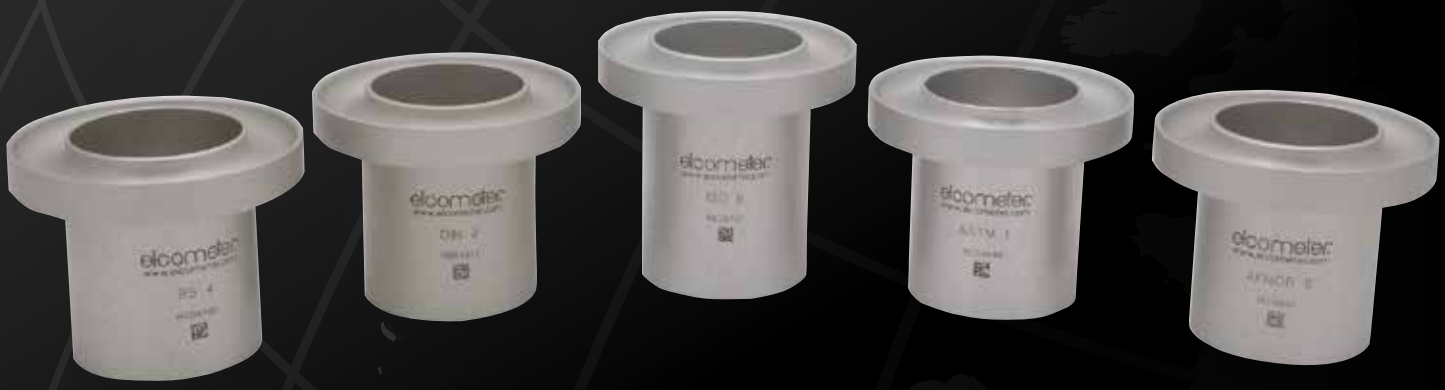
elcometer®
inspection equipment



Viscosity - Flow Cups

Elcometer 2350 & 2354

STANDARDS:
ISO: ASTM D 5125, ISO 2431
BS: AS/NZS 1580.214.2 (cup 4)
BS 3900-A6:1971
FORD/ASTM: ASTM D 1200
DIN: DIN 53211 (cup 4)
AFNOR: NF T30-014

Viscosity Flow Cups

Viscosity Flow Cups are very easy to use instruments made of anodized aluminium with a stainless steel orifice, for measuring the consistency of paints, varnishes and similar products. The measured kinematic viscosity is generally expressed in seconds(s) flow time. If the Standards stipulate conversion methods the flow time can be converted into Centistokes (cSt) using the Elcometer ElcoCalc™ Mobile Apps.

Calibration certificates which offer traceability and assurance that each viscosity cup has been individually tested and comply to Standards are also available.

The cups can be supplied separately or with an adjustable stand which includes a precision level and an overflow glass draw plate. They can also be supplied with a flow jacket for temperature control (thermojacket), see page 16-5 for more information.

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Technical Specification C

BS Viscosity Flow Cups

Part Number	Description	Orifice Diameter	Range[1] (cSt)	Certificate
K0002354M003	Elcometer 2354/3 BS Viscosity Cup 4	3.97mm	89 - 340	◇
K0002354M004	Elcometer 2354/4 BS Viscosity Cup 5	4.76mm	79 - 441	◇
K0002354M003C	Elcometer 2354/3 with calibration certificate	3.97mm	89 - 340	● (e)
K0002354M004C	Elcometer 2354/4 with calibration certificate	4.76mm	79 - 441	● (e)

DIN Viscosity Cups

Part Number	Description	Orifice Diameter	Range[1] (cSt)	Certificate
K0002350M001	Elcometer 2350/1 DIN Viscosity Cup 2	2mm	-	
K0002350M002	Elcometer 2350/2 DIN Viscosity Cup 4	4mm	96 - 683	◇
K0002350M003	Elcometer 2350/3 DIN Viscosity Cup 6	6mm	-	
K0002350M004	Elcometer 2350/4 DIN Viscosity Cup 8	8mm	-	
K0002350M001C	Elcometer 2350/1 with calibration certificate	2mm	-	● (d)
K0002350M002C	Elcometer 2350/2 with calibration certificate	4mm	96 - 683	● (e)
K0002350M003C	Elcometer 2350/3 with calibration certificate	6mm	-	● (d)
K0002350M004C	Elcometer 2350/4 with calibration certificate	8mm	-	● (d)

[1] For Information Only [2] cP values apply to fluids with a specific density of 1 only (d) Dimensional Certificate (e) Efflux Time Certificate

● Calibration Certificate supplied as standard. ◇ Batch Calibration Certificate supplied as standard.

