



Proven measurement capability to meet today's exacting standards

ASTM D 445 - Viscosity Reference Standards, Glass Capillary Viscometers & Viscosity Apparatus

Modified Ostwald Viscometers

The Cannon-Fenske Routine type viscometer has a fixed volume of sample at the filling temperature and, as for the Cannon-Fenske Opaque viscometer, the constant varies with temperature of measurement. Cannon-Fenske Routine viscometers are calibrated at 40°C and the constant for the upper and lower bulbs is stated at 40 and 100°C

U-Tube viscometers have the sample volume adjusted at the bath temperature and the constant is independent of temperature.

Applications

These types of viscometers are suitable for the measurement of kinematic viscosities of transparent Newtonian liquids up to 20,000 mm²/s.

They are suitable for measuring petroleum products and polymer solutions.

Viscosity Apparatus



20400



20410

PSL Glass Capillary Viscometers ASTM D 445

Catalogue # With calibration data	Catalogue # Without calibration data	Size	Nominal Constant (mm ² /s)/s	Recommended Viscosity range cSt, mm ² /s
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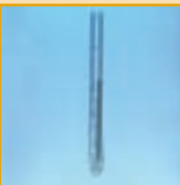
Cannon-Fenske Routine Viscometers				
Type ASTM nominal overall length 250mm; approximate sample volume 7ml				
1634/01	1633/01	25	0.002	0.5 to 2
1634/02	1633/02	50	0.004	0.8 to 4
1634/03	1633/03	75	0.008	1.6 to 8
1634/04	1633/04	100	0.015	3 to 15
1634/05	1633/05	150	0.035	7 to 35
1634/06	1633/06	200	0.1	20 to 100
1634/07	1633/07	300	0.25	50 to 250
1634/08	1633/08	350	0.5	100 to 500
1634/09	1633/09	400	1.2	240 to 1,200
1634/10	1633/10	450	2.5	500 to 2,500
1634/11	1633/11	500	8	1,600 to 8,000
1634/12	1633/12	600	20	4,000 to 20,000
1833/A1	Viscometer holder for Cannon-Fenske Routine sizes 25 to 600			



U-Tube Viscometers				
Type BS/U - nominal overall length 283mm; approximate sample size 18ml				
1619/00	1618/00	O	0.001	0.3 to 1
1619/01	1618/01	A	0.003	0.9 to 3
1619/02	1618/02	B	0.01	2 to 10
1619/03	1618/03	C	0.03	6 to 30
1619/04	1618/04	D	0.1	20 to 100
1619/05	1618/05	E	0.3	60 to 300
1619/06	1618/06	F	1.0	200 to 1,000
1619/07	1618/07	G	3.0	600 to 3,000
1619/08	1618/08	H	10.0	2,000 to 10,000
1818/A1	Viscometer holder for U-Tube sizes O to F			
1818/A2	Viscometer holder for U-Tube sizes G & H			



Miniature U-Tube Viscometers				
Type BS/U/M - nominal overall length 283mm; approximate sample size 4ml				
1622/01	1621/01	M1	0.001	0.2 to 1
1622/02	1621/02	M2	0.005	1 to 5
1622/03	1621/03	M3	0.15	3 to 15
1622/04	1621/04	M4	0.04	8 to 40
1622/05	1621/05	M5	0.1	20 to 100
1821/A1	Viscometer holder for Miniature U-Tube sizes M1 to M5			



PSL Viscosity Apparatus

RHEOTEK TCB-7 Mk II Constant Temperature Bath Catalogue # 20400	RHEOTEK Chiller (type F200) Catalogue # 20410
<ul style="list-style-type: none"> 7 positions (51mm apertures) 15° ...150°C Robust design Competitive price Small footprint Modular design allows for easy replacement Supplied with Certificate of Calibration – bath stability & uniformity 	<ul style="list-style-type: none"> Suitable for use with TCB-7 5°C ...ambient R134a refrigerant
	Viscometer Bench Stand Catalogue # 20430
	<ul style="list-style-type: none"> 6 viscometer positions 10 drip points Drip tray
* with chiller	



