

Extract of important legal units for centrifugal pumps

Physical dimension	Formula symbol	Legal units SI - Units		Further legal units (not complete)	No longer authorised	Recomm. units	Remarks
Length	l	m	Meter	km, dm, cm mm		m	Basic unit
Volume	v	m ³		dm ³ cm ³ . mm ³ litre (1l = 1dm ³)	cbm, cdm	m ³	
Capacity, volume flow	Q V	m ³ /s		m ³ /h, l/s		l/s and m ³ /s	
Time	t	s	Second	s, ms,ns... min., h, d		s	Basic unit
Rotat. speed	n	1/s		1/min.		1/min.	
Mass	m	kg	Kilogram	g, mg, ton ton (1t = 1000 kg)	pound honoured weight	kg	Basic weight The mass of commercial commodity is described as weight
Density	ρ	kg/dm ³		kg/dm ³	kg/dm ³ and kg/m ³		The designation "specific gravity" must no longer be employed, because it is ambiguous (see DIN 1305)
Moment of inertia	J	kg-m ²				kg-m ²	Moment of inertia 2.grade
Mass flow	m	kg/s	t/s, t/h, kg/h		kg/s and t/s		
Force	F	N	Newton (= kg m/s ²)	kN, mN,	kp, Mp	N	1 kp = 9.81 N. The weight force is the product of mass m by the local gravitational g
Pressure	p	Pa	Pascal (1bar = 10 ⁵ Pa)	bar m WS, Torr	kp/cm ² , at,	bar	1 at = 0.981 bar = 9.81 · 10 ⁴ Pa 1 mm Hg = 1.333 mbar 1 mm WS = 0.098 mbar
Mechanical Stress (strength)		Pa	Pascal (= n/m ²)	N/mm ² ,	kp/cm ²	N/mm ²	1 kp/mm ² = 9.81 N/mm ²
Bending Moment torque	M T	N m			kp m,	N m	1 kp m = 9.81 J
Energy, work, Quantity of heat	W Q	J	Joule (= N m = W s)	kJ, W s, kW h 1 kW h = 3600 kJ	kp m kcal, cal, WE	J and kJ	1 kp m = 9.81 J 1 kcal = 4.1868 kJ
Head	H	m	Meter		m.l.c.	m	The head is the work done in J = N m applied to the mass unit of the medium pumped, related to the weight force of this mass unit N.
Power	P	W	Watt (= J/s = N m/s)	MW, kW	kp m/s, PS	kW	1 kp m/s = 9.81 W 1 PS = 736 W
Temperature difference	T	K	Kelvin	°C	°K, dge.	K	Basic unit
Kinematic viscosity	v	m ² /s			St (Stokes) 0E...	m ² /s	1 St = 10 ⁻¹ m ² /s 1cSt = 1 mm ² /s
Dynamic viscosity	n	Pa s	Pascal- second (= N s/m ²)		P (Poise)	Pa s	1 P = 0.1 Pa s
Specific speed	nq	1				1	nq = 333.n. $\frac{Q_{opt.}}{(g.H_{opt})^{3/4}}$ in SI-units (m and s)

