



**VALVE AND FLOW CONTROL SPECIALISTS**  
*SERVICE AND RELIABILITY*

# ASSOCIATED ENGINEERING DATA FOR VALVING

## PRESSURE CONVERSIONS TEMPERATURE CONVERSIONS TORQUE CONVERSIONS

**The Periodic Table of Elements**

1		2										13										14						15						16						17		18									
1	<b>H</b> Hydrogen 1.008											5	<b>B</b> Boron 10.811	6	<b>C</b> Carbon 12.011	7	<b>N</b> Nitrogen 14.007	8	<b>O</b> Oxygen 15.999	9	<b>F</b> Fluorine 18.998	10	<b>Ne</b> Neon 20.180											13	<b>Al</b> Aluminum 26.982	14	<b>Si</b> Silicon 28.086	15	<b>P</b> Phosphorus 30.974	16	<b>S</b> Sulfur 32.065	17	<b>Cl</b> Chlorine 35.453	18	<b>Ar</b> Argon 39.948						
2	<b>Li</b> Lithium 6.941	3	<b>Be</b> Beryllium 9.012											19	<b>K</b> Potassium 39.098	20	<b>Ca</b> Calcium 40.078	21	<b>Sc</b> Scandium 44.956	22	<b>Ti</b> Titanium 47.88	23	<b>V</b> Vanadium 50.942	24	<b>Cr</b> Chromium 51.996	25	<b>Mn</b> Manganese 54.938	26	<b>Fe</b> Iron 55.845	27	<b>Co</b> Cobalt 58.933	28	<b>Ni</b> Nickel 58.693	29	<b>Cu</b> Copper 63.546	30	<b>Zn</b> Zinc 65.38	31	<b>Ga</b> Gallium 69.723	32	<b>Ge</b> Germanium 72.631	33	<b>As</b> Arsenic 74.922	34	<b>Se</b> Selenium 78.971	35	<b>Br</b> Bromine 79.904	36	<b>Kr</b> Krypton 84.798		
3	<b>Na</b> Sodium 22.990	4	<b>Mg</b> Magnesium 24.305											37	<b>Rb</b> Rubidium 85.468	38	<b>Sr</b> Strontium 87.62	39	<b>Y</b> Yttrium 88.906	40	<b>Zr</b> Zirconium 91.224	41	<b>Nb</b> Niobium 92.906	42	<b>Mo</b> Molybdenum 95.95	43	<b>Tc</b> Technetium 98.907	44	<b>Ru</b> Ruthenium 101.07	45	<b>Rh</b> Rhodium 102.906	46	<b>Pd</b> Palladium 106.42	47	<b>Ag</b> Silver 107.868	48	<b>Cd</b> Cadmium 112.414	49	<b>In</b> Indium 114.818	50	<b>Sn</b> Tin 118.710	51	<b>Sb</b> Antimony 121.760	52	<b>Te</b> Tellurium 127.6	53	<b>I</b> Iodine 126.905	54	<b>Xe</b> Xenon 131.294		
4	<b>K</b>	<b>Ca</b>	<b>Sc</b>	<b>Ti</b>	<b>V</b>	<b>Cr</b>	<b>Mn</b>	<b>Fe</b>	<b>Co</b>	<b>Ni</b>	<b>Cu</b>	<b>Zn</b>	<b>Ga</b>	<b>Ge</b>	<b>As</b>	<b>Se</b>	<b>Br</b>	<b>Kr</b>																																	
5	<b>Rb</b>	<b>Sr</b>	<b>Y</b>	<b>Zr</b>	<b>Nb</b>	<b>Mo</b>	<b>Tc</b>	<b>Ru</b>	<b>Rh</b>	<b>Pd</b>	<b>Ag</b>	<b>Cd</b>	<b>In</b>	<b>Sn</b>	<b>Sb</b>	<b>Te</b>	<b>I</b>	<b>Xe</b>																																	
6	<b>Cs</b>	<b>Ba</b>	<b>* 57-71</b>	<b>Hf</b>	<b>Ta</b>	<b>W</b>	<b>Re</b>	<b>Os</b>	<b>Ir</b>	<b>Pt</b>	<b>Au</b>	<b>Hg</b>	<b>Tl</b>	<b>Pb</b>	<b>Bi</b>	<b>Po</b>	<b>At</b>	<b>Rn</b>																																	
7	<b>Fr</b>	<b>Ra</b>	<b>** 89-103</b>	<b>Rf</b>	<b>Db</b>	<b>Sg</b>	<b>Bh</b>	<b>Hs</b>	<b>Mt</b>	<b>Ds</b>	<b>Rg</b>	<b>Cn</b>	<b>Nh</b>	<b>Fl</b>	<b>Mc</b>	<b>Lv</b>	<b>Ts</b>	<b>Og</b>																																	
																				Lanthanide Series*		57	<b>La</b> Lanthanum 138.905	58	<b>Ce</b> Cerium 140.116	59	<b>Pr</b> Praseodymium 140.908	60	<b>Nd</b> Neodymium 144.242	61	<b>Pm</b> Promethium 144.913	62	<b>Sm</b> Samarium 150.36	63	<b>Eu</b> Europium 151.964	64	<b>Gd</b> Gadolinium 157.25	65	<b>Tb</b> Terbium 158.925	66	<b>Dy</b> Dysprosium 162.500	67	<b>Ho</b> Holmium 164.930	68	<b>Er</b> Erbium 167.259	69	<b>Tm</b> Thulium 168.934	70	<b>Yb</b> Ytterbium 173.055	71	<b>Lu</b> Lutetium 174.967
																				Actinide Series**		89	<b>Ac</b> Actinium 227.028	90	<b>Th</b> Thorium 232.038	91	<b>Pa</b> Protactinium 231.036	92	<b>U</b> Uranium 238.029	93	<b>Np</b> Neptunium 237.048	94	<b>Pu</b> Plutonium 244.064	95	<b>Am</b> Americium 243.061	96	<b>Cm</b> Curium 247.070	97	<b>Bk</b> Berkelium 247.070	98	<b>Cf</b> Californium 251.080	99	<b>Es</b> Einsteinium 252.083	100	<b>Fm</b> Fermium 257.095	101	<b>Md</b> Mendelevium 258.10	102	<b>No</b> Nobelium 259.103	103	<b>Lr</b> Lawrencium 262