Viscosity Flow Cups — Elcometer 2351, 2352 & 2353

Technical Specification C

ISO Viscosity Flow Cups

Part Number	Description	Orifice Diameter	Range[1] (cSt)	Certificate
K0002353M001	Elcometer 2353/1 ISO Viscosity Cup 3	3mm	7 - 42	◇
K0002353M002	Elcometer 2353/2 ISO Viscosity Cup 4	4mm	34 - 135	◇
K0002353M003	Elcometer 2353/3 ISO Viscosity Cup 5	5mm	91 - 326	◇
K0002353M004	Elcometer 2353/4 ISO Viscosity Cup 6	6mm	188 - 684	◇
K0002353M005	Elcometer 2353/5 ISO Viscosity Cup 8	8mm	-	
K0002353M001C	Elcometer 2353/1 with calibration certificate	3mm	7 - 42	● (e)
K0002353M002C	Elcometer 2353/2 with calibration certificate	4mm	34 - 135	● (e)
K0002353M003C	Elcometer 2353/3 with calibration certificate	5mm	91 - 326	● (e)
K0002353M004C	Elcometer 2353/4 with calibration certificate	6mm	188 - 684	● (e)
K0002353M005C	Elcometer 2353/5 with calibration certificate	8mm	-	● (d)

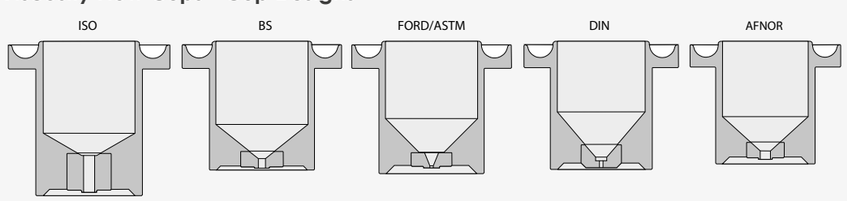
FORD/ASTM Viscosity Cups

Part Number	Description	Orifice Diameter	Range[1] (cSt)	Certificate
K0002351M001	Elcometer 2351/1 FORD/ASTM Viscosity Cup 1	1.90mm	10 - 35	◇
K0002351M002	Elcometer 2351/2 FORD/ASTM Viscosity Cup 2	2.53mm	25 - 120	◇
K0002351M003	Elcometer 2351/3 FORD/ASTM Viscosity Cup 3	3.40mm	49 - 220	◇
K0002351M004	Elcometer 2351/4 FORD/ASTM Viscosity Cup 4	4.12mm	70 - 370	◇
K0002351M005	Elcometer 2351/5 FORD/ASTM Viscosity Cup 5	5.20mm	200 - 1200	◇
K0002351M001C	Elcometer 2351/1 with calibration certificate	1.90mm	10 - 35	● (e)
K0002351M002C	Elcometer 2351/2 with calibration certificate	2.53mm	25 - 120	● (e)
K0002351M003C	Elcometer 2351/3 with calibration certificate	3.40mm	49 - 220	● (e)
K0002351M004C	Elcometer 2351/4 with calibration certificate	4.12mm	70 - 370	● (e)
K0002351M005C	Elcometer 2351/5 with calibration certificate	5.20mm	200 - 1200	● (e)

AFNOR Viscosity Cups

Part Number	Description	Orifice Diameter	Range[1] (cP)[2]	Certificate
K0002352M001	Elcometer 2352/1 AFNOR Viscosity Cup 2.5	2.46mm	5 - 140	
K0002352M002	Elcometer 2352/2 AFNOR Viscosity Cup 4	4mm	50 - 1100	
K0002352M003	Elcometer 2352/3 AFNOR Viscosity Cup 6	6mm	510 - 5100	
K0002352M001C	Elcometer 2352/1 with calibration certificate	2.46mm	5 - 140	● (d)
K0002352M002C	Elcometer 2352/2 with calibration certificate	4mm	50 - 1100	● (d)
K0002352M003C	Elcometer 2352/3 with calibration certificate	6mm	510 - 5100	● (d)

Viscosity Flow Cups - Cup Designs



Viscosity Cup Conversion

The table below lists the major flow cup types together with a conversion chart of Efflux Time (in seconds) to Viscosity in Centistokes (cSt). It has been constructed from the various International Standard Calculators.

