Range from 10000 to 50000 mm ² /s
P/N 25T0829	Size 5	Nom. Constant 100	Range from 20000 to 100000 mm ² /s



Glass capillary viscometers with ISO 17025 certificate

CANNON-FENSKE ROUTINE VISCOMETER for transparent liquids			
P/N 25T0790	Size 25	Nom. Constant 0.002	Range from 0.5 to 2 mm ² /s
P/N 25T0791	Size 50	Nom. Constant 0.004	Range from 0.8 to 4 mm ² /s
P/N 25T0792	Size 75	Nom. Constant 0.008	Range from 1.6 to 8 mm ² /s
P/N 25T0793	Size 100	Nom. Constant 0.015	Range from 3 to 15 mm ² /s
P/N 25T0794	Size 150	Nom. Constant 0.035	Range from 7 to 35 mm ² /s
P/N 25T0795	Size 200	Nom. Constant 0.1	Range from 20 to 100 mm ² /s
P/N 25T0796	Size 300	Nom. Constant 0.25	Range from 50 to 250 mm ² /s
P/N 25T0797	Size 350	Nom. Constant 0.5	Range from 100 to 500 mm ² /s
P/N 25T0798	Size 400	Nom. Constant 1.2	Range from 240 to 1200 mm ² /s
P/N 25T0799	Size 450	Nom. Constant 2.5	Range from 500 to 2500 mm ² /s
P/N 25T0800	Size 500	Nom. Constant 8	Range from 1600 to 8000 mm ² /s
P/N 25T0801	Size 600	Nom. Constant 20	Range from 4000 to 20000 mm ² /s
P/N 25T0842	Size 650	Nom. Constant 50	Range from 10000 to 40000 mm ² /s
P/N 25T0843	Size 700	Nom. Constant 100	Range from 20000 to 100000 mm ² /s



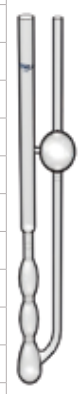
► For Viscometer holders, please see section 'Viscosity accessories'





Glass capillary viscometers with ISO 17025 certificate

CANNON-FENSKÉ REVERSE FLOW VISCOMETER for opaque and transparent liquids			
P/N 25T0802	Size 25	Nom. Constant 0.002	Range from 0.5 to 2 mm ² /s
P/N 25T0803	Size 50	Nom. Constant 0.004	Range from 0.8 to 4 mm ² /s
P/N 25T0804	Size 75	Nom. Constant 0.008	Range from 1.6 to 8 mm ² /s
P/N 25T0805	Size 100	Nom. Constant 0.015	Range from 3 to 15 mm ² /s
P/N 25T0806	Size 150	Nom. Constant 0.035	Range from 7 to 35 mm ² /s
P/N 25T0807	Size 200	Nom. Constant 0.1	Range from 20 to 100 mm ² /s
P/N 25T0808	Size 300	Nom. Constant 0.25	Range from 50 to 200 mm ² /s
P/N 25T0809	Size 350	Nom. Constant 0.5	Range from 100 to 500 mm ² /s
P/N 25T0810	Size 400	Nom. Constant 1.2	Range from 240 to 1200 mm ² /s
P/N 25T0811	Size 450	Nom. Constant 2.5	Range from 500 to 2500 mm ² /s
P/N 25T0812	Size 500	Nom. Constant 8	Range from 1600 to 8000 mm ² /s
P/N 25T0813	Size 600	Nom. Constant 20	Range from 4000 to 20000 mm ² /s
P/N 25T0850	Size 650	Nom. Constant 50	Range from 10000 to 40000 mm ² /s
P/N 25T0851	Size 700	Nom. Constant 100	Range from 20000 to 100000 mm ² /s