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## Conversion Charts - Temperature

TEMPERATURE CONVERSIONS											
C	Temp.	F	C	Temp.	F	C	Temp.	F	C	Temp.	F
F = 5/9F+32			C = 5/9F-32			F = 5/9F+32			C = 5/9F-32		
-73.3	-100	-148.0	0.0	32	89.6	21.7	71	159.8	43.3	110	230.0
-62.2	-80	-112.0	0.6	33	91.4	22.2	72	161.6	46.1	115	239.0
-51.1	-60	-76.0	1.1	34	93.2	22.8	73	163.4	48.9	120	248.0
-40.0	-40	-40.0	1.7	35	95.0	23.3	74	165.2	51.7	125	257.0
-34.4	-30	-22.0	2.2	36	96.8	23.9	75	167.0	54.4	130	266.0
-28.9	-20	4.0	2.8	37	98.6	24.4	76	168.8	57.2	135	275.0
-23.3	-10	14.0	3.3	38	100.4	25.0	77	170.6	60.0	140	284.0
-17.8	0	32.0	3.9	39	102.2	25.6	78	172.4	65.6	150	302.0
-17.2	1	33.8	4.4	40	104.0	26.1	79	174.2	71.1	160	320.0
-16.7	2	35.6	5.0	41	105.8	26.7	80	176.0	76.7	170	338.0
-16.1	3	37.4	5.6	42	107.6	27.2	81	177.8	82.2	180	356.0
-15.6	4	39.2	6.1	43	109.4	27.8	82	179.6	87.8	190	374.0
-15.0	5	41.0	6.7	44	111.2	28.3	83	181.4	93.3	200	392.0
-14.4	6	42.8	7.2	45	113.0	28.9	84	183.2	98.9	210	410.0
-13.9	7	44.6	7.8	46	114.8	29.4	85	185.0	104.4	220	428.0
-13.3	8	46.4	8.3	47	116.6	30.0	86	186.8	110.0	230	446.0
-12.8	9	48.2	8.9	48	118.4	30.6	87	188.6	115.6	240	464.0
-12.2	10	50.0	9.4	49	120.2	31.1	88	190.4	121.1	250	482.0
-11.7	11	51.8	10.0	50	122.0	31.7	89	192.2	148.9	300	572.0
-11.1	12	53.6	10.6	51	123.8	32.2	90	194.0	176.7	350	662.0
-10.6	13	55.4	11.1	52	125.6	32.8	91	195.8	204.0	400	752.0
-10.0	14	57.2	11.7	53	127.4	33.3	92	197.6	232.0	450	842.0
-9.4	15	59.0	12.2	54	129.2	33.9	93	199.4	260.0	500	932.0
-8.9	16	60.8	12.8	55	131.0	34.4	94	201.2	288.0	550	1022.0
-8.3	17	62.6	13.3	56	132.8	35.0	95	203.0	316.0	600	1112.0
-7.8	18	64.4	13.9	57	134.6	35.6	96	204.8	343.0	650	1202.0
-7.2	19	66.2	14.4	58	136.4	36.1	97	206.6	371.0	700	1292.0
-6.7	20	68.0	15.0	59	138.2	36.7	98	208.4	399.0	750	1382.0
-6.1	21	69.8	15.6	60	140.0	37.2	99	210.2	427.0	800	1472.0
-5.6	22	71.6	16.1	61	141.8	37.8	100	212.0	454.0	850	1562.0
-5.0	23	73.4	16.7	62	143.6	38.3	101	213.8	482.0	900	1652.0
-4.4	24	75.2	17.2	63	145.4	38.9	102	215.6	510.0	950	1742.0
-3.9	25	77.0	17.8	64	147.2	39.4	103	217.4	538.0	1000	1832.0
-3.3	26	78.8	18.3	65	149.0	40.0	104	219.2	593.0	1100	2012.0
-2.8	27	80.6	18.9	66	150.8	40.6	105	221.0	649.0	1200	2192.0
-2.2	28	82.4	19.4	67	152.6	41.1	106	222.8	704.0	1300	2372.0
-1.7	29	84.2	20.0	68	154.4	41.7	107	224.6	760.0	1400	2552.0
-1.1	30	68.0	20.6	69	156.2	42.2	108	226.4	816.0	1500	2732.0
-0.6	31	87.8	21.1	70	158.0	42.8	109	228.2	871.0	1600	2912.0



