



To: <b>SUPERSEDED BY EB 20-038</b> <b>EFFECTIVE 9/3/20</b>		New York State Department of Transportation <b>ENGINEERING</b> <b>INSTRUCTION</b>	<div style="font-size: 2em; font-weight: bold; margin: 0;">EI</div> <div style="font-weight: bold; margin: 5px 0;">98-003</div>
<b>Title: METRIC WOOD SIZES AND METHOD OF MEASUREMENT</b>			
Distribution: <input checked="" type="checkbox"/> Manufacturers (18) <input checked="" type="checkbox"/> Surveyors (33) <input checked="" type="checkbox"/> Main Office (30) <input checked="" type="checkbox"/> Consultants (34) <input checked="" type="checkbox"/> Local Govt. (31) <input checked="" type="checkbox"/> Contractors/AGC (39) <input checked="" type="checkbox"/> Regions/Agencies (32) <input type="checkbox"/> _____ ( )	Approved: <div style="text-align: center; margin-top: 10px;">   <hr style="width: 100%;"/>         P. J. Clark, Deputy Chief Engineer,          Design Division       </div> <div style="text-align: right; margin-top: 10px;"> <u>02/03/98</u>          Date       </div>		

**Administrative Information:** This EI supersedes **EB 97-007 METRIC WOOD SIZES**, and because this is primarily a design aid, it is effective immediately.

**Nomenclature:** One of the questions associated with metric conversion is the description of wood sizes in metric units. According to the standards for metric conversion, dimensioned (dressed dry) lumber sizes are **nominal** and may be referred to by their **nominal** names. For example, a 2X4, which is actually 1 1/2" X 3 1/2", may continue to be called a 2X4. (It is assumed that no one would mistake 2X4 as meaning 2 mm X 4 mm, even though the metric note on standard sheets says that all dimensions are in millimeters unless otherwise stated.) Alternatively, soft conversions to the nearest millimeter are also acceptable and both conventions are used in the Metric Spec Book and Standard Sheets. Note that hard conversions to round numbers are unacceptable. For example, a 2X4 may also be called a 38X89, but may **not** be called a 50X100. To assist designers in working with and specifying actual sizes of dressed dry lumber, the attached table is provided.

In contrast to dressed dry lumber which is designated by its **nominal** customary dimensions, rough cut lumber is designated using **actual** customary dimensions. When rough cut lumber is to be specified in metric units, it should be described using a conversion factor of 25 mm per inch, and the word "minimum" should be inserted immediately after the size. For example, a 12X12 rough cut timber should be described as a "300X300 minimum" rough cut timber. However, when the volume computations are performed, customary units should be used as shown below.

The timber industry has not yet developed a uniform policy for designating its products in metric units, but the above nomenclature has been discussed with industry representatives and is acceptable to them.

**Quantity Estimates:** The Method of Measurement of Section 594 - TIMBER AND LUMBER (subsection 594-4) may be difficult for some people to compute because "...commercial size(s) of undressed material..." are designated in customary units. Therefore, one must multiply the minimum nominal commercial cross section, in inches (customary units), by an actual length incorporated into the work, and convert all that to cubic meters.

Contractors order lumber from the mills as a certain quantity of a certain length, in feet, of a certain nominal cross section, in inches. Mills receive that order, and bill contractors for a quantity of board feet: ie. (actual length, ft)X(nominal width, ft)X(nominal thickness, in). When an EIC enters that quantity into the project records, it has to be converted to cubic meters to compare it to the original engineers estimate.

To simplify such computations, the Design Quality Assurance Bureau has developed the following logical method for calculating the required volume of lumber. The required amount of lumber should first be estimated the way contractors order lumber from mills. That amount is then converted to board feet, and finally converted to cubic meters using a conversion factor of 0.00235974. This is a departure from what was stated in EB 97-007, but is consistent with what is presently stated in the specification. This method lends itself quite nicely to being tabulated. For example: if a project requires three hundred 2X4's ten feet long, and two hundred 2X8's twelve feet long, the bid quantity, in cubic meters, can be computed as follows:

QTY (EA)	NOMINAL SECTION	LENGTH (FEET)	CONV FACTOR	BOARD FEET	CONV FACTOR	CUBIC METERS
300 x	2X4	x 10	x (1/12)	= 2000	x .00235974	= 4.719 m <sup>3</sup>
200 x	2X8	x 12	x (1/12)	= +3200	x .00235974	= +7.551 m <sup>3</sup>
<b>TOTAL</b>				<b>= 5200 Board Feet</b>		<b>= 12.270 m<sup>3</sup></b>

A major advantage of estimating the quantity of lumber this way is that it facilitates checking the paper trail between the engineers estimate, the contractor's order to the mill, the invoice from the mill, and the final estimate for the project records. Therefore, to facilitate these computations, the following sentence will be added to the end of §594-4 Method of Measurement: "If the measured quantity is first computed in board feet, the conversion factor shall be 0.00235974 cubic meters per board feet."

The information presented above does not change any contract requirements, but suggests a very convenient method for designers and inspectors to estimate and keep track of lumber quantities.

**Contact Person:** Any questions on this material may be addressed to Richard Stempel of the Design Quality Assurance Bureau at tel (518) 457-5440.

AVAILABLE NOMINAL & MINIMUM DRESSED DRY WOOD SIZES					
THICKNESSES			FACE WIDTHS		
NOMINAL	MINIMUM DRESSED		NOMINAL	MINIMUM DRESSED	
INCH	INCH	MILLIMETER	INCH	INCH	MILLIMETER
3/8	5/16	8	2	1½	38
½	7/16	11	3	2½	63
5/8	9/16	14	4	3½	89
¾	5/8	16	5	4½	114
1	¾	19	6	5½	140
1¼	1	25	7	6½	165
1½	1¼	32	8	7¼	184
1¾	1¾	35	9	8¼	210
2	1½	38	10	9¼	235
2½	2	51	11	10¼	260
3	2½	63	12	11¼	286
3½	3	76	14	13¼	337
4	3½	89	16	15¼	387