PSL – a world leader in Viscosity Measurement

PSL Viscosity Reference Standards ASTM D 445

Viscosity Standard	Nominal Values	Kinematic Viscosity (KV) in cSt, mm ² /s, Dynamic Viscosity (DV) in cP, mPa.s, Saybolt Viscosity (SUS) values							
		°C		°F		°C		°F	
		20.00	25.00	37.78	40.00	50.00	98.89	100.00	210.00
N.4	KV	0.47	0.45	0.41	0.40				
	DV	0.31	0.29	0.27	0.26				
N.8	KV	1.0	0.98	0.76	0.75				
	DV	0.77	0.72	0.57	0.56				
N1.0	KV	1.3	1.2	0.98	0.97				
	DV	1.0	0.93	0.77	0.76				
N2	KV	2.9	2.6	2.1	2.0	1.7			
	DV	2.2	2.0	1.6	1.5	1.3			
S3	KV	5.0	4.4	3	2.9	2.6	1.3	1.3	
	DV	4.1	3.6	2.5	2.4	2.1	0.98	0.98	
S6	KV	11	8.9	5.8	5.7	4.6	1.9	1.9	
	DV	8.8	7.4	4.9	4.8	3.7	1.5	1.5	
N10	KV	21	17	11	10	7.5	2.7	2.7	
	DV	17	14	10	9	6.2	2.2	2.1	
S20	KV	47	37	20	18	13	4.4	4.0	
	DV	40	31	17	16	11	3.3	3.2	
	SUS			100					
N35	KV	95	72	38	32	23	5.9	5.8	
	DV	82	62	33	27	19	4.8	4.7	
	SUS			170					
S60	KV	160	120	61	54	35	7.8	7.7	
	DV	140	104	54	47	30	6.4	6.3	
	SUS			280					
N100	KV	320	230	110	97	59	11	11.0	
	DV	280	200	94	84	51	9.3	9.1	
	SUS			500					
N140	KV	400	300	160	140	90	19	18	
	DV	350	260	135	120	77	16	15	
S200	KV	660	460	210	180	110	18	17	
	DV	590	410	180	150	91	15	14	
	SUS			930			86		
N230	KV	860	600	270	230	145	23	21	
	DV	770	535	230	190	120	19	17	
N350	KV	1400	920	370	310	180	25	24	
	DV	1200	790	320	270	150	21	20	
	SUS						110		
N415	KV	1900	1240	500	415	240	35	34	
	DV	1630	1065	430	360	200	29	28	
S600	KV	2400	1600	560	520	290	37	35	
	DV	2100	1400	490	450	240	31	29	
	SUS						150	130	
N730	KV	3390	2260	790	730	410	52	49	
	DV	2970	1980	690	630	340	43	40	
N1000	KV	4800	3100	980	940	520	58	55	
	DV	4100	2700	840	800	450	48	45	
N1300	KV	6760	4365	1380	1320	730	81	77	
	DV	5775	3800	1180	1120	630	67	63	
S2000	KV	8600	5600	2000	1700	880	85	81	
	DV	7500	4800	1750	1500	760	70	68	
	SUS						361		
N4000	KV	18000	11000	3300	3400	1700	140	130	
	DV	16000	10000	2800	2900	1500	120	112	
S8000	KV	35000	22000	6400	6700	3200	240	220	
	DV	31000	20000	6200	5900	2700	210	190	
N15000	KV	65000	41000	17000	13000	5800	400	370	
	DV	58000	37000	15000	11000	5100	350	320	
S30000	KV		82000	32000	23000	11000	730	670	
	DV		74000	30000	21000	9900	640	580	



PSL Viscosity Reference Standards fully comply with ASTM D 445. Standards are certified by the PSL Calibration Laboratory, which has shown to meet the requirements of ISO 17025 by UKAS independent assessment. Certified viscosity values are traceable to the master viscometer procedure described in ASTM D 2162.

