



**National Research
Council Canada**

**Conseil national
de recherches Canada**

Institute for
Research in
Construction

Institut de
recherche en
construction

CCMC 13245-R

CCMC

*EVALUATION
REPORT*

DIVISION 06172.1

Issued 2006-06-13

Re-evaluation due 2009-06-13

Prokit KT – Adjustable Open Metal-Web Floor Trusses

PROKIT Structural Inc.
900, rue Thomas
Saint-Jean-sur-Richelieu (Québec)
J2X 5E7

Tel.: (450) 347-3999
Fax: (450) 347-3940

Plant: Saint-Jean-sur-Richelieu, Québec

1. Purpose of Evaluation

The proponent sought confirmation from the Canadian Construction Materials Centre (CCMC) that “Prokit KT,” a series of adjustable (i.e. site-trimmable) open metal-web floor trusses, complies with the intent of the National Building Code of Canada (NBC) 1995 for use as floor joists.

2. Opinion

Subject to the limitations and conditions stated in this report, test results and assessments provided by the proponent show that “Prokit KT” complies with CCMC’s Technical Guide for Open Metal-Web Joists with Trimmable I-joist Ends, Masterformat number 06172.1, dated 05-01-23, and provides a level of performance equivalent to that required for structural floor joists in:

- NBC 1995, Sections 4.1. and 4.3; and Subsection 9.23.9.

This Report is provided without representation, warranty, or guarantee of any kind, expressed or implied, and the National Research Council of Canada (NRC) provides no endorsement for any evaluated material, product, system or service described herein.

NRC has evaluated the material, product, system or service described herein only for those characteristics stated herein. The information and opinions in this Report are directed to those who have the appropriate degree of experience to use and apply its contents.

NRC accepts no responsibility whatsoever arising in any way from any and all use or reliance on the information contained in this Report. NRC is not undertaking to render professional or other services for or on behalf of any person or entity nor to perform any duty owed by any person or entity to another person or entity.

Materials used in the joists comply with:

- Finger-joined lumber chords: NLGA SPS 4-2003, "Special Products Standard for Fingerjoined Flange Stock Lumber,"
- Oriented strandboard (OSB) web: CAN/CSA O325.0-92, "Construction Sheathing," and PS2 Exposure 1,
- Adhesives: CSA O112.7-M1977(R2001), "Resorcinol and Phenol-Resorcinol Resin Adhesives for Wood (Room-and Intermediate-Temperature Curing)."

Canada Mortgage and Housing Corporation permits the use of this product in construction financed or insured under the National Housing Act.

3. Description

"Prokit KT" is a series of prefabricated open metal-web floor trusses with trimmable ends shaped like wood I-joists. The chords are 38 mm deep x 63.5 mm wide, constructed of either solid sawn lumber or finger-joined lumber, conforming to NLGA SPS 4-2003.

The trimmable end sections are glued to a 9.5-mm-thick OSB web. The trimmable end sections comprise a 1 200 mm OSB web that may be trimmed up to 12.5 mm from the first metal web (see Figure 1).

The "Prokit KT" comprises the following product designations:

Prokit KT Series Model	Depth (mm)	MiTek Metal Web CCMC #	Chord 38 mm x 63.5 mm
KT30-1178	302	PS12i	S-P-F # 2
KT35-1178	302		MSR 2100F-1.8E
KT37-1178	302		MSR 2400F-2.0E
KT30-14	356	UV14	S-P-F # 2
KT35-14	356		MSR 2100F-1.8E
KT30-16	406	UV16	S-P-F # 2
KT35-16	406		MSR 2100F-1.8E

The web-flange connection is made by inserting the profiled OSB web into a tapered groove in the centre of the wide face of the chord. All joints are bonded with a phenol-resorcinol adhesive.

Intertek Testing Services (ITS) conducts regular audits of the manufacturing plant and the quality assurance program as part of the product's certification.

