

Evaluation Report CCMC 13314-R Quattro™ Post

MASTERFORMAT:	06 18 13.02
Issued:	2008-05-01
Re-evaluated:	2011-09-02
Revised:	2013-02-28
Re-evaluation due:	2014-05-01

1. Opinion

It is the opinion of the Canadian Construction Materials Centre (CCMC) that “Quattro™ Post”, when used as glued-laminated timber columns in accordance with the conditions and limitations stated in Section 3 of this Report, complies with the National Building Code 2010:

- Clause 1.2.1.1.(1)(b), Division A, as an alternative solution that achieves at least the minimum level of performance required by Division B in the areas defined by the objectives and functional statements attributed to the following applicable acceptable solutions:
 - Sentence 4.3.1.1.(1) Design Basis for Wood
 - Article 9.17.4.2. Materials (wood columns)

This opinion is based on CCMC's evaluation of the technical evidence in Section 4.1 provided by the Report Holder.

2. Description

The product is manufactured by laminating graded kiln-dried, Spruce-Pine-Fir (S-P-F) select structural, S-P-F No. 2, Douglas-fir (DF) select structural, DF No. 2 lumber, or western red cedar. The lamina is processed with a patented profile and then laminated together at right angles in custom-built presses to create a hollow core column that can be either 89 mm x 89 mm (4" x 4"), 140 mm x 140 mm (6" x 6") or 184 mm x 184 mm (8" x 8"). Once the pressing is complete, the column is finish profiled and trimmed to length.

Exterior grade phenol-resorcinol adhesives are used for finger-jointed lumber and laminating of the product. The adhesive complies with CSA O112.7-M, “Phenol and Phenol Resorcinol Resin Adhesives for Wood (Room- and Intermediate-Temperature Curing).”

3. Conditions and Limitations

CCMC's compliance opinion in Section 1 is bound by the “Quattro™ Post” being used in accordance with the conditions and limitations set out below.

The scope of this CCMC evaluation is limited to the product being used for dry service applications only¹. When the product is considered for wet service applications, a professional engineer with an expertise in wood science shall determine, in consultation with the manufacturer, the appropriate proprietary strength adjustment factor for the specific application.

- 1 *All lumber, wood-based panels and proprietary engineered wood products are intended for dry service conditions. "Dry service" is defined as the in-service environment under which the equilibrium moisture content (MC) of lumber is 15% or less over a year and does not exceed 19% at any time. The Canadian Wood Council's (CWC) Wood Design Manual states that, "wood contained within the interior of dry, heated or unheated buildings has generally been found to have a MC between 6% and 14% according to season and location. As a rule wood that is used in exterior construction in protected or semi-protected locations, such as under roof or porch canopies or overhangs, or in locations where it is wet only for short periods and dry most of the time, will have an equilibrium moisture content of not more than 15%, and dry design strength may be used." During construction, all wood-based products should be protected from the weather to ensure that the 19% MC is not exceeded in accordance with Article 9.3.2.5., Moisture Content, of Division B of the NBC 2010.*

The product is intended for use in construction as an alternative to a solid sawn lumber column. Proprietary design values presented for the product are to be designed by professional engineers in accordance with CAN/CSA-O86-09, "Engineering Design in Wood," for structural applications in dry service conditions.

Pre-engineered Tables²

The pre-engineered tables in the literature outlined below have been provided to CCMC by Synergy Pacific to demonstrate compliance to Part 9 buildings for acceptance by the local authority having jurisdiction (AHJ):

When the product is used, the installation must be in accordance with the content of Synergy Pacific's publication entitled "Quattro™Post Handling and Installation Instructions," dated 08-03-30 and with the installation guidelines noted in this Report for those applications falling within the scope of this Report. Applications outside the scope of these installation guidelines shall require engineering on a case-by-case basis.

- 2 *The pre-engineered tables list the pre-engineered factored resistance of the column. The AHJ may require further engineering to determine the factored load applied onto the column in a building, in accordance with Part 4, of Division B of the NBC 2010.*

Installation Guidelines

- Bases, column caps and fasteners are required when the column is designed for its intended use.
- The product must be loaded only axially; no load perpendicular to the column axis is allowed.
- The product may be used vertically or under an angle as structural posts. Connection methods may include nails, screws, lag screws and brackets.
- The product may only be notched with the permission of Synergy Pacific.
- Connector holes must be pre-drilled.
- Through-bolting is not permitted on structural connections of the product. Pilot holes are required for lag screws. The maximum permitted lag screw diameter is 12.7 mm (½").
- Holes shall be limited to 15 mm (5/8") for 4 x 4 posts, and 19 mm (3/4") for 6 x 6 and 8 x 8 posts. For multiple holes, they are to be centered on the post and spaced vertically at least 203 mm (8") apart. Holes, in addition to those required for installation of approved column caps and bases, are not permitted within 203 mm (8") of the top or bottom of the post.
- The product is to be stained or primed in accordance with the manufacturer's instructions.
- The ends of the product are factory-sealed to protect them from water damage. Trimmed material will require end-sealing with an alkyl oil primer or equivalent.
- Non-loadbearing "Quattro™Post" columns may be the size and length produced by the manufacturer.

