

### Master Viscometers and Viscosity Oil Standards

ASTM D2162



- ⊕ Ultra-stable  $\pm 0.005^{\circ}\text{C}$
- ⊕ Integrated cooling
- ⊕ Stainless steel bath
- ⊕ Heated window
- ⊕ RS232 communication
- ⊕  $0.001^{\circ}\text{C}$  readout

#### General

This thermostatic bath is specially designed for tests that require ultra-precise temperature control, or processes that need to be followed visually. The TV16000 conforms to ASTM D2162: primary basic calibration of master viscometers and viscosity oil standards.

#### Construction

The stainless steel construction ensures an exceptional stable bath temperature which further is improved by an ingenious stirring mechanism with baffle plates. All wetted parts are made of stainless steel. This provides resistance against all usual bath fluids. The bath is fitted with four wheels, two of them having brakes. The cover of the bath is on request and has to be ordered separately. There's a wide range of possibilities such as round  $\varnothing 51$  mm openings,  $\varnothing 61$  mm openings, the use of a leveling platform or other square or round openings with other dimensions. A bath overflow outlet protects against overflow when bath fluid expands or raises due to submersion of parts.

Item	Unit	TV16000
P/N 230V/50Hz		00T0490
P/N 115V/60Hz		00T0492
P/N 230V/60Hz		00T0495
Power	[kW]	3
Range	[ $^{\circ}\text{C}$ ]	10 .. 60
Reading		$^{\circ}\text{C}$ or $^{\circ}\text{F}$
Setting	[ $^{\circ}\text{C}$ ]	0.001
Stability $\pm$	[ $^{\circ}\text{C}$ ]	< 0.005
Uniformity $\pm$	[ $^{\circ}\text{C}$ ]	< 0.005
Heating	[kW]	Control: 1 + Boost: 1.5
Heating total	[kW]	2.5
Bath volume	[L]	160
Bath opening	[mm]	250 x 365
Bath depth	[mm]	965
Length	[mm]	575
Width	[mm]	575
Height	[mm]	1700
Weight	[kg]	135
Materials	Used inside bath: stainless steel 304, brass	
CE	Conforms to CE regulation	

#### Agitation

A vane type stirrer with maintenance free bearings moves the bath fluid past a special heater ensuring optimal bath temperature control and ensuring excellent uniformity inside the TV16000.

#### Span

Span lies from  $10^{\circ}\text{C}$  up to  $+ 60^{\circ}\text{C}$  ( $50^{\circ}\text{F}$  /  $140^{\circ}\text{F}$ ).

#### Safety

The bath conforms to CE regulation. Further the bath is equipped with a mechanical over temperature device which trips when in case of malfunction the bath exceeds the preset maximum temperature. This feature guarantees safe around the clock operation.

#### Optional

The system overall accuracy is within  $\pm 0.005^{\circ}\text{C}$  based on measurement with water as bath fluid. This value is a min/max recorded over one hour. Standard deviation is better than  $\pm 0.002^{\circ}\text{C}$  under these conditions.

### Master Viscometers and Viscosity Oil Standards

ASTM D2162

#### Fine adjustment and offset

After the temperature control is stable, the offset can be adjusted in the range of  $-5.00^{\circ}\text{C}$  to  $+5.00^{\circ}\text{C}$ , if necessary. The temperature can be set in  $0.001^{\circ}\text{C}$  resolution. A special offset offers  $\pm 0.005^{\circ}\text{C}$  resulting in setting of the set point temperature in  $\pm 0.005^{\circ}\text{C}$ .

#### Ambient condition

For proper cooling performance ambient temperature needs to be within the range of  $18 \dots 23^{\circ}\text{C}$ .

