CCMC CANADIAN CODE COMPLIANCE EVALUATION

# CCMC 12787-R

## CCMC Canadian code compliance evaluation

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| **CCMC number:** | 12787-R |
| **Status:** | Active |
| **Issue date:** | 1996-12-23 |
| **Modified date:** | 2026-10-28 |
| **Evaluation holder:** | **Boise Cascade Company**<br>70 rue Industrielle<br>Saint-Jacques NB  E7B 1T1<br>Canada<br>Website: www.bc.com<br>Telephone: 506-735-3561<br>Email: DomLavoie@BC.com |
| **Product name:** | AJS® Joists |
| **Compliance:** | NBC 2015, NBC 2020 |
| **Criteria:** | CCMC-TG-061733.01-15A, "Technical Guide for Prefabricated Wood I-Joists"<br>CCMC-TG-061733.01-20, "CCMC Technical Guide for Prefabricated Wood I-Joists" |

**In most jurisdictions this document is sufficient evidence for approval by Canadian authorities.**
Learn more about CCMC recognition Look for the trusted CCMC mark on products to verify compliance.

## Compliance opinion

It is the opinion of the Canadian Construction Materials Centre that the evaluated product, when used as joists in floor and roof applications in accordance with the conditions and limitations stated in this evaluation, complies with the following codes:

### National Building Code of Canada 2015

| Code provision | Solution type |
|---|---|
| 4.3.1.1.(1) Buildings and their structural members m ... | Acceptable |
| 9.4.1. Structural Design Requirements and Application Limitations | Acceptable |
| 9.10.8.10. Application to Houses | Alternative |
| 9.23.4.2.(2) Spans for floor joists that are not sele ... | Alternative |

### National Building Code of Canada 2020

| Code provision | Solution type |
|---|---|
| 4.3.1.1.(1) Buildings and their structural members m ... | Acceptable |
| 9.4.1. Structural Design Requirements and Application Limitations | Acceptable |
| 9.10.8.10. Application to Houses | Alternative |
| 9.23.4.2.(2) Spans for floor joists that are not sele ... | Alternative |

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The above opinion(s) is/are based on the evaluation by the CCMC of technical evidence provided by the evaluation holder, and is bound by the stated conditions and limitations. For the benefit of the user, a summary of the technical information that forms the basis of this evaluation has been included.

# Product information

## Product name

AJS® Joists

## Product description

The products are prefabricated wood I-joists that are available in 17 series and include in-plant finger-jointed flange materials. Each of the products consist of two continuous lumber flanges that are glued to a 9.5-mm-thick or 11.1-mm-thick oriented strandboard (OSB) web that comply with the manufacturer's quality requirements and are in conformance with CSA O325-07, "Construction Sheathing." The lumber flanges are either AllJoist® Proprietary Grade (APG) or in-plant proprietary machine stress rated (MSR) grade. The flanges may be solid sawn or finger-jointed lumber or proprietary face-bonded composite lumber. The products are available in depths ranging from 235 mm to 610 mm. The flange sizes and grades of the product series are shown in Table 1.

The web-flange connection is made by inserting the profiled OSB web into a profiled groove in the centre of the wide face of the flange (both top and bottom flanges). The flange-to-flange finger joints are bonded with a polyurethane emulsion polymer (PEP) adhesive (CCMC 13512-L, CCMC 13513-L and CCMC 14964-L), the web-to-web joints are bonded with a PEP adhesive (CCMC 13512-L), and the web-to-flange joints are bonded with an emulsion polymer isocyanate (EPI) adhesive (CCMC 13591-L). For all of the AJS series, the web-to-web and web-to-flange joints may be bonded with a phenol-resorcinol adhesive (CCMC 13051-L or CCMC 13054-L) as an alternative. Except for the AJS-30 and AJS-200 series, the AJS series flange-to-flange finger joints may be bonded with a phenol-resorcinol adhesive (CCMC 13213-L) as an alternative.

**Table 1. Joist flange sizes and grades of the product series**

| Series | Depth (mm) | Web thickness (mm) | Flange size (mm) | Grade [(1)] |
|---|---|---|---|---|
| **AJS-5** | 241 to 302 | 9.5 | 38.1 × 63.5 | APG |
| **AJS-10** | 241 to 406 | 9.5 | 38.1 × 63.5 | APG |
| **AJS-20** | 241 to 406 | 9.5 | 38.1 × 63.5 | MSR |
| **AJS-20v** [(2)] | 235 to 406 | 9.5 | 38.1 × 63.5 | MSR |
| **AJS-24** | 235 to 406 | 9.5 | 38.1 × 89 | MSR |
| **AJS-25** | 241 to 406 | 9.5 | 38.1 × 89 | MSR |
| **AJS-25** | 457 to 610 | 11.1 | 38.1 × 89 | MSR |
| **AJS-25v** [(2)] | 235 to 406 | 9.5 | 38.1 × 89 | MSR |
| **AJS-30** | 457 to 610 | 11.1 | 38.1 × 89 | MSR |
| **AJS-110** | 235 to 406 | 9.5 | 38.1 × 63.5 | MSR |
| **AJS-140** | 241 to 406 | 9.5 | 38.1 × 63.5 | MSR |

| Series | Depth (mm) | Web thickness (mm) | Flange size (mm) | Grade [1] |
|---|---|---|---|---|
| **AJS-150** | 241 to 406 | 9.5 | 38.1 × 63.5 | MSR |
| **AJS-150v** [2] | 235 to 406 | 9.5 | 38.1 × 63.5 | MSR |
| **AJS-160** | 241 to 406 | 9.5 | 38.1 × 63.5 | MSR |
| **AJS-170** | 241 to 406 | 9.5 | 38.1 × 63.5 | MSR |
| **AJS-180** | 241 to 406 | 9.5 | 38.1 × 63.5 | MSR |
| **AJS-190** | 235 to 406 | 9.5 | 38.1 × 63.5 | MSR |
| **AJS-190** | 457 to 508 | 11.1 | 38.1 × 63.5 | MSR |
| **AJS-200** | 241 to 406 | 9.5 | 38.1 × 63.5 | MSR |

| | Notes |
|---|---|
| 1 | Both the APG and MSR lumber flanges are proprietary graded. |
| 2 | The "v" designation indicates that the OSB web strong axis is oriented vertically. |

## Manufacturing plant

This evaluation is valid only for products produced at the following plant:

| Product name | Manufacturing plant |
|---|---|
| | Saint-Jacques, NB, CA |
| AJS® Joists | ✓ |

✓ Indicates that the product from this manufacturing facility has been evaluated by the CCMC

## Conditions and limitations

The CCMC's compliance opinion is bound by this product being used in accordance with the conditions and limitations set out below.

- The products are intended for use in structural applications, such as floor joists, and are intended for dry service [(1)] applications only.
- The following pre-engineering information has been provided to the CCMC by the manufacturer to demonstrate compliance with Part 9, Housing and Small Buildings, of the 2015 and 2020 editions of the National Building Code of Canada (NBC), for acceptance by the local authority having jurisdiction (AHJ).

### Manufacturer's pre-engineered design tables

When the products are used as floor joists and roof rafters in simple (single) spans or as floor joists in continuous (multiple) span applications supporting uniform loads only, the installation must be in accordance with the span tables (including vibration criteria[(2)]) found in the document entitled:

- AJS® JOIST SPECIFIER GUIDE, Reorder #JOI-CE1600, Rev 09/25.

The products must be installed in accordance with the manufacturer's installation guidelines in the above-mentioned document for those applications falling within the scope of the document. Applications outside the scope of these installation guidelines shall require engineering on a case-by-case basis.

### Manufacturer's pre-engineered installation details

The manufacturer's pre-engineered details in the document listed above are limited in scope to building designs where the following details are not exceeded:

- rim board and blocking panel maximum vertical load (page 9)
- squash blocks maximum vertical load (page 9)
- web hole tables (pages 10 and 11)
- reinforced load-bearing cantilever tables (page 13)
- web stiffener requirements (page 14)
- roof joist details (pages 16 and 17)
- roof span tables (pages 18 to 21)
- roof uniform load tables (page 22)

### Engineering required

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

The engineer must design in accordance with CSA O86-14, "Engineering Design in Wood," when complying with NBC 2015, or CSA O86:19 when complying with NBC 2020, and may use the *Engineering Guide for Wood Frame Construction*, published by the Canadian Wood Council, as a guide.

Installations beyond the scope and limitations of the Manufacturer's pre-engineered design tables and Manufacturer's pre-engineered installation details include, but are not limited to, the following:

- higher loads/longer spans than the manufacturer's pre-engineered details;

- concentrated loads;
- offset bearing walls;
- areas of high wind and high seismicity;
- stair openings;
- design of supporting wall studs/beams when the total load exceeds the NBC pre-engineered floor/roof joist tables; and
- design of supporting foundation footings when the total load exceeds the NBC pre-engineered floor/roof joist tables.

## Engineering support provided by manufacturer

The manufacturer provides engineering support and may also be consulted regarding the use of this proprietary prefabricated I-joist by telephone at 506-735-3561.

