Master-Q LVL® 1" and Over Thickness 1.52 E Design Values

Master-Q LVL Section Properties	$M=F_b{}^*S/12$	$V=F_vA/1.5$	$I=bd^3/12$	$S=bd^2/6$	
Size in inches	**Maximum Moment** (ft-lbs) (**M**)	**Maximum Shear** (lbs) (**V**)	**Moment of Inertia** (in^4)(**I**)	**Section Modulus** (in^3)(**S**)	**Weights** (lbs/ft)
7-1/4	2999	2707	56	15	2.8
9-1/4	4742	3435	115	25	3.6
9-1/2	4986	3547	125	26	3.7
11-1/4	6851	4200	208	37	4.4
11-7/8	7584	4433	244	41	4.6
14	10335	5227	400	57	5.4
16	13284	5973	597	75	6.2
18	16577	6720	851	95	7.0
20	20209	7467	1167	117	7.7
24	28471	8960	2016	168	9.3

1.0 GENERAL **Master-Q LVL®** is a new grade of Laminated Veneer Lumber (LVL) manufactured by Finnforest and recently introduced to the North American market by Finnforest USA. **Master-Q LVL** is well known in the European market under the name of "Kerto-Q". **Master-Q LVL** has been in use in Europe for over eight years and is widely used for beams, columns, floor, roof and wall wide panels. **Masrer-Q LVL** has also found a market where preservative treatment is a requirement. ***Contact Finnforest USA for more details.***

The **Master-Q LVL** design values shown in the table above are based on testing performed at the VTT Building Technology Research Center in Helsinki, Finland. The testing was performed in accordance with accepted ASTM testing procedures available in 1995 and results can be found n the VITT research report RTE30725/95, in which **Master-Q LVL** laminated veneer lumber is described and the characteristic values of mechanical properties and density are determined.

Master-Q LVL Design Values

2.0 Design Values
This table provides allowable stress design values for bending, tension, compression and shear strength as well as the average value for modulus of elasticity and specific gravity.

Beam MOE	1,520,000 psi
Beam Bending	2210 psi
Beam Tension	1800 psi
Beam Comp Para	1985 psi
Beam Comp Perp	780 psi
Beam Shear	310 psi
Specific Gravity	0.48
Plank MOE	290,000 psi
Plank Bending	2485 psi
Plank Comp Perp	190 psi
Plank Shear	90 psi

Master-Q LVL Identification

4.0 Identfication
Each piece shall be stamped to indicate conformance with these specifications and the production shift, day, week and year of manufacture.

3.0 TECHNICAL IDENTIFICATION

3.1 Structure: Master-Q LVL is manufactured with cross veneers as part of the lay-up combination. The primary veneer species is Nordic Spruce (Picea abies). Periodically Pine (pinus silvestris) will make up a portion of the lay-up combinations. The surface veneers are always Spruce.

3.2 Dimension: Master-Q LVL is manufactured in 72-inch and 96-inch panel widths. Any length can be provided, with the only limitation being shipping where the maximum length is 60 feet.

3.3 Moisture content: The moisture content when delivered will be approximately 10%.

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Master-Q LVL® Specifications Guide

1.0 GENERAL **Master-Q LVL®** is a laminated construction of spruce veneers procured from forests managed and certified under the Finnish Forest Certification System audited by BVQI (Bureau Veritas Quality International) according to the ISO 14001 environmental standard and the ISO 9002 quality standard. It is composed of various qualities of veneer arranged to obtain optimum utilization of each veneer to develop maximum strength and reliability.

Master-Q LVL is a cross bonded LVL. This means that one-fifth of the veneers are glued crosswise. This structure improves the lateral bending strength and stiffness of this panel, thus increasing the shear strength when used as a beam. With crossbonded veneers, there is an essential reduction in moisture-dependent variations across the width of the panel.

2.0 INTENDED USE This product is intended to be used as panels and beams, under dry conditions of use, and other industrial applications.