► Stopper CFO (pack of 12) **P/N 06T1724**

Glass capillary viscometers with ISO 17025 certificate

BS/IP/RF U-tube VISCOMETER for opaque and transparent liquids			
P/N 25T1030	Size 1	Nom. Constant 0.003	Range from 0.6 to 3 mm ² /s
P/N 25T1031	Size 2	Nom. Constant 0.01	Range from 2 to 10 mm ² /s
P/N 25T1032	Size 3	Nom. Constant 0.03	Range from 6 to 30 mm ² /s
P/N 25T1033	Size 4	Nom. Constant 0.1	Range from 20 to 100 mm ² /s
P/N 25T1034	Size 5	Nom. Constant 0.3	Range from 60 to 300 mm ² /s
P/N 25T1035	Size 6	Nom. Constant 1.0	Range from 200 to 1000 mm ² /s
P/N 25T1036	Size 7	Nom. Constant 3.0	Range from 600 to 3000 mm ² /s
P/N 25T1037	Size 8	Nom. Constant 10	Range from 2000 to 10000 mm ² /s
P/N 25T1038	Size 9	Nom. Constant 30	Range from 6000 to 30000 mm ² /s
P/N 25T1039	Size 10	Nom. Constant 100	Range from 20000 to 100000 mm ² /s
P/N 25T1040	Size 11	Nom. Constant 300	Range from 60000 to 300000 mm ² /s



► Special pipette for charging BS/IP/RF viscometers according to ASTM D2170 (section A 2.3.3.4) includes stopper **P/N 25T1069**

Glass capillary viscometers with ISO 17025 certificate

BS/IP/SL U-tube VISCOMETER for transparent liquids			
P/N 25T0831	Size 1A	Nom. Constant 0.03	Range from 6 to 30 mm ² /s
P/N 25T0830	Size 1	Nom. Constant 0.01	Range from 3.5 to 10 mm ² /s
P/N 25T0833	Size 2A	Nom. Constant 0.3	Range from 60 to 300 mm ² /s
P/N 25T0832	Size 2	Nom. Constant 0.1	Range from 20 to 100 mm ² /s
P/N 25T0835	Size 3A	Nom. Constant 3.0	Range from 600 to 3000 mm ² /s
P/N 25T0834	Size 3	Nom. Constant 1.0	Range from 200 to 1000 mm ² /s
P/N 25T0837	Size 4A	Nom. Constant 30	Range from 6000 to 30000 mm ² /s
P/N 25T0836	Size 4	Nom. Constant 10	Range from 2000 to 10000 mm ² /s
P/N 25T0838	Size 5	Nom. Constant 100	Range from 20000 to 100000 mm ² /s




► For Viscometer holders, please see section 'Viscosity accessories'




Glass capillary viscometers with ISO 17025 certificate

BS/IP/SL(S) VISCOMETER for transparent liquids			
P/N 25T1013	Size 1	Nom. Constant 0.008	Range from 1.05 mm ² /s
P/N 25T1014	Size 2	Nom. Constant 0.003	Range from 2.1 to 3 mm ² /s
P/N 25T1015	Size 3	Nom. Constant 0.01	Range from 3.8 to 10 mm ² /s
P/N 25T1016	Size 4	Nom. Constant 0.03	Range from 6 to 30 mm ² /s
P/N 25T1017	Size 5	Nom. Constant 0.1	Range from 20 to 100 mm ² /s
P/N 25T1018	Size 6	Nom. Constant 0.3	Range from 60 to 300 mm ² /s
P/N 25T1019	Size 7	Nom. Constant 1.0	Range from 200 to 1000 mm ² /s
P/N 25T1020	Size 8	Nom. Constant 3.0	Range from 600 to 2000 mm ² /s
P/N 25T1021	Size 9	Nom. Constant 10.0	Range from 2000 to 10000 mm ² /s




Glass capillary viscometers with ISO 17025 certificate

BS/U-tube VISCOMETER for transparent liquids			
P/N 25T1001	Size A	Nom. Constant 0.003	Range from 0.9 to 3 mm ² /s
P/N 25T1002	Size B	Nom. Constant 0.01	Range from 2.0 to 10 mm ² /s
P/N 25T1003	Size C	Nom. Constant 0.03	Range from 6 to 30 mm ² /s
P/N 25T1004	Size D	Nom. Constant 0.1	Range from 20 to 100 mm ² /s
P/N 25T1005	Size E	Nom. Constant 0.3	Range from 60 to 300 mm ² /s
P/N 25T1006	Size F	Nom. Constant 1.0	Range from 200 to 1000 mm ² /s
P/N 25T1007	Size G	Nom. Constant 3.0	Range from 600 to 3000 mm ² /s
P/N 25T1008	Size H	Nom. Constant 10.0	Range from 2000 to 10000 mm ² /s