- This product must be identified with the phrase "CCMC 12787-R" along the side of the web or flange of the product. The CCMC number is only valid when it appears in conjunction with the APA—The Engineered Wood Association (APA) or PFS TECO certification mark, which indicates that APA and/or PFS TECO is responsible for conducting the third-party quality assurance and product certification.
- Damaged or defective joists must not be used, unless repaired in accordance with written instructions from the manufacturer.

**Notes**

1 All lumber, wood-based panels and proprietary engineered wood products are intended for dry service conditions. "Dry service conditions" are defined as the in-service environment in which the average equilibrium moisture content (MC) of lumber is 15% or less over a year and does not exceed 19% at any time. Wood contained within the interior of dry, heated, or unheated buildings has generally been found to have an MC of between 6% and 14%, depending on season and location. 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 2015 and NBC 2020.

2 In cases where concrete topping is applied or bridging/blocking is used and joists are installed at the maximum spans, the current vibration criteria may not address all occupant performance expectations. The manufacturer should therefore be consulted for span adjustments, if necessary, in these types of installations.

## Technical information

This evaluation is based on demonstrated conformance with the following criteria:

| Criteria number | Criteria name |
|---|---|
| CCMC-TG-061733.01-15A | Technical Guide for Prefabricated Wood I-Joists |
| CCMC-TG-061733.01-20 | CCMC Technical Guide for Prefabricated Wood I-Joists |

### General

The evaluation holder has submitted technical documentation for the CCMC's evaluation. Testing was conducted at laboratories recognized by the CCMC. The corresponding technical evidence for this product is summarized below. Additional engineering data and load/span tables are available from the manufacturer as outlined in Conditions and limitations.

### Design requirements

**Table 2. Factored resistances (1) of the AJS-5**

| Joist depth (mm) | Factored moment resistance (2) (N·m) | Factored shear resistance (N) | Maximum end reaction without stiffeners (3) (N) | Maximum intermediate reaction without stiffeners (4) (N) | Bending stiffness (5) EI × $10^6$ (kN·$mm^2$) | Shear coefficient K × $10^6$ (N) |
|---|---|---|---|---|---|---|
| 241 | 4 920 | 8 144 | 6 670 | 16 499 | 521 | 23.1 |
| 302 | 6 390 | 10 461 | 6 705 | 16 780 | 894 | 29.4 |

**Notes**

1 Factored resistances include ø = 0.9, applied in accordance with CSA O86-14 and CSA O86:19. Additional engineering data and load/span tables are provided by the manufacturer.

2 Moment resistance must not be increased by any Code-allowed repetitive member use factor.

3 Minimum end bearing of 38 mm (44.5 mm if I-joist depth ≥ 457 mm).

4 Minimum intermediate bearing of 89 mm.

5 The bending stiffness is based on the shear-free E.

**Table 3. Factored resistances [(1)] of the AJS-10**

| Joist depth (mm) | Factored moment resistance [(2)] (N·m) | Factored shear resistance (N) | Maximum end reaction without stiffeners [(3)] (N) | Maximum intermediate reaction without stiffeners [(4)] (N) | Bending stiffness [(5)] EI × $10^6$ (kN·$mm^2$) | Shear coefficient K × $10^6$ (N) |
|---|---|---|---|---|---|---|
| 241 | 6 700 | 8 144 | 6 670 | 16 499 | 664 | 23.1 |
| 302 | 8 705 | 10 461 | 6 705 | 16 780 | 1 135 | 29.4 |
| 356 | 10 480 | 12 567 | 6 740 | 17 061 | 1 667 | 34.7 |
| 406 | 12 120 | 14 498 | 6 810 | 17 307 | 2 259 | 39.6 |

**Notes**

1 Factored resistances include ø = 0.9, applied in accordance with CSA O86-14 and CSA O86:19. Additional engineering data and load/span tables are provided by the manufacturer.

2 Moment resistance must not be increased by any Code-allowed repetitive member use factor.

3 Minimum end bearing of 38 mm (44.5 mm if I-joist depth ≥ 457 mm).

4 Minimum intermediate bearing of 89 mm.

5 The bending stiffness is based on the shear-free E.

**Table 4. Factored resistances [(1)] of the AJS-20**

| Permitted labels | Joist depth (mm) | Factored moment resistance [(2)] (N·m) | Factored shear resistance (N) | Maximum end reaction without stiffeners [(3)] (N) | Maximum intermediate reaction without stiffeners [(4)] (N) | Bending stiffness [(5)] EI × $10^6$ (kN·$mm^2$) | Shear coefficient K × $10^6$ (N) |
|---|---|---|---|---|---|---|---|
| NJ60H | 241 | 7 685 | 8 144 | 6 670 | 16 499 | 664 | 23.1 |
| | 302 | 9 985 | 10 461 | 6 705 | 16 780 | 1 135 | 29.4 |
| | 356 | 12 020 | 12 567 | 6 740 | 17 061 | 1 667 | 34.7 |
| | 406 | 13 900 | 14 498 | 6 810 | 17 307 | 2 259 | 39.6 |

**Notes**

1 Factored resistances include ø = 0.9, applied in accordance with CSA O86-14 and CSA O86:19. Additional engineering data and load/span tables are provided by the manufacturer.

2 Moment resistance must not be increased by any Code-allowed repetitive member use factor.

3 Minimum end bearing of 38 mm (44.5 mm if I-joist depth ≥ 457 mm).

4 Minimum intermediate bearing of 89 mm.

5 The bending stiffness is based on the shear-free E.

**Table 5. Factored resistances (1) of the AJS-20v (2)**

| Joist depth (mm) | Factored moment resistance (3) (N·m) | Factored shear resistance (N) | Maximum end reaction without stiffeners (4) (N) | Maximum intermediate reaction without stiffeners (5) (N) | Bending stiffness (6) EI × $10^6$ (kN·$mm^2$) | Shear coefficient K × $10^6$ (N) |
|---|---|---|---|---|---|---|
| 235 | 8 295 | 7 935 | 7 550 | 16 500 | 625 | 22.7 |
| 241 | 8 545 | 8 145 | 7 550 | 16 500 | 664 | 23.1 |
| 286 | 10 430 | 9 830 | 8 250 | 17 555 | 999 | 27.6 |
| 302 | 11 105 | 10 460 | 8 250 | 17 555 | 1 135 | 29.4 |
| 356 | 13 365 | 12 570 | 8 250 | 17 555 | 1 667 | 34.7 |
| 406 | 15 460 | 14 500 | 8 250 | 17 555 | 2 259 | 39.6 |

**Notes**

1 Factored resistances include ø = 0.9, applied in accordance with CSA O86-14 and CSA O86:19. Additional engineering data and load/span tables are provided by the manufacturer.

2 The "v" designation indicates that the OSB web strong axis is oriented vertically.

3 Moment resistance must not be increased by any Code-allowed repetitive member use factor.

4 Minimum end bearing of 38 mm (44.5 mm if I-joist depth ≥ 457 mm).

5 Minimum intermediate bearing of 89 mm.

6 The bending stiffness is based on the shear-free E.

**Table 6. Factored resistances [(1)] of the AJS-24**

| Permitted labels | Joist depth (mm) | Factored moment resistance [(2)] (N·m) | Factored shear resistance (N) | Maximum end reaction without stiffeners [(3)] (N) | Maximum intermediate reaction without stiffeners [(4)] (N) | Bending stiffness [(5)] EI × $10^6$ (kN·$mm^2$) | Shear coefficient K × $10^6$ (N) |
|---|---|---|---|---|---|---|---|
| NJ40U | 235 | 8 775 | 7 898 | 6 670 | 18 255 | 726 | 23.1 |
| | 241 | 9 020 | 8 144 | 6 670 | 18 255 | 771 | 23.6 |
| | 286 | 11 010 | 9 829 | 6 705 | 18 886 | 1 158 | 28.0 |
| | 302 | 11 720 | 10 461 | 6 705 | 18 886 | 1 316 | 29.8 |
| | 356 | 14 115 | 12 567 | 6 740 | 19 448 | 1 928 | 35.1 |
| | 406 | 16 330 | 14 498 | 6 810 | 20 010 | 2 609 | 40.5 |

**Notes**

1 Factored resistances include ø = 0.9, applied in accordance with CSA O86-14 and CSA O86:19. Additional engineering data and load/span tables are provided by the manufacturer.

2 Moment resistance must not be increased by any Code-allowed repetitive member use factor.

3 Minimum end bearing of 38 mm (44.5 mm if I-joist depth ≥ 457 mm).

4 Minimum intermediate bearing of 89 mm.

5 The bending stiffness is based on the shear-free E.

**Table 7. Factored resistances [(1)] of the AJS-25**

| Permitted labels | Joist depth (mm) | Factored moment resistance [(2)] (N·m) | Factored shear resistance (N) | Maximum end reaction without stiffeners [(3)] (N) | Maximum intermediate reaction without stiffeners [(4)] (N) | Bending stiffness [(5)] EI × $10^6$ (kN·$mm^2$) | Shear coefficient K × $10^6$ (N) |
|---|---|---|---|---|---|---|---|
| NJ60U | 241 | 12 095 | 8 144 | 6 670 | 18 255 | 921 | 23.1 |
| | 302 | 15 720 | 10 461 | 6 705 | 18 886 | 1 569 | 29.4 |
| | 356 | 18 925 | 12 567 | 6 740 | 19 448 | 2 295 | 34.7 |
| | 406 | 21 895 | 14 498 | 6 810 | 20 010 | 3 099 | 39.6 |
| N/A | 457 [(6)] | 24 745 | 21 133 | 15 727 | 33 139 | 4 092 | 54.7 |

| Permitted labels | Joist depth (mm) | Factored moment resistance [2] (N·m) | Factored shear resistance (N) | Maximum end reaction without stiffeners [3] (N) | Maximum intermediate reaction without stiffeners [4] (N) | Bending stiffness [5] EI × $10^6$ (kN·$mm^2$) | Shear coefficient K × $10^6$ (N) |
|---|---|---|---|---|---|---|---|
| | 508 [6] | 27 670 | 22 748 | 17 482 | 35 878 | 5 202 | 60.9 |
| | 559 [6] | 30 350 | 24 363 | 17 482 | 36 720 | 6 460 | 66.7 |
| | 610 [6] | 33 005 | 25 908 | 17 482 | 37 528 | 7 869 | 73.4 |

**Notes**

1 Factored resistances include ø = 0.9, applied in accordance with CSA O86-14 and CSA O86:19. Additional engineering data and load/span tables are provided by the manufacturer.