Custom Standards – these can be prepared according to customer's requirements – please specify temperature(s) of calibration required and nominal viscosities.

Standards are packaged in 500ml bottles with a shelf life of up to 24 months from the date of calibration.

Please refer to separate datasheet:

PSL Low Temperature Reference Standards are suitable for calibrating glass capillary viscometers, cold cranking simulators, rotational viscometers and mini rotary viscometers.

PSL Rotational Viscometer Reference Standards are suitable for verifying the calibration of rotational viscometers.

PSL Flow Cup Reference Standards are suitable for confirming the calibration of flow cups to BS, ISO and ASTM standards.



Poulten Selfe & Lee (PSL), a UK company established in 1850, has been specializing in viscosity measurement for more than 60 years.

The company manufactures glass capillary viscometers to the highest standards and maintains a UKAS accredited laboratory for the calibration of viscometers and measurement of viscosity.

Viscosity reference standards are produced both in the UK and in the USA, in an ISO 9001:2000 certified facility. Distribution of PSL's products is worldwide.

PSL's range of apparatus for ASTM D 445 includes:

- Viscosity reference standards – suitable for both verification and calibration purposes
- Glass capillary viscometers with calibration data
- Constant temperature baths and chillers – supplied with certificates of calibration confirming temperature stability and uniformity
- Miscellaneous apparatus – including viscometer holders and bench stand.

The PSL Calibration and Testing laboratory is on hand to assist customers. Services include the blending and calibration of custom reference standards, re-calibration services, calibration of rotational viscometers and flow cups.

PSL also manufactures the RHEOTEK range of automated viscometers, suitable for measuring petroleum and polymer products.

PSL/RHEOTEK

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Reverse Flow Viscometers

In a reverse flow viscometer the liquid flows into a timing bulb not previously wetted by the sample. This, reverse flow technique allows for the timing of liquids whose thin films are opaque.

The calibration constants of the U-Tube Reverse Flow and Zeitfuchs Cross-Arm viscometers are temperature independent.

The Cannon-Fenske Opaque type viscometer has a fixed volume of sample at the filling temperature and hence the viscometer constant varies with temperature of measurement. Cannon-Fenske Opaque viscometers are calibrated at 40°C and the constants for the upper and lower bulbs are stated at 40 and 100°C

Applications

Reverse flow viscometers are used for the measurement of kinematic viscosities of transparent and opaque, Newtonian liquids up to 300,000 mm²/s.

They are suitable for measuring petroleum products and are especially suitable for measuring residual fuels.

Re-calibration

The calibration of Reverse Flow viscometers can be verified or re-calibrated using PSL Viscosity Reference Standards. In addition, viscometers can be returned to the PSL Calibration Laboratory for re-calibration.



PSL Glass Capillary Viscometers ASTM D 445

Catalogue # With calibration data	Catalogue # Without calibration data	Size	Nominal Constant (mm ² /s)/s	Recommended Viscosity range cSt, mm ² /s
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U-Tube Reverse Flow Viscometers (SHELL pattern on request)
Type BS/IP/RF - nominal overall length 275mm; approximate sample volume 12-25ml

Catalogue # With calibration data	Catalogue # Without calibration data	Size	Nominal Constant (mm ² /s)/s	Recommended Viscosity range cSt, mm ² /s
1637/01	1636/01	1	0.003	0.6 to 3
1637/02	1636/02	2	0.01	2 to 10
1637/03	1636/03	3	0.03	6 to 30
1637/04	1636/04	4	0.1	20 to 100
1637/05	1636/05	5	0.3	60 to 300
1637/06	1636/06	6	1.0	200 to 1,000
1637/07	1636/07	7	3.0	600 to 3,000
1637/08	1636/08	8	10	2,000 to 10,000
1637/09	1636/09	9	30	6,000 to 30,000
1637/10	1636/10	10	100	20,000 to 100,000
1637/11	1636/11	11	300	60,000 to 300,000
1836/A1	Viscometer holder for BS/IP/RF sizes 1 to 11			