Glass capillary viscometers with ISO 17025 certificate

BS/U/M-Miniature VISCOMETER for transparent liquids			
P/N 25T1022	Size M1	Nom. Constant 0.001	Range from 0.2 to 1 mm ² /s
P/N 25T1023	Size M2	Nom. Constant 0.005	Range from 1 to 5 mm ² /s
P/N 25T1024	Size M3	Nom. Constant 0.015	Range from 3 to 15 mm ² /s
P/N 25T1025	Size M4	Nom. Constant 0.04	Range from 8 to 40 mm ² /s
P/N 25T1026	Size M5	Nom. Constant 0.1	Range from 20 to 100 mm ² /s



Glass capillary viscometers with ISO 17025 certificate

BS/IP/MSL VISCOMETER for transparent liquids			
P/N 25T0750	Size 1	Nom. Constant 0.003	Range from 0.6 to 3 mm ² /s
P/N 25T0751	Size 2	Nom. Constant 0.01	Range from 2.0 to 10 mm ² /s
P/N 25T0752	Size 3	Nom. Constant 0.03	Range from 6 to 30 mm ² /s
P/N 25T0753	Size 4	Nom. Constant 0.1	Range from 20 to 100 mm ² /s
P/N 25T0754	Size 5	Nom. Constant 0.3	Range from 60 to 300 mm ² /s
P/N 25T0755	Size 6	Nom. Constant 1.0	Range from 200 to 1000 mm ² /s
P/N 25T0756	Size 7	Nom. Constant 3.0	Range from 600 to 3000 mm ² /s




► For Viscometer holders, please see section 'Viscosity accessories'




Glass capillary viscometers with works certificate

SIL VISCOMETER for transparent liquids			
P/N 25T0882	Size 0C	Nom. Constant 0.003	Range from 0.9 to 3 mm ² /s
P/N 25T0883	Size 1	Nom. Constant 0.01	Range from 2.0 to 10 mm ² /s
P/N 25T0884	Size 1C	Nom. Constant 0.03	Range from 6 to 30 mm ² /s
P/N 25T0885	Size 2	Nom. Constant 0.1	Range from 20 to 100 mm ² /s
P/N 25T0886	Size 2C	Nom. Constant 0.3	Range from 60 to 300 mm ² /s
P/N 25T0887	Size 3	Nom. Constant 1.0	Range from 200 to 1000 mm ² /s
P/N 25T0888	Size 3C	Nom. Constant 3.0	Range from 600 to 3000 mm ² /s
P/N 25T0889	Size 4	Nom. Constant 10.0	Range from 2000 to 10000 mm ² /s



Glass capillary viscometers with ISO 17025 certificate

Zeitfuchs Cross-Arm VISCOMETER for opaque and transparent liquids			
P/N 25T1041	Size 1	Nom. Constant 0.003	Range from 0.6 to 3 mm ² /s
P/N 25T0890	Size 2	Nom. Constant 0.01	Range from 2 to 10 mm ² /s
P/N 25T0891	Size 3	Nom. Constant 0.03	Range from 6 to 30 mm ² /s
P/N 25T0893	Size 4	Nom. Constant 0.10	Range from 20 to 100 mm ² /s
P/N 25T0894	Size 5	Nom. Constant 0.3	Range from 60 to 300 mm ² /s
P/N 25T0895	Size 6	Nom. Constant 1.0	Range from 200 to 1000 mm ² /s
P/N 25T0896	Size 7	Nom. Constant 3.0	Range from 600 to 3000 mm ² /s
P/N 25T0897	Size 8	Nom. Constant 10.0	Range from 2000 to 10000 mm ² /s
P/N 25T0898	Size 9	Nom. Constant 30.0	Range from 6000 to 30000 mm ² /s
P/N 25T0899	Size 10	Nom. Constant 100.0	Range from 20000 to 100000 mm ² /s



► For Viscometer holders, please see section 'Viscosity accessories'

Glass capillary viscometers are delivered with an ISO 17025 certificate, except SIL Glass capillary viscometers, they are delivered with a works certificate.

Other ASTM D446 viscometers on request.



4.2 Viscosity

Viscometer Holders

A high quality holder/support for use with manual glass capillary viscometers.