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**Conversion Charts – Pressure**

Pressure Conversions				
Bar	Mpa	kPa	kg/cm2	PSI
1	0.1	100	1.02	14.5
2	0.2	200	2.04	29.0
3	0.3	300	3.06	43.5
4	0.4	400	4.08	58.0
5	0.5	500	5.10	72.5
6	0.6	600	6.12	87.0
7	0.7	700	7.14	101.5
8	0.8	800	8.16	116.0
9	0.9	900	9.18	130.5
10	1	1000	10.2	145
20	2	2000	20.4	290
30	3	3000	30.6	435
40	4	4000	40.8	580
50	5	5000	51.0	725
60	6	6000	61.2	870
70	7	7000	71.4	1015
80	8	8000	81.6	1160
90	9	9000	91.8	1305
100	10	10000	102	1450
200	20	20000	204	2900
300	30	30000	306	4350
400	40	40000	408	5800
500	50	50000	510	7250
600	60	60000	612	8700
700	70	70000	714	10150
800	80	80000	816	11600
900	90	90000	918	13050
1000	100	100000	1020	14500



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**Conversion Charts – Torque**

Newton Meteres (NM)	Foot Pounds (Ft.Lbs)	Inch Pounds (In.Lbs)		Foot Pounds (Ft.Lbs)	Newton Meteres (NM)	Inch Pounds (In.Lbs)
5	3.69	44.25		5	6.78	60
10	7.38	88.51		10	13.56	120
15	11.06	132.76		15	20.34	180
20	14.75	177.01		20	27.12	240
25	18.44	221.27		25	33.90	300
30	22.13	265.52		30	40.67	360
35	25.81	309.78		35	47.45	420
40	29.50	354.03		40	54.23	480
45	33.19	398.28		45	61.01	540
50	36.88	442.54		50	67.79	600
55	40.57	486.79		55	74.57	660
60	44.25	531.04		60	81.35	720
65	47.94	575.30		65	88.13	780
70	51.63	619.55		70	94.91	840
75	55.32	663.80		75	101.69	900
80	59.00	708.06		80	108.47	960
85	62.69	752.31		85	115.24	1020
90	66.38	796.56		90	122.02	1080
95	70.07	840.82		95	128.80	1140
100	73.76	885.07		100	135.58	1200
105	77.44	929.33		105	142.36	1260
110	81.13	973.58		110	149.14	1320
115	84.82	1017.83		115	155.92	1380
120	88.51	1062.09		120	162.70	1440
125	92.20	1106.34		125	169.48	1500
130	95.88	1150.59		130	176.26	1560
135	99.57	1194.85		135	183.04	1620
140	103.26	1239.10		140	189.82	1680
145	106.95	1283.35		145	196.59	1740
150	110.63	1327.61		150	203.37	1800
155	114.32	1371.86		155	210.15	1860
160	118.01	1416.12		160	216.93	1920
165	121.70	1460.37		165	223.71	1980
170	125.39	1504.62		170	230.49	2040
175	129.07	1548.88		175	237.27	2100
180	132.76	1593.13		180	244.05	2160
185	136.45	1637.38		185	250.83	2220
190	140.14	1681.64		190	257.61	2280
195	143.82	1725.89		195	264.39	2340
200	147.51	1770.14		200	271.16	2400