2 Moment resistance must not be increased by any Code-allowed repetitive member use factor.

3 Minimum end bearing of 38 mm (44.5 mm if I-joist depth ≥ 457 mm).

4 Minimum intermediate bearing of 89 mm.

5 The bending stiffness is based on the shear-free E.

6 These I-joist depths require stiffeners at all bearing locations.

**Table 8. Factored resistances [1] of the AJS-25v**

| Joist depth (mm) | Factored moment resistance [2] (N·m) | Factored shear resistance (N) | Maximum end reaction without stiffeners [3] (N) | Maximum intermediate reaction without stiffeners [4] (N) | Bending stiffness [5] EI × $10^6$ (kN·$mm^2$) | Shear coefficient K × $10^6$ (N) |
|---|---|---|---|---|---|---|
| 235 | 11 735 | 7 935 | 7 550 | 18 255 | 867 | 23.6 |
| 241 | 12 095 | 8 145 | 7 550 | 18 255 | 921 | 24.0 |
| 286 | 14 765 | 9 830 | 8 775 | 19 380 | 1 382 | 28.5 |
| 302 | 15 715 | 10 460 | 8 775 | 19 380 | 1 569 | 30.2 |
| 356 | 18 920 | 12 570 | 8 775 | 21 205 | 2 295 | 35.6 |
| 406 | 21 890 | 14 500 | 8 775 | 21 205 | 3 099 | 40.5 |

**Notes**

1 Factored resistances include ø = 0.9, applied in accordance with CSA O86-14 and CSA O86:19. Additional engineering data and load/span tables are provided by the manufacturer.

2 Moment resistance must not be increased by any Code-allowed repetitive member use factor.

3 Minimum end bearing of 38 mm (44.5 mm if I-joist depth ≥ 457 mm).

4 Minimum intermediate bearing of 89 mm.

5 The bending stiffness is based on the shear-free E.

**Table 9. Factored resistances (1) of the AJS-30**

| Joist depth (mm) | Factored moment resistance (2) (N·m) | Factored shear resistance (N) | Maximum end reaction without stiffeners (3) (N) | Maximum intermediate reaction without stiffeners (4) (N) | Bending stiffness (5) EI × $10^6$ (kN·$mm^2$) | Shear coefficient K × $10^6$ (N) |
|---|---|---|---|---|---|---|
| 457 (6) | 30 620 | 21 133 | 15 727 | 33 139 | 4 515 | 54.7 |
| 508 (6) | 34 235 | 22 748 | 17 482 | 35 878 | 5 735 | 60.9 |
| 559 (6) | 37 555 | 24 363 | 17 482 | 36 720 | 7 114 | 66.7 |
| 610 (6) | 40 835 | 25 908 | 17 482 | 37 528 | 8 657 | 73.4 |

**Notes**

1 Factored resistances include ø = 0.9, applied in accordance with CSA O86-14 and CSA O86:19. Additional engineering data and load/span tables are provided by the manufacturer.

2 Moment resistance must not be increased by any Code-allowed repetitive member use factor.

3 Minimum end bearing of 38 mm (44.5 mm if I-joist depth ≥ 457 mm).

4 Minimum intermediate bearing of 89 mm.

5 The bending stiffness is based on the shear-free E.

6 These I-joist depths require stiffeners at all bearing locations.

**Table 10. Factored resistances [(1)] of the AJS-110**

| Joist depth (mm) | Factored moment resistance [(2)] (N·m) | Factored shear resistance (N) | Maximum end reaction without stiffeners [(3)] (N) | Maximum intermediate reaction without stiffeners [(4)] (N) | Bending stiffness [(5)] EI × $10^6$ (kN·$mm^2$) | Shear coefficient K × $10^6$ (N) |
|---|---|---|---|---|---|---|
| 235 | 3 985 | 7 898 | 6 670 | 16 499 | 387 | 22.2 |
| 241 | 4 110 | 8 144 | 6 670 | 16 499 | 413 | 23.0 |
| 286 | 5 015 | 9 829 | 6 705 | 16 780 | 626 | 27.4 |
| 302 | 5 335 | 10 461 | 6 705 | 16 780 | 712 | 28.9 |
| 356 | 6 425 | 12 567 | 6 740 | 16 956 | 1 053 | 34.4 |
| 406 | 7 295 | 14 498 | 6 810 | 17 131 | 1 446 | 39.4 |

**Notes**

1 Factored resistances include ø = 0.9, applied in accordance with CSA O86-14 and CSA O86:19. Additional engineering data and load/span tables are provided by the manufacturer.

2 Moment resistance must not be increased by any Code-allowed repetitive member use factor.

3 Minimum end bearing of 38 mm (44.5 mm if I-joist depth ≥ 457 mm).

4 Minimum intermediate bearing of 89 mm.

5 The bending stiffness is based on the shear-free E.

**Table 11. Factored resistances [(1)] of the AJS-140**

| Joist depth (mm) | Factored moment Resistance [(2)] (N·m) | Factored shear resistance (N) | Maximum end reaction without stiffeners [(3)] (N) | Maximum intermediate reaction without stiffeners [(4)] (N) | Bending stiffness [(5)] EI × $10^6$ (kN·$mm^2$) | Shear coefficient K × $10^6$ (N) |
|---|---|---|---|---|---|---|
| 241 | 5 545 | 8 144 | 6 670 | 16 499 | 521 | 23.1 |
| 302 | 7 205 | 10 461 | 6 705 | 16 780 | 894 | 29.4 |
| 356 | 8 670 | 12 567 | 6 740 | 17 061 | 1 318 | 34.7 |
| 406 | 10 030 | 14 498 | 6 810 | 17 307 | 1 792 | 39.6 |

**Notes**

1 Factored resistances include ø = 0.9, applied in accordance with CSA O86-14 and CSA O86:19. Additional engineering data and load/span tables are provided by the manufacturer.

2 Moment resistance must not be increased by any Code-allowed repetitive member use factor.

3 Minimum end bearing of 38 mm (44.5 mm if I-joist depth ≥ 457 mm).

4 Minimum intermediate bearing of 89 mm.

5 The bending stiffness is based on the shear-free E.

**Table 12. Factored resistances (1) of the AJS-150**

| Permitted labels | Joist depth (mm) | Factored moment resistance (2) (N·m) | Factored shear resistance (N) | Maximum end reaction without stiffeners (3) (N) | Maximum intermediate reaction without stiffeners (4) (N) | Bending stiffness (5) EI × $10^6$ (kN·$mm^2$) | Shear coefficient K × $10^6$ (N) |
|---|---|---|---|---|---|---|---|
| NJ40H | 241 | 6 370 | 8 144 | 6 670 | 16 499 | 556 | 23.1 |
| | 302 | 8 275 | 10 461 | 6 705 | 16 780 | 954 | 29.4 |
| | 356 | 9 960 | 12 567 | 6 740 | 17 061 | 1 405 | 34.7 |
| | 406 | 11 525 | 14 498 | 6 810 | 17 307 | 1 909 | 39.6 |

**Notes**

1 Factored resistances include ø = 0.9, applied in accordance with CSA O86-14 and CSA O86:19. Additional engineering data and load/span tables are provided by the manufacturer.

2 Moment resistance must not be increased by any Code-allowed repetitive member use factor.

3 Minimum end bearing of 38 mm (44.5 mm if I-joist depth ≥ 457 mm).

4 Minimum intermediate bearing of 89 mm.

5 The bending stiffness is based on the shear-free E.

**Table 13. Factored resistances [1] of the AJS-150v**

| Joist depth (mm) | Factored moment resistance [2] (N·m) | Factored shear resistance (N) | Maximum end reaction without stiffeners [3] (N) | Maximum intermediate reaction without stiffeners [4] (N) | Bending stiffness [5] EI × $10^6$ (kN·$mm^2$) | Shear coefficient K × $10^6$ (N) |
|---|---|---|---|---|---|---|
| 235 | 6 180 | 7 935 | 7 550 | 16 500 | 523 | 22.7 |
| 241 | 6 370 | 8 145 | 7 550 | 16 500 | 556 | 23.1 |
| 286 | 7 775 | 9 830 | 8 250 | 17 555 | 839 | 27.6 |
| 302 | 8 275 | 10 460 | 8 250 | 17 555 | 954 | 29.4 |
| 356 | 9 960 | 12 570 | 8 250 | 17 555 | 1 405 | 34.7 |
| 406 | 11 525 | 14 500 | 8 250 | 17 555 | 1 909 | 39.6 |

**Notes**

1 Factored resistances include ø = 0.9, applied in accordance with CSA O86-14 and CSA O86:19. Additional engineering data and load/span tables are provided by the manufacturer.