Engineering Required

For structural applications beyond the scope/limitations of the above-referenced Synergy Pacific publication or when required by the AHJ, the drawings or related documents shall bear the authorized seal of a professional engineer skilled in wood design and licensed to practice under the appropriate provincial or territorial legislation.

The product must be designed in accordance with the requirements of CAN/CSA-O86 and Part 4 of Division B of the NBC 2010. The specified strengths and fastener limits for the product must not exceed the values set forth in Tables 4.1.1 to 4.1.5 of this Report.

The engineer shall design in accordance with CAN/CSA-O86, and may use as a guide, the "Engineering Guide for Wood Frame Construction," published by the Canadian Wood Council.

Engineering Support Provided by the Manufacturer

Synergy Pacific provides engineering support and may be consulted at:

www.quattropost.com
quattropost@synergypacific.com
 Telephone: (877) 546-6808
 Fax: (250) 546-6815

The product must be identified with the following information

- manufacturer's name and logo; and
- the phrase "CCMC 13314-R"

4. Technical Evidence

The Report Holder has submitted technical documentation for CCMC's evaluation. Testing was conducted at laboratories recognized by CCMC. The corresponding technical evidence for this product is summarized below.

4.1 Performance Requirements

Table 4.1.1 Specified Strength¹ and Stiffness for *Spruce-Pine-Fir – Select Structural*

Property(MPa)	Size (mm)		
	89	140	184
E	9776	9776	9776
E ₀₅	8505	8505	8505
f _c @ 12% MC	20.51	18.80	17.91
f _c @ 15% MC	17.55	16.09	15.32
f _c @ 19% MC	13.63	12.49	11.90
f _b @ 15% MC	17.46	16.01	15.25

Table 4.1.2 Specified Strength¹ and Stiffness for *Spruce-Pine-Fir – No. 2*

Property(MPa)	Size (mm)		
	89	140	184
E	10094	10094	10094
E ₀₅	8782	8782	8782
f _c @ 12% MC	19.13	17.53	16.70
f _c @ 15% MC	16.40	15.04	14.32
f _c @ 19% MC	12.80	11.73	11.17
f _b @ 15% MC	15.24	13.97	13.30

Table 4.1.3 Specified Strength¹ and Stiffness for *Douglas-fir – Select Structural*

Property(MPa)	Size (mm)		
	89	140	184
E	11171	11171	11171
E ₀₅	9719	9719	9719
f _c @ 12% MC	23.01	21.10	20.09
f _c @ 15% MC	19.69	18.05	17.19
f _c @ 19% MC	15.34	14.06	13.40
f _b @ 15% MC	18.69	17.14	16.32

Table 4.1.4 Specified Strength¹ and Stiffness for *Douglas-fir – No. 2*

Property(MPa)	Size (mm)		
	89	140	184
E	11134	11134	11134
E ₀₅	9687	9687	9687
f _c @ 12% MC	20.80	19.07	18.17
f _c @ 15% MC	17.81	16.33	15.55
f _c @ 19% MC	13.87	12.71	12.11
f _b @ 15% MC	16.43	15.06	14.35

Table 4.1.5 Specified Strength¹ and Stiffness for *Western Red Cedar – Select Structural*

Property(MPa)	Size (mm)		
	89	140	184
E	7977	7977	7977
E ₀₅	6940	6940	6940
f _c @ 12% MC	15.62	14.31	13.63
f _c @ 15% MC	13.35	12.23	11.65
f _c @ 19% MC	10.39	9.52	9.07
f _b @ 15% MC	17.42	15.97	15.21

Note to tables 4.1.1 to 4.1.5

- 1 Specified strengths are for standard term duration of load ($K_d = 1.0$). Specified strengths have been adjusted to a base volume of 0.515 m^3 (column $0.140 \times 0.140 \times 3.466 \text{ mm}$) where the volume factor $K_{zc} = 1$. For other column volumes use volume factor $K_{zc} = 0.68*(z^{-0.13})$, but not greater than 1.3, where z = member volume (m^3).

Report Holder

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Date modified:
2013-03-01