Main Characteristics

- ▶ Insulated handle, easy to grab at high working temperatures
- ▶ Stainless steel
- ▶ Ring to hang out ± 265 mm
- ▶ Smart design prevents viscometer from falling out of holder
- ▶ Viscometer will not move when applying vacuum to the



Viscometer Holders

Viscometers ASTM D446, IP71, BS88, ASTM 2170

P/N 10T6001	Viscometer holder "Ubbelohde"
P/N 10T6040	Viscometer holder "Pinkevitch transparent D446, 269 mm" / VPZH-4
P/N 10T6061	Viscometer holder "Cannon-Fenske Routine"
P/N 10T6071	Viscometer holder "Cannon-Fenske Opaque/Reverse Flow"
P/N 10T6321	Viscometer holder "BS/U-tube Transparent/Routine, size A to F"
P/N 10T6322	Viscometer holder "BS/U-tube Transparent/Routine, size G to H"
P/N 10T6051	Viscometer holder "BS/IP/RF U-Tube Opaque"
P/N 10T6323	Viscometer Holder "BS/IP/SL"
P/N 10T6324	Viscometer Holder "BS/IP/SL(S)"
P/N 10T6325	Viscometer Holder "BS/U/M"
P/N 10T6326	Viscometer Holder "BS/IP/MSL"
P/N 10T6327	Viscometer Holder "Zeitfuchs Cross Arm"

Russian viscometers

P/N 10T6050	Viscometer holder "Russian Viscometers (ВПЖ-2) like Pinkevitch" (VPZH-2)
P/N 10T6054	Viscometer holder for Russian Viscometer (БЖ) VNZH.

Viscometers ASTM D2171

P/N 10T6052	Viscometer holder "CMVV/AIVV" (adjustable in length)
P/N 10T6053	Viscometer holder "MKVV"

Viscometers ASTM D2162

P/N 10T6035	Viscometer holder "Master Ubbelohde"
P/N 10T6030	Viscometer holder "Master Cannon Fenske"

Viscometer Washer

Designed in order to eliminate hand cleaning of glass capillary viscometers.

Main Characteristics

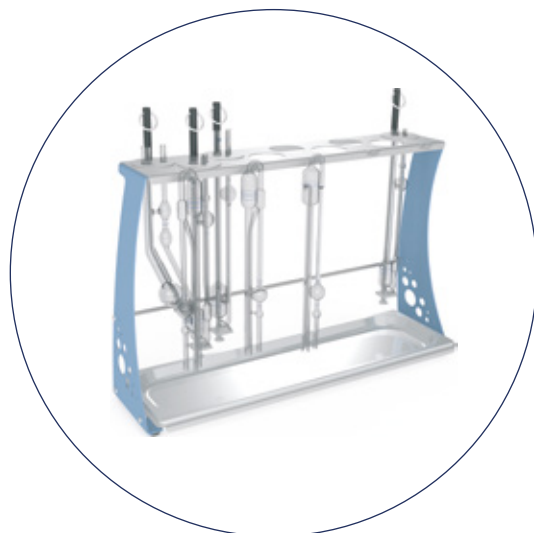
Viscometer washer supplied with six nozzle stoppers. It allows external and internal washing of all types of glass capillary viscometer as mentioned in ASTM D446. We recommend to prewash glass capillary viscometers with Neutralene VG2020 solvent. Eliminate further hand cleaning with the use of toluene as cleaning solvent. Glass capillary viscometers are suspended in Biosane solvent vapours at 80°C. Very fast cleaning (5 to 15 min) for six glass capillary viscometers and negligible solvent consumption.

- ▶ **P/N 31T0550** Model VTW-classic (230V/50-60Hz) (115V/60Hz on request)
- ▶ **P/N 31T0555** Neutralene VG2020 (per can of 20L)
- ▶ **P/N TLC10-3 00T0050** (230V/50Hz) **P/N 00T0051** (230V/60Hz) **P/N 00T0052** (115V/60Hz) to condensate vapour.

For use on	AC 230V/50-60 Hz – 16A
Width	400 mm
Depth	400 mm
Height	1000 mm
Weight	± 30 kg



Viscowasher



Viscohanger

Viscohanger

A nine position hanger for use with manual glass capillary viscometers and holders. The unit facilitates safe, easy storage of glass capillary viscometers once taken from a viscometer bath prior to cleaning. The detachable drip tray collects residual bath fluid and allows easy disposal to waste. It also has five hooks to hang the glass capillary viscometer upside-down.

