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Metric Practice Guide

Steel Deck and Cladding

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CANADIAN
SHEET STEEL
BUILDING INSTITUTE

PREFACE

This Information Bulletin is intended as a guide for designers, specifiers and users of steel deck and cladding products during the period of metric conversion. The transition is expected to be evolutionary, with "soft" conversion of existing products gradually changing to complete metric product sizing as investment in new or modified production equipment reflects market demand. In any event, dimensional differences which would result from a "hard" metric conversion of existing products would in most cases be slight since factors other than the measurement system have a decided influence on profile geometry.

METRIC PRACTICE GUIDE: STEEL DECK AND CLADDING

INTRODUCTION

Deck and cladding products formed from structural sheet steel depend on the steel base thickness, exclusive of coatings, for strength and stiffness. The units by which that thickness (or any dimension) is measured is not a factor, per se. Therefore, to avoid unnecessary complication in the metric conversion process, the practice within the membership of Canadian Sheet Steel Building Institute is as follows:

1. In general, *existing* steel deck and cladding products sized in imperial units will be *soft-converted* to SI units. *These products will therefore be interchangeable between the one measuring system and the other.*
2. In general, future *new* deck and cladding products are expected to be sized in SI units and soft converted to imperial if necessary.

Metric conversion of structural sheet steel, as applicable to deck and cladding products, is described in the paragraphs following. This is an interim conversion practice, subject to possible modification pending progress in international metric standardization of sheet steel.

TABLE 1: STRUCTURAL SHEET STEEL BASE THICKNESS*

Imperial System Base Thickness (inches)	SI System Equivalent Base Thickness (millimetres)
0.105	2.67
.075	1.91
.060	1.52
.048	1.22
.036	0.91
.030	0.76
.024	0.61
.018	0.46

*Base thickness is the steel thickness exclusive of coatings.

BASE THICKNESS

Base Thickness is the thickness of steel, exclusive of coatings. Sheet steel base thickness is expressed in *millimetres* to *two decimal places.* Thickness increments are equivalent to those presently used and expressed in inches to three decimal places. Table 1 shows current base thicknesses in inches and the equivalent metric base thicknesses. The base thickness shown is the "ideal" thickness used in design and often referred to as the "nominal" thickness. Actual thickness as measured may vary within the specified thickness tolerance for a given base thickness.

ZINC COATED SHEET STEEL THICKNESS

For zinc coated sheet steel the thickness of the sheet includes both the base steel thickness and the coating thickness. This total thickness is the basis for ordering zinc coated material. Table 2 shows the *order thickness* (including zinc coating allowance) for the various base thickness increments given in Table 1 and the various zinc coating designations. The order thickness shown in Table 2 is the "ideal" thickness which the purchaser wishes to receive. Actual thickness as measured may vary within the specified thickness tolerance.

TABLE 2: ZINC COATED SHEET STEEL THICKNESS

Base Steel Thickness (mm)	Order Thickness (mm)					
	Zinc Coating Designation (1)					
	ZF075 (2) (wiped coat)	Z275	Z350	Z450	Z600	Z700
2.67	2.67	2.71	2.72	2.74	2.76	2.77
1.91	1.91	1.95	1.96	1.98	2.00	2.01
1.52	1.52	1.56	1.57	1.59	1.61	1.62
1.22	1.22	1.26	1.27	1.29	1.31	1.32
0.91	0.91	0.95	0.96	0.98	1.00	1.01
0.76	0.76	0.80	0.81	(3) 0.83	0.85	0.86
0.61	0.61	0.65	0.66	0.68	0.70	0.71
0.46	0.46	0.50	0.51	0.53	0.55	0.56

(1) Metric zinc coating designations indicate the coating density in g/m² (minimum by triple spot test).

(2) The thickness increment for ZF075, (wiped coat) is not significant.

(3) For base thickness/coating combinations in shaded area, enquire as to availability.

PREPAINTED SHEET STEEL THICKNESS

Prepainted sheet steel is used widely for cladding and other applications where appearance is important. Prepaint systems such as those listed in CSSBI Publication No. 40.5 "Coated Galvanized Sheet Steel for Exterior Building Products" add 20 to 30 μm per painted surface to the zinc coated sheet steel thickness.

SHEET STEEL MATERIAL SPECIFICATIONS

Steel cladding products are generally produced from zinc coated sheet steel conforming to ASTM A446 "Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process. Structural (Physical) Quality". This Standard provides metric equivalents to U.S. customary units.

For steel deck products, the Canadian Sheet Steel Building Institute publishes CSSBI Specification 101M-78 (Interim) "Zinc Coated Structural Quality Steel Sheet for Roof and Floor Deck". This recent specification covers material suitable for steel deck in six of the eight base thicknesses given in Tables 1 and 2. An imperial version, CSSBI 101-78, is also published.

