

Viscosity

Flow Cups

These easy to use cups determine the flow time of paints, varnishes and other Newtonian (or near Newtonian) fluids. There are many types available, all engineered to the relevant national standards.

Certification

Certificates of Conformity or Calibration can be supplied for any cup. These certificates must be requested at the time of purchase. Calibration certificates for 419 series and stated special size orifices are available calibrated against our Reference cups.

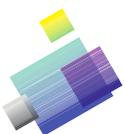
Method of Use

(excluding Zahn - and shell type cups)
N.B. Please refer to the relevant national standard for detailed instructions.

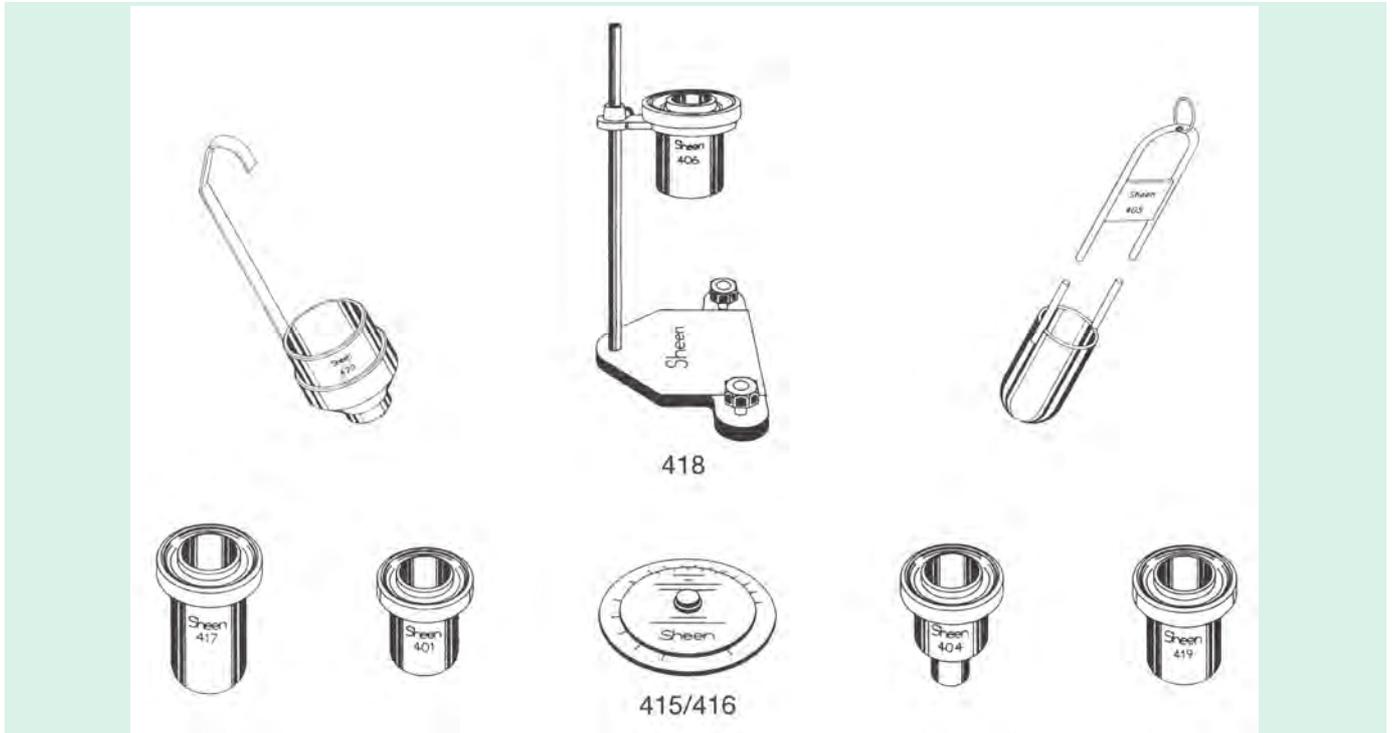
- 1 Select a suitable cup. (Please see over for flow times).
- 2 Ensure that the cup and test fluid are at the required temperature (or use a temperature / viscosity calculator, Ref 415/416.
- 3 Ensure no bubbles or debris are in the test fluid.
- 4 Seal the cup orifice (usually with a finger) and fill with test fluid, level the top of the fluid with a scraper.
- 5 Break-point procedure - remove finger from the orifice and simultaneously begin to time. At the first break in flow stop the timer. This elapsed time represents the 'flow-time' of the test fluid.
- 6 Fixed-volume procedure - proceed as above, but stop timing when 50ml has passed into a graduated measuring cylinder.



401/2 Flow cup and 418 stand



Viscosity Flow Cups



These flow cups are precision engineered from hard aluminium alloy and conform to the stated national and international standards, unless otherwise stated.

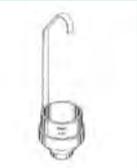
FLOW CUP COMPARISON CHART						
Oil Viscosity cSt (mm ² /s) @ 25°C	Cup reference / Flow time (seconds)					
	401-No 4	404-No 4	405-No 2	406-No 4	417-No4	420-No 4
87	34	23	39	27	66	23
115	43	29	47	34	86	29
228	82	52	79	64	167	52
393	139	87	126	106	287	87

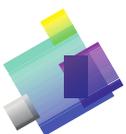
This chart illustrates the variations in flow times which may be expected when comparing different cup types. N.B. These times must not be used as a basis of calibration, as they are derived by calculation and are for illustrative purposes only.



