



Temperature control equipment for viscosity measurements for viscometers “ST-2020” and “STS-2011”

The influence of temperature while measuring viscosity is considerable, lower temperatures increase viscosity. Therefore it is indispensable to control temperature when precise viscosity measurements are required. The control of temperature by using a thermostatically controlled bath is the most efficient, because of the re-circulation of liquid produces a rapid and stable temperature. We recommend our range of immersion thermostats for this application.

TEMPERATURE CONTROL AND CONFIGURATION FOR VISCOSITY MEASUREMENTS:

FRIGITERM-TFT-10 Part No. **3000546**, **FRIGITERM-TFT-30** Part No. **3000547** Suitable for below ambient working environments (see page 101 for specifications).

For temperatures above ambient see the **DIGITERM-S-150** Part No. **3000543**, or **DIGITEM-TFT-200** Part No. **3000544** complete with 12 litre tank Part No **6000391**, (see pages 98 and 100 for specifications).

An adapter kit for the thermostat bath is required:

Part No. **1001625** for STS-2011

Part No. **1001626** for ST-2020

Adapter for thermostat bath comprising of an extension spindle and 4 leg adjusters for the bath. (Kit can be fitted by the user.)

This kit adjusts the bath measuring height to enable samples to be placed inside.

Part No. **1001627**. Support for 2 500 ml beakers, to be placed inside the bath (**only for bucket 6000391**).

Part No. **1001628** Support base for the **DIGITERM** immersion thermostats. This accessory is recommended to close the bath and maintain a constant temperature.

CONSTANT TEMPERATURE CONTROL ACCESSORY FOR SMALL SAMPLE VOLUME ADAPTERS. USE WITH THE RE-CIRCULATING JACKET ACCESSORIES. PART NO. 1000996

To work below ambient temperatures, we recommend the use of the **FRIGITERM-TFT-10** Part No. **3000546**, or **FRIGITERM-TFT-30** Part No. **3000547** (see page 101 for specifications).

For temperatures above ambient see the **DIGITERM-S-150** Part No. **3000543**, or **DIGITEM-TFT-200** Part No. **3000544** complete with 12 litre tank Part No. **6000391**, (see pages 98 and 100 for specifications).

It is necessary to configure the immersion thermostats for “external re-circulation.” The Bath adapter kit is not required.



Frigiterm thermostat bath with adapter kit Part No. 1001625, fitted with a rotary viscometer.



Support for 2 beakers 1001627

Digiterm thermostat bath with support base Part No. 1001628. 12 litre bath Part No. 6000391 and adapter kit Part No. 1001625 or 1001626 To be used with a rotary viscometer and beaker support Part No. 1001627.



Immersion thermostat Digiterm controlling temperature of viscometer.

COMECTA Rotary Viscometer “NDJ-1”

APPLICATIONS

The instrument operates by rotating a disk or cylinder, (spindle), that is submerged in the liquid or fluid to be analysed. A pre-selected speed is set, the unit measures the absolute resistance from viscosity of the fluid being analysed. Suitable for samples such as: foods, cosmetics, fats and oils, pharmaceutical products, paints and plastics, etc.

FEATURES

The asynchronous motor is connected to a graduated disk with 4 different speeds that propel the spindle via a spiral and die.

Supplied complete with a set of 4 spindles in a box, numbered 1 to 4 with spindle stand.

The viscometer includes a level and adjustable screw feet support base and protective case.

MODEL	Part No.	Measuring range	Tolerance	Spindle Speed r.p.m. for 1 to 4	Power W	Weight Kg
NDJ-1	5120230	10-100.000 mPaS	±5% Liquid Newtons	6 - 12 - 30 - 60	15	6





Ford cup thermostat for viscosity measurement "TV-1452"

CUP MODELS THAT CONFORM TO THE FOLLOWING STANDARDS: DIN 53211, ISO 2431 AND ASTM 1200.
ELECTRONIC DIGITAL CONTROL FROM 10°C TO 60°C.

Heating and cooling by Peltier effect

APPLICATIONS

Thermostat Ford cups for viscosity measurement need to be maintained at a precise temperature of 10 and 60 °C.

FEATURES

Made up of an independent Peltier thermostat control system that heats and cools. Made from AISI 304 stainless steel, with adjustable levelling feet supports, and central orifice for locating the cup.

