

ICC-ES Evaluation Report

ESR-1397

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DIVISION: 06 00 00—WOOD, PLASTICS, AND COMPOSITES
Section: 06 17 53—Shop-Fabricated Wood Trusses

REPORT HOLDER:

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EVALUATION SUBJECT:
MITEK® HINGE PLATE, BEH18
1.0 EVALUATION SCOPE
Compliance with the following codes:

- 2006 *International Building Code*® (IBC)
- 2006 *International Residential Code*® (IRC)

Property evaluated:

Structural

2.0 USES

The MiTek® Hinge Plate, BEH18, is a metal hinge plate connector used to connect wood chord members end-to-end in prefabricated wood trusses complying with IBC Section 2303.4 and IRC Sections R502.11 and R802.10.

3.0 DESCRIPTION

The MiTek® Hinge Plate, BEH18, is a No. 18 gage [0.0456 inch (1.158 mm) minimum base-metal thickness] connector fabricated from ASTM A 653 SS Grade 40 steel with a G60 galvanized coating. The MiTek® Hinge Plate, BEH18, consists of two 2¹/₄-by-5-inch (57 by 127 mm) plates connected with a 3/4-inch-diameter (19.1 mm) hinge. Each half of each plate is composed of an approximately 2-inch-by-3-inch (51 by-76 mm) area of integral teeth that are approximately 3/8 inch (9.5 mm) long and punched at right angles to the plate. The MiTek® Hinge Plate, BEH18, must be pressed into the chord for the full depth of the teeth by hydraulic-platen embedment presses, multiple roller presses that use partial embedment followed by full-embedment rollers, or combinations of partial embedment roller presses and hydraulic-platen presses that feed trusses into a stationary finish roller press. See Figures 1 and 2.

4.0 DESIGN AND INSTALLATION
4.1 General:

Installation of the MiTek® Hinge Plate, BEH18, must comply with this report and the manufacturer's published installation instructions. The manufacturer's published installation instructions must be available to the truss fabricator at all times during installation. Trusses must be assembled within the tolerances given in Section 4 of ANSI/TPI 1.

The connectors must be installed in pairs in the 180-degree position on opposite faces of sheathed truss top chord members. The sheathing attached to the chords must comply and be installed in accordance with Section 5.5 of this report and the applicable code. The chords must be composed of sawn wood lumber with a minimum specific gravity of 0.42. The gap between chord members must be 1 inch (25.4 mm) or less.

4.2 Allowable Design Values:

Allowable shear, tension and compression design values for the MiTek® Hinge Plate, BEH18, are given in Table 1. Imposed forces at the joint and internal stresses within the truss containing the joint must be determined using a structural model with a pin at the hinge joint location. The design load due to combined shear and axial loads must not exceed the allowable load using the Hankinson formula as follows:

$$F_{\theta} \leq P_{\theta}$$

where:

$$F_{\theta} = \text{Imposed combined shear and axial load, } lb = (F_a^2 + F_v^2)^{0.5}$$

$$P_{\theta} = \text{Allowable combined shear and axial load, } lb = (P_a \times P_v) / ((P_a \times (\sin \theta)^2 + (P_v \times (\cos \theta)^2))$$

$$F_a = \text{Imposed axial force, lb.}$$

$$F_v = \text{Imposed shear force, lb.}$$

$$P_a = \text{Allowable axial force, lb. (in compression or tension corresponding to imposed axial force).}$$

$$P_v = \text{Allowable shear load, lb.}$$

$$\theta = \text{Angle between } F_{\theta} \text{ and the length of the plate.}$$

5.0 CONDITIONS OF USE

The MiTek® Hinge Plate, BEH18, described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 Installation must comply with this report, the manufacturer’s published installation instructions and the applicable code. In the event of a conflict between the manufacturer’s published installation instructions and this report, this report governs.
- 5.2 This report establishes allowable design values for the MiTek® Hinge Plate, BEH18, only. Materials and general design considerations, truss member design procedures and metal plate joint design must be in accordance with Chapters 6, 7 and 8, respectively, of ANSI/TPI-1. Calculations and details for the use of MiTek® Hinge Plate, BEH18, must be submitted to the code official for approval at the time of permit application. The calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.3 The final installation of the MiTek® Hinge Plate, BEH18, is limited to applications of the connector plates, installed in pairs to truss top chord members, where the plates are installed in the 180-degree position with a maximum 1-inch (25.4 mm) gap between truss chord members.
- 5.4 The allowable design values used in the design of trusses using the MiTek® Hinge Plate, BEH18, must not exceed the values given in Table 1. Load combination must be in accordance with the applicable code. No adjustments for duration of load are permitted.
- 5.5 Lateral translation of the truss chords across the hinge joints must be prevented by sheathing attached to the truss chord members continuously across the joint as prescribed by the applicable code or by other means acceptable to the code official. The higher compression value given in Table 1 may be achieved

by the installation of a single piece of sheathing continuously across the joint and connected to each chord member at the joint by a nail penetrating through the sheathing and into the chord section at a location not more than 3 inches (76 mm) from the chord end at the hinged joint, or by other special measures specified by the building designer and acceptable to the code official.