Main Characteristics

- ▶ Made from stainless steel to aid chemical resistance
 - ▶ Space saving footprint
 - ▶ Easy to clean
 - ▶ Nine openings (Ø 51 mm) to hang viscometers in their holder
 - ▶ Five hooks to hang glass capillary viscometers upside-down
- ▶ **P/N 10T6066**



8 Channel Stopwatch

Timer to measure the time for a volume of liquid to flow under gravity through a calibrated glass capillary viscometer. The apparatus contains eight individual stopwatches. Each stopwatch operates by pressing a single button to run, stop or reset. Auto power-off when no stopwatches are running. After power-off individual values are kept in memory. All values can be reset together at the same timer or per individual channel.

Main Characteristics

- ▶ Eight individual channels
 - ▶ Easy to use
 - ▶ Long battery life
 - ▶ Uses simple 9V block (battery included)
 - ▶ 0.01 sec. resolution
 - ▶ Outer dimension 195 x 112 x 46 mm (L x W x H)
-
- ▶ **P/N 10T6090** 8 channel stopwatch
 - ▶ **P/N 10T6091** ISO 17025 verification conform ASTM D445 for 8 channel stopwatch (P/N 10T6090)



8 Channel stop-watch

Illuminator

Backlight illuminator for visibility baths.

References

- ▶ **P/N 00T0909** Stand alone Z41 illuminator (85~230V/50-60Hz)
- ▶ **P/N 00T0908** Back panel with LED light for TV2000MKII and TV4000MKII (85~230V/50-60Hz)
- ▶ **P/N 00T0907** Back panel with LED light for TV7000DC and TV7000LT (85~230V/50-60Hz)



Z41 Standalone & Z41 Backpanel





General Purpose Viscosity Reference Standards

ISO 17025 and ISO Guide 34 certified viscosity standards are for the calibration and verification of glass capillary viscometers and other viscosity measuring equipment where operating temperature is controlled precisely.

Main Characteristics

- ▶ Certified to ISO 17025 Quality System.
- ▶ Manufactured in accordance with ASTM D2162.
- ▶ Density g/mL in accordance with ASTM D1480.
- ▶ Kinematic (mm²/s) & dynamic viscosity (mPa.s) given at all temperatures.
- ▶ Standard pack size 500 mL.
- ▶ Fully traceable to national standards.
- ▶ Ensures full compliance to ASTM & IP test method protocol.
- ▶ Tamper evident security packaging.
- ▶ Two year shelf life.