#### Heating / cooling rate

Heating rate  $12^{\circ}\text{C}/\text{hour}$   
Cooling rate  $2.2^{\circ}\text{C}/\text{hour}$

#### Accuracy of control

Stability min / max over one hour measured in water, please see graphs on the next page

**@10 °C**

min / max  $\pm 0.005^{\circ}\text{C}$

Standard deviation  $\pm 0.0019^{\circ}\text{C}$

**@20 °C**

min / max  $\pm 0.003^{\circ}\text{C}$

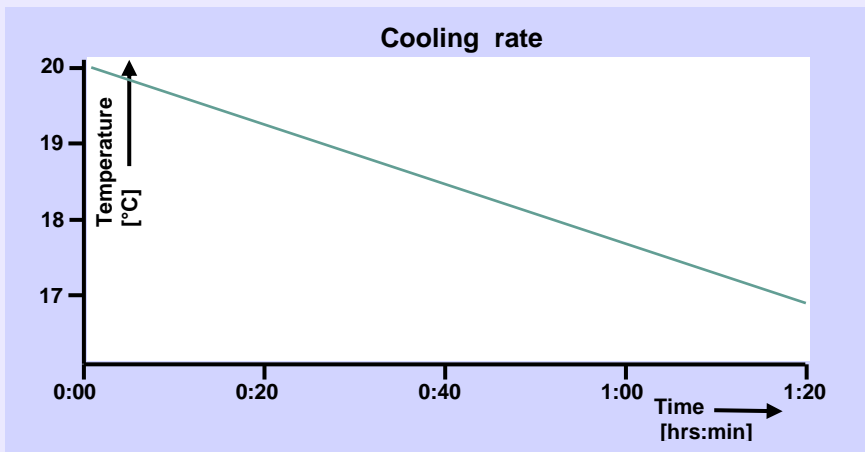
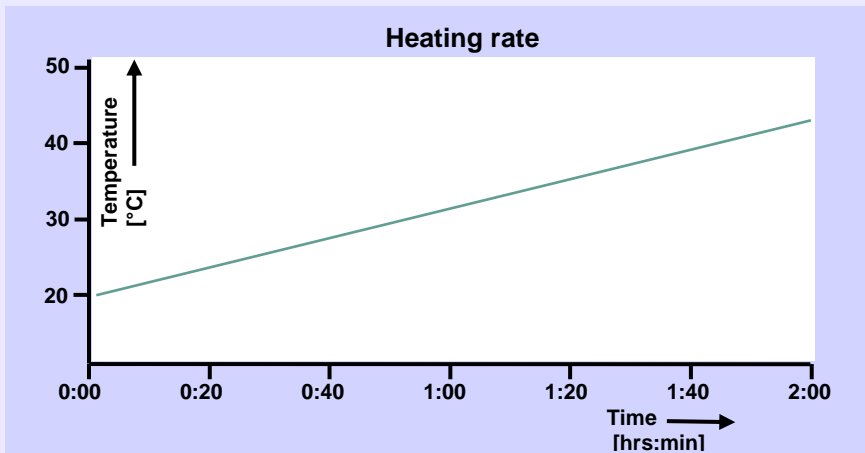
Standard deviation  $\pm 0.0013^{\circ}\text{C}$