Cannon-Fenske Opaque Viscometers
Type ASTM nominal overall length 295mm; approximate sample volume 12ml

Catalogue # With calibration data	Catalogue # Without calibration data	Size	Nominal Constant (mm ² /s)/s	Recommended Viscosity range cSt, mm ² /s
1641/01	1640/01	25	0.002	0.4 to 2
1641/02	1640/02	50	0.004	0.8 to 4
1641/03	1640/03	75	0.008	1.6 to 8
1641/04	1640/04	100	0.015	3 to 15
1641/05	1640/05	150	0.035	7 to 35
1641/06	1640/06	200	0.1	20 to 100
1641/07	1640/07	300	0.25	50 to 200
1641/08	1640/08	350	0.5	100 to 500
1641/09	1640/09	400	1.2	240 to 1,200
1641/10	1640/10	450	2.5	500 to 2,500
1641/11	1640/11	500	8	1,600 to 8,000
1641/12	1640/12	600	20	4,000 to 20,000
1840/A1	Viscometer holder for Cannon-Fenske Opaque sizes 25 to 600			

Zeitfuchs Cross-Arm Viscometers
Type ASTM – nominal overall length 295mm; approximate sample up to 3ml

Catalogue # With calibration data	Catalogue # Without calibration data	Size	Nominal Constant (mm ² /s)/s	Recommended Viscosity range cSt, mm ² /s
1663/01	1662/01	1	0.003	0.6 to 3
1663/02	1662/02	2	0.01	2 to 10
1663/03	1662/03	3	0.03	6 to 30
1663/04	1662/04	4	0.10	20 to 100
1663/05	1662/05	5	0.3	60 to 300
1663/06	1662/06	6	1.0	200 to 1,000
1663/07	1662/07	7	3.0	600 to 3,000
1663/08	1662/08	8	10.0	2,000 to 10,000
1663/09	1662/09	9	30.0	6,000 to 30,000
1663/10	1662/10	10	100.0	20,000 to 100,000
1850/A1	Universal viscometer holder			

PSL Glass Capillary Viscometers ASTM D 445

Catalogue # With calibration data	Catalogue # Without calibration data	Size	Nominal Constant (mm ² /s)/s	Recommended Viscosity range cSt, mm ² /s
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Suspended-Level Viscometers
Type BS/IP/SL - nominal overall length 330mm; approximate sample volume 22-40ml

Catalogue # With calibration data	Catalogue # Without calibration data	Size	Nominal Constant (mm ² /s)/s	Recommended Viscosity range cSt, mm ² /s
1625/01	1624/01	1	0.01	3.5 to 10
1625/02	1624/02	1A	0.03	6 to 30
1625/03	1624/03	2	0.1	20 to 100
1625/04	1624/04	2A	0.3	60 to 300
1625/05	1624/05	3	1.0	200 to 1,000
1625/06	1624/06	3A	3.0	600 to 3,000
1625/07	1624/07	4	10	2,000 to 10,000
1625/08	1624/08	4A	30	6,000 to 30,000
1625/09	1624/09	5	100	20,000 to 100,000
1824/A1	Viscometer holder for BS/IP/SL sizes 1 to 4			
1824/A2	Viscometer holder for BS/IP/SL sizes 4 A & 5			

Suspended-Level Viscometers, Shortened Form (SHELL pattern on request)
Type BS/IP/SL(S) nominal overall length 250mm; approximate sample volume 10ml

Catalogue # With calibration data	Catalogue # Without calibration data	Size	Nominal Constant (mm ² /s)/s	Recommended Viscosity range cSt, mm ² /s
1628/01	1627/01	1	0.0008	1.05 min
1628/02	1627/02	2	0.003	2.1 to 3
1628/03	1627/03	3	0.01	3.8 to 10
1628/04	1627/04	4	0.03	6 to 30
1628/05	1627/05	5	0.1	20 to 100
1628/06	1627/06	6	0.3	60 to 300
1628/07	1627/07	7	1.0	200 to 1,000
1628/08	1627/08	8	3.0	600 to 3,000
1628/09	1627/09	9	10.0	2,000 to 10,000
1827/A1	Viscometer holder for BS/IP/SL(S) sizes 1 to 9			