Each cup design is unique, care must be taken when comparing viscosity values between different cup types. These values are the absolute values and do not include the allowed tolerances, as these differ considerably between each of the Standards.

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Viscosity Cup Type

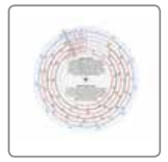
Time (seconds)	DIN	BS					ISO				FORD / ASTM				ZAHN					SHELL					
	4	2	3	4	5	6	3	4	5	6	1	2	3	4	1	2	3	4	5	1	2	3	4	5	6
15	38	6.4		19	40	234			35	66			19	40		4	88	148	322			20	48	91	235
16	45	6.8	3	24	48	262			39	75			22	44		7	99	163	345			21	52	98	251
17	51	7.3	5	28	56	290			43	84			24	48		11	111	178	368			23	55	104	267
18	57	7.7	7	32	64	317			47	93			26	52		14	123	192	391	1.1	7.5	24	59	111	284
19	63	8.1	9	35	72	343			51	101		1	29	56		18	135	207	414	1.4	8.1	26	62	117	300
20	69	8.6	11	39	79	369			55	110		3	31	60		21	146	222	437	1.6	8.6	27	66	124	316
21	74	9.0	13	43	86	395			58	118		4	33	64		25	158	237	460	1.8	9.2	29	69	130	332
22	80	9.4	15	47	93	420			62	126		6	36	67		28	170	252	483	2.0	9.8	30	72	137	348
23	85	9.8	17	50	100	445	1		66	134		7	38	71		32	181	266	506	2.3	10.4	32	76	143	365
24	91	10.3	18	54	107	470	2		70	142		9	40	75		35	193	281	529	2.5	10.9	33	79	150	381
25	96	10.7	20	57	114	494	3		73	150		10	43	79		39	205	296	552	2.7	11.5	35	83	156	397
26	101	11.1	22	60	120	519	4		77	157		12	45	83		42	216	311	575	2.9	12.1	36	86	163	413
27	107	11.5	23	64	127	543	4.5		80	165		13	47	87		46	228	326	598	3.2	12.7	38	90	169	429
28	112	12.0	25	67	133	567	5		84	173		14	49	91		49	240	340	621	3.4	13.2	39	93	176	446
29	117	12.4	26	70	140	591	6		88	180		16	52	94		53	252	355	644	3.6	13.8	41	97	182	462
30	122	12.8	28	73	146	614	6.6	34.5	91	188		17	54	98	1	56	263	370	667	3.8	14.4	42	100	189	478
31	127	13.3	30	77	153	638	7.3	36.0	95	196		19	56	102	2	60	275	385	690	4.1	15.0	44	104	195	494
32	132	13.7	31	80	159	662	7.9	37.5	98	203		20	59	106	3	63	287	400	713	4.3	15.6	45	107	202	510
33	137	14.1	33	83	165	685	8.6	38.0	102	210		22	61	110	4	67	298	414	736	4.5	16.1	47	110	208	527
34	142	14.5	34	86	171	709	9.2	41.0	105	218		23	63	114	6	70	310	429	759	4.7	16.7	48	114	215	543
35	147	15.0	35	89	177	732	9.8	42.0	109	225		24	66	117	7	74	322	444	782	5.0	17.3	50	117	221	559
36	152	15.4	37	92	184	755	10.4	44.0	112	233		26	68	121	8	77	333	459	805	5.2	17.9	51	121	228	575
37	157	15.8	38	96	190	778	11.0	45.2	115	240		27	70	125	9	81	345	474	828	5.4	18.4	53	124	234	591
38	162	16.3	40	99	196	801	11.6	47.0	119	247	1	29	73	129	10	84	357	488	851	5.6	19.0	54	128	241	608
39	167	16.7	41	102	202	825	12.1	48.0	122	254	2	30	75	133	11	88	369	503	874	5.9	19.6	56	131	247	624
40	172	17.1	43	105	208	848	12.7	50.0	126	262	2	32	77	137	12	91	380	518	897	6.1	20.2	57	135	254	640
41	176	17.5	44	108	214	871	13.3	51.2	129	269	3	33	80	141	13	95	392	533	920	6.3	20.7	59	138	260	656
42	181	18.0	45	111	220	893	13.8	53.0	133	276	4	35	82	144	14	98	404	548	943	6.6	21.3	60	141	267	672
43	186	18.4	47	114	226	916	14.4	54.0	136	283	4	36	84	148	15	102	415	562	966	6.8	21.9	62	145	273	689
