ANALYT MESSTECHNIK



REFERENCE GUIDE

Variable-Area Flow Meters

Flow tubes, floats, scales and valves of the Model P, Px, S, T, Tx and G glass-tube flow meters and the rotameter kits — with the sizing method and the flow capacity of every standard tube.

AMTC-RF-0001

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About this guide

The Analyt-MTC glass-tube variable-area flow meters — Model P, Px, S, T, Tx, the Model G gas proportioner and the rotameter kits — are built from the same parts: interchangeable flow tubes, floats and valve cartridges. This guide collects what these families share. It explains how the meters work and how to read them, which floats and valves there are, how to choose a flow tube for your fluid and operating conditions, and the maximum flow of every standard tube.

To choose a tube, read Choosing a flow tube (p. 11) and then look up the result in Flow capacities of millimetre-scale tubes (p. 13) or Direct-reading flow tubes (p. 21). Dimensions, materials and ordering codes of each family are in its specification sheet.

If your fluid, pressure or temperature is far from the conditions in the tables, or you need a tube calibrated for your application, Analyt-MTC application engineers will help you choose and can calibrate the meter for you.

Abbreviations: CV and CVT are needle valves, MFV and MVT high-precision metering valves (see Valves and mounting (p. 8)); P, Px, S, T, Tx and G are the meter families (see The meter families (p. 5)).

Safety notices in this guide

NOTICE

Practices not related to personal injury — damage to the product, the process or the sample.

Note
Information that helps understanding; never a hazard.

Document information

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CHAPTER 1

How the meters work

Float and tapered tube

A variable-area flow meter is a vertical glass tube whose bore widens towards the top, with a spherical float inside. The fluid enters at the narrow bottom end, flows upwards around the float and leaves at the top.

The flow lifts the float until the forces on it balance: the upward force of the fluid passing the float, together with buoyancy, equals the weight of the float. Because the bore is tapered, the ring-shaped gap between float and tube wall grows as the float rises. A larger flow therefore holds the float higher, and each float height stands for exactly one flow rate. You read that height on the scale on the tube.

The meter needs no power supply and no electrical connection, and its pressure drop is low and stays nearly the same over the whole range. The tubes are self-cleaning.

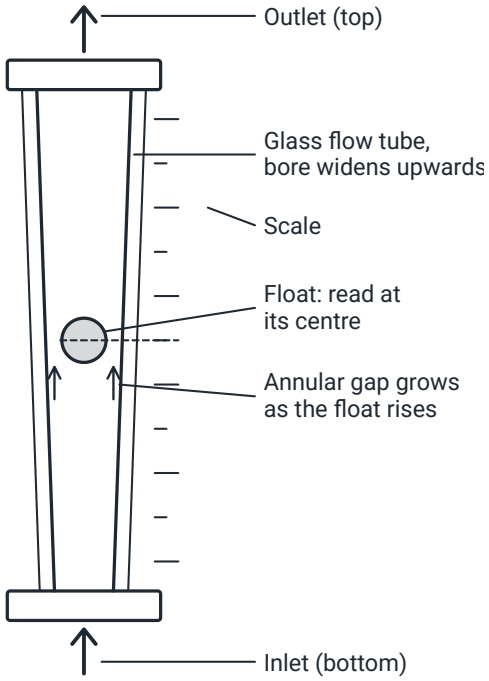


Figure 1-1. Working principle. The float settles where the flow through the gap around it balances its weight. Schematic, not to scale.

Measuring range and accuracy

The tables in this guide give the **maximum** flow of each tube. A tube reads reliably down to one tenth of that value or lower, so the usable range is at least 10:1. Meters with two floats in the tube cover more than 20:1 (Model P, Px and S).

- **Standard accuracy:** ±2 % of full scale on millimetre scales; ±5 % of full scale on direct-reading scales and on tubes of the 042 and 032 series. Model G: ±2 % of full scale from 10 to 100 % of the scale, ±5 % for tubes 042 and 032.
- **Calibrated accuracy:** ±1 % of full scale, optional for Model P, Px and S.
- **Repeatability:** ±0.25 %.

The meter families

All families use the same borosilicate glass flow tubes in two scale lengths. What differs is the frame, the material of the parts in contact with the fluid, the valves and the number of tubes.

Table 1-1 The meter families

Model	Design and wetted fittings	Tubes	Scale length (mm)	Valves	Max. pressure (psig, bar g), temperature (°C)
P	Single tube. Aluminium (black anodised), brass (chrome plated) or 316 stainless steel.	1	65 or 150 mm	CV, MFV or none	200 psig (13.8 bar g), 121 °C
Px	Multiple tube, separate channels or manifolded at inlet or outlet. Aluminium or 316 stainless steel.	2–6	65 or 150 mm	CV, MFV or none	200 psig (13.8 bar g), 121 °C
S	Single tube like Model P, built for frequent tube changes (several tubes for one meter, or fluids that need regular cleaning). Aluminium, brass or 316 stainless steel.	1	65 or 150 mm	CV, MFV or none	200 psig (13.8 bar g), 121 °C
T	Single tube for corrosive or high-purity fluids. Wetted parts glass, PTFE and PCTFE.	1	65 or 150 mm	CVT, MVT or none	100 psig, 65 °C
Tx	Multiple tube version of Model T, separate channels or manifolded.	2–4	65 or 150 mm	CVT, MVT or none	100 psig, 65 °C
G gas proportioner	Blends two or three gases; one tube per gas plus a mixing tube. Aluminium or 316 stainless steel.	2 or 3	150 mm	CV or MFV	200 psig (13.8 bar g), 121 °C
Rotameter kits	One frame with four interchangeable tubes (042-29, 112-02, 102-05, 044-40) and spare floats. Aluminium, stainless steel or PTFE kit.	4, one fitted	150 mm	High-flow cartridge	not stated; ask Analyt-MTC

Note

The pressure and temperature limits apply to the whole meter. No limits are stated for the rotameter kits: ask Analyt-MTC before you use a kit at elevated pressure or temperature. The specification sheet of each family gives the complete data, the dimensions and the ordering code; this guide does not replace it.

Which tables to use:

- **Model P, Px, S, T, Tx and the kits:** 150 mm tubes (p. 13) and 65 mm tubes (p. 15) for millimetre scales, Direct-reading flow tubes (p. 21) for scales in flow units.
- **Model G:** Gas proportioner tubes at 50 psig (p. 20).

CHAPTER 2

Flow tubes, floats and scales

Flow tubes

The flow tubes are made of heavy-walled, shock-resistant borosilicate glass. The bore is either uniformly tapered or formed with internal rib guides (flutes) that guide the float for a steady, accurate reading. A PTFE plug at each end keeps the float in the tube.