Viscosity Flow Cups

Specification

Product	Code	Orifice diameter	Viscosity range	Flow times
Ref 401 Series (old type) BS3900 : Part A6, 1971 This specification replaced by EN ISO 2431/8S3900 part A6:1996 - see Ref 417		401/2 - B2	2.38mm (0.09")	38-71cSt 30 - 300 secs
		401/3 - B3	3.17mm (0.12")	
		401/4 - B4	3.97mm (0.16")	
		401/5 - B5	4.76mm (0.19")	
		401/6 - B6	7.14mm (0.28")	
Ref 404 Series (old type) DIN 53 211 404/4 The orifices are manufactured from stainless steel. N.B. Special orifices available to order e.g. 404/2mm; 404/6mm; 404/8mm. This specification replaced by EN ISO 2431 - see Ref 417			4mm (0.16")	112 - 685cSt 25 - 150 secs <i>(For options see Ref 417)</i>
Ref 406 series ASTM D1200 (Ford) The orifices are manufactured from stainless steel.		406/1 No 1	2.1mm (0.08")	10-35cSt 55-100 secs
		406/2 No 2	2.8mm (0.11")	
		406/3 No 3	3.4mm (0.13")	
		406/4 No 4	4.1mm (0.16")	
		406/5 No 5	5.8mm (0.23")	
Ref 417 Series BS EN ISO 2431, ASTM D 5125, BS3900 part A6:1996 The orifices are manufactured from stainless steel		417/3 No 3	3 mm (0.12")	7-42cSt 30-100 secs
		417/4 No 4	4mm (0.16")	
		417/5 No 5	5mm (0.20")	
		417/6 No 6	6mm (0.24")	
		417/8 No 8	8mm (0.31") <small>special size</small>	
Ref 419 Series AFNOR CUPS. NF - T - 30014 419/4		419/2.5	2.5mm (0.10")	5-140cSt 30-100 secs
		419/6	4mm (0.16")	
		419/8 No 8	6mm (0.24") 8mm (0.31") <small>special size</small>	
Ref 420 Series FRIKMAR CUP. 420/2 A dip cup format based on old Ref. 404 style cup DIN 53 211. (internal dimensions) The orifices are manufactured from stainless steel		420/4	2mm (0.08") <small>special size</small> 4mm (0.16")	112-685cSt 25-150 secs
		420/6	6mm (0.24") <small>special size</small>	
Ref 405 Series ASTM D 4212 Zahn Cups. 405/1 These cups are manufactured from brass and then bright nickel plated for a superior finish		405/2	1.93mm (0.08")	5-60cSt 35-80 secs
		405/3	2.69mm (0.11")	
		405/4	3.86mm (0.15")	
		405/5	4.39mm (0.17") 5.41mm (0.21")	



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Flow Cup Stands

Ref 405 ST - Zahn Cup Stand. Aluminium alloy 41cm high, which will store up to five Zahn viscosity flow cups. Flow cup stands designed to hold cups (except 405/420) steady and level during flow time measurement.

Ref 418 Construction - Stainless Steel rod mounted in a cast aluminium base with two adjustable feet. The cup is held within a cast aluminium height adjustable ring. A superior quality spirit level is also supplied.

Ref 418/LC - A lightweight aluminium frame supplied with spirit level.

Temperature/Viscosity Calculators

These allow viscosity corrections to be calculated when tests are not carried out at the specified temperature. For example a measured viscosity, in a flow cup, of 80 seconds at 25°C is equivalent to 99 seconds at 21°C and a specified viscosity of 80 divided by 10 i.e. 8 poises at 25°C is equal to 10.5 (105 divided by 10) poises at 20°C at which the determination is to be made. These relationships are not applicable to structured products and heavily pigmented compositions.

Ref 415 - coefficient of 5.5% per °C. e.g. resins, clear or pigmented products.

Ref 416 - coefficient of 2.66% per °C. e.g. water based products.

Note

Owing to continuous development, we reserve the right to introduce improvements and modify specifications without prior notice.

Calibration Oils

We offer a full range of oils for calibrating each of our flow cups and spindle viscometers, (nominal volume 500cc). Our recommended oils for calibration of flow cups (nominal values).

404/4 259cSt @ 23°C (73.4°F)

405/1 34cSt @ 25°C (77°F)

405/2 118cSt @ 25°C (77°F)

405/3 463cSt @ 25°C (77°F)

405/4 572cSt @ 25°C (77°F)

405/5 1131cSt @ 25°C (77°F)

406/1 17.4cSt @ 25°C (77°F)

406/2 58cSt @ 25°C (77°F)

406/3 118cSt @ 25°C (77°F)

406/4 228cSt @ 25°C (77°F)

406/5 800cSt @ 25°C (77°F)

417/3 19cSt @ 23°C (73.4°F)

417/4 65cSt @ 23°C (73.4°F)

417/5 259cSt @ 23°C (73.4°F)

417/6 533cSt @ 23°C (73.4°F)

417/8 1322cSt @ 23°C (73.4°F)

419/2.5 76cSt @ 20°C (68°F)

419/4 159cSt @ 20°C (68°F)

419/6 1130cSt @ 25°C (77°F)

420/4 259cSt @ 23°C (73.4°F)

Note: The oil viscosities have been selected to enable cups to be calibrated at the mid point of recommended working viscosity range at the temperatures stated.

Ref 440 Calibration Oils calibrated @ 20 & 25°C only, accuracy $\pm 2\%$.

Ref 441 Calibration Oils calibrated @ 20, 23, 24, 24.5, 25, 25.5 and 26°C, accuracy $\pm 0.2\%$.

Accuracy of Ref 441 oils up to 1000 cSt $\pm 0.3\%$ 1001 - 10,000 cSt $\pm 0.4\%$

