

ABBREVIATED METRIC PRACTICE GUIDE FOR THE ROOFING INDUSTRY¹

1. General

1.1 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 Practice 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.

2. Referenced Documents

2.1 *ASTM Standards:*

D 5 Test Method for Penetration of Bituminous Materials²

D 113 Test Method for Ductility of Bituminous Materials²

E 380 Practice for Use of the International System of Units (SI) (the Modernized Metric System)³

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

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² *Annual Book of ASTM Standards*, Vol 04.03.

³ *Annual Book of ASTM Standards*, Vol 14.02.

3. Preferred Units for Roofing Materials

3.1 The preferred units for roofing materials are as follows:

mm	for width of rolls, shingles; thickness of insulation, etc.
g/m ²	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 D 113)
0.1 mm	for penetration units (use Test Method D 5)

4. Rounding Rules

4.1 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.

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TABLE 1 Conversion Factors

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 = 1 m ²
	square foot square	ft ² 100 ft ²	square metre square metre	m ² m ²	0.092 90 9.290	
Breaking strength	pound force per inch width	lbf/in.	kilonewton per metre width	kN/m	0.175	
Coverage	square foot per U.S. gallon	ft ² /gal	square metre per litre	m ² /litre	0.024 54	
	square 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	
Flow, or volume per unit time	U.S. gallon per minute	gpm	cubic centimetre per second	cm ³ /s	63.09	or 0.0631 litre/s
	U.K. gallon per minute	gpm	cubic centimetre per second	cm ³ /s	75.77	or 0.0758 litre/s
Force	pound force	lbf	newton	N	4.448	N = kg · m/s ²
	kilogram force	kgf	newton	N	9.807	
Heat flow	thermal conductance, C	Btu/h · ft ² · °F	watt per square 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	1000 g = 1 kg
	pound	lb	kilogram	kg	0.4536	1000 kg = 1 Mg
	short ton	2000 lb	megagram	Mg	0.9072	
Mass per unit area	pound per square foot	lb/ft ²	kilogram per square metre	kg/m ²	4.882	
	pound per square foot	lb/ft ²	gram per square metre	g/m ²	4882	
	pound per square ounce per square yard	lb/100 ft ² oz/yd ²	gram per square metre gram per square metre	g/m ² g/m ²	48.82 33.91	

* Exact conversion factor.

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TABLE 1 *Continued*

Property	To Convert from	Symbol	to	Symbol	Multiply by	Remarks
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 square inch pound force per square foot	lbf/in. ² or psi	kilopascal	kPa	6.895	Pa = N/m ²
		lbf/ft ² or psf	pascal	Pa	47.88	
Temperature	degree Fahrenheit degree Celsius	°F	degree Celsius	°C	(t _F - 32)/1.8*	32°F ≈ 0°C
		°C	kelvin	K	t _C + 273.15*	273.15 K ≈ 0°C
Thread count (fabric)	threads per inch width	threads/in.	threads per centimetre width	threads/cm	0.394	
Velocity (speed)	foot per minute mile per hour	ft/min or fpm	metre per second	m/s	0.005 080*	
		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.