Flow tubes and floats are interchangeable between the meters of one scale length. Valve cartridges are matched to the meter family (P, Px and S on one side, T and Tx on the other), so order spare cartridges for your family. You can keep several tubes for one frame and change them to suit the job — a practical choice in the laboratory.

Every standard tube and float combination is identified by a **tube number** and a two-letter **float suffix**, for example `082-03-ST`: tube 082-03 with a stainless steel float. The same tube with a heavier float carries more flow. The tables in this guide list every standard tube and float combination.

Floats

The float material sets the flow range of a tube and must suit the fluid. Its density also enters the sizing formula for liquids (see Liquids (p. 11)).

Table 2-1 Float materials

Suffix	Material	Density (g/mL)
GL	Black glass	2.53
SA	Sapphire (red)	3.98
ST	316 stainless steel	8.04
CA	Carboloy®	14.98
TA	Tantalum	16.58

- **Model T and Tx** (PTFE meters for corrosive fluids): sapphire or glass floats are recommended.
- **Rotameter kits** are delivered with glass floats fitted. The aluminium and stainless steel kits include spare metal floats; the PTFE kit includes spare sapphire floats.

Scales

Scales come in two lengths, **65 mm** and **150 mm**, and in two kinds:

- **Millimetre scales** show how high the float stands. A calibration data sheet or curve converts the height into a flow rate. The same meter can then serve many fluids, pressures and temperatures: you only need the calibration data for each. Maximum flows: Flow capacities of millimetre-scale tubes (p. 13).
- **Direct-reading scales** are printed in flow units such as mL/min, L/min or scfh. They are convenient, but each is drawn for one gas or liquid at one pressure and temperature, and is valid only for that fluid, those conditions and that unit. Standard tubes: Direct-reading flow tubes (p. 21).

NOTICE

A direct-reading scale used with a different fluid, pressure or temperature reads wrong. Convert the reading as described in Choosing a flow tube (p. 11), or have the tube calibrated for your conditions.

Reading the scale

The flow rate is the graduation level with the **centre** of the ball float. Looking at the scale at an angle (parallax) shifts the reading. To avoid this, the scale has a vertical locator line built into its graduations, and a yellow background behind the scale makes repeated readings less tiring.

1. Position your head in front of the meter, with your eyes level with the float.
2. Move your head sideways to the left until the outline of the float seems to just touch the locator line.
3. Read the graduation where the locator line crosses the line through the centre of the float.

The front shield of the single-tube meters (Model P and S) has a built-in magnifier lens along the scale for a finer reading.

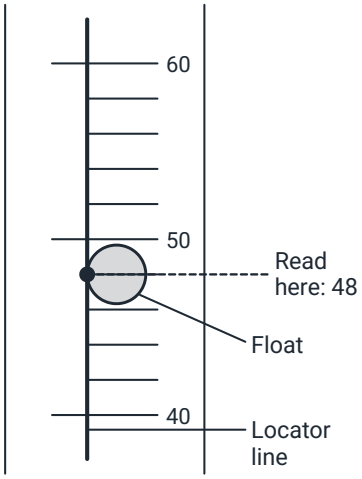


Figure 2-1. Reading the scale. With the float outline just touching the locator line, the reading is the graduation where the locator line meets the float centre — here 48 on a millimetre scale.

CHAPTER 3

Valves and mounting

Built-in valves

Each tube can have a built-in valve cartridge to set the flow, or no valve. There are two designs:

- **Needle valve** — CV on Model P, Px, S and G; CVT on Model T and Tx. A spindle with a conical tip moves into the orifice and turns as it moves; the annular gap between tip and orifice sets the flow. Screwed fully in, the tip seats on the orifice and the valve closes bubble-tight. The economical choice where very fine adjustment is not needed.
- **High-precision metering valve** — MFV on Model P, Px, S and G; MVT on Model T and Tx. The stem does not rise: the needle moves straight in and out of a precision cylindrical orifice without turning, and its flat, tapered face opens the flow area gradually. Worth its higher cost where fine control and resolution matter, above all with low-flow tubes.

Each valve size is matched to a range of tubes: compare its capacity below with the maximum flow of your tube. Capacities are given for the cartridges of Model P, Px and S (Tables 3-1 and 3-2) and of Model T and Tx (Tables 3-3 and 3-4); none are available for Model G.

Valve flow capacities

Maximum flow through the fully open cartridge with 10 psig at the inlet and the outlet open to atmosphere, as printed: gas in smL/min (standard, at 21.11 °C, 1013.25 mbar) and scfh, water in mL/min and gph.

Table 3-1 MFV, Model P, Px, S

	Air		Helium		Water	
Size	smL/min	scfh	smL/min	scfh	mL/min	gph
1	200	0.42	400	0.85	6	0.095
2	400	0.85	850	1.80	12	0.190
3	1020	2.15	2100	4.45	28	0.444
4	2600	5.50	6050	12.80	85	1.347
5	8900	18.85	20 800	44.05	270	4.279
6	35 000	74.15	84 500	179.10	1070	16.960
7	63 000	133.50	156 000	330.50	1930	30.590

Table 3-2 CV, Model P, Px, S

	Air		Helium		Water	
Size	smL/min	scfh	smL/min	scfh	mL/min	gph
L	5050	10.70	11 500	24.35	360	5.70
M	30 000	63.55	71 500	151.50	1760	27.90
H	76 000	161.05	180 000	381.40	4500	71.33

Table 3-3 MVT, Model T, Tx

	Air		Helium		Water	
Size	smL/min	scfh	smL/min	scfh	mL/min	gph
1	600	1.25	1250	2.65	36	0.57
3	3000	6.35	6900	14.60	180	2.85
6	30 000	63.55	71 500	151.50	1800	28.53

Table 3-4 CVT, Model T, Tx

	Air		Helium		Water	
Size	smL/min	scfh	smL/min	scfh	mL/min	gph
L	2400	5.10	5300	11.23	130	2.05
H	55 000	116.55	135 000	286.05	2800	44.40

Valve position

The valve sits either at the inlet (bottom) or at the outlet (top) of the tube. The rules below come from the Model P, Px and S data. For Model G no position rule is given, so ask Analyt-MTC before you plan a G meter for a particular position.

- **Gases (P, Px, S):** at the inlet (recommended).
- **Liquids (P, Px, S):** at the inlet or the outlet.
- **Vacuum service:** at the outlet, which is required on Model P, Px and S and recommended on Model T and Tx.
- **Manifolded Model Px meters:** the valves are always in the end block opposite the manifold — at the inlets when the meter is manifolded at the outlet, and the other way round.