Reference standard

REFERENCE number	Viscosity standard	VISCOSITY STANDARDS (Flask of 500 mL) - with ISO 17025 certificate						
		Approximate Kinematic Viscosity in mm ² /s (Centistokes)						
		20°C	25°C	40°C	50°C	60°C	80°C	100°C
25T0726*	N0.4	0.4693	0.4497	0.3982	-	-	-	-
25T0727*	N0.8	0.7412	0.7024	0.6045	-	-	-	-
25T0728*	N1.0	1.292	1.203	0.9908	0.8826	-	-	-
25T0729	N2	2.886	2.604	1.981	1.688	1.461	-	-
25T0700	S3	4.527	3.999	2.885	2.392	2.022	1.511	1.184
25T0708	D5	6.553	5.677	3.893	3.142	2.598	1.876	1.433
25T0701	S6	10.46	8.872	5.781	4.538	3.663	2.548	1.891
25T0710	N7.5	12.38	10.49	6.787	5.300	4.253	2.924	2.149
25T0709	D10	14.57	12.15	7.579	5.810	4.597	3.100	2.249
25T0730	N10	20.72	16.92	10.01	7.473	5.780	3.758	2.656
25T0738	N14	30.30	24.46	14.03	10.28	7.812	4.939	3.413
25T0702	S20	42.78	33.72	18.19	12.90	9.545	5.785	3.882
25T0715	N26	60.96	48.99	27.45	19.75	14.74	8.992	6.018
25T0731	N35	85.45	65.30	32.42	21.93	15.75	8.833	5.633
25T0716	N44	111.2	86.38	44.20	30.15	21.46	12.10	7.613
25T0703	S60	158.8	117.9	54.29	35.16	24.04	12.81	7.786
25T0717	N75	196.6	150.4	73.73	49.01	34.08	18.41	11.18
25T0732	N100	330.2	238.4	101.6	62.90	41.31	20.59	11.89
25T0741	N140	408.7	304.8	140.1	89.71	60.31	30.82	17.91
25T0704	S200	649.1	457.5	183.0	109.1	69.24	32.58	17.99
25T0742	N250	794.9	581.3	253.5	157.5	103.0	50.11	27.95
25T0711	D500	817.8	573.3	224.7	132.2	82.92	38.19	20.71
25T0733	N350	1179	818.4	312.1	180.5	111.3	49.79	26.33
25T0740	N415	1369	988.1	415.7	253.1	162.5	76.56	41.52
25T0713	D1000	1640	1132	421.8	240.3	146.2	63.64	32.88
25T0705	S600	2219	1498	528.5	292.2	173.2	72.37	36.34
25T0743	N750	2807	1961	757.1	438.2	269.0	117.4	60.00
25T0734	N1000	4427	2952	1003	540.3	311.9	124.0	59.52
25T0744	N1400	5806	3941	1401	772.5	454.2	184.1	88.60
25T0706	S2000	8089	5303	1706	886.9	494.9	184.9	84.26
25T0714	D5000	10380	6729	2100	1073	589.4	214.4	95.45
25T0712	N2500	11431	7576	2507	1317	739.7	276.3	124.5
25T0736	D7500	12521	8282	2725	1424	794.8	293.0	130.7
25T0735	N4000	16881	10950	3420	1735	945.8	336.0	145.9
25T0718	N5100	27783	17622	5172	2528	1330	444.1	183.2
25T0707	S8000	37546	23680	6846	3310	1722	561.8	226.6
25T0719	N10200	58149	36421	10268	4896	2507	791.5	308.8
25T0737	N15000	74610	46603	13014	6162	3123	972.3	373.1
25T0721	N18000	106285	65942	18077	8447	4235	1280	477.3
25T0722	S30000	137816	85532	23398	10902	5452	1638	604.2
25T0746	N62000	-	-	55000	25000	-	4000	1500
25T0745	N130000	-	-	150000	75000	-	15000	4000

Nominal Values

▶ FOR ALL OTHER VISCOSITY STANDARDS, TBN/TAN STANDARDS, CERTIFIED REFERENCE MATERIALS AND OTHER REFERENCE STANDARDS, PLEASE VISIT OUR WEBSITE WWW.TAMSON.COM



4.3 ASTM Thermometers

Tamson is supplying alternative precision thermometers, manufactured as per latest specifications of ASTM E2251 (standard specification for liquid-in-glass ASTM thermometers with low-hazard precision liquids); for the temperature range from -50°C up to 250°C; fine subdivision up to 0.01°C; all instruments are for government calibration. The thermometers with a 'B' in the part number have the following characteristics: white backed, round or prismatic, with blue special filling, non-wetting because of capillary tube specially coated inside, durable pigment, round top finish, in transparent square plastic case. When a 'G' or 'T' is used in the part number, the thermometer is filled with gallium or toluene. All thermometers mentioned in the table below are low hazardous to ship. Thermometers are supplied with a conformity certificate. A works certificate or ISO 17025 verification certificate are on request.

