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ICC-ES Report

ESR-3282

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
SECTION: 06 17 53—SHOP-FABRICATED WOOD TRUSSES

REPORT HOLDER:

MITEK USA, INC.

**14515 NORTH OUTER FORTY, SUITE 300
CHESTERFIELD, MISSOURI 63017**

EVALUATION SUBJECT:

MITEK® MTH18 AND SMH18 HINGE PLATE CONNECTORS



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

REPORT HOLDER:

MITEK USA, INC.
 14515 NORTH OUTER FORTY, SUITE 300
 CHESTERFIELD, MISSOURI 63017
 (314) 434-1200
www.mii.com

EVALUATION SUBJECT:
MITEK® MTH18 AND SMH18 HINGE PLATE CONNECTORS
1.0 EVALUATION SCOPE
Compliance with the following codes:

- 2015, 2012, 2009 and 2006 *International Building Code*® (IBC)
- 2015, 2012, 2009 and 2006 *International Residential Code*® (IRC)

Property evaluated:

Structural

2.0 USES

MiTek® MTH18 and SMH18 Hinge Plate Connectors are metal hinge plates used to connect wood chord members end-to-end in prefabricated wood trusses complying with IBC Section 2303.4 (Section 2303.4.2 of the 2006 IBC) and IRC Sections R502.11 and R802.10.

3.0 DESCRIPTION

MiTek® MTH18 and SMH18 Hinge Plate Connectors are No. 18 gage [0.0456 inch (1.158 mm) minimum base-metal thickness] connectors fabricated from ASTM A653 SS Grade 50 steel with a G60 galvanized coating. The MiTek® MTH18 Hinge Connector Plate (Figure 1) consists of two 2¹/₄-inch-by-5³/₁₆-inch (57 mm by 132 mm) plates connected with a 1-inch-diameter (25.4 mm) hinge. Each half of each plate is composed of an approximately 2-inch-by-3-inch (51 mm by 76 mm) area of integral teeth that are approximately 1¹/₃₂ inch (8.7 mm) long and punched at right angles to the plate. The MiTek® SMH18 Hinge Connector Plate (Figure 2) consists of two 2-inch-by-4-inch (51 mm by 102 mm) plates connected with a 3/4-inch-diameter (19.1 mm) hinge, with each half of each plate composed of an approximately 1³/₄-inch-by-2-inch (44 mm

by 51 mm) area of integral teeth that are approximately 1¹/₃₂ inch (8.7 mm) long and punched at right angles to the plate. The MiTek® MTH18 and SMH18 Hinge Connector Plates must be pressed into the chord for the full depth of their 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 Figure 3 for examples of trusses incorporating MiTek® Hinge Connector Plates.

4.0 DESIGN AND INSTALLATION
4.1 General:

Installation of the MiTek® MTH18 and SMH18 Hinge Plate Connectors 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 Chapter 3 of ANSI/TPI 1.

The connectors must be installed in pairs in the 180-degree position on opposite faces of truss top chord members, which must be braced by sheathing installed at the jobsite. The sheathing must comply with 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 for the MTH18 Hinge Connector Plate must be 1 inch (25.4 mm) or less, and the gap between chord members for the SMH18 Hinge Connector Plate must be 1¹/₂ inches (38.1 mm) or less.

4.2 Allowable Design Values:

Allowable shear, tension and compression design values for the MiTek® MTH18 and SMH18 Hinge Connector Plates 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:

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

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

- P_{Θ} = Allowable combined shear and axial load, $lbf = (P_a \times P_v) / ((P_a \times (\sin \Theta)^2 + (P_v \times (\cos \Theta)^2))$.
- F_a = Imposed axial force, lbf.
- F_v = Imposed shear force, lbf.
- P_a = Allowable axial force, lbf. (in compression or tension corresponding to imposed axial force).
- P_v = Allowable shear load, lbf.
- Θ = Angle between F_{Θ} and the length of the plate.

5.0 CONDITIONS OF USE

The MiTek® MTH18 and SMH18 Hinge Plate Connectors described in this report comply with, or are suitable alternatives 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 only for MiTek® MTH18 and SMH18 Hinge Plate Connectors. 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® MTH18 and SMH18 Hinge Connector Plates 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® MTH18 and SMH18 Hinge Plate Connectors 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. The MiTek® MTH18 must be installed with a maximum 1-inch (25.4 mm) gap between truss chord members. The MiTek® SMH18 must be installed with a maximum 1½-inch (38.1 mm) gap between truss chord

members. Installation in other configurations is beyond the scope of this report.

- 5.4** The allowable design values used in the design of trusses using the MiTek® MTH18 and SMH18 Hinge Plate Connectors are for a pair of hinge plates on opposite faces of the truss members and 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.
- 5.6** Due to the rotation provided at the joint of the MiTek® MTH18 and SMH18 Hinge Plate Connectors, 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® MTH18 and SMH18 Hinge Plate Connectors is outside the scope of this report.
- 5.8** Use of the MiTek® MTH18 and SMH18 Hinge Plate Connectors is limited to prefabricated trusses. Field installation is prohibited. Compliance with IBC Section 2303.4 (Section 2303.4.2 under the 2006 IBC) 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 (editorially revised December 2015).