If the order does not state a position, Model P, Px, S, T and Tx are delivered with the valves at the inlet.

NOTICE

In vacuum service, put the valve at the outlet, between the meter and the vacuum source (required on Model P, Px and S, recommended on Model T and Tx). Order the meter that way, or move the valve as described below before you connect it.

Moving the valve to the other end

1. Take the flow tubes out of the frame.
2. Fit the tubes back upside down.
3. Turn the whole meter upside down, so that the tubes are upright again and the valve is now at the other end.

Mounting

Meters are delivered ready for panel mounting and are always installed vertically, inlet at the bottom.

- **On the panel:** drill holes for the inlet and outlet fittings and fix the meter with the panel nuts supplied.
- **Behind the panel:** fix the meter with the screws of its front shield.

- **On the bench:** an optional acrylic tripod base turns a panel meter into a free-standing one. The tripod has a spirit level and levelling screws.

NOTICE

A wetted material that is not compatible with your fluid can be attacked by it and damage the meter. Check that every wetted material — tube, float, fittings, O-rings and valve — is compatible with your fluid before you order or change parts. The choice of materials is the user's responsibility. Ask Analyt-MTC if you are not sure.

CHAPTER 4

Choosing a flow tube

The flow capacity tables are measured with air and water at standard conditions. For any other fluid, pressure or temperature, convert your maximum flow into the equivalent flow of air or water, then pick the tube from the tables.

Standard conditions and range

The capacity tables in Flow capacities of millimetre-scale tubes (p. 13) are based on calibrations at standard conditions: 14.7 psia (1 atm) and 70 °F (21.1 °C). Gas flows are standard flows at **21.11 °C, 1013.25 mbar**.

Each value is the tube's maximum flow, at the top of the scale. The usable range is at least 10:1, so as a rule of thumb the lowest flow you can measure is one tenth of the listed value. Choose a tube whose maximum is at or above your highest flow and whose one-tenth point is below your lowest flow.

If your fluid behaves much like air or water and your pressure and temperature are close to standard, use the tables directly. Otherwise, calculate the equivalent flow as shown below.

Gases

$$Q_{air} = K_{gas} \times Q_{gas} \qquad \text{with} \qquad K_{gas} = \sqrt{(G \times T_{act} / T_o \times P_o / P_{act})}$$

Table 4-1 Symbols for gases

Symbol	Meaning
Q_{air}	Equivalent air flow at standard conditions — look this value up in the air column of the tables.
Q_{gas}	Maximum flow of your gas, referred to standard conditions.
G	Specific gravity of your gas, air = 1 (Table A-1 (p. 25)).
T_{act}	Absolute temperature of the gas in the meter, in K (°C + 273.2) or °R.
T_o	Standard temperature: 294 K (530 °R).
P_{act}	Absolute pressure of the gas in the meter (gauge pressure + atmospheric pressure).
P_o	Standard pressure: 14.7 psia. Use the same unit as for P_{act}.

Liquids

$$Q_{water} = K_{liq} \times Q_{liq} \qquad \text{with} \qquad K_{liq} = \sqrt{((d_F - d_W) / (d_F - d_L) \times d_L / d_W)}$$

Table 4-2 Symbols for liquids

Symbol	Meaning
Q_{water}	Equivalent water flow — look this value up in the water column of the tables.
Q_{liq}	Maximum flow of your liquid.
d_F	Density of the float, g/mL (Table 2-1 (p. 6)).
d_L	Density of your liquid at operating conditions, g/mL.
d_W	Density of water at standard conditions: 1.0 g/mL.

K_{liq} depends on the float, so calculate it for the float of the tube you have in mind and check the result in the table for that same float.

Calculation or calibration

NOTICE

The K factors are simplified and serve to **choose** a tube only. They do not turn a reading into an accurate flow rate. For accurate measurement at non-standard conditions, calibrate the meter with your fluid at your operating conditions.

A calibration records the true flow at several points along the scale and turns them into a table or a curve. For a liquid, the volume that passes in a measured time is collected in a burette or volumetric flask at each major scale point. For a gas, a gas volume meter does the same job; the simplest is a soap-bubble meter.

Analyt-MTC calibrates gas flow meters in its own laboratory. Contact Analyt-MTC for a calibration with your gas and at your operating conditions.

CHAPTER 5

Flow capacities of millimetre-scale tubes

The tables give the **maximum flow** of each standard tube and float combination, in mL/min, at standard conditions: 21.11 °C, 1013.25 mbar. Gas flows are referred to these conditions. A tube measures down to one tenth of its maximum or lower.

Air and water are the calibration fluids. For any other fluid or for other operating conditions, first calculate the equivalent air or water flow (Choosing a flow tube (p. 11)). The columns for argon, carbon dioxide, helium, hydrogen, nitrogen and oxygen let you choose directly when one of these gases flows at standard conditions.

The float suffix is the last part of the tube number: `GL` glass, `SA` sapphire, `ST` stainless steel, `CA` Carboloy®, `TA` tantalum. Where the water column shows a dash, no water value is given for that combination. To convert mL/min to scfh, divide by 472.

150 mm tubes

Table 5-1 150 mm tubes, air and water: maximum flow; air at 21.11 °C, 1013.25 mbar

	Air		Water	
Flow tube	smL/min	scfh	mL/min	gph
042-29-GL	11.6	0.024	–	–
042-29-SA	18.3	0.038	–	–
042-29-ST	34	0.07	–	–
042-29-CA	62.8	0.13	–	–
032-41-GL	46.6	0.098	0.50	0.007
032-41-SA	73.1	0.154	0.99	0.015
032-41-ST	138.3	0.293	2.36	0.037
032-41-CA	239.1	0.506	4.60	0.072
032-41-TA	258.7	0.548	5.10	0.080
062-01-GL	91.6	0.194	1.13	0.020
062-01-SA	144.3	0.306	2.19	0.035
062-01-ST	262.2	0.556	4.97	0.079
062-01-CA	431.7	0.915	9.23	0.146
062-01-TA	467.1	0.990	10.15	0.161
112-02-GL	370.6	0.784	5.71	0.090
112-02-SA	513.3	1.087	10.00	0.158
112-02-ST	816.0	1.729	19.2	0.301
112-02-CA	1216.9	2.579	31.6	0.500
112-02-TA	1291.7	2.738	34.1	0.540
082-03-GL	817	1.731	15.2	0.240
082-03-SA	1093	2.316	24.9	0.394
082-03-ST	1665	3.528	44.3	0.702
082-03-CA	2405	5.096	69.0	1.094
082-03-TA	2558	5.420	74.1	1.175