	P/N Cat.	Range		
1 C	25T0901B	-20 à +150	1	76
2 C	25T0902G	-5 à +300	1	76
3 C	25T0903G	-5 à +400	1	76
S5 C	25T0904B	-38 à +50	1	108
6 C	25T0905T	-80 à +20	1	76
7 C	25T0906G	-2 à +300	1	Total
8 C	25T0907G	-2 à +400	1	Total
9 C	25T0908B	-5 à +110	0.5	57
10 C	25T0909G	+90 à +370	2	57
11 C	25T0910G	-6 à +400	2	25
S12 C	25T0911B	-10 à +102	0.2	Total
13 C	25T0912B	+155 à +170	.5	Total
14 C	25T0913B	+38 à +82	0.1	79
S15 C	25T0914B	-2 à +80	0.2	Total
16 C	25T0915B	+30 à +200	0.5	Total
17 C	25T0916B	+19 à +27	0.1	Total
18 C	25T0917B	+34 à +42	0.1	Total
19 C	25T0918B	+49 à +57	0.1	Total
20 C	25T0919B	+57 à +65	0.1	Total
21 C	25T0920B	+79 à +87	0.1	Total
S22 C	25T0921B	+95 à +103	0.1	Total
23 C	25T0922B	+18 à +28	0.2	90
24 C	25T0923B	+39 à +54	0.2	90
25 C	25T0924B	+95 à +105	0.2	90
26 C	25T0925B	+130 à +140	0.1	Total
33 C	25T0927B	-38 à +42	0.2	50
34 C	25T0928B	+25 à +105	0.5	50
35 C	25T0929B	+90 à +170	0.2	51
36 C	25T0930B	-2 à +68	0.2	45
38 C	25T0931B	+24 à +78	0.2	100
39 C	25T0933B	+48 à +102	0.2	100
40 C	25T0932B	+72 à +126	0.2	100
41 C	25T0934B	+98 à +152	0.2	100
42 C	25T0935G	+95 à 255	0.5	100
44 C	25T0937B	+18.5 à +21.5	0.05	Total
45 C	25T0938B	+23.6 à +26.4	0.05	Total
46 C	25T0939B	+48.6 à +51.4	0.05	Total
47 C	25T0940B	+58.6 à +61.5	0.05	Total
49 C	25T0941B	+20 à +70	0.2	65
52 C	25T0942B	-10 à +5	0.1	Total
54 C	25T0943B	+20 à +100.6	0.2	Total
S56 C	25T0956B	+19 à +35	0.02	Total
57 C	25T0944B	-20 à +50	0.5	57
61 C	25T0946B	+32 à +127	0.2	79
S62 C	25T0947B	-38 à +2	0.1	Total

	P/N Cat.	Range	Subd	
S63 C	25T0948B	+8 à +32	0.1	Total
S64 C	25T0949B	+25 à +55	0.1	Total
S65 C	25T0950B	+50 à +80	0.1	Total
S67C	25T0952B	+95 à +155	0.2	Total
68 C	25T0953G	+145 à +205	0.2	Total
71 C	25T0955B	-37 à +21	0.5	76
73 C	25T0957B	-41.4 à +38.6	0.05	Total
82 C	25T0958B	-15 à +105	1	30
83 C	25T0959B	+15 à +70	1	40
84 C	25T0960B	+25 à +80	1	249
85 C	25T0961B	+40 à +150	1	181
86 C	25T0962B	+95 à +175	1	35
87 C	25T0963G	+150 à +205	1	40
88 C	25T0964G	+10 à +200	1	57
89 C	25T0965B	-20 à +10	0.1	76
90 C	25T0966B	0 à +30	0.1	76
S91 C	25T0967B	+20 à +50	0.1	76
92 C	25T0968B	+40 à +70	0.1	76
93 C	25T0969B	+60 à 90	0.1	76
94 C	25T0970B	+80 à +110	0.1	76
95 C	25T0971B	+100 à +130	0.1	76
96 C	25T0972B	+120 à +150	0.1	76
98 C	25T0973B	+16 à +82	0.5	Total
99 C	25T0974B	-48 à +4	0.2	35
102 C	25T0975B	+123 à +177	0.2	100
103 C	25T0976G	+148 à +202	0.2	100
104 C	25T0977G	+173 à +227	0.2	100
105 C	25T0978G	+198 à +252	0.2	100
106 C	25T0979G	+223 à +277	0.2	100
107 C	25T0980G	+248 à +302	0.2	100
110 C	25T0981B	+133.6à+136.4	0.05	Total
111 C	25T0982G	+170 à +250	0.2	100
112 C	25T0983B	+4 à +6	0.02	Total
113 C	25T0984B	-1 à +175	0.5	Total
114 C	25T0985T	-80 à +20	0.5	Total
S116 C	25T0986B	+18.9 à +25.1	0.01	Total
S117 C	25T0987B	+23.9 à +30.1	0.01	Total
118 C	25T0988B	+28.6 à +31.4	0.05	Total
119 C	25T0989B	-38 à +30	0.1	100
S120 C	25T0990B	+38.5 à +41.5	0.05	Total
121 C	25T0991B	+98.5 à +101.5	0.05	Total
122 C	25T0992B	-45 à -35	0.1	Total
126 C	25T0993B	-27.4 à -24.6	0.05	Total
127 C	25T0995B	-21.4 à -18.6	0.05	Total
128 C	25T0994B	-1.4 à +1.4	0.05	Total

