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Abbreviated Metric Practice Guide for the Roofing Industry

GENERAL

This abbreviated metric practice guide provides a table of conversion factors for expressing units of measure peculiar to the roofing industry as exact metric units. This guide is based on Standard E 380. Relationships that are exact in terms of the base unit are followed by an asterisk. Relationships that are not followed by an asterisk are either the results of physical measurements or are only approximate

APPLICABLE DOCUMENTS (ASTM Standards):

D5 Test Method for Penetration of Bituminous Materials²

D113 Test Method for Ductility of Bituminous Materials²

E380 Standard for Metric Practice³

ROUNDING RULES

Converted values should be rounded to the minimum number of significant digits that will maintain the required precision, but do not indicate greater precision than justified by the measuring method used. If the first significant digit of the converted number is smaller than the first digit of the original number, carry one additional significant figure. For example, 7.5 in. should be converted to 191 mm, but 2.5 in. should be converted to 64 mm.

PREFERRED UNITS FOR ROOFING MATERIALS

The preferred units for roofing materials are as follows:

- mm** for width of rolls, shingles; thickness of Insulation etc.
- g/m²** for mass (weight) per unit area (felts and moppings)
- m** for dimension over ~4 ft
- µm** for thickness of felt, flashing etc.
- kg** for gross mass (weight)
- kN/m** for breaking strength
- cm** for ductility of bituminous materials (see test Method D113)
- 0.1 mm** for penetration units (use test Method D5)

¹This guide is under the jurisdiction of ASTM Committee D-8 on Roofing, Waterproofing, and Bituminous Materials.

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²Annual Book of ASTM Standards, Vol 04.03.

³Annual Book of ASTM Standards, Vol 14.02.

Property	To convert from	Symbol	To	Symbol	Multiply by	Remarks
Application rate	U.S. gallon per square	gal (U.S.)/100 ft ²	litre per square metre	litre/m ²	0.4075	= 0.4075 mm thick
	U.K. gallon per square	gal (U.K.)/100 ft ²	litre per square metre	litre/m ²	0.4893	= 0.4893 mm thick
Area	square inch	in. ²	square millimetre	mm ²	645.2	1,000,000 mm ² = 1m ²
	square foot	ft ²	square metre	m ²	0.092 90	-
	square	100ft ²	square metre	m ²	9.290	-
Breaking strength	pound force per in. width	lbf/in.	kilonewton per metre width	kN/m	0.175	-
Coverage	sq. foot per U.S. gal.	ft ² /gal	square metre per litre	m ² /litre	0.024 54	-
	sq. foot per U.K. gallon	ft ² /gal	square metre per litre	m ² /litre	0.020 44	-
Density, or mass per unit volume	pound per cubic foot	lb/ft ³	kilogram per cubic metre	kg/m ³	16.02	water ≅ 1000 kg/m ³
Energy or work	kilowatt-hour	kWh	megajoule	MJ	3.600*	J = W • s = N • m
	British thermal unit	Btu	joule	J	1055	-

(continued on back)

MANUFACTURERS OF ADVANCED TECHNOLOGY WATERPROOFING MEMBRANES

Property	To convert from	Symbol	To	Symbol	Multiply by	Remarks
Flow, or volume per unit time	U.S. gallon per minute	gpm	cubic centimetre per sec.	cm ³ /s	63.09	or 0.0631 litre/s
	U.K. gallon per minute	gpm	cubic centimetre per sec.	cm ³ /s	75.77	or 0.0758 litre/s
Force	pound force	lbf	newton	N	4.448	-
	kilogram force	kgf	newton	N	9.807	N = kg • m/s ²
Heat flow	thermal conductance, C	Btu/h • ft ² • °F	watt per sq. metre kelvin	W/(m ² • K)	5.678	-
	thermal conductivity, k	Btu • in./h • ft ² • °F	watt per metre kelvin	W/(m • K)	0.1442	-
Incline	inch per foot	in./ft	percent	%	8.333	3 in./ft = 25 %
Length, width, thickness	mil	0.001 in.	micrometre	µm	25.40*	1000 µm = 1 mm
	inch (up to ~48 in.)	in.	millimetre	mm	25.40*	1000 mm = 1 m
	foot (~4 ft. and above)	ft.	metre	m	0.3048*	-
Mass (weight)	ounce	oz	gram	g	28.35	1000g = 1 kg
	pound	lb	kilogram	kg	0.4536	1000kg = 1 Mg
	short ton	2000 lb	megagram	Mg	0.9072	-
Mass per unit area	pound per square foot	lb/ft ²	kilogram per sq. metre	kg/m ²	4.882	-
	pound per square foot	lb/ft ²	gram per square metre	g/m ²	4882	-
	pound per square	lb/100 ft ²	gram per square metre	g/m ²	48.82	-
	ounce per square yard	oz/yd ²	gram per square metre	g/m ²	33.91	-
Permeability at 23°C	perm inch	grain • in./ft ² • h • in. Hg	nanogram/pascal second metre	ng/(Pa • s • m)	1.459	ng = 10 ⁻¹² kg
Permeance at 23°C	perm	grain/ft ² • h • in. Hg	nanogram/pascal second square metre	ng/(Pa • s • m ²)	57.45	1 grain = 64.8 mg
Power	horsepower	hp	watt	W	746	W = N • m/s = J/s
Pressure or stress	pound force per sq. in.	lbf/in ² or psi	kilopascal	kPa	6.895	Pa = N/m ²
	pound force per sq. ft.	lbf/ft ² or psf	pascal	Pa	47.88	-
Temperature	degree Fahrenheit	°F	degree Celsius	°C	(t °F - 32)/1.8*	32°F = 0°C
	degree Celsius	°C	kelvin	K	t °F + 273.15*	273.15K = 0°C
Thread count (fabric)	threads per inch width	threads/in.	threads per centimetre width	threads/cm	0.394	-
Velocity (speed)	foot per minute	ft/min or fpm	metre per second	m/s	0.005 080*	-
	mile per hour	mile/h or mph	kilometre per hour	km/h	1.609	-
Volume	U.S. gallon	gal (U.S.)	cubic metre	m ³	0.003 785	or 3.785 litres
	U.K. gallon	gal (U.K.)	cubic metre	m ³	0.004 546	or 4.546 litres
	cubic foot	ft. ³	cubic metre	m ³	0.028 32	-
	cubic yard	yd ³	cubic metre	m ³	0.764 6	-

* Exact conversion factor.