CONTROL PANEL

Illuminate ON/OFF switch
Digital temperature display
Key pad to select readout and temperature.



MODEL

Part No.	Temperature °C	Stability °C	Homogeneity °C	Read error	Resolution	Height / Width / Depth cm	Power W	Weight Kg
3001452	10 to 60 °C	±0.1	±0.2	±0.5	0.1	23 34 30	130	5

See the different standards, models and cups (see page 289.)



Viscometer Precision Bath "VB-1423"

FOR CONTROLLABLE TEMPERATURES FROM AMB.+5 °C TO 100 °C.
STABILITY ±0.1 °C. HOMOGENEITY ±0.1 °C. READING ERROR ±0.09 °C. RESOLUTION 0.1 °C.

SAFETY:

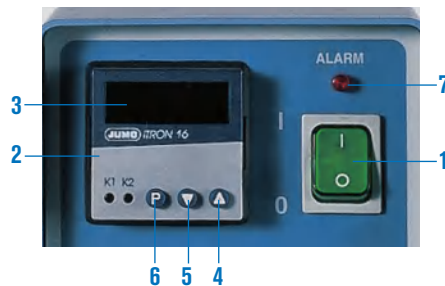
STANDARD DIN 12879.2 CONTROLLABLE SAFETY THERMOSTAT WITH MANUAL RESET.

FEATURES

Temperature sensor Pt100 thermo-resistor, stainless steel AISI 304 lid with three viscometer locations ports, three independent lids and an additional location port for the control thermometer. The main body of the bath is made of a 20 litre borosilicate glass tank. A white plate is located at the back to help optimise and read the viscometers.

CONTROL PANEL

1. Mains power illuminated switch.
2. Temperature regulator:
 3. Real time temperature display.
 4. Push button to increase value.
 5. Push button to decrease value.
 6. Push button to configure operation.
7. Safety thermostat safety lamp.



Used for measurements with glass viscometers

Made for the calibration of viscometers according to the following standards UNE 400313, ISO 3105, ASTM D 445 and 2515

MODEL

Part No.	Control range °C	Capacity litres	Height / Ø (tank) cm	Height / Ø (total) cm	Power W	Weight Kg
3001423	amb.+5 up to 100	20	32 30	47 30	1000	8



ACCESSORIES

Universal viscometer support made from PTFE with stainless steel AISI 304 support.

Suitable for the following viscometers :

- Cannon-Fenske for transparent liquids.
- Cannon-Fenske for opaque liquids.
- Ubbelohde.
- Ostwald.
- BS U Tube.
- Cannon-Manning semi-micro.



- Ubbelohde type BS/IP/SL, BS/IP/SL(S) & type BS/IP/MSL.
- DIN Ubbelohde.

Part No. **1001453**

Calibration Chronometers (see page 295).

Thermometers for viscometer baths.

Part No.

- 1001454** Thermometer ASTM 120C at 38.6 to 41.4°C divisions 0.05 °C.
- 1001455** Thermometer ASTM 121C at 98.6 to 101.4 °C divisions 0.05 °C.
- 1001456** Thermometer ASTM 91C at 20.0 to 50.0 °C divisions 0.1 °C.
- 1001457** Thermometer ASTM 92C at 40.0 to 70.0 °C divisions 0.1 °C.
- 1001458** Thermometer ASTM 93C at 60.0 to 90.0 °C divisions 0.1 °C.
- 1001459** Thermometer ASTM 94C at 80.0 to 110.0 °C divisions 0.1 °C.



Rotary Viscometers

Rotary viscosimeters "ST-2020"

INTRODUCTION

Rheology is the study of the effects experimented in a substance when a mechanical force is applied on it (flow and deformation) under different external conditions. It is used to describe the consistency of different products and is normally defined by the components: **viscosity and elasticity**.

Measuring viscosity is determined by the tangible force required to displace the materials particles with a specific deformation-flow i.e. velocity. The relationship between the tangible force and the deformation flow obtains the viscosity result. Ambient conditions such as temperature and pressure also have an effect on viscosity.

The measurement of viscosity is not just limited to the research laboratory, it has progressively entered the field of industrial quality control.

