GRK Tech Bulletin

Built-Up Wood Beam - Canadian

Minimum Spacing Geometry - perpendicular to grain loading

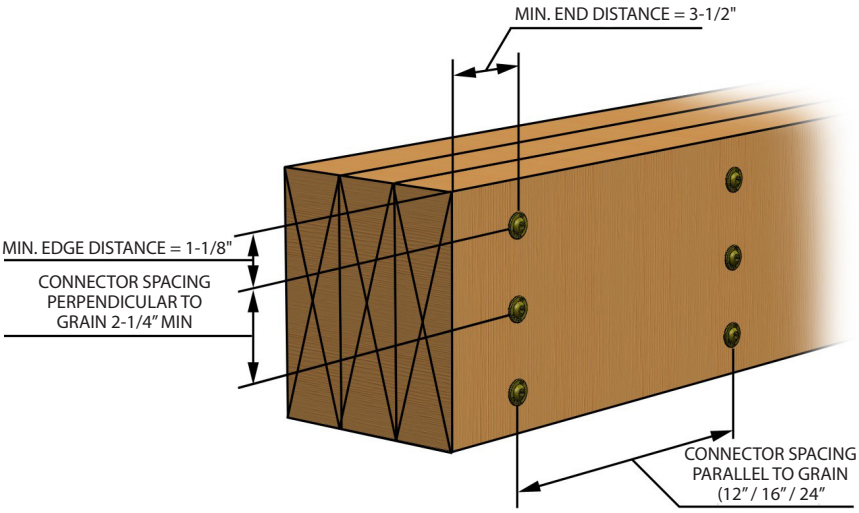

Figure 1 a

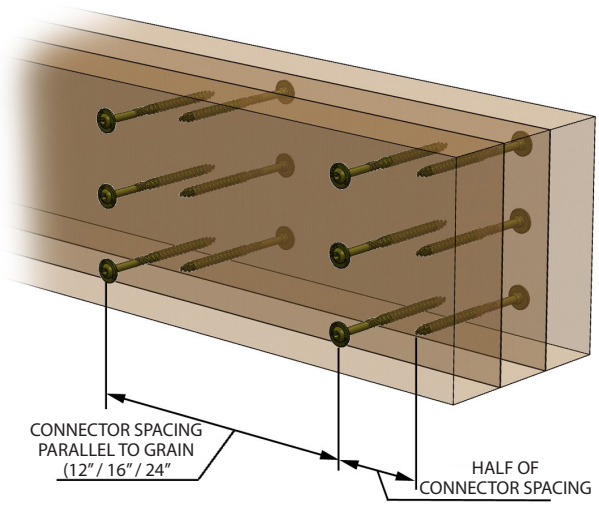

Figure 1 b

Multi-Ply Beam with One Face Loaded

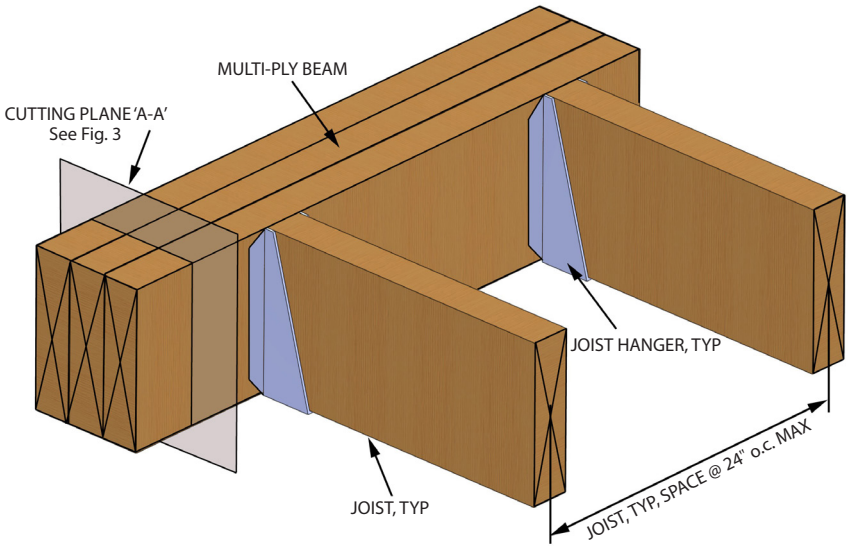

Figure 2

Cutting Plane 'A-A'