Miniature Suspended-Level Viscometers
Type BS/IP/MSL – nominal overall length 330mm; approximate sample volume 4ml

Catalogue # With calibration data	Catalogue # Without calibration data	Size	Nominal Constant (mm ² /s)/s	Recommended Viscosity range cSt, mm ² /s
1631/01	1630/01	1	0.003	0.6 to 3
1631/02	1630/02	2	0.01	2 to 10
1631/03	1630/03	3	0.03	6 to 30
1631/04	1630/04	4	0.1	20 to 100
1631/05	1630/05	5	0.3	60 to 300
1631/06	1630/06	6	1.0	200 to 1,000
1631/07	1630/07	7	3.0	600 to 3,000
1830/A1	Viscometer holder for BS/IP/MSL sizes 1 to 7			

Ubbelohde
Type ASTM – nominal overall length 283mm; approximate sample size 18ml

Catalogue # With calibration data	Catalogue # Without calibration data	Size	Nominal Constant (mm ² /s)/s	Recommended Viscosity range cSt, mm ² /s
1643/01	1642/01	0	0.001	0.3 to 1
1643/02	1642/02	0C	0.003	0.6 to 3
1643/03	1642/03	0B	0.005	1 to 5
1643/04	1642/04	1	0.01	2 to 10
1643/05	1642/05	1C	0.03	6 to 30
1643/06	1642/06	1B	0.05	10 to 50
1643/07	1642/07	2	0.1	20 to 100
1643/08	1642/08	2C	0.3	60 to 300
1643/09	1642/09	2B	0.5	100 to 500
1643/10	1642/10	3	1.0	200 to 1,000
1643/11	1642/11	3C	3.0	600 to 3,000
1643/12	1642/12	3B	5.0	1,000 to 5,000
1643/13	1642/13	4	10	2,000 to 10,000
1643/14	1642/14	4C	30	6,000 to 30,000
1643/15	1642/15	4B	50	10,000 to 50,000
1643/16	1642/16	5	100	20,000 to 100,000
1842/A1	Viscometer holder for ASTM Ubbelohde sizes 0 to 4			
1842/A2	Viscometer holder for ASTM Ubbelohde sizes 4C to 5			

Suspended-Level Viscometers

Suspended-Level viscometers are of the direct flow type, providing ease of use and high precision. Instruments can be charged in or out of the bath. Prior to measurement the liquid is suspended in the capillary tube which it fills completely. This suspension ensures a uniform driving head of liquid, independent of sample volume, making the viscometer constant independent of temperature.

PSL viscometers are supplied with calibration data which meets the requirements of ISO 17025.

Applications

Suspended-level viscometers are used for the measurement of kinematic viscosities of transparent, Newtonian, liquids up to 100,000 mm²/s.

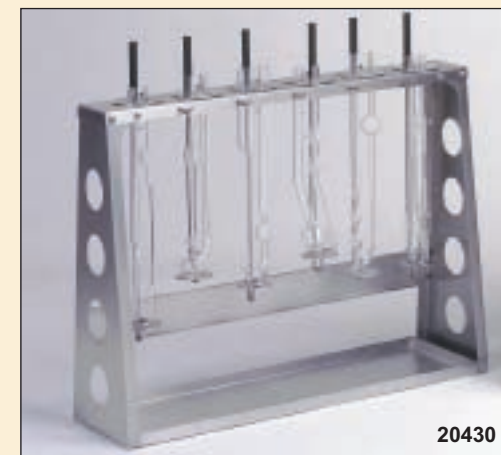
They are suitable for measuring petroleum and polymer solutions.

Re-calibration

The calibration of Suspended-Level viscometers can be verified or re-calibrated using PSL Viscosity Reference Standards. In addition, viscometers can be returned to the PSL Calibration Laboratory for re-calibration.



Viscometer holder



20430

Viscometer stand

Proven measurement capability to meet today's exacting standards