2 Moment resistance must not be increased by any Code-allowed repetitive member use factor.

3 Minimum end bearing of 38 mm (44.5 mm if I-joist depth ≥ 457 mm).

4 Minimum intermediate bearing of 89 mm.

5 The bending stiffness is based on the shear-free E.

**Table 14. Factored resistances [1] of the AJS-160**

| Joist depth (mm) | Factored moment resistance [2] (N·m) | Factored shear resistance (N) | Maximum end reaction without stiffeners [3] (N) | Maximum intermediate reaction without stiffeners [4] (N) | Bending stiffness [5] EI × $10^6$ (kN·$mm^2$) | Shear coefficient K × $10^6$ (N) |
|---|---|---|---|---|---|---|
| 241 | 6 910 | 8 144 | 6 670 | 16 499 | 592 | 23.1 |
| 302 | 8 980 | 10 461 | 6 705 | 16 780 | 1 015 | 29.4 |
| 356 | 10 810 | 12 567 | 6 740 | 17 061 | 1 492 | 34.7 |
| 406 | 12 505 | 14 498 | 6 810 | 17 307 | 2 025 | 39.6 |

**Notes**

1 Factored resistances include ø = 0.9, applied in accordance with CSA O86-14 and CSA O86:19. Additional engineering data and load/span tables are provided by the manufacturer.

2 Moment resistance must not be increased by any Code-allowed repetitive member use factor.

3 Minimum end bearing of 38 mm (44.5 mm if I-joist depth ≥ 457 mm).

4 Minimum intermediate bearing of 89 mm.

5 The bending stiffness is based on the shear-free E.

**Table 15. Factored resistances (1) of the AJS-170**

| Joist depth (mm) | Factored moment resistance (2) (N·m) | Factored shear resistance (N) | Maximum end reaction without stiffeners (3) (N) | Maximum intermediate reaction without stiffeners (4) (N) | Bending stiffness (5) EI × $10^6$ (kN·$mm^2$) | Shear coefficient K × $10^6$ (N) |
|---|---|---|---|---|---|---|
| 241 | 7 455 | 8 144 | 6 670 | 16 499 | 628 | 23.1 |
| 302 | 9 690 | 10 461 | 6 705 | 16 780 | 1 075 | 29.4 |
| 356 | 11 660 | 12 567 | 6 740 | 17 061 | 1 580 | 34.7 |
| 406 | 13 490 | 14 498 | 6 810 | 17 307 | 2 142 | 40.0 |

**Notes**

1 Factored resistances include ø = 0.9, applied in accordance with CSA O86-14 and CSA O86:19. Additional engineering data and load/span tables are provided by the manufacturer.

2 Moment resistance must not be increased by any Code-allowed repetitive member use factor.

3 Minimum end bearing of 38 mm (44.5 mm if I-joist depth ≥ 457 mm).

4 Minimum intermediate bearing of 89 mm.

5 The bending stiffness is based on the shear-free E.

**Table 16. Factored resistances [1] of the AJS-180**

| Joist depth (mm) | Factored moment resistance [2] (N·m) | Factored shear resistance (N) | Maximum end reaction without stiffeners [3] (N) | Maximum intermediate reaction without stiffeners [4] (N) | Bending stiffness [5] EI × $10^6$ (kN·$mm^2$) | Shear coefficient K × $10^6$ (N) |
|---|---|---|---|---|---|---|
| 241 | 8 230 | 8 144 | 6 670 | 16 499 | 664 | 23.1 |
| 302 | 10 690 | 10 461 | 6 705 | 16 780 | 1 135 | 29.4 |
| 356 | 12 870 | 12 567 | 6 740 | 17 061 | 1 667 | 34.7 |
| 406 | 14 890 | 14 498 | 6 810 | 17 307 | 2 259 | 40.0 |

**Notes**

1 Factored resistances include ø = 0.9, applied in accordance with CSA O86-14 and CSA O86:19. Additional engineering data and load/span tables are provided by the manufacturer.

2 Moment resistance must not be increased by any Code-allowed repetitive member use factor.

3 Minimum end bearing of 38 mm (44.5 mm if I-joist depth ≥ 457 mm).

4 Minimum intermediate bearing of 89 mm.

5 The bending stiffness is based on the shear-free E.

**Table 17. Factored resistances [1] of the AJS-190**

| Joist depth (mm) | Factored moment resistance [2] (N·m) | Factored shear resistance (N) | Maximum end reaction without stiffeners [3] (N) | Maximum intermediate reaction without stiffeners [4] (N) | Bending stiffness [5] EI × $10^6$ (kN·$mm^2$) | Shear coefficient K × $10^6$ (N) |
|---|---|---|---|---|---|---|
| 235 | 8 545 | 7 898 | 6 670 | 16 499 | 658 | 22.7 |
| 241 | 8 805 | 8 144 | 6 670 | 16 499 | 700 | 23.1 |
| 286 | 10 750 | 9 829 | 6 705 | 16 780 | 1 052 | 27.6 |
| 302 | 11 440 | 10 461 | 6 705 | 16 780 | 1 195 | 29.4 |
| 356 | 13 770 | 12 567 | 6 740 | 17 061 | 1 754 | 34.7 |
| 406 | 15 930 | 14 498 | 6 810 | 17 307 | 2 375 | 40.0 |
| 457 [6] | 18 135 | 21 133 | 15 165 | 33 139 | 3 154 | 53.8 |

| Joist depth (mm) | Factored moment resistance [2] (N·m) | Factored shear resistance (N) | Maximum end reaction without stiffeners [3] (N) | Maximum intermediate reaction without stiffeners [4] (N) | Bending stiffness [5] EI × $10^6$ (kN·$mm^2$) | Shear coefficient K × $10^6$ (N) |
|---|---|---|---|---|---|---|
| 508 [6] | 20 275 | 22 748 | 15 165 | 33 561 | 4 023 | 60.1 |

**Notes**

1 Factored resistances include ø = 0.9, applied in accordance with CSA O86-14 and CSA O86:19. Additional engineering data and load/span tables are provided by the manufacturer.

2 Moment resistance must not be increased by any Code-allowed repetitive member use factor.

3 Minimum end bearing of 38 mm (44.5 mm if I-joist depth ≥ 457 mm).

4 Minimum intermediate bearing of 89 mm.

5 The bending stiffness is based on the shear-free E.

6 These I-joist depths require stiffeners at all bearing locations.

**Table 18. Factored resistances [1] of the AJS-200**

| Joist depth (mm) | Factored moment resistance [2] (N·m) | Factored shear resistance (N) | Maximum end reaction without stiffeners [3] (N) | Maximum intermediate reaction without stiffeners [4] (N) | Bending stiffness [5] EI × $10^6$ (kN·$mm^2$) | Shear coefficient K × $10^6$ (N) |
|---|---|---|---|---|---|---|
| 241 | 9 400 | 8 144 | 6 670 | 16 499 | 735 | 23.1 |
| 302 | 12 215 | 10 461 | 6 705 | 16 780 | 1 256 | 29.4 |
| 356 | 14 700 | 12 567 | 6 740 | 17 061 | 1 841 | 34.7 |
| 406 | 17 005 | 14 498 | 6 810 | 17 307 | 2 492 | 40.0 |

**Notes**

1 Factored resistances include ø = 0.9, applied in accordance with CSA O86-14 and CSA O86:19. Additional engineering data and load/span tables are provided by the manufacturer.

2 Moment resistance must not be increased by any Code-allowed repetitive member use factor.

3 Minimum end bearing of 38 mm (44.5 mm if I-joist depth ≥ 457 mm).

| | |
|---|---|
| 4 | Minimum intermediate bearing of 89 mm. |
| 5 | The bending stiffness is based on the shear-free E. |

## Additional test information for the products

The design values obtained from testing to ASTM D5055-04, "Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists," as specified in CAN/CSA-O86-01 are summarized below. The manufacturer's published pre-engineered joist spans were designed in accordance with CSA O86-19. The design values are also valid for CSA O86:14.