Conversion of British and U.S. Units

		British		U.S.		
Length	1 mil	25.4	µm	25.4	µm	
	1 point	0.3528	mm	0.3528	mm	
	1 line	0.635	mm	0.635	mm	
	1 inch	25.4	mm	25.4	mm	
	1 hand	10.1	cm	10.16	cm	
	1 link	20.1168	cm	20.1168	cm	
	1 span	22.86	cm	22.86	cm	
	1 foot	0.3048	m	0.3048	m	
	1 yard	0.9144	m	0.9144	m	
	1 fathom	1.8288	m	1.8288	m	
	1 rod	5.0292	m	5.0292	m	
	1 chain	20.1168	m	20.1168	m	
	1 furlong	201.168	m	201.168	m	
	1 mile					
1 statute mile	= 1760 yd	1.6093	km	1.6093	km	
1 nautical mile		1.8532	km	1.8532	km	
Area	1 circular mil	506.709	µm ²	506.709	µm ²	
	1 circular inch	5.067	cm ²	5.067	cm ²	
	1 square inch	6.4516	cm ²	6.4516	cm ²	
	1 square link	404.687	cm ²	404.687	cm ²	
	1 square foot	929.03	cm ²	929.03	cm ²	
	1 square yard	0.8361	m ²	0.8361	m ²	
	1 square rod	25.2929	m ²	25.2929	m ²	
	1 square chain	404.686	m ²	404.686	m ²	
	1 rood	1011.7124	m ²	1011.7124	m ²	
	1 acre	4046.86	m ²	4046.86	m ²	
	1 square mile	2.59	km ²	2.59	km ²	
Volume	1 cubic inch	16.387	cm ³	16.387	cm ³	
	1 board foot	2.3597	dm ³	2.3597	dm ³	
	1 cubic foot	28.3268	dm ³	28.3268	dm ³	
	1 cubic yard	0.7646	m ³	0.7646	m ³	
	1 register ton	2.8327	m ³	2.8327	m ³	
	1 british shipping ton	= 42 cu ft	1.1897	m ³	-	
	1 US shipping ton	= 40 cu ft.	-	m ³	-	
	Basic unit gallon for fluids	1 minimum	59.1939	mm ³	61.6119	mm ³
	1 fluid scruple	1.1839	cm ³	-	-	
	1 fluid drachm	3.5516	cm ³	-	-	
	1 fluid dram	-	cm ³	3.6967	cm ³	
	1 fluid ounce	28.4131	cm ³	118.2948	cm ³	
	1 gill	142.065	cm ³	118.2948	cm ³	
	1 pint	0.5683	dm ³	0.9464	dm ³	
	1 quart	1.1365	dm ³	0.9464	dm ³	
	1 pottle	2.2730	dm ³	-	-	
	1 gallon	4.5460	dm ³	3.7854	dm ³	
	1 peck	9.0922	dm ³	-	-	
	1 bushel	36.3687	dm ³	-	-	
1 US oil-barrel (for crude oil)	-	0.159	m ³	-		
1 quarter	0.291	m ³	-	-		
1 chaldron	1.3093	m ³	-	-		
Basic unit bushel	1 dry pint	-	0.5506	dm ³		
for dry goods	1 dry quart	-	1.1012	dm ³		
	1 peck	-	8.8098	dm ³		
	1 bushel	36.3687	dm ³	35.2329	dm ³	
	1 dry barrel	-	0.1156	m ³		
Mass and weight	1 grain	64.7989	mg	64.7989	mg	
Avoirdupois system	1 dram	1.7718	g	1.7718	g	
(trade and sommerce	1 ounce	28.3495	g	28.3495	g	
weights)	1 pound	0.4536	kg	0.4536	kg	
	1 stone	6.3503	kg	-	-	
	1 quarter	12.7006	kg	-	-	
	1 cental	-	-	45.3592	kg	
	1 short hundredweight	-	-	45.3592	kg	
	1 hundredweight	50.8024	kg	-	kg	
	1 long hundredweight	-	-	50.8024	kg	
	1 short ton	-	-	907.1849	kg	
	1 ton	1016.0470	kg	-	-	
	1 long ton	-	-	1016.0470	kg	
Troy system	1 pennyweight	1.5552	g	1.5552	g	
(for precious metals)	1 troy ounce	31.1035	g	32.1035	g	
	1 troy pound	-	-	0.3732	kg	