The engineering properties are proprietary and used within the "Prokit KT" design software. For further engineering data, contact the manufacturer.

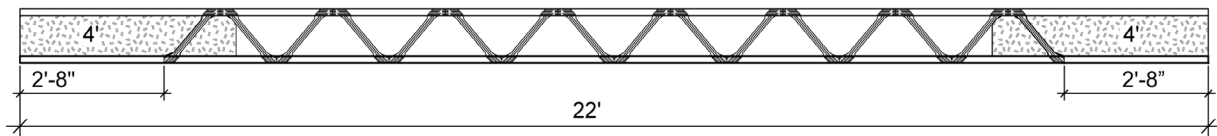


Figure 1. "Prokit KT" floor trusses have end-panels with a total length of 1 200 mm and a trimmable portion that may be trimmed up to 12.5 mm from the first metal web. However, trimming more than 300 mm must be on floor designs engineered and authorized by the manufacturer.

4. Usage and Limitations

“Prokit KT” is intended for structural applications, such as floor joists, and are intended for “dry service” use⁽¹⁾ applications only.

1. *General Note: 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 (M.C.) 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 a M.C. between 6% and 14% according to season and location. During construction, all wood-based products should be protected from the weather to ensure that the 19% M.C. is not exceeded in accordance with the NBC 1995. Article 9.3.2.5.*

The following published documents and outlined pre-engineering in 4(i) and 4(ii) below are intended to demonstrate compliance to Part 9 of the NBC 1995 for acceptance by the local authority having jurisdiction. The pre-engineering was provided to CCMC by PROKIT Structural Inc. and was carried out in accordance with Part 4 of the NBC 1995 for anticipated loads in small buildings falling within the scope of Part 9 of the NBC 1995, and sealed by a professional engineer. Articles 4(iii) and 4(iv) outline when further engineering is required and whether the manufacturer provides engineering support for installation of the “Prokit KT” framing system.

i) PROKIT Structural Inc.’s Pre-engineered Floor Span Charts

When “Prokit KT” trusses are used as floor joists in simple (single) span applications supporting uniform loads only, the installation must be in accordance with the vibration controlled floor span tables (including the NBC 1995 Code-specified vibration criteria⁽²⁾ found in:

⁽²⁾ *In cases where strongbacks are used and joists are installed at the maximum spans, the current*

vibration criteria may not address all occupant performance expectations. PROKIT Structural Inc. should therefore be consulted for span adjustments, if necessary, in these types of installations.

- Application and Installation Guides using “Prokit KT” Adjustable Open-Web Floor Truss, dated 06-06-22.

They shall be installed in accordance with PROKIT Structural Inc.’s installation guidelines noted in this 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.

ii) PROKIT Structural Inc.’s Pre-engineered Installation Details

PROKIT Structural Inc.’s pre-engineered details within the above-mentioned document in 4(i) are limited in scope to building designs where the anticipated loads on the following structural details are not exceeded:

- Stairwell openings
- Cantilevers
- Strongback size and attachment
- Web reinforcement at bearing.
- Maximum 300-mm trim of ends of pre-engineered spans⁽³⁾

⁽³⁾ *If the joist needs to be trimmed more than 300 mm from one side, then both sides should be trimmed equally. Consult the manufacturer.*

iii) Engineering Required

For structural applications beyond the scope/limitations of the above-referenced PROKIT Structural Inc. publication or when required by the authority having jurisdiction, 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.

Installations beyond the scope/limitations of 4(i) and 4(ii) imply, but are not limited to, the following:

- rim boards (by others)
- web stiffeners
- higher loads than the manufacturer's pre-engineered details
- concentrated loads
- offset bearing walls
- high wind and seismic areas
- trimming greater than 300 mm
- cantilever maximum load
- roof installation
- design of supporting wall studs/beams when total load exceeds the NBC 1995 pre-engineered floor/roof joist tables
- design of supporting foundation footings when total load exceeds the NBC 1995 pre-engineered floor/roof joist tables.