**Table 19. Additional test information for the products (1)**

| Property | Test information |
|---|---|
| **Shear capacity** | The shear capacity of the products was established by testing as per ASTM D5055. Qualification and quality control tests were used to establish the applicable coefficient of variation, CVw, and the reliability normalization factor from CAN/CSA-O86-01 was used to determine the specified strength. |
| **Moment capacity** | The moment capacity qualification was carried out using the analytical method in accordance with ASTM D5055. Quality control tests and qualification tests were used to establish the fifth percentile based on a normal distribution. The Weibull coefficient of variation, CVw, was standardized at a conservative 15%, and the reliability normalization factor from CAN/CSA-O86-01 was used to determine the specified strength. |
| **Stiffness** | An appropriate test program was used to confirm the stiffness capacity. The following formula was used to predict mid-span deflection:<br>deflection = $(5wL^4)/(384EI) + (wL^2)/K$<br>where EI = shear-free E × I, from Design requirements, w = uniform load (kN/m), L = span (mm), K = shear deflection factor |
| **End joints** | End joints were qualified as part of the flange tension qualification. The flanges are finger-jointed at the plant and regular tension testing is conducted. |
| **Creep** | Specimens were tested for creep performance as per ASTM D5055, whereby two specimens in each I-joist series group are loaded to 1.5 times the design resistive moment capacity and the average deflection recovery must exceed 90% of the deflection between 1.5 times total load and the basic dead load deflection (20% design). |
| **Bearing length** | A minimum of 10 specimens was tested for three bearing lengths at various I-joist depths, including the extreme depths. A linear regression was performed on the averages of the tested depths to obtain the remaining values. Tests were conducted to qualify a minimum end bearing of 38 mm (44.5 mm if I-joist depth ≥ 457 mm) and 89 mm. Qualification tests were used to establish the applicable coefficient of variation, CVw, and the reliability normalization factor from Table 13.2.3.2 of CAN/CSA-O86-01 was used to determine the specified strength. |
| **Adhesive qualification** | The flange-to-flange finger joints are bonded with a polyurethane emulsion polymer (PEP) adhesive (CCMC 13512-L, CCMC 13513-L and CCMC 14964-L), the web-to-web joints are bonded with a PEP adhesive (CCMC 13512-L), and the web-to-flange joints are bonded with an emulsion polymer isocyanate (EPI) adhesive (CCMC 13591-L). For all of the AJS series, the web-to-web and web-to-flange joints may be bonded with a phenol-resorcinol adhesive (CCMC 13051-L or CCMC 13054-L) as an alternative. Except for the AJS-30 and AJS-200 series, the AJS series flange-to-flange finger joints may be bonded with a phenol-resorcinol adhesive (CCMC 13213-L) as an alternative. |

| Property | Test information |
|---|---|
| **Web stock** | The web stock complies with CAN/CSA-O325.0-92, “Construction Sheathing,” and/or Product Standard, PS 2. |
| **Manufacturing quality assurance** | The manufacturing quality assurance program includes requirements specified in ASTM D5055 and is verified by the third-party agencies APA and/or PFS TECO as part of the product certification. The quality assurance program also includes proprietary grading, random sampling and ongoing testing at the plant. The third-party certification agency ensures that the quality control measures are adequate to maintain the published design values at each plant. |

| | Notes |
|---|---|
| 1 | Design values were developed in accordance with the referenced standards found herein. The requirements met have not changed in the current editions of the standards referenced in CSA O86-14. |

## Fire-protection options

The performance of the below fire-protection options are presented as additional information for authorities having jurisdiction. This section is beyond the scope of the CCMC's Code compliance opinion related to the evaluation of structural performance.

## Fire performance of innovative structural products

The CCMC Registry of Product Assessments contains opinions on the suitability-for-use of products intended as structural elements in houses. Although historically there has been no need to regulate the structural fire performance of houses, an inherent intent of the National Building Code of Canada (NBC) is that occupants have sufficient time to escape from a building in the event of a fire. There are many factors that may determine whether that intent is achieved. The fire endurance of structural elements may be one. However, its importance may be minimized by other factors such as combustible content load, early warning devices, smoke movement and toxicity, and fire department response time; all contributing to the overall system performance. Research is underway within the NRC Construction Research Centre to determine the critical factors that affect occupant escape from houses.

Some innovative structural products have been used in the marketplace for several years and have gained the confidence of design professionals, code authorities and users with respect to their performance under typical fire scenarios in today's house system. Some newer products have not been in service long enough to have gained that confidence and may present a more obvious concern.

The minimum fire performance of innovative structural materials, or alternative solutions, as compared to that of the NBC-specified conventional wood-frame construction, or acceptable solution, has been the subject of analysis and discussion for several years among fire officials, provincial and territorial regulators, and AHJs. In fire tests conducted between 2002 and 2008 at the NRC, the innovative structural joist systems tested, and currently in the marketplace (i.e., I-joists, C-channel steel joists, metal-plated wood trusses and metal-web trusses), had a time-to-collapse below the performance of exposed 38 mm × 235 mm (2 × 10) lumber joists.

The CCMC provides this floor fire performance information to the local AHJs across Canada to aid their decision-making on whether the fire performance of floors (i.e., the time to evacuate before failure occurs) for alternative joist systems performs “as well as” the inherent fire performance of exposed 38 mm × 235 mm (2 × 10) lumber joists. As is the case for all innovative products, designers and authorities should exercise judgment in considering the use of

innovative structural products for houses. Unless otherwise stated, innovative structural products for houses have not been evaluated in the context of the NBC intent noted above.

The CCMC has reviewed the below fire-protection options in comparison to the fire performance of an unprotected exposed 38 mm × 235 mm (2 × 10) floor joist system. The presented fire-protection options perform “as well as” exposed 38 mm × 235 mm (2 × 10) lumber joists. It should be noted that the NBC 2015 and NBC 2020 exempt single-family houses constructed using conventional wood-frame construction, in accordance with Part 9, from requiring a fire-resistance rating (see Article 9.10.8.10., Application to Houses, of Division B of the NBC 2015 and NBC 2020). The below fire-protection options for alternative floor joists is not to be considered in sprinklered single-family houses or where fire-resistance-rated assemblies are required.

The following fire protection assemblies are applicable for the evaluated products as provided in Table 20.

**Table 20. Applicable AllJoist® Prefabricated I-Joists for fire protection assemblies based on flange size**

| Product | Flange size (thickness × width) (mm) | Fire protection assembly |
|---|---|---|
| **AJS-5** | 38.1 × 63.5 | FP-01, FP-02, FP-03, FP-04, FP-06, FP-07, FP-09 |
| **AJS-10** | 38.1 × 63.5 | FP-01, FP-02, FP-03, FP-04, FP-06, FP-07, FP-09 |
| **AJS-20** | 38.1 × 63.5 | FP-01, FP-02, FP-03, FP-04, FP-06, FP-07, FP-09 |
| **AJS-20v** | 38.1 × 63.5 | FP-01, FP-02, FP-03, FP-04, FP-06, FP-07, FP-09 |
| **AJS-24** | 38.1 × 89 | FP-01, FP-02, FP-03, FP-04, FP-06, FP-07, FP-09 |
| **AJS-25** | 38.1 × 89 | FP-01, FP-02, FP-03, FP-04, FP-06, FP-07, FP-09 |
| **AJS-25v** | 38.1 × 89 | FP-01, FP-02, FP-03, FP-04, FP-06, FP-07, FP-09 |
| **AJS-30** | 38.1 × 89 | FP-01, FP-02, FP-03, FP-04, FP-06, FP-07, FP-09 |
| **AJS-110** | 38.1 × 63.5 | FP-01, FP-02, FP-03, FP-04, FP-06, FP-07, FP-09 |
| **AJS-140** | 38.1 × 63.5 | FP-01, FP-02, FP-03, FP-04, FP-06, FP-07, FP-09 |
| **AJS-150** | 38.1 × 63.5 | FP-01, FP-02, FP-03, FP-04, FP-06, FP-07, FP-09 |
| **AJS-150v** | 38.1 × 63.5 | FP-01, FP-02, FP-03, FP-04, FP-06, FP-07, FP-09 |
| **AJS-160** | 38.1 × 63.5 | FP-01, FP-02, FP-03, FP-04, FP-06, FP-07, FP-09 |
| **AJS-170** | 38.1 × 63.5 | FP-01, FP-02, FP-03, FP-04, FP-06, FP-07, FP-09 |
| **AJS-180** | 38.1 × 63.5 | FP-01, FP-02, FP-03, FP-04, FP-06, FP-07, FP-09 |
| **AJS-190** | 38.1 × 63.5 | FP-01, FP-02, FP-03, FP-04, FP-06, FP-07, FP-09 |
| **AJS-200** | 38.1 × 63.5 | FP-01, FP-02, FP-03 |

## Industry-based fire-protection options

## Fire-protection options

The details of the following industry-based fire-protection floor assemblies [(1)] are outlined in the figures below.

1. FP-01 - 12.5 mm (1/2 in.) Gypsum Board Attached to Bottom of Flange
2. FP-02 - 12.5 mm (1/2 in.) Gypsum Board Attached Directly to Web
3. FP-03 - 12.5 mm (1/2 in.) Gypsum Board Attached Directly to Sides of Flange
4. FP-04 - Mineral Wool Insulation
5. FP-06 - 12.5 mm (1/2 in.) Gypsum Board Installed on Top of the Bottom Flange
6. FP-07 - 15.8 mm (5/8 in.) Gypsum Board Installed on Top of the Bottom Flange
7. FP-09 - Rockwool SAFE'n'Sound® Mineral Wool Insulation

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**Note:**

1 These floor assemblies and supporting fire test data have been provided to the CCMC by the I-joist industry in collaboration with the APA – Engineered Wood Association. The floor assemblies contained herein reviewed by the CCMC provide equivalent fire performance to exposed 38 mm × 235 mm (2 × 10) lumber joists, and are a subset of those published in APA System Report SR-405G, dated April 2019.