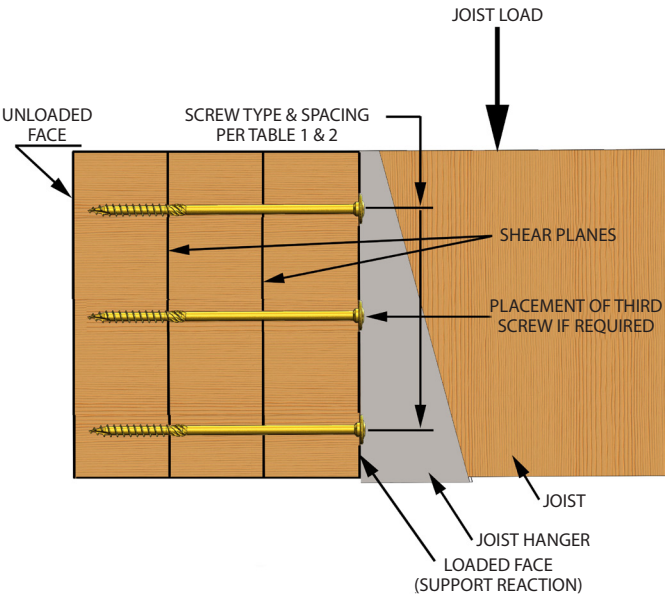

Figure 3

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Built-Up Wood Beam - Canadian

Built-Up Wood Beam Top-Loaded

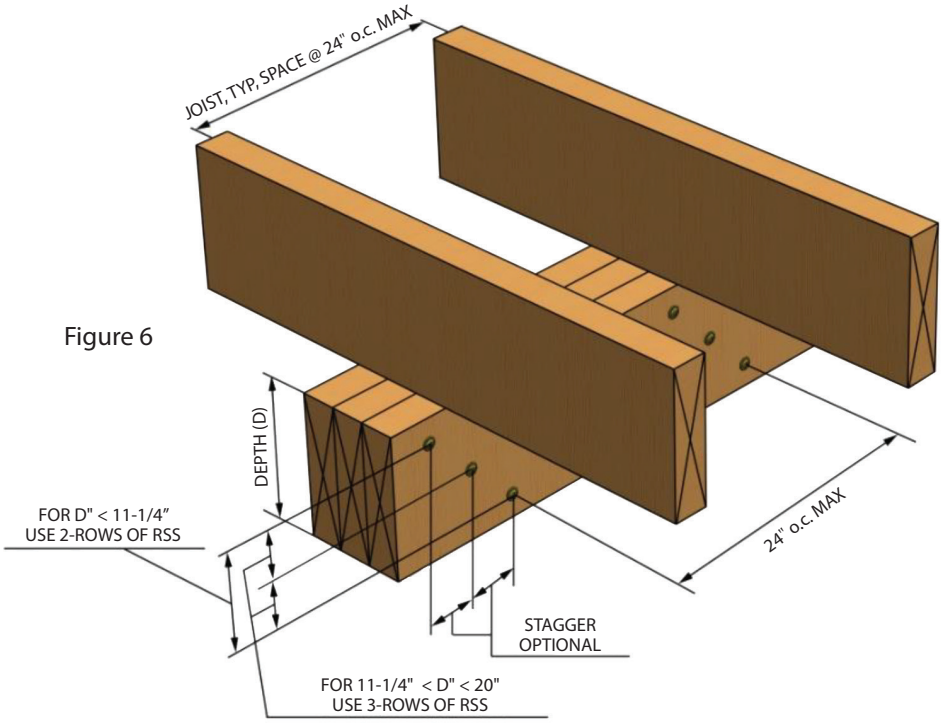


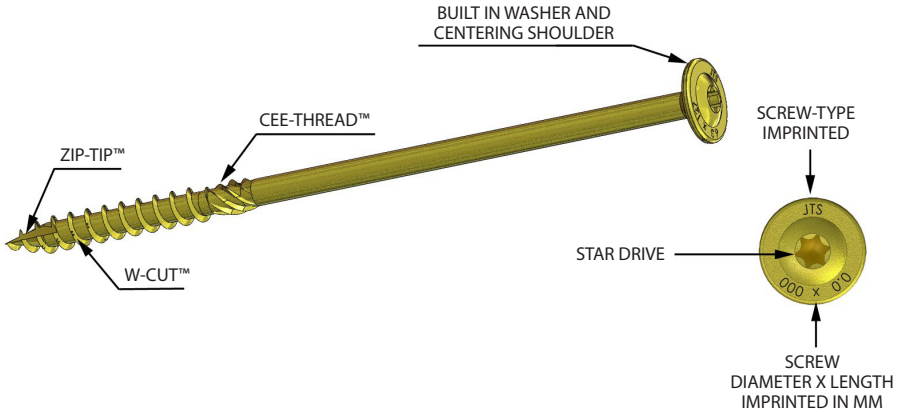
Figure 6

Installation:

