

## Horizontal Diaphragm Design with Trus Joist® TJI® Joists

With the ever increasing optimization of I-joist flange dimensions and properties, more focus has been placed on the performance of these products in horizontal diaphragm applications. Weyerhaeuser has performed a significant amount of full scale horizontal diaphragm testing with Trus Joist® TJI® joists in accordance with ASTM E455 to validate diaphragm performance properties. Based on this testing, Weyerhaeuser has developed the following guidelines when TJI® joists are used as horizontal diaphragm framing members.

### TJI® Joists as Prescriptive (2010 NBCC, Part 9) Diaphragm Framing Members

TJI® joists are permitted as framing members in prescriptive floor and roof diaphragm construction in accordance with the 2010 NBCC, Part 9. When TJI® 110, 210, and 230 joists are used in floor diaphragm construction, the thickness of the sheathing must be a minimum of 19/32" with 8d (0.131" x 2½") nails.

### TJI® Joists as Engineered Diaphragm Framing Members

TJI® 110, 210, 230, 360, and 560 joists may be used as framing members in blocked and unblocked engineered diaphragms designed using the specified shear strength values in table 9.5.2 and procedures given in section 9 of CSA O86-09, subject to the limitations in Table 1 below.

**Table 1: TJI® Joist Engineered Diaphragm Framing Design Information<sup>(1)</sup>**

| TJI® Joist Series                              | Closest Permitted Nail Spacing (in) <sup>(2)</sup> |                       |                       | Design Information                   |                                  |  |
|--|--|-----------------------|-----------------------|--------------------------------------|----------------------------------|--|
|  | 6d Common (0.113"X2")                              | 8d Common (0.131X2½") | 10d Common (0.148X3") | Equivalent Framing Member Width (in) | Equivalent Specific Gravity (SG) | Maximum Permitted Specified Shear Strength, v <sub>d</sub> (plf) |
| <b>110<sup>(3)</sup> and 210<sup>(3)</sup></b> | 4  | 4                     | 4                     | 1½                                   | 0.50                             | 790  |
| <b>230<sup>(3)</sup></b>                       | 4  | 4                     | 4                     | 2½                                   | 0.50                             | 895  |
| <b>360 and 560</b>                             | 3  | 3                     | 4                     | 2½                                   | 0.50                             | 1340   |
| <b>s31, s33 and s47</b>                        | 3  | 3                     | 4                     | 2½                                   | 0.42                             | 1072   |

- (1) Specified shear strength for wood structural diaphragms with TJI® joist framing must be determined in accordance with Table 9.5.2 of CSA O86-09, using the equivalent framing member width and specific gravities specified in Table 1 above and must not exceed the maximum permitted specified strength given.
- (2) One row of nails is permitted along each sheathing panel end and edge. When nail spacing is less than 6" on-center, adjacent nails within a row must be offset (staggered). The closest permitted nail spacing in Table 1 must not be exceeded. Solid sawn framing members must be used in lieu of TJI® framing members where the fastener spacing required in Table 9.5.2 of CSA O86-09 is closer than the permitted nail spacing in table 1 above.
- (3) The specified shear strength of an unblocked diaphragm framed with TJI® 110, 210, and 230 joists must be multiplied by a factor of 0.85 unless a non-polyurethane sub-floor adhesive is used in combination with mechanical fasteners for the sheathing attachment.

If you have any questions or require additional information, please contact your Weyerhaeuser representative.

**Some TJI® joist series may not be available in your region.**

**TJI® joists are intended for dry use applications.**