PLAN
M-9011

METRIC FACT SHEET

CANADA PLAN SERVICE

The Canada Plan Service prepares detailed plans showing how to construct modern farm buildings, livestock housing systems, storages and equipment for Canadian Agriculture.

To **obtain another** copy of **this leaflet, contact your local provincial agricultural engineer or extension** advisor.

METRIC FACT SHEET

PLAN M-9011 REVISED 85:01

This `Fact Sheet' is intended to provide a quick condensed reference for those concerned with the conversion to metric building practice and with the preparation of metric construction drawings.

The `Fact Sheet' is not complete, but is updated periodically whenever new metric standards are published.

DEFINITIONS

HARD CONVERSION

Physical dimensions and mechanical properties have changed, products are converted to modular metric increments.

SOFT CONVERSION

Physical dimensions remain unchanged and products are converted to an appropriate degree of precision in metric designations.

LENGTH

imperial	metric
1/8"	3 mm
1/4"	6
3/8''	10
1/2"	13
5/8"	16
¾''	19
1"	25
1'-0"	300
4'-0"	1 200
6'-0"	1 800
8'-0"	2 400
10'-0"	3 000

TEMPERATURE CONVERSIONS

°K = °C +273.15
℃ = 5/9 (°F - 32)
°F = 9/5 (°C) + 32

EXPRESSION OF SLOPE

(approximate conversion)

present ratio	metric ratio
Roof Slopes	
1:12	1:12
2:12	1:6
3:12	1:4
4:12	1:3
6:12	1:2
8:12	1:1.5
12:12	1:1
Floor Slopes	
1/16"/1'	1:200
1/8"/1'	1:100
1/4"/1'	1:50
1/2"/1'	1:25
5/8"/ 1'	1:20
1''/1'	1:10

GENERAL CONVERSIONS

LENGTH

m = ft x 0.3048
ft = m x 3.281

AREA

$m^2 = ft^2 \times 0.0929$
$ft^2 = m^2 \times 10.764$

AREA

ha = acres x 0.4047
acres = ha x 2.471

VOLUME

$m^3 = ft^3 \times 0.02832$
$ft^3 = m^3 \times 35.31$

VOLUME

L = gal (Can.) x 4.546
Gal (Can.) = L x 0.220

VOLUME

L = gal (US) x 3.785
Gal (US) = L x 0.2642

FLUID FLOW

L/s = cfm x 0.472
cfm = L/s x 2.12

MASS

kg = lb x 0.4536
lb = kg x 2.205

MASS

t = ton x 0.9072
ton = t x 1.102

DENSITY

$kg/m^3 = lb/ft^3 \times 16.01$
$lb/ft^3 = kg/m^3 \times 0.06245$

FORCE

kN = kg x 0.009807
N = lbf x 4.448
lbf = N x 0.2248

PRESSURE, STRESS

MPa = N/mm2 = psi x 0.006895
psi = MPa x 145.0

ENERGY

J = W ·s =N•m = ft ·lb x 1.356
MJ = kWh x 3.60
kWh = MJ x 0.2778

ENERGY

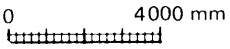
kWh = BTU x 0.0002930
BTU = kWh x 3413

POWER

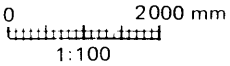
kW = hp x 0.746
hp = kW x 1.340

RECOMMENDED RATIO SCALES

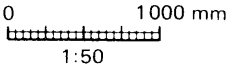
General Location Drawings



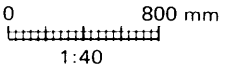
Floor Plans



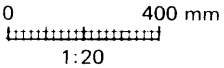
Floor Plans & Sections



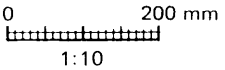
Floor Plans & Sections



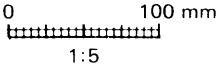
Construction Detail



Construction Details



Construction Details



TOTAL ROOF LOADS

(approximate conversion)

imperial	metric
20 psf	1 kN/m²
40	2
60	3
80	4
100	5
120	6

$kN/m^2 = psf \times .04788$
$psf = kN/m^2 \times 20.89$

ROLLED STEEL SHAPES

- most structural rolled steel shapes now available in metric sizes, refer to appropriate manufacturers literature for new sizes.