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## Fire protection assembly details

The following floor assembly design (FP-01) is the default alternative solution for all cases and where the manufacturer has not undertaken any specific testing to show equivalency to exposed 38 x 235 mm (2×10) lumber with proprietary joist fire-protection options.

## Fire protection of floors FP-01

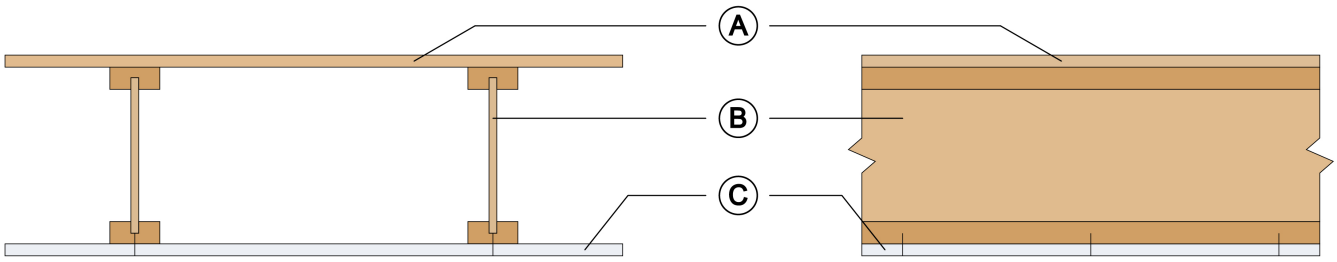



Figure 1. Fire protection of floors FP-01 - fire protection: 12.5 mm (1/2-in.) gypsum board attached to bottom of flange

A. Floor sheathing: materials and installation in accordance with the NBC referenced in this report.
B. I-joist: installation in accordance with Section 3 of this Report. Maximum 24 in. on centre (o.c.) spacing. Applicable to all flange sizes. Minimum web thickness of 9.5 mm (3/8 in.).
C. 12.5 mm (1/2 in.) gypsum board: materials and installation in accordance with the NBC referenced in this report. 1 × 3 (nominal) wood furring strips are permitted to be installed perpendicular to the bottom flange of the I-joists at 400 mm (16 in.) o.c. provided that the gypsum boards are directly attached to the furring strips using 32 mm (1-1/4 in.) Type W drywall screws at 300 mm (12 in.) o.c. Gypsum board not required to be finished with tape and joint compound.

The remaining fire-resistance designs, FP-02 to FP-09, provide fire performance as good as to 38 mm × 235 mm (2 × 10) dimensional lumber exposed floor joists.

## Fire protection of floors FP-02

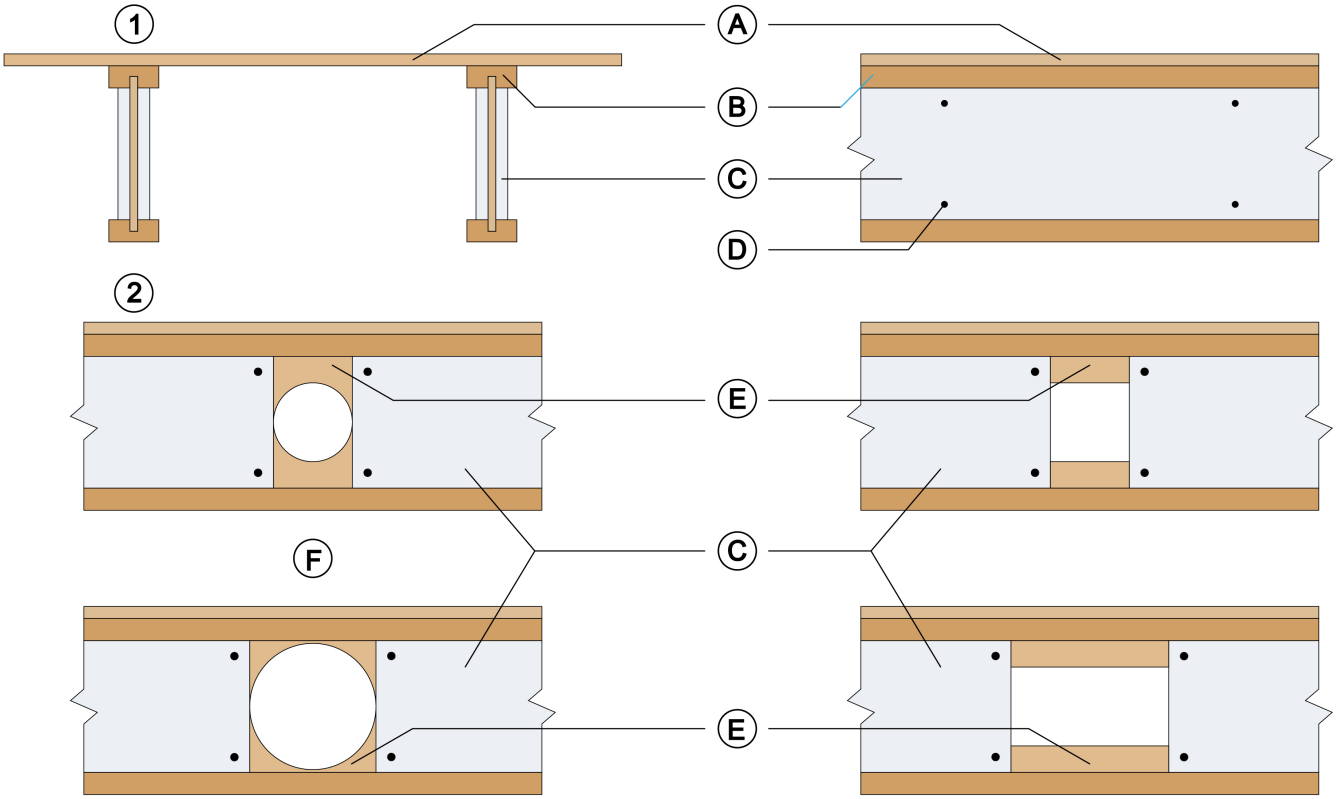



Figure 2. Fire protection of floors FP-02 - fire protection: 12.5 mm (1/2 in.) gypsum board attached directly to web

1. 12.5 mm (1/2 in.) gypsum board attached to web
2. installation requirements at web holes

A. Floor sheathing: materials and installation in accordance with the NBC referenced in this report.
B. I-joist: installation in accordance with Section 3 of this Report. Maximum 24 in. on centre (o.c.) spacing. Minimum flange size of 38 mm (1-1/2 in.) thick × 50 mm (2 in.) wide. Minimum web thickness of 9.5 mm (3/8 in.). At hole location, fasteners shall be installed 25 mm (1 in.) from the edge and end of the gypsum board.
C. 12.5 mm (1/2 in.) gypsum board: materials (over entire length of I-joist) not required to be finished with tape and joint compound. Fasteners: minimum 25 mm (1 in.) screws (Type W or Type S) or nails installed 25 mm (1 in.) from edges and ends and 400 mm (16 in.) o.c., top and bottom. Fasteners may be staggered from top to bottom.
D. Fastener
E. I-joist web
F. Or

## Fire protection of floors FP-03

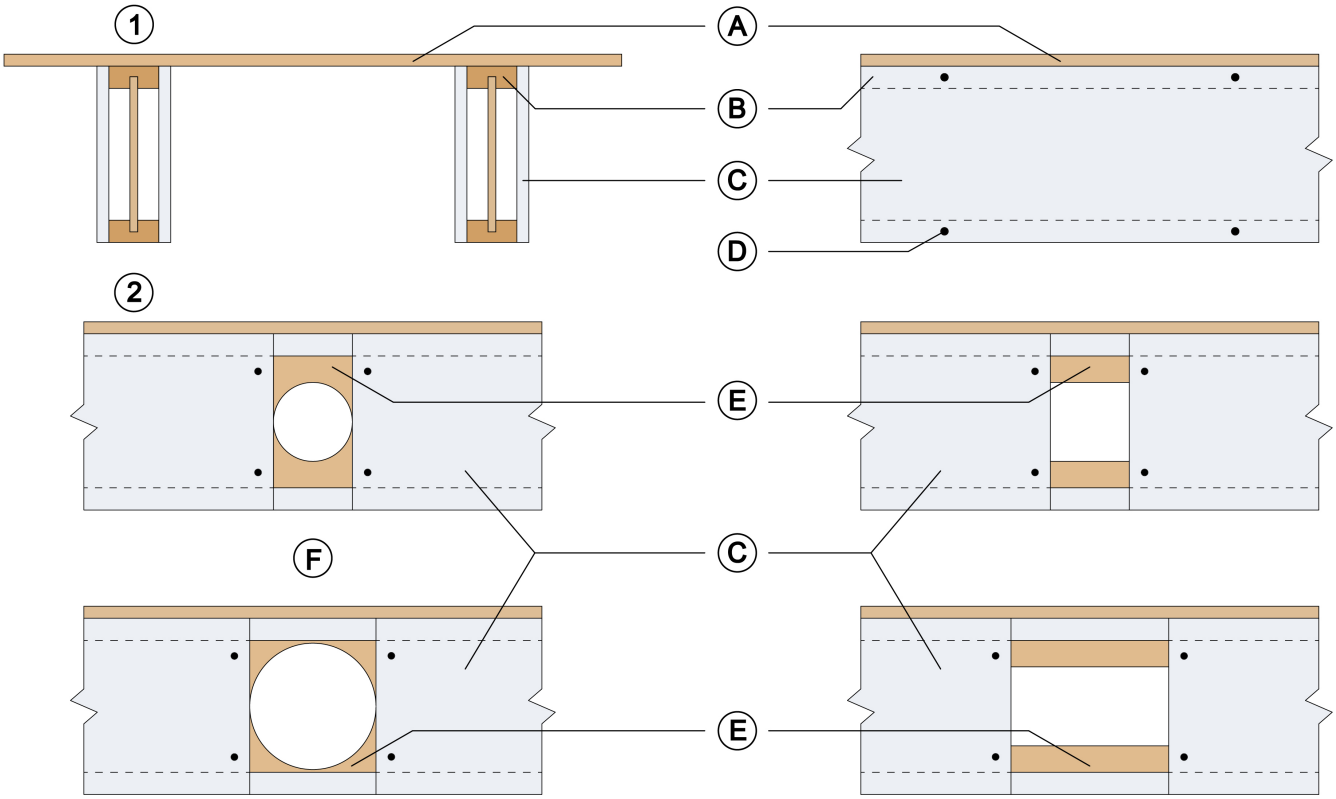



Figure 3. Fire protection of floors FP-03 - fire protection: 12.5 mm (1/2 in.) gypsum board attached directly to sides of flange