PRINCIPLES OF VISCOSITY

These instruments operate by means of a cylinder or disk (spindle) that is submerged into the material to be analysed and by measuring the resistance of the substance at a selected known speed. This resistance results in the measurement of the viscosity according to the flow characteristics of the reference spindle; the instrument calculates the result and directly displays the viscosity that is reported in **cP (CGS)** or **mPa-s (SI)**.

A wide range of viscosity can be measured using viscometers that are equipped with different types of spindles and speed ranges. The design of the spindles and the principals of measurement principles are regulated by **ISO 2555** and **ISO 1652** standards. All spindles are made of AISI 316 stainless steel. Each spindle can be identified by a letter and a number.

SELECTION TABLE

Standard measuring range of the viscometers, without additional accessories

Part no	1001616	1001617
Model	ST-2020 L	ST-2020 R
Units	centiPoise (cP)	centiPoise (cP)
Standard spindle	L1 to L4	R2 to R7
Speed range r.p.m.	1 to 60	0,1 to 100
Measuring range	20 to 600.000 cP	20 to 40.000.000 cP
Temperature range °C	0,0 to 100,0	0,0 to 100,0
Power requirement	115/230V to 12VDC 1.2A	115/230V to 12VDC 1.2A
Power	15 W	15 W
Weight	5 Kg	5 Kg

FEATURES

L.C.D. display of parameters and results:

- Selected speed r.p.m.
- Selected spindle. S.P.
- Viscosity result cP (mPa-s) or cSt.
- Base scale percentage %.
- Sample temperature: °C or °F.

Auto alarm in the case of any fault being detected.

Off scale detection and indication by an audible and visual signal.

Step controlled speed to prevent spindle vibrations.

Velocity from 0,1 to 100 r.p.m.

Mains power surge protection.

RS 232 unidirectional interface, download to a computer.

TECHNICAL DATA

Precision: ±1% base scale.

Repeatability: 0.2%.

Supplied complete with:

- Anti shock carry case.
- Main unit.
- Support base.
- Spindle protector.
- Spindle support.
- Set of spindles (model dependant)
- Temperature probe

DIGITAL THERMOMETER

Temp range:- from 0.0 °C to + 100.0 °C (+ 32.0 °F to + 212.0 °F).

- Resolution: 0.1 °C (0.1722 °F).

- Precision: ± 0.1 °C.



Model ST2020L



ACCESSORIES

Standard **spindles** for L model.

L1 Part No. **1000998**

L2 Part No. **1000999**

L3 Part No. **1001000**

L4 Part No. **1001001**

Standard **spindles** for R model.

R1 Part No. **1000995** (for low viscosity samples)

R2 Part No. **1001030**

R3 Part No. **1001031**

R4 Part No. **1001032**

R5 Part No. **1001033**

R6 Part No. **1001034**

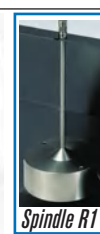
R7 Part No. **1001035**



Rack of standard spindles L1, L2, L3, L4 : Suitable for models L.



Rack of standard spindles R2, R3, R4, R5, R6 and R7: Suitable for model R.



Spindle R1



Wide range rotary viscosimeters "STS-2011"

MODEL WITH TEMPERATURE READOUT AND SHEAR RATE MEASUREMENT AND SHEAR STRESS.

FEATURES

10 different options of language.
 L.C.D. display of parameters and results.
 Parameters display:
 - Selected speed r.p.m.
 - Selected spindle
 - Viscosity result cP (mPa-s) or cSt.
 - Base scale percentage %
 - Sample temperature: °C or °F.
 - Deformation ratio (with special spindle)
 - Torsion force (with special spindles)
 - Density
 (input by the user) g/cm³.
 This instrument determines both relative and absolute viscosity.
 Data can be changed between S.I. and C.G.S.
 Automatically checks for correct operation point by scanning at different speeds.
 Auto alarm in the case of any fault being detected.
 Off scale detection and indication by an audible and visual signal.
 Step controlled speed to prevent spindle vibrations.
 Calibration by the user himself.
 18 preselected speeds from 0.01 a 200 r.p.m.
 The operator can select any speed within this range.
 USB port.

Mains power surge protection.
 10 memoirs of working programs.