3.0 DIMENSIONS< COMPOSITION & TOLERANCES

Thickness			Veneer Structure			Width	Length
Nominal (inches)	**Actual** (inches)	(mm)	**Z(I)** qty	**X (–)** qty	**Veneer Composition** Sequence	**Inches**	**Feet**
3/4	0.77	21	5	2	I–III–I	Multiples of 6′ or 8′ panels.	Minimum= 8′
1	1.06	27	7	2	II–III–II		Maximum=60′
1-1/8	1.10	30	8	2	II–IIIII–II		
1-1/4	1.30	33	9	2	II–IIIII–II	**Width Tolerance**	**Length Tolerance**
1-1/2	1.54	39	10	3	II–III–III–II	< 8″= ±1/16″	< 24′= ±5/16″
1-3/4	1.77	45	12	3	II–IIII–IIII–II	> 8″= ±1/8″	> 24′= ±0.5%
2	2.00	51	14	3	II–IIIII–IIIII–II		
2-1/4	2.24	57	15	4	II–III–IIIII–III–II		
2-1/2	2.48	63	16	5	II–III–III–III–III–II		
2-3/4	2.72	69	18	5	II–IIII–III–III–IIII–II		

Tolerance= ± 5/64″ (2mm) Z = longitudinal direction, X = crosswise direction

MATERIAL

4.0 Veneer Plies; Face, back and inner plies are all of the same species and meet Pan European Forest Certification Requirements.
4.1 Species; Norway Spruce (Picea abies)
4.2 Grade; the Grade shall not be below Grade C, per American Product Standard PS 1.
4.3 Thickness; The thickness of each veneer shall be nominal 3.0mm (0.110″)

CONSTRUCTION

5.0 Glue Bond Requirements; The glue shall meet or exceed American Product Standard PS 1-Exterior Type.
6.0 Grain Direction; All veneers shall be oriented with the grain parallel to the long dimension of the billet.
7.0 Veneer Joints; All individual veneer joints shall be scarfed and staggered with a distance between joints of no less than 4" (10.16cm).

MANUFACTURE 8.0 Finished Product

8.1 Widths; Widths shall be cut within tolerances given, and with square clean edges for each order.
8.2 Lengths; Lengths shall be cut within tolerances given, and with square clean edges for each order.
8.3 Surface; Surface may be sanded or unsanded as required by order.
8.4 Surface; Surface (face) veneer will use clear glue and may be grade A (clear) if requested.
8.5 Surface; To enhance dimensional stability seal coating can be provided upon request.

QUALITY CONTROL

9.0 Master-Q LVL is manufactured under the ISO 9001 quality certification system. Quality control shall be under the supervision of the Technical Research Centre of Finland, Helsinki, Finland.

IDENTIFICATION

10.0 Master-Q LVL®

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Master-Q LVL® 3/4" Thickness 1.45 E Design Values

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Size in inches	**Maximum Moment** (ft-lbs) (**M**)	**Maximum Shear** (lbs) (**V**)	**Moment of Inertia** (in^4)(**I**)	**Section Modulus** (in^3)(**S**)	**Weights** (lbs/ft)
7-1/4	1124	1127	24	7	1.1
9-1/4	1777	1438	49	11	1.4
9-1/2	1869	1477	54	11	1.5
11-1/4	2568	1749	89	16	1.8
11-7/8	2843	1847	105	18	1.9
14	3874	2177	172	25	2.2
16	4980	2488	256	32	2.5
18	6214	2799	365	41	2.8
20	7575	3110	500	50	3.1
24	10672	3732	864	72	3.7

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Master-Q LVL Design Values

2.0 Design Values
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Beam MOE	1,450,000 psi
Beam Bending	1930 psi
Beam Tension	1310 psi
Beam Comp Para	1450 psi
Beam Comp Perp	780 psi
Beam Shear	310 psi
Plank MOE	174,000 psi
Plank Bending	2210 psi
Plank Comp Perp	190 psi
Plank Shear	90 psi

Master-Q LVL Identification

4.0 Identfication
Each piece shall be stamped to indicate conformance with these specifications and the production shift, day, week and year of manufacture.

3.0 TECHNICAL IDENTIFICATION

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