Heating and electrical data

1 British Thermal Unit	= the amount of heat required to raise 1 lb of water through 1 °F.
1 watt (W)	= 1 joule per second (1 J/s).
1 kilowatt hour	= 3413 British Thermal Units (Btu).
(kWh)	= 860 kilocalories.
1 Kilocalorie	= the amount of heat required to raise 1 litre of water through 1 °C.
°F	= (°C x 1.8) + 32.
°C	= (°F - 32) x 0.555.

1 kWh raises 3.41 gallons of water through 100 °F.
1 kWh raises 15.5 litres of water through 56 °C.

Water heating calculations

kW loading	= (gallons x temp. rise °F) / (5.7 x time in mins)
	= (litres x temp. rise K)/(14.3 x time in mins)
Time in mins	= (gallons x temp. rise °F) / (5.7 x kW loading)
	= (litres x temp. rise K) / (14.3 x kW loading)
Gallons	= (5.7 x kW loading x time in mins) / (temp. rise °F)
litres	= (14.3 x kW loading x time in mins) / (temp. rise K)
Temp rise °F	= (5.7 x kW loading x time in mins) / (gallons)
Temp rise K	= (14.3 x kW loading x time in mins) / (litres)

Mean Water Temperature:

in °F	= (Galls hot x temp. hot °F) + (Galls cold x temp. cold °F) / Total (hot + cold) Galls
in °C	= (litres hot x temp. hot °C) + (litres cold x temp. cold °C) / Total (hot + cold) litres

Oil heating calculations

kW loading	= Gallons per hour x temp. rise °F / 580
	= litres per hour x temp. rise °C / 1464

Capacity calculations

Cylinders:	= Height x πr^2
	Height x 0.785 $Ø^2$
Tanks:	
Gallons	= Length x Width x Height (in) / 277
litres	= Length x Width x Height (cm) / 1000

Conversion formulae

Type	Metric	Imperial
Volume (I)	1 litre = 1000 cm^3 (61 in^3) 0.22 gal. 1.76 pt.	1 gallon= 277 in^3 (4546 cm^3) 10 lb. (4.533 kg.) 4.54 litres.
Volume (II)	1 cu. meter= 1000 litres. (1 m^2)35.31 ft^3. 1.31 yd^3.	1 cubic foot= 6.23 gal. 0.028 m^3.
Distance	1 meter= 39.37 in. 3.28 ft. 1.09 yd.	1 inch= 25.4 mm. 1 foot= 304.8 mm. 1 yard= 914.4 mm.
Surface	1 sq. meter= 1550.39 in^2 (1 m^2)10.763 ft^2 1.195 yds^2	1 sq. yard= 0.836 m^2.
Weight	1 kilogram= 2.204 lb.	1 pound= 0.4536 kg.

Volume flow rate

L/s	l/min	m³/hr	I.g.p.m.	I.g.p.h.	U.S.g.p.m.
1	60	3.6	13.2	792	15.84
0.01667	1	0.06	0.22	13.2	0.264
0.2778	16.67	1	3.667	220	4.4
0.07577	4.546	0.2727	1	60	1.2
0.001263	0.07577	0.004546	0.01667	1	0.02
0.06314	3.788	0.2273	0.8333	50	1

Volume

litres	m³	Imp galls	U.S. galls	ft³
1	0.001	0.22	0.264	0.03532
1000	1	220	264.17	35.32
4.546	0.004546	1	1.2	0.16054
3.788	0.003788	0.8333	1	0.1339
28.32	0.02832	6.229	7.475	1

Heat flow rate

kW	joules/sec	Btu/hr	k.cal/hr
1	1000	3412	859.8
0.001	1	3.412	0.8598
0.0002931	0.2931	1	0.252
0.001163	1.163	3.968	1

Pressure

bar	psi	kPa
1	14.5	100
0.06895	1	6.89476
0.01	0.145	1

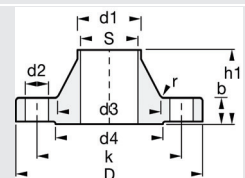## Velocity

Ft / sec	m / sec
1	0.3048
3.28084	1

Dimensions and weights

Flanges

According to DIN 2633 PN 16.

Material: C 22.3 according to DIN 17243. without corrosion protection.

DN	d1	D	d3	s	b	r	k	h1	Holes	D2	d4	Weight (kg)
50	60.3	165	75	2.9	18	6	125	45	4	18	102	2.53
65	76.1	185	90	2.9	18	6	145	45	4	18	122	3.06
80	88.9	200	105	3.2	20	8	160	50	8	18	138	3.7
100	114.3	220	125	3.6	20	8	180	52	8	18	158	4.62
125	139.7	250	156	4	22	8	210	55	8	18	188	6.3
150	168.3	285	184	4.5	22	10	240	55	8	22	212	7.75
200	219.1	340	235	5.9	24	10	295	62	12	22	268	11.0
250	273	405	292	6.3	26	12	355	70	12	26	320	15.6
300	323.9	460	344	7.1	28	12	410	78	12	26	378	22.0
350	355.6	520	390	8	30	12	470	82	16	26	438	28.7
400	406.4	580	445	8	32	12	525	85	16	30	490	36.3
450	457	640	490	8	32	12	585	85	18	30	550	44.1
500	508	715	548	8	34	12	650	90	20	33	610	61.0
600	610	840	652	8.8	36	12	770	95	20	36	725	75.4