	Air		Water	
Flow tube	smL/min	scfh	mL/min	gph
092-04-GL	2214	4.690	49.9	0.792
092-04-SA	2975	6.300	77.7	1.234
092-04-ST	4494	9.520	132.5	2.092
092-04-CA	6467	13.70	203.2	3.218
092-04-TA	6979	14.79	219	3.471
102-05-GL	3780	8.00	89	1.411
102-05-SA	4942	10.47	134	2.124
102-05-ST	7720	16.35	234	3.70
102-05-CA	10780	22.84	343	5.437
102-05-TA	11287	23.92	361	5.722
034-39-GL	8555	18.12	200	3.170
034-39-SA	11140	23.60	301	4.771
034-39-ST	16493	34.94	498	7.893
034-39-CA	23001	48.73	736	11.67
034-39-TA	24540	51.99	784	12.43
044-40-GL	23105	48.95	579	9.177
044-40-SA	29410	62.30	833	13.2
044-40-ST	42860	90.80	1339	21.22
044-40-CA	60212	127.5	1972	31.26
044-40-TA	65625	139.0	2144	33.98

Table 5-2 150 mm tubes, gases: maximum flow at 21.11 °C, 1013.25 mbar

	Argon		CO_2		Helium		Hydrogen		Nitrogen		Oxygen	
Flow tube	smL/min	scfh	smL/min	scfh	smL/min	scfh	smL/min	scfh	smL/min	scfh	smL/min	scfh
042-29-GL	10.1	0.021	14.9	0.031	10.7	0.023	22.7	0.048	12	0.025	11	0.023
042-29-SA	14.3	0.030	22	0.046	16	0.033	35.8	0.075	18	0.038	16	0.034
042-29-ST	28	0.059	42	0.089	33	0.070	67	0.14	35	0.074	31	0.066
042-29-CA	55	0.116	79	0.167	66	0.14	126	0.26	69	0.146	61	0.129
032-41-GL	38.1	0.080	55.1	0.116	41.1	0.087	95	0.201	48	0.101	42	0.088
032-41-SA	59.1	0.125	83	0.175	66	0.139	151	0.319	74	0.156	65	0.137
032-41-ST	114	0.241	153	0.324	136	0.288	304	0.644	142	0.300	125	0.264
032-41-CA	197	0.417	255	0.540	254	0.538	553	1.171	246	0.521	217	0.459
032-41-TA	215	0.455	276	0.584	281	0.595	609	1.29	268	0.567	237	0.502
062-01-GL	79.2	0.168	112.8	0.239	94	0.200	211	0.447	93	0.197	87	0.185
062-01-SA	119	0.253	156	0.331	149	0.316	327	0.693	148	0.314	131	0.278
062-01-ST	217	0.460	272	0.577	288	0.611	632	1.339	269	0.570	239	0.507
062-01-CA	368	0.780	431	0.914	518	1.098	1100	2.331	443	0.939	396	0.839
062-01-TA	388.3	0.823	464.1	0.983	571.9	1.212	1200.3	2.543	478.8	1.015	429	0.909
112-02-GL	307	0.650	358.3	0.758	453	0.959	981	2.079	378	0.800	340	0.012
112-02-SA	429	0.909	485	1.028	708	1.500	1420	3.009	525	1.112	478	1.013
112-02-ST	682	1.445	740	1.568	1352	2.865	2366	5.013	832	1.763	756	1.621
112-02-CA	1022	2.165	1080	2.288	2228	4.721	3688	7.814	1243	2.634	1141	2.418

	Argon		CO_2		Helium		Hydrogen		Nitrogen		Oxygen	
Flow tube	smL/min	scfh	smL/min	scfh	smL/min	scfh	smL/min	scfh	smL/min	scfh	smL/min	scfh
112-02-TA	1090	2.310	1140.9	2.418	2404.6	5.096	4257	9.020	1321.4	2.799	1211	2.566
082-03-GL	685	1.451	705	1.494	1488	3.153	2459	5.210	834	1.767	761	1.612
082-03-SA	919	1.947	950	2.013	2105	4.460	3546	7.514	1117	2.367	1022	2.165
082-03-ST	1403	2.973	1362	2.886	3443	7.295	5359	11.36	1699	3.600	1573	3.333
082-03-CA	2029	4.299	2076	4.399	5197	11.01	7967	16.88	2452	5.195	2275	4.820
082-03-TA	2159	4.575	2182	4.623	5530	11.72	8511	18.03	2608	5.526	2406	5.098
092-04-GL	1896	4.01	1976	4.18	4727	10.02	7557	16.01	2288	4.84	2113	4.47
092-04-SA	2516	5.33	2610	5.53	6310	13.37	10202	21.62	3032	6.42	2806	5.94
092-04-ST	3805	8.06	3887	8.23	9728	20.61	15754	33.38	4578	9.70	4247	8.99
092-04-CA	5525	11.71	5599	11.86	14158	30.00	23232	49.23	6640	14.07	6170	13.07
092-04-TA	5914	12.53	5954	12.62	15227	32.26	24927	52.82	7103	15.05	6604	13.99
102-05-GL	3148	6.67	3334	6.92	8526	18.07	13164	27.89	3824	8.10	3549	7.52
102-05-SA	4185	8.86	4314	9.14	10384	22.00	17434	36.94	5033	10.66	4672	9.89
102-05-ST	6641	14.06	6520	13.80	16163	34.24	27705	58.69	7992	16.93	7475	15.83
102-05-CA	9082	19.24	8976	19.02	23416	49.62	39080	82.81	10974	23.25	10185	21.58
102-05-TA	9573	20.28	9351	19.81	24794	52.54	40968	86.81	11490	24.35	10697	22.67
034-39-GL	7266	15.39	7304	15.47	19040	40.33	29795	63.12	8695	18.42	8091	17.14
034-39-SA	9373	19.85	9406	19.92	24810	52.56	39101	82.84	11270	23.87	10535	22.31
034-39-ST	13977	29.61	13728	29.08	39280	83.22	58968	124.9	16794	35.58	15610	33.07
034-39-CA	19580	41.48	19296	40.88	54965	116.4	84023	178.0	23444	49.66	22000	46.61
034-39-TA	20938	44.36	20543	43.52	60207	127.5	89109	188.7	25084	53.14	23500	49.78
044-40-GL	19472	41.25	19220	40.72	53552	113.4	83730	177.3	23432	49.64	21832	46.25
044-40-SA	24878	52.70	24263	51.40	71100	150.6	106992	226.6	29798	63.13	27937	59.26
044-40-ST	36564	77.46	35541	75.29	106151	224.8	157719	334.1	43607	92.38	41076	87.02
044-40-CA	51689	109.5	50243	106.4	161232	341.5	224353	475.3	61653	130.6	57480	121.7
044-40-TA	55248	117.0	53771	113.9	171090	362.4	243016	514.8	66954	141.8	61892	131.1

