1. Basis of the product report:
   - 2015 National Building Code of Canada (NBC): Clause 1.2.1.1 of Division A and Clauses 4.1, 4.3.1.1, and 9.23 of Division B
   - CAN/CSA O86-14 (reprint 2016) Engineering Design in Wood
   - ANSI/APA PRG 320-2018 Performance Rated Cross-Laminated Timber
   - ANSI/APA PRG 320-2012 recognized in CSA O86-14 (reprint 2016)
   - APA Reports T2018P-21 and T2019P-50, and other qualification data

2. Product description:
   Freres mass panel products (MPP) are manufactured with 25-mm-thick (1-inch-thick) Freres 1.6E Douglas-fir LVL in accordance with custom layups of ANSI/APA PRG 320 through product qualification and mathematical models using principles of engineering mechanics. The LVL layers are parallel laminated, bonded with structural adhesives, and pressed to form a solid panel. Freres MPP can be used in floor, roof, and wall applications, and is manufactured in a plank billet with nominal widths of 51 to 3658 mm (2 to 144 inches), thicknesses of 51 to 305 mm (2 to 12 inches), and lengths up to 14.6 m (48 feet).

3. Design properties:
   Freres MPP shall be designed with the design properties and capacities provided in Table 1, or recommendations provided by the manufacturer. The design adjustment factors shall be based on the recommendations provided by the manufacturer and approved by the engineer of record. The lateral resistance of Freres MPP, when used as shearwalls or diaphragms, depends on the panel-to-panel connection and anchorage designs, and shall be consulted with the manufacturer and approved by the engineer of record.

4. Product installation:
   Freres MPP shall be installed in accordance with the recommendations provided by the manufacturer and the engineering drawing approved by the engineer of record. Permissible details shall be in accordance with the engineering drawing.

5. Fire-rated assemblies:
   Fire-rated assemblies shall be constructed in accordance with the recommendations provided by the manufacturer. Procedures specified in Annex B of CSA O86 shall be permitted for use in the fire design of Freres MPP when approved by the authority having jurisdiction.

6. Limitations:
   a) Freres MPP shall be designed in accordance with principles of engineering mechanics using the design properties specified in this report or provided by the manufacturer.
   b) Freres MPP products shall be limited to dry service conditions where the average equilibrium moisture content of solid-sawn lumber over a year is 15 percent or less and does not exceed 19 percent.
   c) Design properties for Freres MPP, when used as beams or lintels with loads applied parallel to the face-bond gluelines, are beyond the scope of this report.
d) Freres MPP shall be manufactured in accordance with proprietary Freres MPP manufacturing specifications documented in the in-plant manufacturing standard approved by APA.

e) Freres MPP is produced at the Freres facility in Lyons, Oregon under a quality assurance program audited by APA.

f) Properties shown in this report are limited to MPP manufactured with 25-mm-thick (1-inch-thick) Freres 1.6E Douglas-fir LVL.

g) This report is subject to re-examination in one year.

7. Identification:
Freres MPP described in this report is identified by a label bearing the manufacturer's name (Freres) and/or trademark, the APA assigned plant number (1121), the product standard (ANSI/APA PRG 320 or ASTM D5456), the APA logo, the MPP thickness, the report number PR-L325, and a means of identifying the date of manufacture.
### Table 1. LSD Flatwise Bending Stiffness and Unfactored Resistance Values\(^{(a)}\) for Freres MPP (For Use in Canada)

| MPP Layup(b) | Layup ID | Thickness, \(t_p\) (mm) | \((F_bS)_{eff,l,0}\) \((10^6\ N/\text{mm/m})\) | \((E)_{eff,l,0}\) \((10^9\ N/\text{mm}^2/\text{m})\) | \((G)_{eff,l,0}\) \((10^6\ N/\text{m})\) | \(V_{s,0}\) (kN/m) | \((F_bS)_{eff,l,90}\) \((10^6\ N/\text{mm/m})\) | \((E)_{eff,l,90}\) \((10^9\ N/\text{mm}^2/\text{m})\) | \((G)_{eff,l,90}\) \((10^6\ N/\text{m})\) | \(V_{s,90}\) (kN/m) |
|--------------|----------|-------------------------|-----------------------------------|-------------------------------|-------------------|--------------|--------------------------|---------------------------------|-------------------|-------------------|--------------|
| F16-2        |          | 51                      | 9.1                               | 151                           | 12                | 51           | 1.7                       | 26                              | 2.5               | 16                |
| F16-3        |          | 76                      | 15                                | 480                           | 18                | 51           | 2.9                       | 85                              | 3.8               | 16                |
| F16-4        |          | 102                     | 27                                | 1,149                         | 24                | 69           | 5.2                       | 198                             | 5.0               | 22                |
| F16-5        |          | 127                     | 43                                | 2,241                         | 30                | 86           | 8.1                       | 395                             | 6.3               | 27                |
| F16-6        |          | 152                     | 62                                | 3,860                         | 36                | 103          | 12                        | 678                             | 10                | 33                |
| F16-7        |          | 178                     | 84                                | 6,139                         | 39                | 120          | 16                        | 1,073                           | 12                | 38                |
| F16-8        |          | 203                     | 110                               | 9,160                         | 44                | 137          | 21                        | 1,601                           | 13                | 44                |
| F16-9        |          | 229                     | 139                               | 13,040                        | 50                | 154          | 26                        | 2,278                           | 15                | 49                |
| F16-10       |          | 254                     | 171                               | 17,888                        | 55                | 171          | 32                        | 3,135                           | 17                | 54                |
| F16-11       |          | 279                     | 207                               | 23,810                        | 61                | 188          | 39                        | 4,171                           | 19                | 60                |
| F16-12       |          | 305                     | 246                               | 30,909                        | 67                | 205          | 47                        | 5,414                           | 20                | 65                |

For Imperial: 1 mm = 0.0394 in.; 1 m = 3.28 ft; 1 N = 0.2248 lbf

\(^{(a)}\) Tabulated values are unfactored Limit States design values and not permitted to be increased for the lumber size adjustment factor in accordance with CSA O86.

\(^{(b)}\) The CLT layups are developed based on ANSI/APA PRG 320, as permitted by the standard.
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