Society of Wood Science and Technology (SWST)

CONVERSION TO SI UNITS

The policy of *Wood and Fiber Science* is to publish only in SI units. The "in-lb" (sometimes referred to as “US Customary”) units are not to be shown, even in parentheses after SI units.

When converting to SI, keep in mind several pitfalls:
Many wood products are produced in "nominal" sizes; in metric units, these must be described as actual sizes. Here are two examples:

> A 2 x 4 is a product of commerce, not a dimension, so it is assumed to be 38 x 89 mm (if it has been dried to a 15 or 19% standard), although it is perfectly proper to refer to it as a 2 x 4. If it is green material, then the dimensions will obviously be greater, so they must be determined. Not all green 2 x 4s are the same dimension, since some mills cut to greater precision to increase their yield.
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> Conversion of BF to m^3 is a challenge (sometimes). If you convert 1 MBF of dry 2 x 4s to m^3, it converts to 1.6 m^3. With a random width mixture of 2-bys you either have to calculate the volume for each of the widths of the 2-bys, or choose an average value.

Log sizes should be given in meters (m) in length and either cm or mm in diameter. In SI units the preference is always in multiples of powers of three: mm, m, km, etc. Conversion of panel production (ft^2, 3/8 in. basis) should be expressed as m^2, 10 mm basis.

Make sure the SI units have the same number of significant digits (as in the 2 x 4 example); if you are converting from a nominal dimension, for example, with a 10-ft log, it makes more sense to express this as a 3-m log rather than a 3.05-m log. This is an example of a “hard” vs a “soft” conversion. Wherever justified, the hard conversion (nicely rounded) should be used. Another example is converting temperature from ºF to ºC. If you have a conditioning chamber operating at 70ºF, you could express this as 21.1ºC (soft conversion) or 21ºC (hard conversion); the decision has as much to do with the effect of temperature on the materials in the chamber as the precision of the measurement and variation in actual temperature.

Some approximate conversion values

1 atm ~ 15 psi ~ 100 kPa
1 psi ~ 6.9 kPa
1 in. H_20 ~ 0.25 kPa
1 lbf ~ 4.45 N
1 CFM ~ 0.028 m^3/min
1 ft^3 ~ 0.028 m^3
1 ft^3/ac ~ 0.07 m^3/ha
1 ha ~ 10 000 m^2
1 ha ~ 2.5 ac
1 lb/ft^3 ~16 kg/m^3

1 BTU/lb-F = 4.19 kJ/kg·K
1 BTU/h-ft-F = 1.73 W/m·K
1 BTU = 1.055 kJ
1 hp-h = 2.7 MJ
1 kWh = 3.6 MJ
W = J/s
1 BTU/h = 0.29 W
1 hp = 0.75 W
1 BTU/lb = 2.33 kJ/kg