- Install with a Standard low speed/ high torque drill with matched star drive bit.
- Allow underside of washer to pull plies firmly together. Do not countersink – this may damage the beam and reduces the connection capacity.
- Typically no pre-drilling required.

Product info:

- Material : Casehardened carbon steel
- Finish: Climatek™ coated
- Identification: Screw type, Diameter and Length imprinted for easy inspection after installation
- Screw Sizes and Dimensions: Provided in ICC - ES #2442
- Patented products



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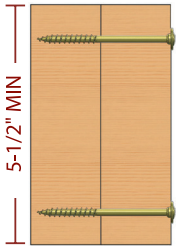
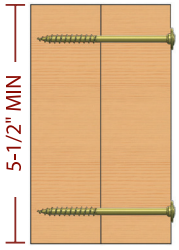
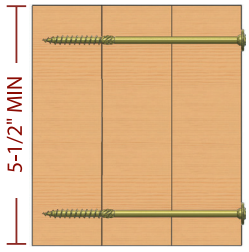
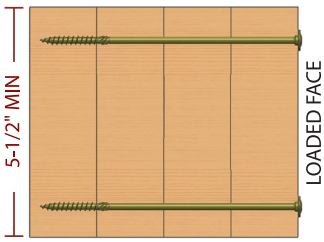
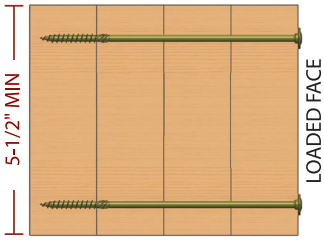
Built-Up Wood Beam - Canadian

Built-up Beam Connection: Side-loaded ply
2 rows of fasteners

RSS	Screw Spacing	Maximum Factored DISTRIBUTED Load on Face Ply			Assembly
		SPF	D.Fir-L	LVL / LSL	
		Nominal 2" ply	Nominal 2" ply	1-3/4" wide ply	
1/4"Ø x 2-1/2"	24 in.	197 plf	230 plf	---	
	610 mm	2.9 kN/m	3.4 kN/m	---	
	16 in.	296 plf	345 plf	---	
	406 mm	4.3 kN/m	5.0 kN/m	---	
	12 in.	394 plf	460 plf	---	
	305 mm	5.8 kN/m	6.7 kN/m	---	
1/4"Ø x 3-1/8"	---	---	---	342 plf	
	---	---	---	5.0 kN/m	
	---	---	---	513 plf	
	---	---	---	7.5 kN/m	
	---	---	---	685 plf	
	---	---	---	10.0 kN/m	
5/16"Ø x 4"	24 in.	232 plf	268 plf	437 plf	
	610 mm	3.4 kN/m	3.9 kN/m	6.4 kN/m	
	16 in.	348 plf	402 plf	656 plf	
	406 mm	5.1 kN/m	5.9 kN/m	9.6 kN/m	
	12 in.	464 plf	537 plf	874 plf	
	305 mm	6.8 kN/m	7.8 kN/m	12.8 kN/m	
5/16"Ø x 6"	24 in.	357 plf	405 plf	---	
	610 mm	5.2 kN/m	5.9 kN/m	---	
	16 in.	536 plf	607 plf	---	
	406 mm	7.8 kN/m	8.9 kN/m	---	
	12 in.	714 plf	809 plf	---	
	305 mm	10.4 kN/m	11.8 kN/m	---	
3/8"Ø x 7-1/4"	---	---	---	521 plf	
	---	---	---	7.6 kN/m	
	---	---	---	781 plf	
	---	---	---	11.4 kN/m	
	---	---	---	1042 plf	
	---	---	---	15.2 kN/m	