SI UNITS FOR APPLICATION TO STRUCTURAL SHEET STEEL BUILDING PRODUCTS

In general, published information on structural sheet steel deck and cladding products will show sheet thickness to the nearest 0.01 millimetre, basic dimensions other than thickness to the nearest millimetre, and maximum allowable spans to the nearest 10 millimetres. Span increments in load tables will be 100 millimetres, generally. Distributed loads (pressures) will be expressed in kilopascals and concentrated loads (forces) in kilonewtons.

Table 3 shows the various SI units which are recommended for use in conjunction with structural sheet steel building products of all types. For selection of units not included in Table 3, refer to CAN3-Z234.1-76 "Canadian Metric Practice Guide" or to ASTM E621 "Metric (SI) Units in Building Design and Construction."

TABLE 3: SELECTED SI UNITS FOR APPLICATION TO STRUCTURAL SHEET STEEL BUILDING PRODUCTS

Angular Measurement	degrees
Area, cross-sections	mm^2
Area, surfaces	m^2
Bending Moment	$kN \cdot m$
Coating mass, zinc (on surfaces)	g/m^2
Conductance, thermal (U-value)	$W/(m^2 \cdot K)$, $W/(m^2 \cdot °C)$
Conductivity, thermal (k-value)	$W/(m \cdot K)$, $W/(m \cdot °C)$
Density, mass	kg/m^3
Energy	kJ, MJ
Energy (electrical)	kWh
Force	kN
Force, linear	kN/m
Force, unit (on surfaces)	See Pressure
Force, unit (on cross-sections)	See Stress
Linear measurement (length, width)	mm, m
Mass	kg, Mg (tonne)
Modulus of elasticity or shear	MPa, GPa
Moment of inertia (2nd moment of area)	mm^4
Moment of inertia per unit width	mm^4/m
Pressure (on surfaces)	kPa
Resistance, thermal (R-value)	$m^2 \cdot K/W$, $m^2 \cdot °C/W$
Section dimensions	mm
Section modulus (1st moment of area)	mm^3
Section modulus per unit width	mm^3/m
Spans	mm
Span increments	multiples of 100 mm
Stress	MPa
Structural load	See Force
Thickness, steel	mm to two decimals
Thickness, zinc coatings	mm to two decimals
Thickness, paint coatings	μm
Torque	$kN \cdot m$
Volume, solids	m^3
Volume, liquids	L (litre)
Weight to indicate quantity	See Mass
Weight to indicate force of gravity	See Force

NOTE: Numerical values above 999 will normally contain a space marker to replace the comma e.g. 7 200 and 48 000

METRIC CONVERSION FACTORS

	TO CHANGE	MULTIPLY BY
LENGTH	in to mm ft to mm ft to m	25.4 (exact) 304.8 (exact) 0.3048 (exact)
AREA	in^2 to mm^2 ft^2 to m^2	645.16 (exact) 0.092 903
VOLUME	in^3 to mm^3 in^3 to mL ft^3 to m^3 yd^3 to m^3	16 387.1 16.3871 0.028 317 0.764 555
MASS	lb to kg 2000 lb to 1000 kg lb/ft to kg/m lb/ft^2 to kg/m^2 oz/ft^2 to g/m^2 lb/ft^3 to kg/m^3 lb/yd^3 to kg/m^3	0.453 592 0.907 185 1.488 16 4.882 43 305.152 16.0185 0.593 276
FORCE	lb to N kip to kN lb/in to N/m lb/ft to N/m kip/ft to kN/m	4.448 22 4.448 22 175.127 14.5939 14.5939
PRESSURE	lb/in^2 to kPa lb/ft^2 to kPa kip/in^2 to MPa	6.894 76 0.047 88 6.894 76
SECTION MODULUS	in^3 to mm^3 in^3/ft to mm^3/m	16 387.1 53 763.5
MOMENT OF INERTIA	in^4 to mm^4 in^4/ft to mm^4/m	416 231 1 365 587
TEMPERATURE INTERVAL	°C to K °F to °C	1 0.555 556
TEMPERATURE VALUE	°F to °C	$\frac{5}{9}$(°F - 32)
THERMAL CONDUCTIVITY (k-value)	Btu/(ft·h·°F) to W/(m·°C)	1.730 73
THERMAL CONDUCTANCE (U-value)	Btu/(ft^2·h·°F) to W/(m^2·°C)	5.678 26
THERMAL RESISTANCE (R-value)	ft^2·h·°F/Btu to m^2·°C/W	0.176 11

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