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**Conversion References - Collated**

<b>Pressure Conversion Matrix</b>										
Pressure Units	PSI	KPA	inH <sub>2</sub> O (60°F)	mmH <sub>2</sub> O	inHg (32°F)	mmHg	Bars	mBars	Kg/cm <sup>2</sup>	gm/cm <sup>2</sup>
PSI	1	6.8948	27.7620	705.1500	2.0360	51.7149	0.0689	68.9470	0.0703	70.3070
KPA	0.1450	1	4.0266	102.2742	0.2953	7.5006	0.0100	10.0000	0.0102	10.197
inH <sub>2</sub> O	0.0361	0.2483	1	25.4210	0.0734	1.8650	0.0025	2.4864	0.0025	2.5355
MmH <sub>2</sub> O	0.0014	0.0098	0.0394	1	0.0028	0.0734	0.0001	0.0979	0.00001	0.0982
InHg	0.4912	3.3867	13.6195	345.936	1	25.4000	0.0339	33.8639	0.0345	34.532
mmHg	0.0193	0.1331	0.5362	13.6195	0.0394	1	0.0013	1.3332	0.0014	1.3595
Bars	14.5040	100.000	402.180	10215.0	29.5300	750.060	1	1000	1.0197	1019.72
mBars	0.0145	0.1000	0.4022	10.2150	0.0295	0.7501	0.001	1	0.0010	1.0197
Kg/cm <sup>2</sup>	14.2233	97.9047	394.408	10018.0	28.9590	735.559	0.9000	980.700	1	1000
gm/cm <sup>2</sup>	0.0142	0.0979	0.3944	10.0180	0.0290	0.7356	0.0009	0.9807	0.001	1

**Table for Converting Feet Head of Water into Pressure per Square Inch**

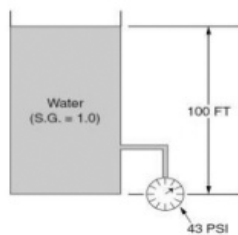
Feet Head	Pounds per Square Inch	Feet Head	Pounds per Square Inch	Feet Head	Pounds per Square Inch
1	.43	55	23.88	190	84.49
2	.87	60	25.99	200	86.84
3	1.30	65	28.15	215	92.45
4	1.73	70	30.38	230	98.27
5	2.17	75	32.68	245	104.30
6	2.60	80	34.65	260	110.93
7	3.03	85	36.81	275	117.75
8	3.46	90	38.98	290	124.58
9	3.90	95	41.14	305	131.41
10	4.33	100	43.31	320	138.44
15	6.50	110	47.84	340	148.35
20	8.66	120	51.97	360	158.85
25	10.83	130	56.30	380	169.16
30	12.99	140	60.63	400	174.47
35	15.16	150	64.96	420	184.78
40	17.32	160	69.29	440	194.09
45	19.49	170	73.63	—	—
50	21.65	180	77.96	—	—

LIQUID	TEMP °F	SPECIFIC GRAVITY	LIQUID	TEMP °F	SPECIFIC GRAVITY
Water (1 cu. ft. weighs 62.41 lb)	50	1.00	30% Acetic Acid	68	1.04
Brine (Sodium Chloride 25%)	32	1.20	50% Acetic Acid	68	1.05
Pennsylvania Crude Oil	80	0.85	20% Chromic Acid	68	1.16
Fuel Oil No. 1 and 2	85	0.95	20% Hydrogen Peroxide	68	1.07
Gasoline	80	0.74	25% Methyl Alcohol	68	0.96
Kerosene	85	0.82	10% Nitric Acid	68	1.05
Lubricating Oil SAE 10-20-30	115	0.94	20% Nitric Acid	68	1.11

LIQUID	TEMP °F	SPECIFIC GRAVITY
20% Phosphoric Acid	68	1.11
20% Sodium Hydroxide	68	1.21
50% Sodium Hydroxide	68	1.52
20% Sulphuric Acid	68	1.14
50% Sulphuric Acid	68	1.40
98% Sulphuric Acid	68	1.83

❖ It is important to understand the relationship between pressure and head. Pressure is measured in psi (pounds per square inch) or kilopascal (kPa), bar, or kilograms per square centimeter (kg/cm<sup>2</sup>), while the equivalent units for head are meters (m) or feet(ft).



$$\text{psi} = \frac{\text{feet} \times \text{s.g.}}{2.31}$$

where:  
psi = pounds per square inch  
s.g. = specific gravity