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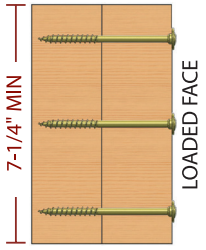
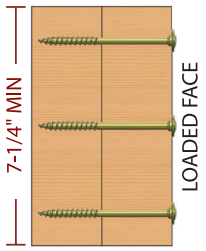
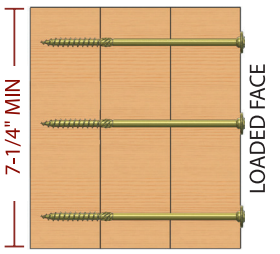
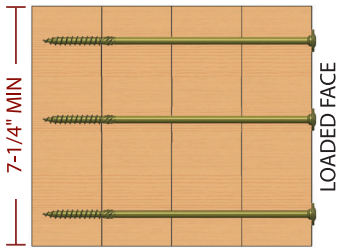
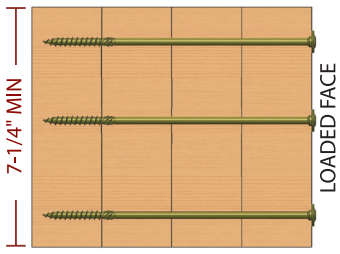
Built-Up Wood Beam - Canadian

Built-up Beam Connection: Side-loaded ply
3 rows of fasteners

RSS	Screw Spacing	Maximum Factored DISTRIBUTED Load on Face Ply			Assembly
		SPF	D.Fir-L	LVL / LSL	
		Nominal 2" ply	Nominal 2" ply	1-3/4" wide ply	
1/4"Ø x 2-1/2"	24 in.	296 plf	345 plf	---	
	610 mm	4.3 kN/m	5.0 kN/m	---	
	16 in.	444 plf	517 plf	---	
	406 mm	6.5 kN/m	7.5 kN/m	---	
	12 in.	592 plf	689 plf	---	
	305 mm	8.6 kN/m	10.1 kN/m	---	
1/4"Ø x 3-1/8"	---	---	---	513 plf	
	---	---	---	7.5 kN/m	
	---	---	---	770 plf	
	---	---	---	11.2 kN/m	
	---	---	---	1027 plf	
	---	---	---	15.0 kN/m	
5/16"Ø x 4"	24 in.	348 plf	402 plf	656 plf	
	610 mm	5.1 kN/m	5.9 kN/m	9.6 kN/m	
	16 in.	522 plf	604 plf	983 plf	
	406 mm	7.6 kN/m	8.8 kN/m	14.3 kN/m	
	12 in.	696 plf	805 plf	1311 plf	
	305 mm	10.1 kN/m	11.7 kN/m	19.1 kN/m	
5/16"Ø x 5-1/8"	24 in.	536 plf	607 plf	---	
	610 mm	7.8 kN/m	8.9 kN/m	---	
	16 in.	803 plf	910 plf	---	
	406 mm	11.7 kN/m	13.3 kN/m	---	
	12 in.	1071 plf	1214 plf	---	
	305 mm	15.6 kN/m	17.7 kN/m	---	
3/8"Ø x 7-1/4"	---	---	---	781 plf	
	---	---	---	11.4 kN/m	
	---	---	---	1172 plf	
	---	---	---	17.1 kN/m	
	---	---	---	1563 plf	
	---	---	---	22.8 kN/m	

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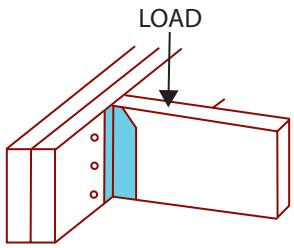
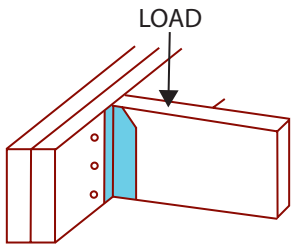
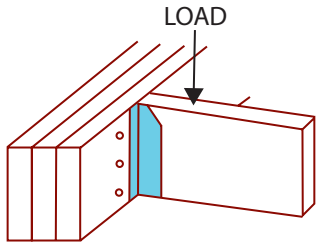
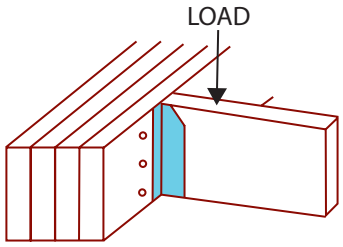
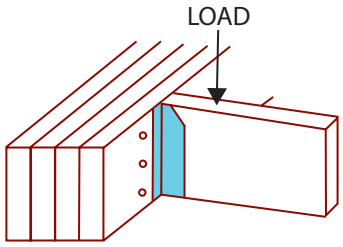
Built-Up Wood Beam - Canadian