TECHNICAL DATA

Temperature range:- from -40 °C to + 300.0 °C
 (- 40.0 °F to + 572.0 °F).
 - Resolution °C: 0.1 °C (0.1722 °F).
 - Precision °C: ± 0.1 °C.
 - Probe type: Pt 100.
 Direct results in cP(mPa-s) or cSt.: models STS-2011 L & R.
 Direct results in Poise (Pa-s) or St.: model STS-2011 H.
 Precision: ±1% base scale.
 Supplied complete with:
 - Anti shock carry case.
 - Main unit.
 - Support base.
 - Spindle protector.
 - Spindle support.
 - Set of spindles (model dependant) (see table).



MODELS	Part No.	Measuring range	Standard spindles	Power requirement	Power W	Weight Kg
STS-2011 L	1001611	20 to 2.000.000 cP	L1, L2, L3, L4	100-240 V 50/60 Hz	25	5
STS-2011 R	1001612	100 to 13.000.000 cP	R2, R3, R4, R5, R6, R7	100-240 V 50/60 Hz	25	5
STS-2011 H	1001613	200 to 106.000.000 cP	R2, R3, R4, R5, R6, R7	100-240 V 50/60 Hz	25	5

ACCESSORIES

Standard spindles for L model.

- L1 Part No. 1001036
- L2 Part No. 1001037
- L3 Part No. 1001038
- L4 Part No. 1001039

Standard spindles for R and H model.

- R1 Part No. 1000990 (for low viscosity samples)
- R2 Part No. 1001070
- R3 Part No. 1001071
- R4 Part No. 1001072
- R5 Part No. 1001073
- R6 Part No. 1001074
- R7 Part No. 1001075

Small sample volume adapters (APM).

Suitable for sample volumes from 6,7 to 13,5 ml.
 Requires the "TL" or "TR" set of spindles.
 Unit suitable for temperatures from 0 °C to +100 °C.
 Part No. 1000987 Small sample adapter APM with water jacket and temperature sensor incorporated.

Special Spindles

Part No. 1001224 set of spindles TL5 - TL6- TL7 for models L.
 Part No. 1001225 set of spindles TR8 - TR9 - TR10 - TR11 for models R and H.

Low viscosity adapters. (LCP).

Required if low viscosity measurements are necessary.
 Reproducible results and measurements of viscosity from 1 cP.
 Suitable for models L and R.
 Sample volume: 16 to 18 ml.
 Includes special spindle LCP.
 Part No. 1000985. Adapter LCP with water jacket.
 Part No. 1001624 Temperature sensor suitable for LCP.

Displacement spiral helix adapter.

Required for low fluidity samples.
 Part No. 1000988



Spindle R1



Part No. 1000985



Part No. 1000986



Part No. 1000988

COMECTA Glass Viscometers

VISCOMETER "UBBELOHDE"

ASTM D445 - ASTM D446 - ISO 3104 - ISO 3105.
 Suitable for transparent liquids.
 Complete with calibration certificate.
 Total length 283 mm.
 Permanent amber markings.

ACCESSORY

Viscometers support rack.
 Part No. 1025812
 Capacity:
 6 viscometers.

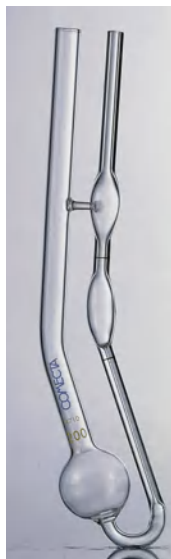


Ubbelohde

Part No.	Size	Nominal constant	Viscosity range in cSt
5600001	0	0.001	0.3 to 1
5600002	0C	0.003	0.6 to 3
5600003	0B	0.005	1 to 5
5600004	1	0.01	2 to 10
5600005	1C	0.03	6 to 30
5600006	1B	0.05	10 to 50
5600007	2	0.1	20 to 100
5600008	2C	0.3	60 to 300
5600009	2B	0.5	100 to 500
5600010	3	1.0	200 to 1000
5600011	3C	3.0	600 to 3000
5600012	3B	5.0	1000 to 5000
5600013	4	10.0	2000 to 10000
5600014	4C	30.0	6000 to 30000

VISCOMETERS "CANNON-FENSKE" TRANSPARENT

ASTM D445 - ASTM D446 - ISO 3104 - ISO 3105 - IP 71.
 Suitable for transparent liquids.
 Complete with calibration certificate.
 Constant at 40 °C to 100 °C.
 Total length 250 mm.
 Permanent amber markings.