STEEL YIELD STRENGTH

(hard conversion)

imperial psi	metric MPa	desinated as
40 000	300	Grade 300
50 000	350	Glade 350
60 000	400	Grade 400

REBAR SIZES

(hard conversion)

imperial	metric	area of section mm2
3	10M	100
4		
5	15M	200
6	20M	300
7	25M	500
8		
9	30M	700
10	35M	1000
11		
14	45M/55	1500/2500
18		

WELDED WIRE FABRIC SIZES

(soft conversion)

imperial		metric
2"		51 mm
3"		76
4"	wire	102
6"	spacings	152
8"		203
12"		305

wire size ga		cross-sectional area mm2
0		47.6
2		34.9
4		25.8
6		18.7
8	longitudinal and	13.3
9	transversewires	11.1
10		9.1
12		5.6
14		3.2

- metric designation of wire size signifies the nominal cross-sectional area (mm^2) of the longitudinal and transverse wires

MW -denotes smooth wire

MD - denotes deformed wire

eg.

6 x 6 6/6

becomes

152 x 152 MW18.7 x MW18.7

VAPOR BARRIERS

imperial	metric
2 mil	50 µm
4 mil	100 µm
6 mil	150 µm
10 mil	250 µm

SHEET METAL THICKNESSES

(base steel thickness)

imperial	metric
12 ga.	2.67 mm
14	1.91
16	1.52
18	1.22
20	0.91
22	0.76
24	0.61
26	0.46
28	0.34
30	0.31

- for galvanized sheet metal, add 0.04 mm to above figures

BOLT SIZES

(hard conversion)

imperial		metric
¼"		M6
5/16"		M8
3/8"		M10
½"	Diameter	M12
9/16"		M14
5/8"		M16
11/16"		M18
¾"		M20
½"		12 mm
¾"		20
1"		25
1 3/8"		35
1 ¾"		45
2"	Length	50
2 ¾"		70
3"		75
3 ¼"		80
3 ½"		90
4"		100

NOMINAL SIZES OF NON METALLIC PIPES AND TUBES

(hard conversion)

imperial	metric
3"	75 mm
4"	100
5"	125
6"	150
8"	200
10"	250
12"	300
14"	350
16"	400

CONCRETE STRENGTH

(hard conversion)

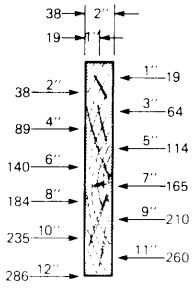
imperial	metric
2 000 psi	15 MPa
3 000	20
3 500	25
4 000	30
5 000	35
6 000	40
7 000	50

For soft conversion the relationship is:

MPa = psi x 0.006895

SAWN LUMBER SIZES

(soft conversion)



POLE SIZES

Sawn imperial (nom.)	metric (actual)	Round imperial	metric
4" x 4"	89 x 89 mm	4"	100 mrn
4" x 6"	89 x140	5"	125
6" x 6"	140x140	6"	150
6" x 8"	140x184	7"	175
8" x 8"	184x184	8"	200
		9"	225

CONSTRUCTION PLYWOOD

Modular size of a sheet 1200 x2400 mm

imperial (nom.)	metric (actual) sanded	sheathing
¼"	6mm	-
5/16"	-	7.5 mm
3/8"	8	9.5
½"	11	12.5
5/8"	14	15.5
¾"	17	18.5

WAFERBOARD THICKNESS

(soft conversion)

imperial	**metric**
1 4"	6.35 mm
5 16"	7.9
3 8"	9.5
7 16"	11.1
1 2"	12.7
5 8"	15.9
3 4"	19.0

R - VALUES

(fibreglass insulation)

imperial	metric
R8	RSI 1.4
R12	RSI 2.1
R14	RSI 2.5
R20	RSI 3.5
R26	RSI 4.5
R28	RSI 4.9

RSI = R x 0.176