- ▶ **P/N 00T0239** Thermometer holder 330 x 10 mm
- ▶ **P/N 25T2154** Thermometer holder 425 x 10 mm
- ▶ **For our digital contact thermometer, conforming to ASTM E20, please see section 5.2**



4.4 Bath Fluids

To replace water as a bath fluid. Viscosity, volatility and other properties that change with temperature affect the performance of fluids in controlled baths and circulators. Tamson has tested and used each of the fluids we sell, over the ranges recommended in the following table, each fluid remains at a low enough viscosity to be adequately pumped or stirred. Whether your application is industrial or critical lab calibration work, Tamson fluids give you top performance and stability.



Can with 20L of mineral oil

Main Characteristics

Type	Remarks	Life			Viscosity [mm ² /s] ^x				Temp. Range	Package
		150°C	200°C	250°C	80°C	100°C	150°C	200°C		
Mineral	T150 Yellow Mineral oil	1/2 yr	X	X	3	2.2	1.8		80..150°C	20 ltrs
Silicon	200-10 Transparent Dimethyl siloxane polymer	No limit	200hrs	<10hrs	4	3.5	2.5		20..150°C	20 ltrs
Silicon	200-50 Transparent Dimethyl siloxane polymer	No limit	200hrs	<10hrs	20	15	9		80..150°C	20 ltrs
Silicon	Silicon 210 Dark Dimethyl poly siloxane	No limit	<2yrs	<1yr	(35)	30	22	12	80..250°C	20 ltrs
Silicon	Silicon 550 Colourless Polyphenyl methyl dimethyl siloxane	No limit	<1yr	<1200 hrs	(50)	20	12	5	80..250°C	20 ltrs

- ▶ **P/N 00T0220** Tamson mineral oil T150 20 L (80..150°C/176..302°F)
- ▶ **P/N 08T0001** Silicon 200-10 mm²/s 20 L Transparent (20..150°C/ 68..302°F)
- ▶ **P/N 00T0226** Silicon 200-50 mm²/s -20 L Transparent (80..150°C/176..302°F)
- ▶ **P/N 00T0229** Silicon 200-100 mm²/s - 20 L Transparent (80..150°C/176..302°F)
- ▶ **P/N 00T0231** Silicon 210-20 ltrs Darkish (80..250°C/176..482°F)
- ▶ **P/N 00T0238** Silicon 550-20 ltrs Transparent (80..250°C/176..482°F)



4.5 TT3B Benchtop Thermometer

The TT3B thermometer is a benchtop thermometer that can be used to verify the bath temperature or to calibrate probes, thermometer, instruments, indicator or temperature measurements of baths.

Main Characteristics

This thermometer is referred to as a Resistive Contact Thermometer (RCT) or Resistive Thermometer Device (RTD). The TT3B thermometer uses a six points ITS 90 calibration. The display provides a three decimal reading (0.001°C) and an accuracy of $\pm 0.01^\circ\text{C}$ on request over the full scale. The thermometer has a thin stainless steel probe which ensures a very fast temperature response. The probe has low thermal mass which prevents temperature changes slowing down thus not influencing the measurement. This prevents significant measurement error caused by a slow measurement response.

The thermometer consists of a stainless steel PT100 probe, a small electronic circuit board which is placed in a plastic (HIPS) housing. The PT100 probe is thermally insulated from this housing using a PTFE ring. The electronics are powered via USB cable. The probe is designed to accommodate a wide range of voltages and frequencies (85-260V/50~60Hz). The probe is factory calibrated and a calibration certificate comes standard with the thermometer and is traceable to an ISO 17025 certified laboratory. The calibration certificate offers at least 5 calibration points over the full range.

The thermometer can be connected to an USB connector. Together with the TamCom software, logged sessions can be shown and saved on the PC.



TT3B

Range	-40 .. + 140°C/-40..302°F
Reading	°C or °F menu selectable
Interface	USB
Resolution	0.001°C
Accuracy	Up to $\pm 0.01^\circ\text{C}$ on request
Linearity	$\pm 0.01^\circ\text{C}$
Drift annual	$\pm 0.001^\circ\text{C}$
Response T_{63}	< 3 sec
Power	9V mains adapter

► **TT3B P/N** 10T6094



Test & Measurement
Instruments



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ENERGY TESTING