Transparent

Part No.	Size	Nominal constant	Viscosity range in cSt
5600050	25	0,002	0,4 a 1,6
5600051	50	0,004	0,8 a 3,2
5600052	75	0,008	1,6 a 6,4
5600053	100	0,015	3 a 15
5600054	150	0,035	7 a 35
5600055	200	0,1	20 a 100
5600056	300	0,25	50 a 200
5600057	350	0,5	100 a 500
5600058	400	1,2	240 a 1200
5600059	450	2,5	500 a 2500
5600060	500	8	1600 a 8000
5600061	600	20	4000 a 20000

VISCOMETERS "CANNON-FENSKE" OPAQUE

ASTM D445 - ASTM D446 - ISO 3104 - ISO 3105.
 Suitable for opaque and transparent liquids.
 Complete with calibration certificate.
 Constant at 40 °C and 100 °C.
 Total length 295 mm.
 Permanent amber markings.



Opaque

Part No.	Size	Nominal constant	Viscosity range in cSt
5600065	25	0,002	0,4 a 1,6
5600066	50	0,004	0,8 a 3,2
5600067	75	0,008	1,6 a 6,4
5600068	100	0,015	3 a 15
5600069	150	0,035	7 a 35
5600070	200	0,1	20 a 100
5600071	300	0,25	50 a 200
5600072	350	0,5	100 a 500
5600073	400	1,2	240 a 1200
5600074	450	2,5	500 a 2500
5600075	500	8	1600 a 8000
5600076	600	20	4000 a 20000

MICRO-UBBELOHDE VISCOMETER 3 ml

Suitable for transparent liquids.
 Calibration certificate.
 Nominal overall length 290 mm.
 Permanent ring marks in amber.
 Sample filling volume: 3 ml.



Micro-Ubbelohde

Code	Size	Nominal constant	Viscosity range in cSt
5600020	I	0,01	0,4 to 6
5600021	Ic	0,03	1,2 to 18
5600022	II	0,1	4 to 60
5600023	IIc	0,3	12 to 180
5600024	III	1,0	40 to 800

“U-TUBE REVERSE FLOW” VISCOMETER BS/IP/RF

Suitable for opaque liquids.
 With calibration certificate at 40 and 100 °C.
 Nominal overall length 275 mm.
 Permanent ring marks in amber.



U-Tube reverse flow

Code	Size	Nominal constant	Viscosity range in cSt
5600025	1	0,003	0,6 to 3
5600026	2	0,01	2 to 10
5600027	3	0,03	6 to 30
5600028	4	0,1	20 to 100
5600029	5	0,3	60 to 300
5600030	6	1,0	200 to 1000
5600031	7	3,0	600 to 3000
5600032	8	10	2000 to 10000
5600033	9	30	6000 to 30000
5600034	10	100	20000 to 100000
5600035	11	300	60000 to 300000

BS/U TUBE VISCOMETER

Suitable for transparent liquids.
 With calibration certificate at 40 and 100 °C.
 Nominal overall length 300 mm.
 Permanent ring marks in amber.



BS/U Tube

Code	Size	Nominal constant	Viscosity range in cSt
5600036	A	0,003	0,9 to 3
5600037	B	0,01	2 to 10
5600038	C	0,03	6 to 30
5600039	D	0,1	20 to 100
5600040	E	0,3	60 to 300
5600041	F	1,0	200 to 1000
5600042	G	3,0	600 to 3000
5600043	H	10,0	2000 to 10000

OSTWALD PATTERN VISCOMETER

Suitable for transparent liquids.
 Calibration certificate at 20°C.
 Nominal overall length 250 mm.
 Permanent ring marks in amber.
 Sample filling volume 10 ml.



Ostwald

Code	Size	Nominal constant	Efflux time between ring marks Water at 20 °C. (seconds)
5600044	45	0,022	45
5600045	85	0,011	85
5600046	100	0,01	100
5600047	125	0,008	125