- 5.6 Due to the rotation provided at the joint of the MiTek® Hinge Plate, BEH18, the truss design must be modeled with a pin at the hinge joint location. In the final installed condition, shear loads must be applied within the plane of the hinge plate, at a 90-degree angle to the long axis.
- 5.7 Design of diaphragms with trusses manufactured with the MiTek® Hinge Plate, BEH18, is outside the scope of this report.
- 5.8 Use of the MiTek® Hinge Plate, BEH18, is limited to prefabricated trusses. Field installation is prohibited. Compliance with IBC Section 2303.4 or IRC Sections R502.11 and R802.10, as applicable, is required.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Metal Hinge Plate Connectors for Wood Trusses (AC283), dated February 2008.

7.0 IDENTIFICATION

Each package of MiTek® Hinge Plates, BEH18, described in this report is identified by a label bearing the manufacturer’s name (MiTek Industries, Inc.), the model number and the evaluation report number (ESR-1397).

TABLE 1—ALLOWABLE DESIGN VALUES FOR THE MITEK® HINGE PLATE, BEH18

PROPERTY	ALLOWABLE DESIGN VALUE (lb)
Shear	619
Tension	1472
Compression	1029/1439 ¹

For **SI**: 1lb = 4.448 N.

¹The higher compression value may be used where the special sheathing requirements given in Section 5.5 of this report are met.

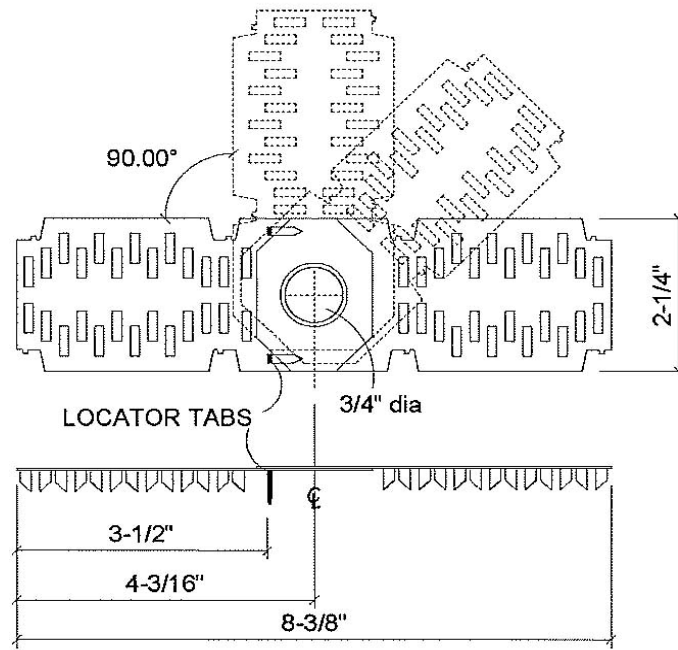
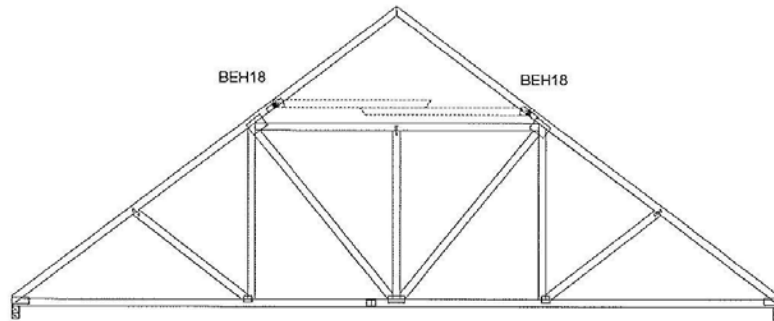
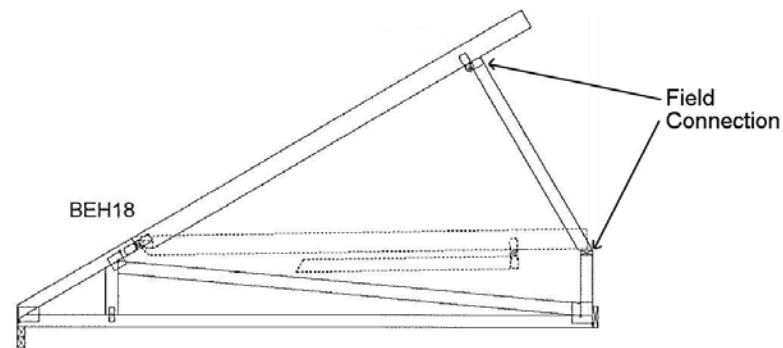


FIGURE 1—MiTek HINGE PLATE, BEH18



Conventional Truss OverHeight Hinge Replaces Piggyback or Cap Truss



Modular Construction Used to Reduce Shipping Height

FIGURE 2—TYPICAL APPLICATIONS OF THE MiTek HINGE PLATE, BEH18