65 mm tubes

Table 5-3 65 mm tubes, air and water: maximum flow; air at 21.11 °C, 1013.25 mbar

	Air		Water	
Flow tube	smL/min	scfh	mL/min	gph
042-07-GL	5.8	0.013	–	–
042-07-SA	9	0.017	–	–
042-07-ST	19	0.036	–	–
042-07-CA	33	0.070	–	–
042-07-TA	36	0.072	–	–
032-15-GL	49	0.104	0.55	0.009
032-15-SA	74	0.153	0.98	0.016
032-15-ST	145	0.307	2.38	0.038
032-15-CA	246	0.528	4.60	0.073

	Air		Water	
Flow tube	smL/min	scfh	mL/min	gph
032-15-TA	271	0.578	5.25	0.084
022-13-GL	107	0.22	1.28	0.020
022-13-SA	167	0.35	2.60	0.041
022-13-ST	314	0.66	6.15	0.098
022-13-CA	517	1.09	11.21	0.179
022-13-TA	563	1.19	12.67	0.202
012-10-GL	216	0.46	3.0	0.048
012-10-SA	320	0.68	5.7	0.091
012-10-ST	538	1.14	11.7	0.187
012-10-CA	826	1.75	20.0	0.320
012-10-TA	898	1.90	22.1	0.353
052-01-GL	1036	2.42	20	0.320
052-01-SA	1383	2.93	33	0.527
052-01-ST	2088	4.42	57	0.912
052-01-CA	3007	6.37	89	1.42
052-01-TA	3196	6.77	95	1.52
023-92-GL	1249	2.65	25	0.396
023-92-SA	1623	3.44	36.7	0.581
023-92-ST	2520	5.34	70.7	1.121
023-92-CA	3680	7.80	103.5	1.641
013-88-GL	2030	4.3	40.01	0.641
013-88-SA	2655	5.62	63.1	1.0
013-88-ST	4041	8.56	111.2	1.76
013-88-CA	5769	12.22	169.9	2.69
365-02-GL	2522	5.35	54.7	0.86
365-02-ST	4917	10.42	143	2.26
014-96-GL	6318	13.4	147	2.33
014-96-SA	8145	17.3	217	3.44
014-96-ST	12058	25.5	364	5.77
014-96-CA	16943	35.8	540	8.56
014-96-TA	18213	38.6	568	9.00
054-17-GL	12860	27.2	307	4.86
054-17-SA	16617	35.2	449	7.11
054-17-ST	24452	51.8	723	11.46
054-17-CA	34507	73.1	1049	16.63
054-17-TA	36466	77.2	1111	17.61
064-63-GL	21969	46.5	550	8.71
064-63-SA	28518	60.4	811	12.85
064-63-ST	41289	87.4	1297	20.56
064-63-CA	58348	123.6	1895	30.04
064-63-TA	61299	129.9	2000	31.70

Table 5-4 65 mm tubes, gases: maximum flow at 21.11 °C, 1013.25 mbar

Flow tube	Argon		CO_2		Helium		Hydrogen		Nitrogen		Oxygen	
	smL/min	scfh	smL/min	scfh	smL/min	scfh	smL/min	scfh	smL/min	scfh	smL/min	scfh
042-07-GL	4	0.01	6.5	0.01	5.5	0.01	9.6	0.02	6	0.01	5	0.01
042-07-SA	7.7	0.02	10	0.02	8	0.02	15.3	0.03	9	0.02	7	0.01
042-07-ST	14	0.03	20	0.04	16	0.03	32.3	0.07	18	0.04	15	0.03
042-07-CA	28	0.06	39	0.08	30	0.06	53.6	0.11	34	0.07	29	0.06
042-07-TA	29	0.06	40	0.08	32	0.07	64.8	0.14	34	0.07	30	0.06
032-15-GL	38	0.08	59	0.13	47	0.10	100	0.21	51	0.11	46	0.10
032-15-SA	63	0.13	90	0.19	71	0.15	150	0.32	78	0.17	72	0.15
032-15-ST	122	0.26	160	0.34	146	0.31	314	0.67	149	0.32	132	0.28
032-15-CA	214	0.45	263	0.56	274	0.58	593	1.26	264	0.56	239	0.51
032-15-TA	224	0.47	279	0.59	294	0.62	654	1.39	276	0.58	248	0.53
022-13-GL	87	0.18	126	0.26	101	0.21	237	0.50	109	0.23	96	0.20
022-13-SA	137	0.29	189	0.40	161	0.34	386	0.81	173	0.36	151	0.31
022-13-ST	265	0.56	330	0.69	335	0.70	777	1.64	332	0.70	295	0.62
022-13-CA	432	0.91	499	1.05	600	1.27	1352	2.86	535	1.13	482	1.02
022-13-TA	472	1.00	539	1.14	675	1.43	1492	3.16	581	1.23	525	1.11
012-10-GL	170	0.36	223	0.48	208	0.44	527	1.12	214	0.46	189	0.4
012-10-SA	255	0.54	311	0.66	329	0.7	818	1.74	318	0.68	285	0.61
012-10-ST	448	0.95	503	1.07	672	1.43	1459	3.1	541	1.15	499	1.06
012-10-CA	687	1.46	738	1.57	1196	2.54	2346	4.97	838	1.78	769	1.63
012-10-TA	732	1.55	786	1.67	1325	2.81	2575	5.46	890	1.89	817	1.73
052-01-GL	886	1.87	939	1.98	2070	4.38	3294	6.98	1086	2.30	1003	2.12
052-01-SA	1185	2.51	1227	2.59	2852	6.04	4477	9.49	1419	3.00	1344	2.84
052-01-ST	1794	3.80	1838	3.89	4573	9.68	7061	14.96	2164	4.58	2022	4.28
052-01-CA	2573	5.45	2629	5.56	6762	14.32	10394	21.93	3105	6.57	2912	6.16