The engineer shall design in accordance with CAN/CSA-O86-01, "Engineering Design in Wood," and may use, as a guide, the *Engineering Guide for Wood Frame Construction* published by the Canadian Wood Council.

iv) Engineering Support Provided by Manufacturer

PROKIT Structural Inc. provides engineering services and shall be consulted in the use of this proprietary "Prokit KT" joist.

Technical help tel.: (450) 347-3999
Toll-free: 1-800-663-3999

This product must be identified with the phrase "CCMC # 13245-R" along the side of the flange. This CCMC number is only valid when it appears in conjunction with the WHI certification mark of Intertek Testing.

Damaged or defective joists shall not be used, unless repaired in accordance with written instructions from the manufacturer.

As the "Prokit KT" joist has I-joist-type ends, the same I-joist details apply with respect to transfer of load to the bearing supports. Figures 2 to 4 show generalized details in a prefabricated I-joist floor framing system that apply to the "Prokit KT" joist. The construction, including accessories such as rim joists, squash blocks and web stiffeners, must be installed in accordance with the manufacturer's detailed instructions for the specific loading condition.

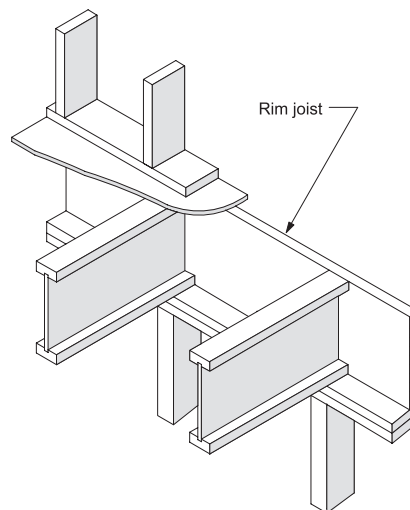


Figure 2. Rim board

Note: Proper framing involves the installation of an adequate rim board to transfer gravity loads from the loadbearing exterior walls above, and to provide and ensure adequate floor diaphragm performance.

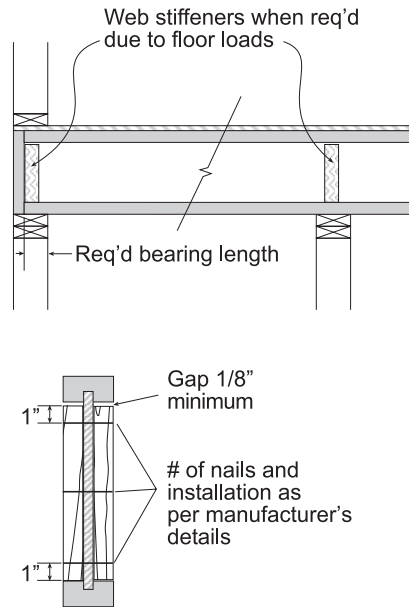


Figure 3. Web stiffeners

Note: Web stiffeners are installed when the floor loads are such that the web must be reinforced with web stiffeners to transfer the floor loads successfully through to the bearing support. When web stiffeners are to be installed, the manufacturer's stiffener construction details, stiffener size and nailing schedule must be followed.