1. 12.5 mm (1/2 in.) gypsum board attached to sides of flange
2. installation requirements at web holes

A. Floor sheathing: materials and installation in accordance with the NBC referenced in this report.
B. I-joist: installation in accordance with Section 3 of this Report. Maximum 600 mm (24 in.) on centre (o.c.) spacing. Minimum flange size of 28.5 mm (1-1/8 in.) thick × 44.5 mm (1-3/4 in.) wide. Minimum web thickness of 9.5 mm (3/8 in.). At hole location, fasteners shall be installed 12.5 mm (1/2 in.) from the edge and 1 in. from the end of the gypsum board. Maximum fastener spacing shall be no more than 8 in. on gypsum board above and below the hole.
C. 12.5 mm (1/2 in.) gypsum board: materials (over entire length of I-joist) not required to be finished with tape and joint compound. Fasteners: minimum 25 mm (1 in.) screws (Type W or Type S) or nails installed 12.5 mm (1/2 in.) from edges and 1 in. from ends, and 400 mm (16 in.) o.c., top and bottom. Fasteners may be staggered from top to bottom.
D. Fastener
E. I-Joist web
F. Or

## Fire protection of floors FP-04

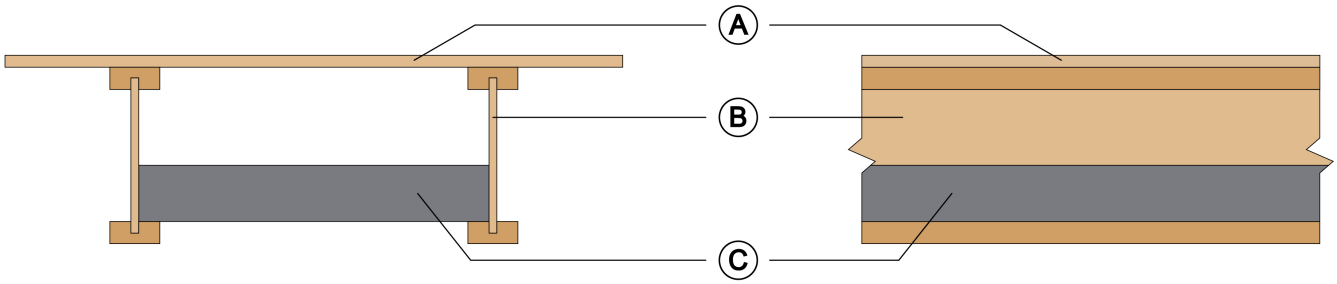



Figure 4. Fire protection of floors FP-04 - fire protection: mineral wool insulation

A. Floor sheathing: materials and installation in accordance with the NBC referenced in this report.
B. I-joist: installation in accordance with the "Conditions and limitations" section of this evaluation. Maximum 487 mm (19.2 in.) on centre (o.c.) spacing. Minimum flange size of 28.5 mm (1 1/8 in.) thick × 44.5 mm (1 3/4 in.) wide. Minimum web thickness of 9.5 mm (3/8 in.).
C. Mineral wool insulation: minimum 46.5 kg/m$^3$ (2.9 lb/ft$^3$) (nominal) and 50 mm (2 in.) thick mineral wool insulation made of rock slag, complying with CAN/ULC-S702 and with CCMC Listing, installed without gaps between individual batts as shown with stay wire insulation supports, spaced no more than 600 mm (24 in.) apart and no more than 100 mm (4 in.) from ends of batts. Minimum 40 kg/m$^3$ (2.5 lb/ft$^3$) (nominal) and 50 mm (2 in.) thick mineral wool insulation shall be permitted if the I-joists are spaced no more than 400 mm (16 in.) o.c. Use minimum 387 mm (15.25 in.) and 470 mm (18.5 in.) wide batts when I-joist spacing is 400 mm (16 in.) and 487 mm (19.2 in.) o.c., respectively.

Note: *As per the NBC referenced in this report, Sentence 9.25.2.3.(7), any insulation that may be subjected to mechanical damage is to be protected by a covering such as gypsum board, plywood, particleboard, OSB or hardboard.*

For assemblies where mineral-fibre insulation is installed to provide joist protection in a fire, as per the NBC referenced in this report, Sentence 9.25.2.3.(7), any insulation that may be subjected to mechanical damage is to be protected by a covering such as gypsum board, plywood, particleboard, oriented strandboard (OSB) or hardboard

## Fire protection of floors FP-06

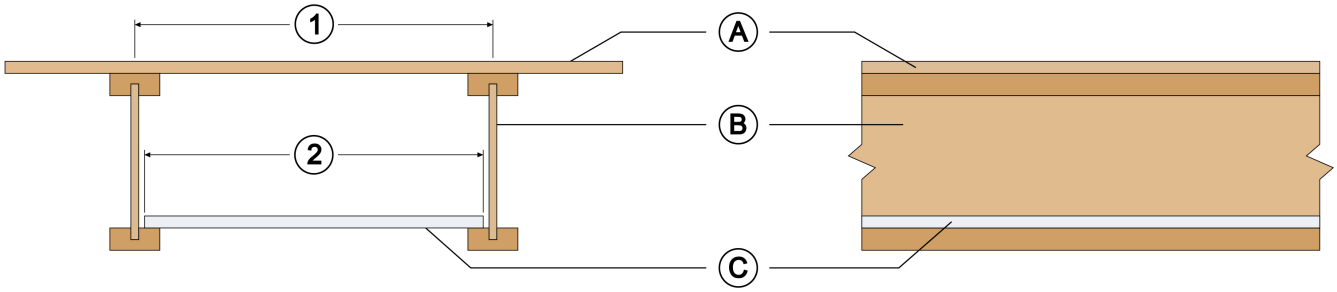



Figure 5. Fire protection of floors FP-06 - fire protection: 12.5 mm (1/2-in.) gypsum board installed on top of the bottom flange

A. Floor sheathing: materials and installation in accordance with the NBC referenced in this report.
B. I-joist: installation in accordance with Section 3 of this Report. Maximum 487 mm (19.2 in.) on centre spacing. Minimum flange size of 28.5 mm (1-1/8 in.) thick × 50 mm (2 in.) wide. Minimum web thickness of 9.5 mm (3/8 in.).
C. One layer of 12.5 mm (1/2 in.) lightweight or normal weight (nominal 7.3 kg/m$^2$ (1.5 psf) minimum) gypsum wall board meeting ASTM C 1396, installed on the top of the bottom flange. Mechanical fastener or adhesive attachment to the top of the bottom flange is not required.

1. 19.2 inches maximum
2. Gypsum board length (see table below)

**Table 21. Table for FP-06** [(3)]

| Joist spacing | Required length for gypsum boards |
|---|---|
| 300 mm (12 in.) | 282.5 mm (11-1/8 in.) ± 3.2 mm (1/8 in.) |
| 400 mm (16 in.) | 384.2 mm (15-1/8 in.) ± 3.2 mm (1/8 in.) |
| 487 mm (19.2 in.) | 467 mm (18-3/8 in.) ± 3.2 mm (1/8 in.) |

**Note:**

3 Gypsum board lengths shown above provide at least a 6 mm (1/4 in.) bearing on the top of the bottom flange in each I-joist as installed. For other joist spacings, the required gypsum board lengths shall be adjusted so that the required gypsum board lengths are determined based on a full bearing on the flange at one end of the joist spacing, while maintaining at least a 6 mm (1/4 in.) bearing at the other end. If double joists are used, the required gypsum board lengths shall be reduced from the table above by a length equal to the flange width.