Flow tube	Argon		CO_2		Helium		Hydrogen		Nitrogen		Oxygen	
	smL/min	scfh	smL/min	scfh	smL/min	scfh	smL/min	scfh	smL/min	scfh	smL/min	scfh
052-01-TA	2742	5.80	2774	5.87	7190	15.23	11 056	23.43	3293	6.97	3094	6.55
023-92-GL	1030	2.19	1114	2.36	1934	4.10	3590	7.61	1251	2.65	1150	2.44
023-92-SA	1399	2.97	1494	3.17	2878	6.10	5022	10.64	1702	3.61	1568	3.33
023-92-ST	2141	4.54	2224	4.72	4886	10.36	8251	17.48	2576	5.46	2381	5.05
023-92-CA	3103	6.58	3194	6.77	7580	16.06	12 517	26.52	3767	7.98	3480	7.38
013-88-GL	1729	3.66	1795	3.8	3371	7.14	6335	13.42	2077	4.40	1927	4.08
013-88-SA	2286	4.84	2347	4.97	4882	10.34	8482	17.97	2762	5.85	2560	5.42
013-88-ST	3426	7.33	3498	7.41	8541	18.09	13 362	28.3	4124	8.73	3867	8.19
013-88-CA	4928	10.50	4999	10.59	12 885	27.29	19 542	41.4	5869	12.43	5529	11.71
365-02-GL	2106	4.47	2188	4.64	4748	10.06	7770	16.47	2563	5.43	2373	5.03
365-02-ST	4141	8.78	4106	8.70	10 903	23.10	16 980	35.98	5034	10.67	4657	9.87
014-96-GL	5290	11.21	5379	11.4	13 639	28.9	21 327	45.2	6380	13.52	5880	12.45
014-96-SA	6900	14.62	6980	14.79	18 280	39.19	28 211	59.77	8280	17.54	7690	16.29
014-96-ST	10 175	21.56	10 150	21.50	27 300	57.84	41 889	88.76	12 058	25.55	11 250	23.83
014-96-CA	14 293	30.28	14 200	30.08	40 036	84.84	58 498	123.9	17 253	36.55	16 031	33.97
014-96-TA	15 168	32.14	15 088	36.55	42 396	89.84	63 885	135.4	18 250	38.67	16 939	35.89
054-17-GL	10 895	23.09	10 811	22.91	29 355	62.20	47 100	99.8	13 096	27.75	12 166	25.78
054-17-SA	14 085	29.85	14 000	29.67	38 325	81.20	61 715	130.7	16 919	35.85	15 733	33.34
054-17-ST	20 740	43.94	20 307	43.03	57 120	121.0	90 323	191.3	24 891	52.74	23 174	49.10
054-17-CA	29 280	62.04	28 420	60.22	81 800	173.3	130 805	277.1	35 122	74.42	32 724	69.33
054-17-TA	30 944	65.56	30 570	64.77	87 573	185.5	139 224	294.9	37 115	78.64	34 585	73.28
064-63-GL	18 625	39.46	18 159	38.48	50 441	106.87	79 680	168.82	22 501	47.68	20 812	44.10
064-63-SA	24 193	51.26	23 513	49.82	66 312	140.50	104 110	220.58	29 027	61.50	27 038	57.29
064-63-ST	35 263	74.71	34 151	72.36	104 993	222.45	152 772	323.67	41 985	88.96	39 416	83.51
064-63-CA	49 534	104.95	47 860	101.40	143 606	304.25	215 595	456.77	59 377	125.80	55 375	117.32

Flow tube	Argon		CO_2		Helium		Hydrogen		Nitrogen		Oxygen	
	smL/min	scfh	smL/min	scfh	smL/min	scfh	smL/min	scfh	smL/min	scfh	smL/min	scfh
064-63-TA	52041	110.26	50268	106.50	156768	332.14	226636	480.17	62380	132.17	57772	122.40

Gas proportioner tubes at 50 psig

A Model G gas proportioner meters each gas through its own 150 mm tube and blends the streams in a mixing tube. Its flows do not change with the downstream pressure as long as the back pressure stays well below the inlet pressure. The inlet pressure can be up to 200 psig (13.8 bar g); 50 psig (3.5 bar g) is a convenient setting, and the table below is based on it.

Table 5-5 Model G, 150 mm tubes at 50 psig (3.5 bar g) inlet pressure: maximum flow, mL/min (standard)

	Maximum flow, mL/min (standard)						
Flow tube	Air	Argon	CO_2	Helium	Hydrogen	Nitrogen	Oxygen
032-41-GL	191	161	203	195	399	197	166
032-41-SA	270	229	279	302	662	283	246
032-41-ST	460	383	478	573	1185	471	442
032-41-CA	743	625	702	1094	2013	771	719
062-01-GL	324	270	346	333	844	331	294
062-01-SA	505	412	494	569	1209	467	460
062-01-ST	825	687	771	1089	2432	833	764
062-01-CA	1275	1062	1132	1972	3732	1303	1175
112-02-GL	1086	855	934	1779	3110	1016	930
112-02-SA	1324	1115	1168	2468	4289	1340	1228
112-02-ST	2024	1717	1724	4083	6740	2034	1905
112-02-CA	2912	2472	2521	6927	9979	2997	2703
082-03-GL	2008	1697	1747	4214	6711	2039	1865
082-03-SA	2590	2186	2264	5656	8995	2643	2503
082-03-ST	3903	3274	3343	8669	14490	3731	3685
082-03-CA	5547	4697	4691	12717	19993	6169	5210
092-04-GL	5528	4794	4954	12540	18862	5801	5381
092-04-SA	7240	6163	6217	15703	25235	7415	6826
092-04-ST	10813	9077	9178	24629	38556	11044	10335
092-04-CA	15322	12904	12879	34709	55936	15433	14451
102-05-GL	9294	7705	7888	19830	30900	9419	8749
102-05-SA	11647	9969	10042	26008	45263	11955	11137
102-05-ST	17311	14489	14420	40831	60300	17525	16353
102-05-CA	24065	20744	20099	59702	86369	24549	22905
034-39-GL	19767	17978	17936	48193	73500	21676	19931
034-39-SA	27514	23001	54010	63240	97000	27449	25800
034-39-ST	38995	33778	33087	98676	142000	40086	36821
034-39-CA	55293	47151	45745	139847	200500	55930	52494
044-40-GL	49374	41899	40520	125617	182239	50258	46851
044-40-SA	62480	53038	51220	159976	231239	63595	59304
044-40-ST	89880	76322	73584	231946	333775	91478	85341
044-40-CA	123846	105182	101303	321265	460942	126041	117615

CHAPTER 6

Direct-reading flow tubes

Direct-reading tubes carry a scale in flow units. The standard tubes below are drawn for the fluid named in each table at 1 atm absolute (14.7 psia). The full-scale value is the flow at the top of the scale; the scale is in the unit shown.

Each tube is valid for its fluid and conditions only. For other fluids or conditions, use a millimetre-scale tube (Chapter 5 (p. 13)), or ask Analyt-MTC for a direct-reading scale drawn for your application.