Built-up Beam Connection: Point Load

RSS	No. of screws on each side of point laod	Maximum Factored POINT Load on Face Ply			Built-up Beam Assembly
		SPF	D.Fir-L	LVL / LSL	
		Nominal 2" ply	Nominal 2" ply	1-3/4" wide ply	
1/4"Ø x 2-1/2"	2	789 lbf	919 lbf	---	
	Min 5-1/2" beam depth	3.5 kN	4.1 kN	---	
	3	1183 lbf	1379 lbf	---	
	Min 7-1/4" beam depth	5.3 kN	6.1 kN	---	
	4	1577 lbf	1838 lbf	---	
	Min 9-1/4" beam depth	7.0 kN	8.2 kN	---	
1/4"Ø x 3-1/8"	2	---	---	1369 lbf	
	Min 5-1/2" beam depth	---	---	6.1 kN	
	3	---	---	2053 lbf	
	Min 7-1/4" beam depth	---	---	9.1 kN	
	4	---	---	2738 lbf	
	Min 9-1/4" beam depth	---	---	12.2 kN	
5/16"Ø x 4"	2	927 lbf	1073 lbf	1748 lbf	
	Min 5-1/2" beam depth	4.1 kN	4.8 kN	7.8 kN	
	3	1391 lbf	1609 lbf	2622 lbf	
	Min 7-1/4" beam depth	6.2 kN	7.2 kN	11.7 kN	
	4	1854 lbf	2146 lbf	3496 lbf	
	Min 9-1/4" beam depth	8.2 kN	9.5 kN	15.5 kN	
5/16"Ø x 6"	2	1428 lbf	1618 lbf	---	
	Min 5-1/2" beam depth	6.4 kN	7.2 kN	---	
	3	2142 lbf	2427 lbf	---	
	Min 7-1/4" beam depth	9.5 kN	10.8 kN	---	
	4	2856 lbf	3236 lbf	---	
	Min 9-1/4" beam depth	12.7 kN	14.4 kN	---	
3/8"Ø x 7-1/4"	2	---	---	2083 lbf	
	Min 5-1/2" beam depth	---	---	9.3 kN	
	3	---	---	3125 lbf	
	Min 7-1/4" beam depth	---	---	13.9 kN	
	4	---	---	4166 lbf	
	Min 9-1/4" beam depth	---	---	18.5 kN	

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Built-Up Wood Beam - Canadian

General Notes:

1. Screw spacings are based on the shear capacity in accordance to Clause 12.11 "Wood Screws" CSA 086-14 for the connection configuration as shown in the figures.

2. "---" indicates the screw cannot be used for the built-up wood beam due to insufficient screw penetration length into the main member per CSA 086-14 or the screw is too long and would penetrate out on the other side of the beam

3. All wood plies in the built-up wood beam should be of the same wood species or engineered wood.

4. The design loads in the tables are for normal duration as defined in CSA 086-14. Multiply by 0.65 or 1.15 for long-term and short-term load durations respectively.

5. For built-up wood beams using sawn lumber, the plies should be No.2 grade lumber or better with moisture content between 10% and 19% at the time of installation. For built-up wood beams using engineered lumber (LVL or LSL), the plies should be 1.55E grade or better, in dry conditions.

6. The design loads in the tables are for dry service conditions. Built-up wood beams to be used in wet service conditions should be designed by a professional engineer as required by the building code of jurisdiction. Note that LVL or LSL built-up beams are not permitted to be used in wet service conditions.

7. The design loads in the tables are for loads applied to the ply on the screw-head side (one-face loaded). For built-up wood beams with both faces loaded, install screws alternating sides as shown in the figure within this technical bulletin. Unequal side loads may undergo torsion when loaded on both faces. The design loads do not account for beam torsion. A professional engineer should account for any torsional affects on the built-up wood beams and the screws.

8. The design loads, connection geometry, and screw spacing do not take into account any effects of splicing in the wood plies. The design tables assumes that the plies are continuous over the length of the beam. A professional engineer should account for possible splicing of the wood.

9. Built-up wood beams or connections not shown in this technical bulletin should be designed by a professional engineer as required by the building code of jurisdiction.