44	191	18.8	48	117	232	939	14.9	56.0	139	291	5	37	86	152	17	105	427	577	989	7.0	22.5	63	148	280	705
45	196	19.2	50	120	238	962	15.5	57.0	143	298	5	39	89	156	18	109	439	592	1012	7.2	23.0	65	152	286	721
46	200	19.7	51	123	244	985	16.0	59.0	146	305	6	40	91	160	19	112	450	607	1035	7.5	23.6	66	155	293	737
47	205	20.1	52	126	250	1008	16.6	60.0	149	312	6	42	93	164	20	116	462	622	1058	7.7	24.2	68	159	299	753
48	210	20.5	54	129	255	1030	17.1	62.0	153	319	7	43	96	168	21	119	474	636	1081	7.9	24.8	69	162	306	770
49	215	21.0	55	132	261	1053	17.6	63.5	156	326	7	45	98	171	22	123	486	651	1104	8.1	25.3	71	166	312	786
50	219	21.4	56	135	267	1076	18.2	64.5	160	334	8	46	100	175	23	126	497	666	1127	8.4	25.9	72	169	319	802
51	224	21.8	58	138	273	1099	18.7	66.0	163	341	8	48	103	179	24	130	509	681	1150	8.6	26.5	74	173	325	818
52	229	22.2	59	141	279	1121	19.2	67.5	166	348	8	49	105	183	25	133	521	696	1173	8.8	27.1	76	176	332	834
53	234	22.7	60	144	285	1144	19.7	69.0	170	355	9	50	107	187	26	137	532	710	1196	9.0	27.6	77	179	338	851
54	238	23.1	62	147	291	1166	20.2	70.0	173	362	9	52	110	191	28	140	544	725	1219	9.3	28.2	79	183	345	867
55	243	23.5	63	150	297	1189	20.7	71.5	176	369	10	53	112	194	29	144	556	740	1242	9.5	28.8	80	186	351	883
56	248	24.0	64	153	302	1212	21.2	73.0	180	376	10	55	114	198	30	147	567	755	1265	9.7	29.4	82	190	358	899
57	253	24.4	66	156	308	1234	21.7	75.0	183	383	11	56	116	202	31	151	579	770	1288	9.9	30.0	83	193	364	915
58	257	24.8	67	159	314	1257	22.2	76.0	186	390	11	58	119	206	32	154	591	784	1311	10.2	30.5	85	197	371	932
59	262	25.2	68	162	320	1279	22.7	77.0	190	397	12	59	121	210	33	158	603	799	1334	10.4	31.1	86	200	377	948
60	267	25.7	70	165	326	1302	23.2	79.0	193	405	12	60	123	214	34	161	614	814	1357	10.6	31.7	88	204	384	964
65	290	27.8	76	179	354	1414	26	86.0	210	440	15	68	135	233	40	179	673	888	1472	11.8	34.6	95	221	416	1045
70	313	29.9	83	194	383	1526	28	93.0	226	475	17	75	147	252	45	196	731	962	1587	12.9	37.4	103	238	449	1126
75	337	32.1	89	208	412	1638	31	100	243	510	20	82	158	271	51	214	790	1036	1702	14.0	40.3	110	255	481	1207
80	360	34.2	96	223	441	1750	33	108	260	545	22	89	170	291	56	231	848	1110	1817	15.1	43.2	118	273	514	1288
85	383	36.4	102	237	469	1861	35	115	276	580	25	96	181	310	61.6	249	907	1184	1932	16.3	46.1	125	290	546	1369
90	406	38.5	108	252	498	1973	38	122	293	615	27	104	193	329	67	266	965	1258	2047	17.4	49.0	133	307	579	1450
100	452	42.8	121	280	554	2195	42	135	326	684	32	118	216	368	78	301	1082	1406	2277	19.7	54.7	148	342	644	1612
110	499	47.0	134	309	611	2418	47		359	754	37	132	239	406	89	336	1199	1554	2507	21.9	60.5	163	376	709	1774
120	545	51.3	146	338	668	2640	51		392	823	42	147	262	445	100	371	1316	1702	2737	24.2	66.2	178	411	774	1936
130	591	55.6	159	366	724	2862	56		425	893	47	161	285	483	111	406	1433	1850	2967	26.4	72.0	193	445	839	2098
140	637	59.9	171	395	781	3084	61		458	962	51	176	308	522	122	441	1550	1998	3197	28.7	77.8	208	480	904	2260
150	682	64.2	184	424	837	3305	65		491	1031	56	190	331	560	133	476	1667	2146	3427	31.0	83.5	223	514	969	2422