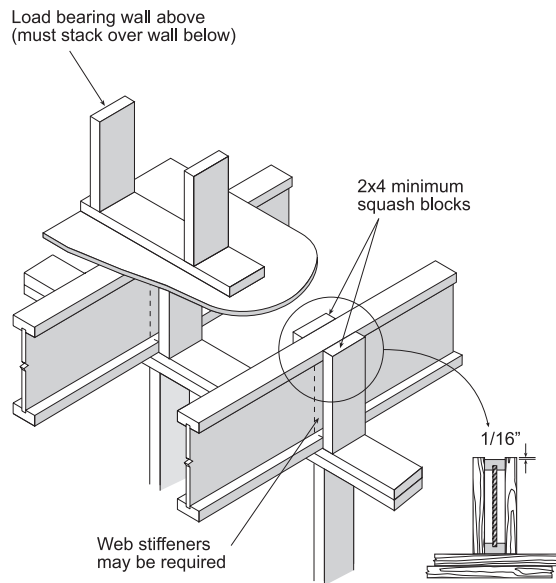


Figure 4. Squash blocks

Note: Squash blocks are installed beneath interior loadbearing walls to transfer vertical gravity loads to beams or loadbearing walls below. Some rim joist details may also prescribe that squash blocks be installed in conjunction with the rim joist beneath exterior loadbearing walls.

5. Performance

Structural testing of the “Prokit KT” was witnessed by an independent certification and testing agency recognized by CCMC. The tests were in accordance with the CCMC Technical Guide for Open Metal-Web Joists with Trimmable I-joist Ends, Masterformat number 06172.1, dated 05-01-23. Results of the tests are summarized below.

Moment Capacity

The joist moment capacity qualification was carried out using an empirical method. Twenty-eight (28) specimens of each joist depth with each flange type were tested. Qualification tests were used to establish the applicable coefficient of variation, CV_w , and the reliability normalization factor from Table 13.2.3.2 of CAN/CSA-O86-01, “Engineering Design in Wood,” was used to determine the factored moment resistance. The local moment resistance of the top and bottom chords were checked analytically.

Shear Capacity

The factored shear resistance of the joist at four (4) critical locations for design was determined, namely: i) at I-joist trimmable end, ii) at maximum end trim, iii) at single tension web, and iv) at single compression web. Qualification tests have been used to establish the applicable coefficient of variation, CV_w , and the reliability normalization factor from Table 13.2.3.2 of CSA O86-01 was used to determine the specified strength.

Stiffness

The shear stiffness and bending stiffness was determined empirically by testing twenty-eight (28) specimens of each depth for each flange type. This was compared with the shear stiffness of ten (10) specimens of I-joist (i.e. no metal-web) for each flange type.

The following formula was used to predict mid-span deflection:

$$\Delta \text{ deflection} = \frac{5wL^4}{384EI} + \frac{wL^2}{K}$$

where L = design span (mm), w = load (kN/mm), EI = based on flange type (kN·mm²), K = based on joist length/trimming.

Creep

Six (6) specimens of each joist depth and flange type were subjected to the 24-hr creep and recovery test and were deemed acceptable.

Bearing Length and Maximum End Reaction

Tests were conducted to qualify a minimum bearing of 38 mm and an 89-mm end bearing as part of the shear test qualification. Qualification tests were used to establish the applicable coefficient of variation, CV_w , and the reliability normalization factor from Table 13.2.3.2 of CAN/CSA-O86-01, “Engineering Design in Wood,” was used to determine the factored shear resistance.

Manufacturing Quality Assurance

The manufacturing quality assurance program has been adapted to include requirements specified in ASTM D 5055-04, “Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists,” for empirically derived moment capacity and is verified by ITS as part of the plant qualification.

For more information contact:

Bruno Di Lenardo, P.Eng.
(613) 993-7769

*Issued by the Institute for Research in Construction
under the authority of the National Research Council*

John Flack, Ph.D.
Manager, CCMC

Note: Readers are asked to refer to limitations imposed by NRC on the interpretation and use of this report. These limitations are included in the introduction to CCMC’s Registry of Product Evaluations, of which this report is part.

Readers are advised to confirm that this report has not been withdrawn or superseded by a later issue by referring to <http://irc.nrc.gc.ca/ccmc>, or contacting the Canadian Construction Materials Centre, Institute for Research in Construction, National Research Council of Canada, Montreal Road, Ottawa, Ontario, K1A 0R6; Telephone (613) 993-6189, Fax (613) 952-0268.