Table 6-1 Air

65 mm tubes			150 mm tubes		
Flow tube	**Full scale**	**Unit**	**Flow tube**	**Full scale**	**Unit**
042-10-GL	7	mL/min	042-12-SA	25	mL/min
032-01-ST	50	mL/min	032-06-SA	52	mL/min
062-04-ST	75	mL/min	042-06-CA	75	mL/min
022-14-GL	100	mL/min	032-10-ST	100	mL/min
032-11-ST	130	mL/min	032-21-ST	150	mL/min
032-03-CA	250	mL/min	062-03-ST	200	mL/min
022-05-CA	500	mL/min	112-10-GL	300	mL/min
052-12-GL	1000	mL/min	112-08-SA	500	mL/min
052-04-GL	1	L/min	082-02-GL	800	mL/min
023-03-GL	1.15	L/min	112-19-CA	1.25	L/min
052-07-ST	2	L/min	082-12-ST	1.8	L/min
013-89-ST	4	L/min	092-25-GL	2.5	L/min
014-03-GL	5	L/min	102-07-GL	4	L/min
014-02-ST	10	L/min	102-03-SA	4.5	L/min
044-11-ST	16	L/min	092-14-ST	4.8	L/min
054-01-ST	25	L/min	102-01-SA	5	L/min
064-03-ST	40	L/min	102-16-CA	10	L/min
052-05-GL	2.2	scfh	034-13-ST	17	L/min
365-18-GL	6	scfh	044-14-GL	23	L/min
365-19-ST	10	scfh	044-41-ST	42	L/min
034-61-ST	18	scfh	044-16-CA	60	L/min
014-17-ST	25	scfh	112-01-CA	2.5	scfh
054-02-ST	50	scfh	092-09-GL	5	scfh
064-62-ST	90	scfh	102-06-GL	8.25	scfh
074-02-CA	150	scfh	092-10-ST	10	scfh
014-01-CA	0.6	scfm	102-08-ST	16.5	scfh
			102-09-CA	23	scfh
			044-05-GL	55	scfh
			044-18-ST	90	scfh
			044-07-ST	94	scfh
			044-23-SA	1	scfm
			044-43-ST	1.5	scfm

Table 6-2 Water

65 mm tubes			150 mm tubes		
Flow tube	**Full scale**	**Unit**	**Flow tube**	**Full scale**	**Unit**
032-04-GL	0.5	mL/min	032-05-SA	1	mL/min
022-08-ST	6	mL/min	112-12-SA	10	mL/min
052-08-ST	60	mL/min	112-05-ST	20	mL/min
013-02-ST	115	mL/min	092-02-GL	50	mL/min
365-01-ST	150	mL/min	092-08-GL	60	mL/min
044-09-GL	250	mL/min	102-11-GL	100	mL/min
064-05-GL	500	mL/min	092-06-CA	200	mL/min
054-03-ST	750	mL/min	044-15-ST	1.2	L/min
052-16-ST	3	L/h	044-01-TA	2	L/min
064-04-SA	1	L/min	044-10-CA	29	gph
064-06-ST	1.2	L/min	044-12-SA	0.22	gpm
064-12-GL	10	gph	044-42-CA	0.45	gpm
064-09-CA	24	gph			
064-11-TA	32	gph			

Table 6-3 Argon

65 mm tubes			150 mm tubes		
Flow tube	**Full scale**	**Unit**	**Flow tube**	**Full scale**	**Unit**
052-15-SA	1000	mL/min	032-18-GL	33	mL/min
013-09-CA	4.5	L/min	062-10-CA	325	mL/min
064-14-SA	26	L/min	082-11-CA	2	L/min
023-05-GL	2.5	scfh	034-07-ST	15	L/min
365-17-ST	10	scfh	044-22-SA	25	L/min
014-14-ST	22	scfh			
064-01-GL	50	scfh			

Table 6-4 Carbon dioxide

65 mm tubes			150 mm tubes		
Flow tube	**Full scale**	**Unit**	**Flow tube**	**Full scale**	**Unit**
042-20-SA	10	mL/min	062-09-GL	100	mL/min
042-09-ST	20	mL/min	032-32-ST	150	mL/min
032-20-GL	55	mL/min	062-14-ST	300	mL/min
022-24-SA	220	mL/min	092-18-SA	2.5	L/min
052-14-GL	1	L/min	034-18-SA	10	L/min
023-07-ST	2	L/min			
014-18-GL	6	L/min			
014-19-ST	10	L/min			
064-08-ST	35	L/min			

Table 6-5 Fuel oil, methane and nitrous oxide

Fluid	Tube length	Flow tube	Full scale	Unit
Fuel oil	150 mm	034-60-GL	3	gph
Methane	65 mm	042-03-ST	40	mL/min
Nitrous oxide	150 mm	112-11-SA	500	mL/min

Table 6-6 Helium

65 mm tubes			150 mm tubes		
Flow tube	Full scale	Unit	Flow tube	Full scale	Unit
032-07-SA	65	mL/min	062-13-GL	100	mL/min
022-02-GL	120	mL/min	062-07-CA	500	mL/min
014-04-GL	30	scfh	082-05-GL	1500	mL/min
			082-07-CA	5	L/min
			034-09-ST	40	L/min

Table 6-7 Hydrogen

65 mm tubes			150 mm tubes		
Flow tube	Full scale	Unit	Flow tube	Full scale	Unit
032-13-GL	35	mL/min	032-12-GL	100	mL/min
042-01-CA	100	mL/min	092-15-SA	20	scfh
032-02-SA	150	mL/min	044-20-SA	225	scfh
012-01-GL	600	mL/min			
022-01-CA	1.5	L/min			
023-01-GL	3.5	L/min			
013-01-GL	6	L/min			
014-15-ST	42	L/min			
013-08-ST	30	scfh			

Table 6-8 Nitrogen

65 mm tubes			150 mm tubes		
Flow tube	Full scale	Unit	Flow tube	Full scale	Unit
042-08-GL	6	mL/min	032-31-GL	50	mL/min
032-16-ST	50	mL/min	062-12-GL	100	mL/min
032-08-SA	60	mL/min	032-22-CA	200	mL/min
022-15-GL	120	mL/min	062-30-CA	300	mL/min
022-06-SA	200	mL/min	112-06-SA	500	mL/min
014-16-ST	12	L/min	092-05-GL	2	L/min
064-13-GL	20	L/min	102-21-ST	7	L/min
			034-24-ST	14	L/min
			044-25-CA	50	L/min
			044-24-TA	66	L/min
			044-06-ST	1.6	scfm