**@40 °C**

min / max  $\pm 0.003^{\circ}\text{C}$

Standard deviation  $\pm 0.0013^{\circ}\text{C}$

Homogeneity  $\pm 0.003^{\circ}\text{C}$



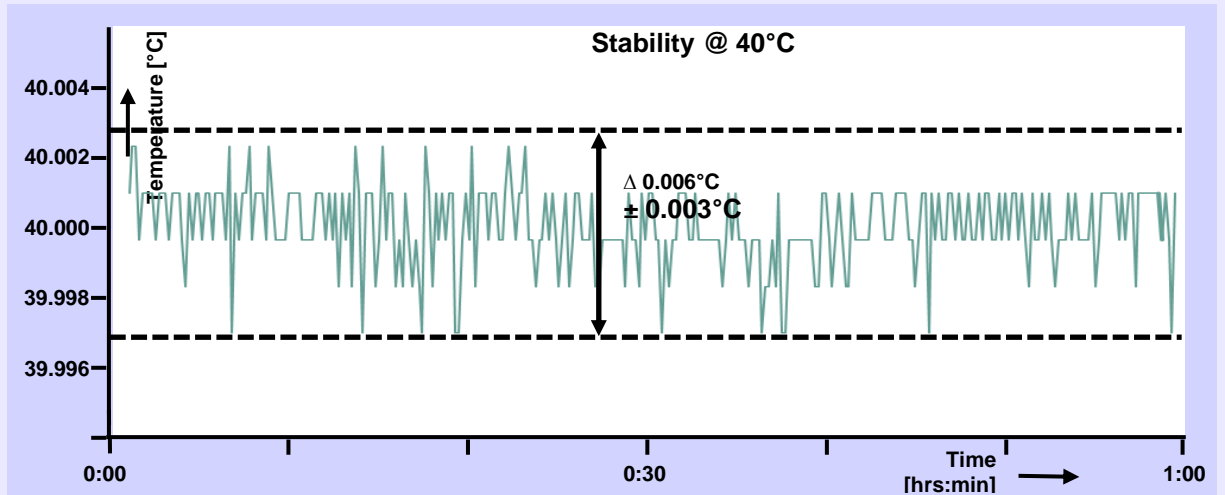
D2162

### Master Viscometers and Viscosity Oil Standards

#### ASTM D2162

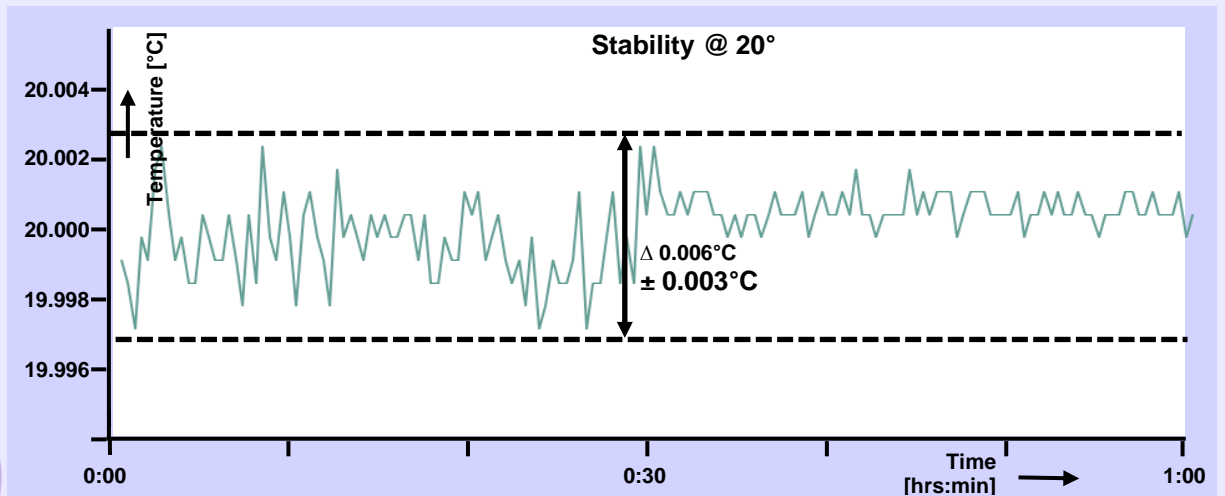
@40 °C

Min / max  $\pm 0.003$  °C  
 Standard deviation  $\pm 0.0013$  °C



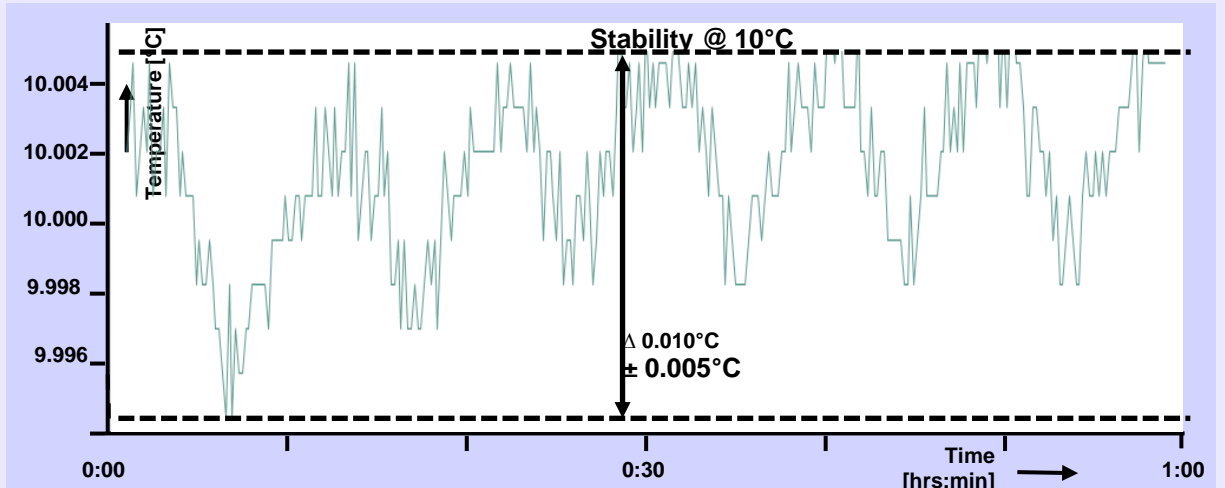
@20 °C

Min / max  $\pm 0.003$  °C  
 Standard deviation  $\pm 0.0013$  °C



@10 °C

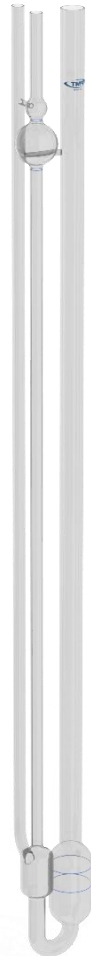


Min / max  $\pm 0.005$  °C  
 Standard deviation  $\pm 0.0019$  °C



D2162




### Master Viscometers and Viscosity Oil Standards

ASTM D2162

P/N	Picture	Description
25T0581P		Master Ubbelohde viscometer ISO 17025 calibrated under UKAS size 0
25T0582P		Master Ubbelohde viscometer ISO 17025 calibrated under UKAS size 0B
25T0583P		Master Ubbelohde viscometer ISO 17025 calibrated under UKAS size 0C
25T0584P		Master Ubbelohde viscometer ISO 17025 calibrated under UKAS size 1
25T0585P		Master Ubbelohde viscometer ISO 17025 calibrated under UKAS size 1B
25T0586P		Master Ubbelohde viscometer ISO 17025 calibrated under UKAS size 1C
25T0587P		Master Ubbelohde viscometer ISO 17025 calibrated under UKAS size 2