All measurements are in Centistokes (cSt). Centipoise (cP) = cSt x product density

Viscosity Flow Cup Accessories

Elcometer

Accessories

KT002400N201	Viscosity Cup Stand with Bubble Level and Glass Draw Plate To ensure the viscosity cup is positioned correctly to carry out the test.	
KT002400N001	Viscosity Cup Precision Stand with Bubble Level and Glass Draw Plate To ensure the viscosity cup is positioned correctly to carry out the test.	
KT002400P001	Bubble Level for Viscosity Cup To ensure the viscosity cup is parallel to the surface.	
KT002400P999	Viscosity Glass Draw Plate To retain test sample until operator is ready to commence test and provides surface for bubble level.	
KT002400N002	Double-walled Stand with Thermojacket For heating test samples for viscosity measurement at specific elevated temperatures.	
K0007300M201	Elcometer 7300 High Precision Stopwatch	
KT002400N003	Elcometer 2400 Conversion Disc Allowing viscosity (cSt) and flow times of different cups to be calculated. Front: No.4 cups according to AFNOR, BS, NF, ASTM, DIN, Zahn 2 Back: No.3-4-5-6 cups according to ISO and Zahn 3	

Thermometers

To accurately measure flow for viscosity the temperature needs to be 23°C ± 2°C (73.4°F). Here are a range of thermometers from Elcometer.

T1164441-	Spirit Thermometer in °C
T1164442-	Spirit Thermometer in °F
G212----1A	Elcometer 212 Digital Pocket Thermometer (°C/°F) with Liquid Probe
G213----2	Elcometer 213/2 Digital Thermometer (°C/°F)
T9996390-	Elcometer 213/2 Liquid Probe

For a full range of Certified Calibration Oils see page 6

Elcometer 2410

Elcometer Viscosity Cup Standard Calibration Oils

In order to check the viscosity cup's calibration or to certify it for ISO purposes, it is imperative that viscosity cup standard calibration oils are used.

Standard oils have a specific drain time, dependent upon the viscosity cup type (Ford, Shell, Zahn etc.) and the orifice or cup number used.

To check the viscosity cup, use the standard viscosity oils in place of the liquid and measure the drain time.

Specific calibration oils can only be used with specific flow cups. Please use the table below to determine which calibration oil is required for your cup, or contact Elcometer. Viscosity oils are supplied in ½ litre (1 pint) bottles.

Technical Specification

		Flow Cups				
Part Number	Description	DIN	ASTM/FORD	ISO	Kinematic Viscosity at 25°C (77°F)†	Certificate
K0002410M021	Certified Calibration Oil		2	3	34cSt	●
K0002410M022	Certified Calibration Oil	4	3	4	120cSt	●
K0002410M023	Certified Calibration Oil	4	4	6	230cSt	●
K0002410M024	Certified Calibration Oil	4		6	460cSt	●
K0002410M025	Certified Calibration Oil				850cSt	●
K0002410M026	Certified Calibration Oil				1600cSt	●

† Nominal Value

● Calibration certificate supplied as standard.

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Due to our policy of continuous improvement, Elcometer Limited reserves the right to change specifications without notice.

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