Table 6-9 Oxygen

65 mm tubes			150 mm tubes		
Flow tube	**Full scale**	**Unit**	**Flow tube**	**Full scale**	**Unit**
042-21-ST	10	mL/min	032-33-ST	150	mL/min
032-09-GL	35	mL/min	062-02-ST	250	mL/min
032-19-GL	50	mL/min	112-04-SA	400	mL/min
022-07-ST	300	mL/min	062-16-CA	600	mL/min
012-02-ST	500	mL/min	082-08-SA	1	L/min
052-02-GL	1	L/min	102-12-SA	5	L/min
013-25-ST	4	L/min	034-77-SA	10	L/min
034-08-ST	8	L/min	034-15-ST	16.5	L/min
044-04-ST	15	L/min			

Table 6-10 Propane

65 mm tubes			150 mm tubes		
Flow tube	**Full scale**	**Unit**	**Flow tube**	**Full scale**	**Unit**
none			092-01-ST	4.2	L/min
			102-02-CA	10	L/min
			044-02-ST	38	L/min

APPENDIX A

Gas data

Use the specific gravity G in the sizing formula for gases (Gases (p. 11)). Density and viscosity are given for reference.

Table A-1 Density, viscosity and specific gravity of gases

Gas	Density (g/mL)	Viscosity (cP)	Specific gravity G (air = 1)
Acetylene	0.001090	0.00988	0.9073
Air	0.001200	0.01812	1.0000
Ammonia	0.000716	0.00994	0.5963
Argon	0.001660	0.02220	1.3796
Butane	0.002484	0.00848	2.0854
Carbon dioxide	0.001835	0.01470	1.5290
Carbon monoxide	0.001163	0.01750	0.9671
Chlorine	0.002983	0.01330	2.4860
Ethane	0.001260	0.00901	1.0493
Ethylene	0.001170	0.00994	0.9749
Helium	0.0001656	0.01980	0.13804
Hydrogen	0.0000834	0.00885	0.06952
Hydrogen chloride	0.001512	0.01560	1.2678
Methane	0.0006653	0.01099	0.5544
Nitrogen	0.001160	0.01756	0.96724
Nitrous oxide	0.001833	0.01453	1.5297
Oxygen	0.001326	0.02030	1.10527
Propane	0.001874	0.00805	1.5620
Sulfur dioxide	0.002717	0.01270	2.2638

APPENDIX B

Unit conversions

Multiply a value in the unit on the left by the factor to obtain the unit on the right. US gallons and US fluid ounces throughout.

Table B-1 Flow

Multiply	by	to obtain
mL/min	0.001	L/min
mL/min	3.531×10^{-5}	ft³/min
mL/min	1.585×10^{-2}	gal/h
cm³/min (cc/min)	1	mL/min
ft³/h (scfh)	472	mL/min
ft³/min (scfm)	28.31	L/min
ft³/min (scfm)	1.699	m³/h
gal/min (gpm)	3785	mL/min
oz/min	29.57	mL/min

Table B-2 Density

Multiply	by	to obtain
g/mL	62.43	lb/ft³
g/mL	0.03613	lb/in³

Table B-3 Length

Multiply	by	to obtain
in	25.4	mm
ft	0.3048	m
yd	0.9144	m
Å	–	m

Table B-4 Pressure

Multiply	by	to obtain
psi	0.0689	bar
psi	68.95	mbar
psi	6.895	kPa
psi	6895	Pa
psi	0.07031	kg/cm²
psi	27.71	in H_2O
psi	703.1	mm H_2O
psi	2.036	in Hg
psi	51.75	mm Hg
atm	14.70	psi
atm	1.0333	kg/cm²

Table B-5 Temperature

°F = 1.8 × °C + 32
°C = (°F − 32) × 0.555
K = °C + 273.2

Table B-6 Common equivalents and conversions

1 unit	Approximate equivalent	Multiply by, accurate to parts per million	To obtain
in	25 mm	25.4 *	mm
ft	0.3 m	0.3048 *	m
yd	0.9 m	0.9144 *	m
mi	1.6 km	–	km
in²	6.5 cm²	6.4516 *	cm²
ft²	0.09 m²	–	m²
yd²	0.8 m²	0.836 127	m²
acre	0.4 ha +	0.404 686	ha
in³	16 cm³	16.3871	cm³
ft³	0.03 m³	–	m³
yd³	0.8 m³	0.764 555	m³
qt (lq)	1 L +	0.946 353	L
gal	0.004 m³	0.003 785 41	m³
oz (avdp)	28 g	28.3495	g
lb (avdp)	0.45 kg	0.453 592	kg
hp	0.75 kW	0.745 700	kW
mm	0.04 in	0.039 370 1	in
m	3.3 ft	3.280 84	ft
m	1.1 yd	1.093 61	yd
km	0.6 mi	0.621 371	mi
cm²	0.16 in²	0.155 000	in²
m²	11 ft²	10.7639	ft²
m²	1.2 yd²	1.195 99	yd²
ha +	2.5 acre	2.471 05	acre
cm³	–	0.061 623 7	in³
m³	35 ft³	35.3147	ft³
m³	1.3 yd³	1.307 95	yd³
L +	1 qt	1.056 69	qt (lq)
m³	250 gal	264.172	gal
g	0.035 oz (avdp)	0.035 274 0	oz (avdp)
kg	2.2 lb (avdp)	2.204 62	lb (avdp)
kW	1.3 hp	1.341 02	hp

* exact. + common term not used in SI. – not printed: the value in the source is misprinted. Source: NBS Special Publication 304.

Table B-6 Common equivalents and conversions (continued): prefixes for all SI units

Multiple or submultiple	Power of ten	Prefix	Symbol
1 000 000 000 000	10^{12}	tera	T
1 000 000 000	10^{9}	giga	G
1 000 000	10^{6}	mega	M
1000	10^{3}	kilo	k
100	10^{2}	hecto	h
10	10^{1}	deka	da
0.1	10^{-1}	deci	d
0.01	10^{-2}	centi	c
0.001	10^{-3}	milli	m
0.000 001	10^{-6}	micro	μ
0.000 000 001	10^{-9}	nano	n
0.000 000 000 001	10^{-12}	pico	p
0.000 000 000 000 001	10^{-15}	femto	f
0.000 000 000 000 000 001	10^{-18}	atto	a

Source: NBS Special Publication 304.

CHAPTER 7

Contacts

Contact and support

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Before you call

Have the following at hand so that Analyt-MTC can help you quickly:

- the meter model, the flow tube number and the float (for example 082-03-ST);
- the fluid, the flow range you need, and the operating pressure and temperature;
- for a liquid, its density; for a gas mixture, its composition.

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