25T0588P		Master Ubbelohde viscometer ISO 17025 calibrated under UKAS size 2B
25T0589P		Master Ubbelohde viscometer ISO 17025 calibrated under UKAS size 2C
25T0590P		Master Ubbelohde viscometer ISO 17025 calibrated under UKAS size 3
25T0591P		Master Ubbelohde viscometer ISO 17025 calibrated under UKAS size 3B
25T0592P		Master Ubbelohde viscometer ISO 17025 calibrated under UKAS size 3C
25T0593P		Master Ubbelohde viscometer ISO 17025 calibrated under UKAS size 4
25T0594P		Master Ubbelohde viscometer ISO 17025 calibrated under UKAS size 4B
25T0595P		Master Ubbelohde viscometer ISO 17025 calibrated under UKAS size 4C
25T0596P		Master Ubbelohde viscometer ISO 17025 calibrated under UKAS size 5
10T6035		Viscometer holder Master Ubbelohde
10T6030		Viscometer holder Master Cannon Fenske
On request		Uncalibrated master viscometers either Cannon Fenske or Ubbelohde.

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ASTM D2162

TV16000 accessories – options		
P/N	Picture	Description
On request		Top lid closed
On request		Top lid ø51 mm openings
On request		Top lid ø61 mm openings

Alternative set-up TV7000DC + TLC15-5 with range from +15°C to +230°C and a temperature stability of  $\pm 0.007^\circ\text{C}$ . For further information about the TV7000DC, please see specification sheet "TV7000DC".



# D2162