## Fire protection of floors FP-07

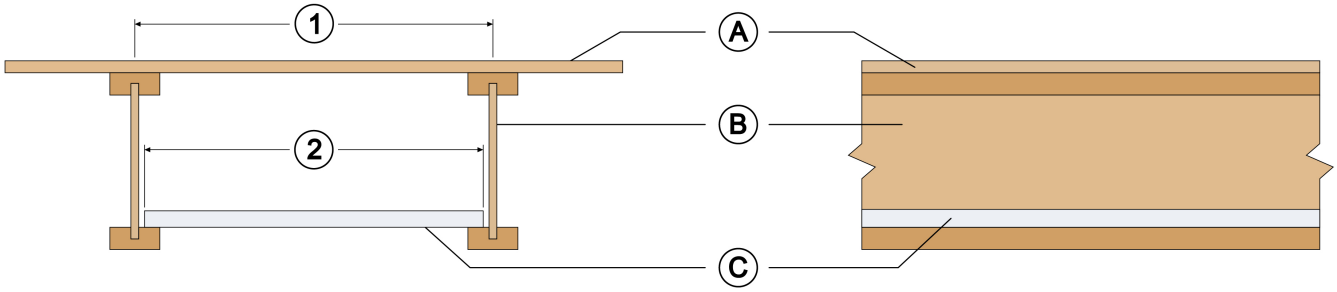



Figure 6. Fire protection of floors FP-07 - fire protection: 15.8 mm (5/8-inch) gypsum board installed on top of the bottom flange

A. Floor sheathing: materials and installation in accordance with the NBC referenced in this report.
B. I-joist: installation in accordance with Section 3 of this Report. Maximum 600 mm (24 in.) on centre spacing. Minimum flange size of 28.5 mm (1-1/8 in.) thick × 50 mm (2 in.) wide. Minimum web thickness of 9.5 mm (3/8 in.).
C. One layer of 15.8 mm (5/8 in.) lightweight or normal weight (nominal 9.3 kg/m2 (1.9 psf) minimum) gypsum wall board meeting ASTM C 1396, installed on the top of the bottom flange. Mechanical fastener or adhesive attachment to the top of the bottom flange is not required.

1. 24 inches maximum
2. Gypsum board length (see table below)

**Table 22. Gypsum board length for FP-07** [(4)]

| Joist spacing | Required length for gypsum boards |
|---|---|
| 300 mm (12 in.) | 282.5 mm (11-1/8 in.) ± 3.2 mm (1/8 in.) |
| 400 mm (16 in.) | 384.2 mm (15-1/8 in.) ± 3.2 mm (1/8 in.) |
| 487 mm (19.2 in.) | 467 mm (18-3/8 in.) ± 3.2 mm (1/8 in.) |
| 600 mm (24 in.) | 587 mm (23-1/8 in.) ± 3.2 mm (1/8 in.) |

**Note:**

4 Gypsum board lengths shown above provide at least a 6 mm (1/4 in.) bearing on the top of the bottom flange in each I-joist as installed. For other joist spacings, the required gypsum board lengths shall be adjusted so that the required gypsum board lengths are determined based on a full bearing on the flange at one end of the joist spacing, while maintaining at least a 6 mm (1/4 in.) bearing at the other end. If double joists are used, the required gypsum board lengths shall be reduced from the table above by a length equal to the flange width.

## Fire protection of floors FP-09

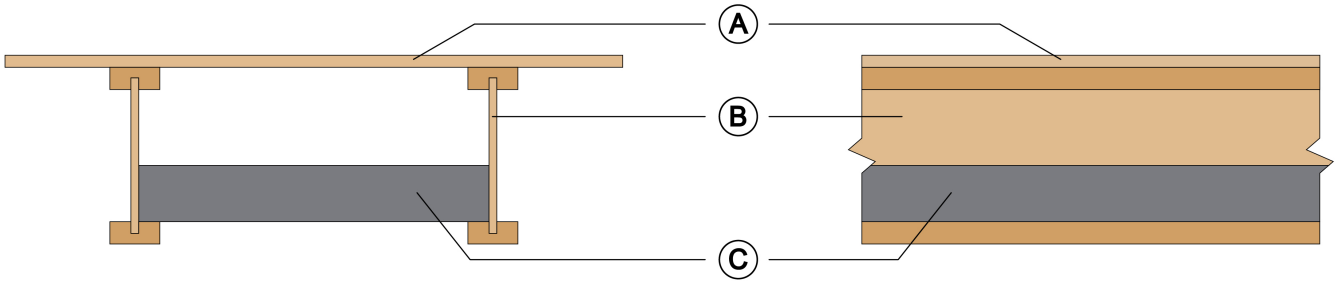



Figure 7. Fire protection of floors FP-09 - fire protection: Rockwool SAFE'n'Sound® mineral wool insulation

A. floor sheathing: materials and installation in accordance with the NBC referenced in this report.
B. I-joist: installation in accordance with the "Conditions and limitations" section of this evaluation. Maximum 600 mm (24 in.) on centre (o.c.) spacing. Minimum flange size of 28.5 mm (1 1/8 in.) thick × 50 mm (2 in.) wide. Minimum web thickness of 9.5 mm (3/8 in.).
C. mineral wool insulation: Rockwool SAFE'n'SOUND® minimum 40 kg/m$^3$ (2.5 lb/ft$^3$) (nominal) and 75 mm (3 in.) thick mineral wool batt insulation made of rock or furnace slag (ASTM C 665 Type 1-compliant) installed as shown with insulation stay wire supports, spaced no more than 600 mm (24 in.) apart and no more than 100 mm (4 in.) from ends of batts. Use minimum 387 mm (15.25 in.), 470 mm (18.5 in.) and 584 mm (23 in.) wide batts when I-joist spacing is 400 mm (16 in.), 487 mm (19.2 in.) and 600 mm (24 in.) o.c., respectively.

Note: *As per the NBC referenced in this report, Sentence 9.25.2.3.(7), any insulation that may be subjected to mechanical damage is to be protected by a covering such as gypsum board, plywood, particleboard, OSB or hardboard.*

For assemblies where mineral-fibre insulation is installed to provide joist protection in a fire, as per the NBC referenced in this report, Sentence 9.25.2.3.(7), any insulation that may be subjected to mechanical damage is to be protected by a covering such as gypsum board, plywood, particleboard, oriented strandboard (OSB) or hardboard

# Administrative information

## Use of Canadian Construction Materials Centre (CCMC) assessments

This assessment must be read in the context of the entire CCMC Registry of Product Assessments, any applicable building code or by-law requirements, and/or any other regulatory requirements (for example, the Canada Consumer Product Safety Act, the Canadian Environmental Protection Act, etc.).

It is the responsibility of the user to confirm that the assessment they are using is current and has not been withdrawn or superseded by a later version on the CCMC Registry of Product Assessments.

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## Language

Une version française de ce document est disponible.
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## CCMC recognition

The Canadian Construction Materials Centre (CCMC) assesses compliance with Canadian building, energy and safety codes. We are the only construction code compliance service supported and operated by the Government of Canada. Trusted by over 6,000 regulators across Canada.

> Most Canadian authorities having jurisdiction (AHJs) consider CCMC product assessments acceptable as evidence for product approval.

### CCMC assessments are recognized by construction authorities across Canada:

| | |
|---|---|
| Alliance of Canadian Building Official Associations (ACBOA) | (Alliance of Canadian Building Official Associations (ACBOA)) |
| First Nations National Building Officers Association (FNNBOA) | (First Nations National Building Officers Association (FNNBOA)) |
| Canadian Home Builders' Association (CHBA) | (Canadian Home Builders' Association (CHBA)) |
| Alberta Building Officials Association (ABOA) | (Alberta Building Officials Associations (ABOA)) |
| Saskatchewan Building Officials Association (SBOA) | (Saskatchewan Building Officials Association (SBOA)) |
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| Ontario Building Officials Association (OBOA) | (Ontario Building Officials Association (OBOA)) |
| New Brunswick Building Officials Association (NBBOA) | (New Brunswick Building Officials Association (NBBOA)) |
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> The CCMC provides code compliance assessments to Canadian code requirements, consulting nationwide with construction regulators to elicit regional variations in code requirements as well as provincial and local interpretations. Users are advised to review the technical information presented in CCMC assessments when making approval decisions. Learn more about how the CCMC provides a unique service for Canada.

For more information, contact the CCMC by phone at (613) 993-6189 or by email at ccmc@nrc-cnrc.gc.ca

## Code compliance as an acceptable solution

**Code Compliance via Acceptable Solutions**

> If a building design (e.g. material, component, assembly or system) can be shown to meet all provisions of the applicable **acceptable solutions** in Division B (e.g. it complies with the applicable provisions of a referenced standard), it is deemed to have satisfied the objectives and functional statements linked to those provisions and thus to have complied with that part of the Code.
>
> — **National Building Code of Canada, Sentence A-1.2.1.1.(1)(a)**

The CCMC has determined that compliance with this provision of the Code has been demonstrated as an **Acceptable Solution**. The evaluation report provides a summary of the basis of CCMC's compliance opinion.

**CCMC's code compliance opinions**

All CCMC evaluation reports are opinions of code compliance established in accordance with the National Building Code of Canada, Subsection 1.2.1. "Compliance with this Code," which requires compliance to be achieved by:

- complying with the applicable acceptable solutions in Division B, or
- using an alternative solution that will achieve at least the minimum level of performance required by Division B in the areas defined by the objective and functional statements attributed to the applicable acceptable solutions.

The CCMC assesses compliance with Canadian building, energy and safety codes, and is trusted by over 6,000 regulators across Canada.

## Code compliance as an alternative solution