Vacuum Symbols

All symbols, except those marked [1] may be used in any orientation.

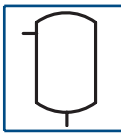
The symbols for vacuum pumps should always be so positioned that the narrowing lines point to the side of higher pressure.

[1] These symbols must only be used in the indicated position (tip of the triangle pointing downwards)

Vacuum Pumps

	Vacuum pump, general
	Piston vacuum pump
	Diaphragm vacuum pump
	Rotary positive displacement pump
	Rotary piston vacuum pump
	Sliding vane rotary vacuum pump
	Rotary plunger vacuum pump
	Liquid ring vacuum pump
	Roots vacuum pump
	Turbine vacuum pump, general
	Turboradial vacuum pump
	Turboraxial vacuum pump
	Turbomolecular pump
	Ejector vacuum pump
	Diffusion pump
	Adsorption pump
	Getter pump
	Sputter-ion pump
	Cryopump
	Scroll vacuum pump

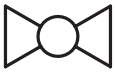
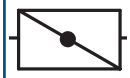
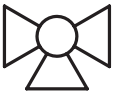
Container

	Vessel with crowned ends, general
	Vacuum bell jar

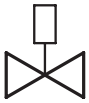
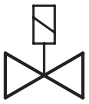
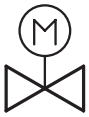
Accessories

 Seperator, general	 Seperator with heat exchange, (e. g. cooled)	 Gas filter, air filter, general
 Filter or filter device, general	 Vapour baffle, general	 Vapour baffle, cooled (with heat exchange)
 Cold trap, general	 Cold trap with supply reservoir	 Cold trap

Isolating Devices

 Shut-off fitting, general	 Gate valve	 Shut-off valve, Straight-line valve
 Right-angle valve	 Shut-off device with safety function	 Stopcock
 Butterfly valve	 Right-angle stopcock	 Three-way stopcock
 Check valve		

Valve Actuation

	Manual operation
	Metering valve
	Fluid drive (hydraulic or magnetic)
	Solenoid operation
	Electric motor drive
	Weight-actuated

Connections and Piping

	Flange connector, general
	Flange connector, bolted
	Small flange connector
	Clamped flange connector
	Threaded pipe connector
	Ball-and-socket joint
	Spigot-and-socket joint
	Connection by taper ground joint
	Flange connector, general
	Change in pipe cross section (e.g. reducer nipple)
	Junction of two pipes with communication
	Cross-over of two pipes without communication
	Branch point
	Bundle pipes
	Port allowing sliding motion, with flange
	Linear motion feedthrough
	Rotary and linear motion feedthrough
	Rotary motion feedthrough
	Electric current feedthrough

Vacuum Measurement and Gauges

	[1] Vacuum (to indicate the presence of a vacuum)
	[1] Vacuum measurement, Vacuum measurement point
	[1] Vacuum gauge
	[1] Recording vacuum gauge (writing)
	[1] Vacuum gauge with analogue display
	[1] Vacuum gauge with digital display
	Flow measurement

[1] These symbols must only be used in the indicated position (tip of the triangle pointing downwards)

Pressure Units

	bar	mbar	Pa	atm	Torr	mTorr
1 bar	1	10^3	10^5	0.987	0.750×10^3	0.750×10^6
1 mbar	10^{-3}	1	10^2	0.987×10^{-3}	0.750	0.750×10^3
1 Pa [1] (N x m^{-2})	10^{-5}	10^{-2}	1	0.987×10^{-5}	0.750×10^{-2}	0.750×10^1
1 atm = 760 Torr	1.01	1.01×10^3	1.01×10^5	1	0.760×10^3	0.760×10^6
1 Torr	1.33×10^{-3}	1.33	1.33×10^2	1.32×10^{-3}	1	10^3
1 mTorr	1.33×10^{-6}	1.33×10^{-3}	1.33×10^{-1}	1.32×10^{-6}	10^{-3}	1

[1] Pa = Pascal

On the basis of international agreements (ISO/R 1000) and the regulations which apply in the Federal Republic of Germany based on these (laws on the units used in metrology) as well as the Vacuum Engineering Standards (DIN 28 400 and subsequent numbers) we have adapted the characteristic quantities stated in this catalog to the current regulations.

The table gives the conversion factors between commonly used pressure units.

1 mbar x l x s^{-1} ≙ 60 sccm

All dimensions given in the technical drawings are stated in mm.
Dimensions in ( ) are stated in inch.
The products of Leybold Vacuum are subject to continual further development; thus the technical data or the dimensional drawings are subject to change without prior notice.

Conversion Factors

1 inch	**2.54 cm**
1 ft	**30.48 cm**
1 sq inch	**6.45 cm^2**
1 sqft	**0.0929 m^2**
1 cu inch	**923.03 cm^3**
1 cu ft	**28.32 liter**
1 US gallon	**3.78 liter**
1 Imp gallon	**4.54 liter**
1 micron	**1.33 x 10^{-3} mbar**
1 qt	**0.946 liter**
1 lb	**0.453 kg**
1 hp	**735 W**
1 r.p.m.	**1 min^{-1}**

Temperature

°C	°F
0	32
10	50
20	68
30	86
40	104
50	122
60	140
70	158
80	176
90	194
100	212

°F = 1.8 x °C + 32

Pressure

psi	bar
1.0	0.07
10	0.70
14.5	1.00
20	1.38
30	2.07
40	2.76
50	3.45
60	4.14
70	4.83
80	5.51
90	6.20
100	6.90

Various pressure units

mbar (millibar)	Torr	inches Hg vacuum
1013	760	0
400	300	18.12
133	100	25.98
4	3	29.80
1	0.75	29.89
0	0	29.92

Various pumping speed units

	$m^3 \times h^{-1}$	$l \times s^{-1}$	cfm
$m^3 \times h^{-1} = m^3/h$	1.0	0.278	0.589
$l \times s^{-1} = l/s$	3.60	1.0	2.12
cfm (cubic feet per minute)	1.699	0.472	1.0

Example: 1 $m^3 \times h^{-1}$ = 0.589 cfm

Please note: The nominal pumping speed of a pump at 60 Hz is 20% higher than at 50 Hz

Dimensions

Inches	Inches	mm
1/8	0.1250	3.1750
1/4	0.2500	6.3500
3.8	0.3750	9.5250
1/2	0.5000	12.7000
3/4	0.7500	19.0500
1/1	1.0000	25.4000

Various flow rate units

	mbar x l x s^{-1}	kg x h^{-1}	$cm^3 \times h^{-1}$	slm
mbar x l x s^{-1}	1.0	4.28 x 10^{-3}	0.987	59.2 x 10^{-3}
kg x h^{-1} (0 °C)	218	1.0	215	12.91
$cm^3 \times h^{-1}$ (NTP)	2.81 x 10^{-4}	1.2 x 10^{-6}	1.0	1.66 x 10^{-5}
slm (standard liter per minute)	16.88	72.15 x 10^{-3}	16.67	1.0