			British		U.S.	
Density	1 ounce (av) per cubic foot	(oz/cu. ft)	0.0010	kg/dm ³	0.0010	kg/dm ³
	1 pound per cubic foot	(lb/cu ft)	0.0160	kg/dm ³	0.0160	kg/dm ³
	1 ounce (av) per cubic inch	(oz/cu in)	1.7300	kg/dm ³	1.7300	kg/dm ³
	1 pound per cubic inch	(lb/cu in)	27.6799	kg/dm ³	27.6799	kg/dm ³
	1 short ton per cubic yard	(shtn/cu yd)	-		1.1865	kg/dm ³
	1 long ton per cubic yard	(ltn/cu yd)	-		1.3289	kg/dm ³
	1 pound per gallon	(lb/gal)	0.09978	kg/dm ³	0.1198	kg/dm ³
Velocity	1 foot per second	(ft/s)	0.3048	m/s	0.3048	m/s
	1 foot per minute	(ft/min)	0.00508	m/s	0.00508	m/s
	1 yard per second	(yd/s)	0.9144	m/s	0.9144	m/s
	1 yard per minute	(yd/min)	0.01524	m/s	0.01524	m/s
Capacity (rate of volume flow)	1 gallon per second		4.5460	l/s	3.7854	l/s
	1 gallon per minute	(gpm)	0.07577	l/s	0.06309	l/s
	1 cubic foot per second	(cusec)	28.3268	l/s	28.3268	l/s
	1 cubic yard per second		0.7646	m ³ /s	0.7646	m ³ /s
Mass flow	1 ounce per second	(oz/s)	28.3495	g/s	28.3495	g/s
	1 ounce per minute	(oz/min)	0.4725	g/s	0.4725	g/s
	1 pound per sec	(lb/s)	0.4536	kg/s	0.4536	kg/s
	1 pound per minute	(lb/min)	0.00756	kg/s	0.00756	kg/s
	1 short ton per hour	(shtn/h)	-		0.2520	kg/s
	1 ton per hour		0.2822	kg/s	-	
	1 long ton per hour	(ltn/h)	-		0.2822	kg/s
Force (weight force)	1 ounce (force)	(oz)	0.2780	N	0.2780	N
	1 pound (force)	(lb)	4.4483	N	4.4483	N
	1 short ton (force)	(shtn)	8.8964	kN	8.8964	kN
	1 long ton (force)	(ltn)	9.9640	kN	9.9640	kN
Pressure	1 $\frac{\text{pound(force)}}{\text{square foot}}$	$\frac{\text{lb(force)}}{\text{sq foot}}$	47.88025	Pa	47.88025	Pa
	1 $\frac{\text{pound(force)}}{\text{square inch}}$	$\frac{\text{lb(force)}}{\text{sq inch}}$ (psi)	68.9476	mbar	68.9476	mbar
	1 $\frac{\text{short ton (force)}}{\text{square inch}}$	$\frac{\text{sh tn (force)}}{\text{sq inch}}$	137.8951	bar	137.8951	bar
	1 inch H ₂ O	(in H ₂ O)	2.4909	mbar	2.4909	mbar
	1 foot H ₂ O	(ft H ₂ O)	29.8907	mbar	29.8907	mbar
	1 inch HG	(in HG)	33.8663	mbar	33.8663	mbar
Mechanical Stress	1 $\frac{\text{pound (force)}}{\text{square inch}}$	$\frac{\text{lb (force)}}{\text{sq in}}$	0.006895	N/mm ²	0.006895	N/mm ²
	1 $\frac{\text{short ton(force)}}{\text{square inch}}$	$\frac{\text{sh tn (force)}}{\text{sq in}}$	13.78951	N/mm ²	13.78951	N/mm ²
Work, energy, quantity of heat, internal (intrinsic) energy and enthalpy	1 foot-pound	(ft lb)	1.3558	J	1.3558	J
	1 horse power hour	(Hp h)	2.6841	MJ	1.0558	kJ
	1 British Thermal Unit	(BTU)	1.0558	kJ	1.0558	kJ
Power (heat flow)	1 foot-pound (av) per second	$\frac{\text{ft lb}}{\text{s}}$	1.3558	W	1.3558	W
	1 Horse power (Hp)	(Hp h)	0.7457	kW	0.7457	kW
	1 Brithish Thermal unit per second	(BTU/s)	1.0558	kW	1.0558	kW
Dynamic viscosity	1 $\frac{\text{pound (mass)}}{\text{foot x second}}$	$\frac{\text{lb (mass)}}{\text{ft x s}}$	1.4882	Pa s	1.4882	Pa s
	1 $\frac{\text{pound (force) x second}}{\text{square foot}}$	$\frac{\text{lb (force) s}}{\text{sq ft}}$	47.8803	Pa s	47.8803	Pa s

Temperature Conversion of temperature points : Conversion of temperature points :

$$T = \frac{5}{9} t_F + 255.37; \quad t = \frac{5}{4} (t_F - 32); \quad \Delta T = \Delta t = \frac{5}{9} \Delta t_F$$

$$T = \frac{5}{4} t_R + 273.15; \quad t = \frac{5}{4} t_R \quad \Delta T = \Delta t = \frac{5}{4} \Delta t_R$$

Where : T = thermodynamic temperature in K t_F = Fahrenheit temperature in °F
t_R = reamur temperature in °R t_R = Celcius temperature in °C