7.0 IDENTIFICATION

Each package of the MiTek® MTH18 and SMH18 Hinge Plate Connectors described in this report is identified by a label bearing the manufacturer’s name (MiTek®), the model number and the evaluation report number (ESR-3282).

TABLE 1—ALLOWABLE DESIGN VALUES FOR THE MITEK® MTH18 AND SMH18 HINGE CONNECTOR PLATES

PROPERTY	ALLOWABLE DESIGN VALUE (lbf) ¹	
	MTH18	SMH18
Shear (P_v)	950	637
Tension (P_a)	1624	1135
Compression (P_a)	1624	1135

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

¹Allowable design values are applicable to application of the metal hinge plates installed in pairs to truss chord members.

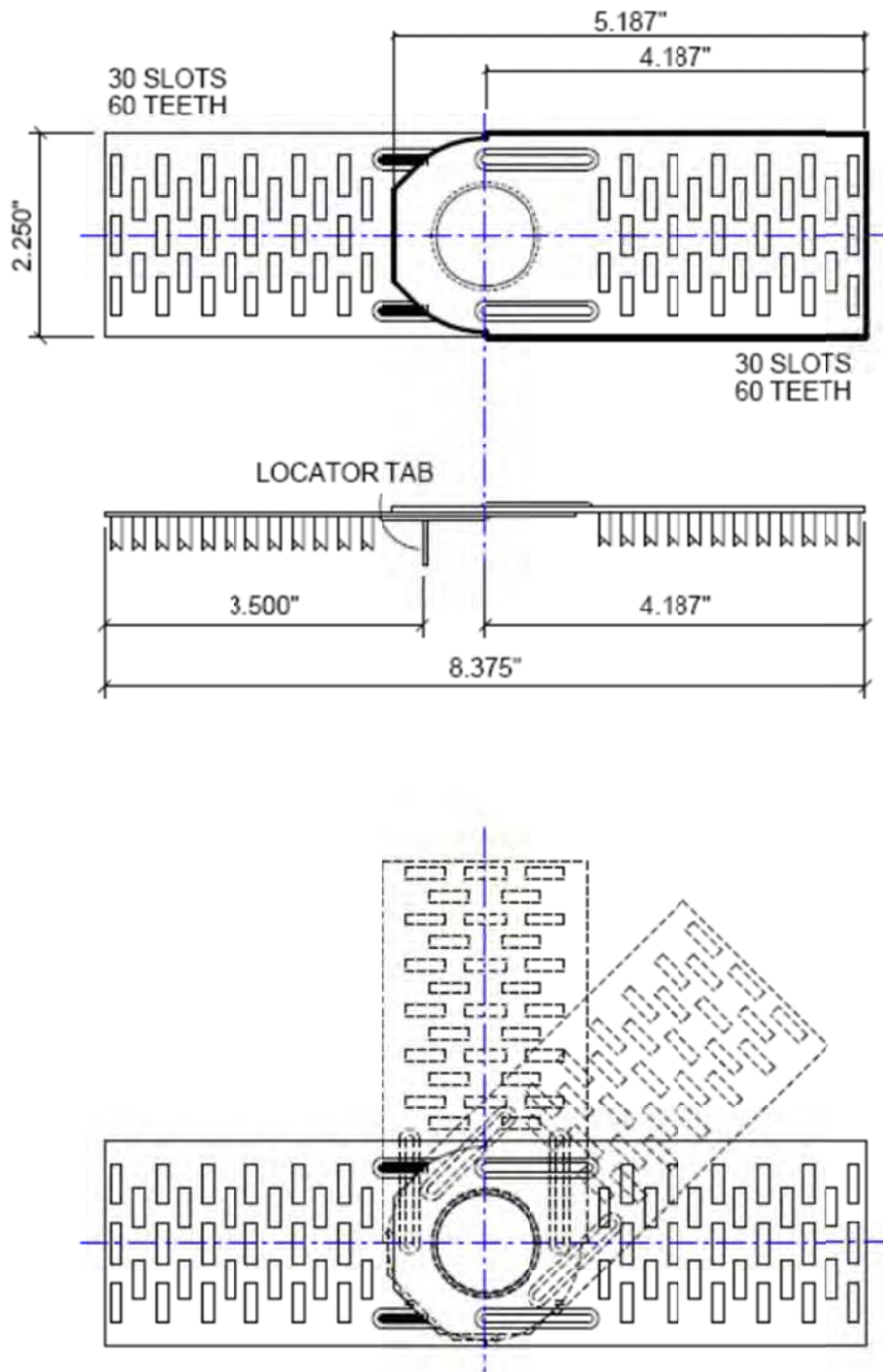


FIGURE 1—MITEK® MTH18 HINGE CONNECTOR PLATE
For SI: 1 inch = 25.4 mm

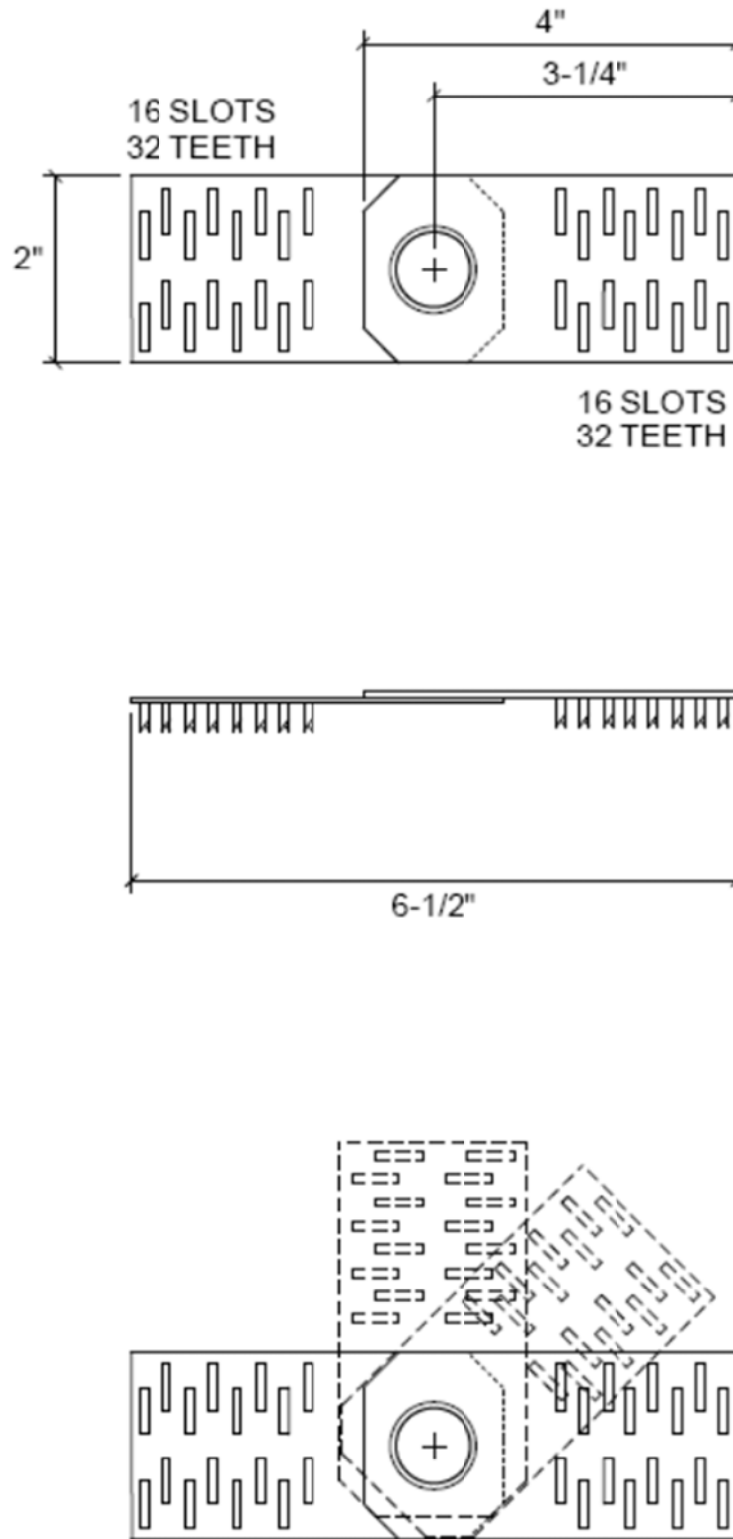
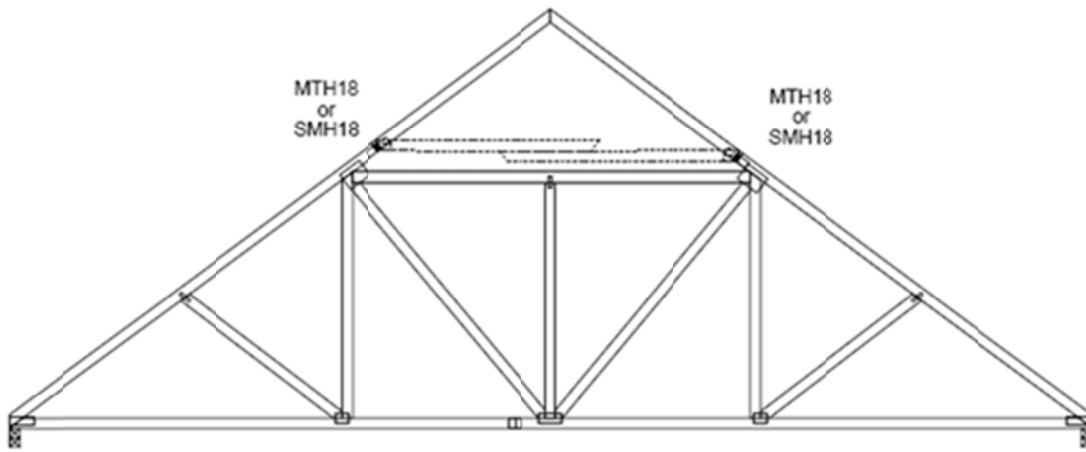
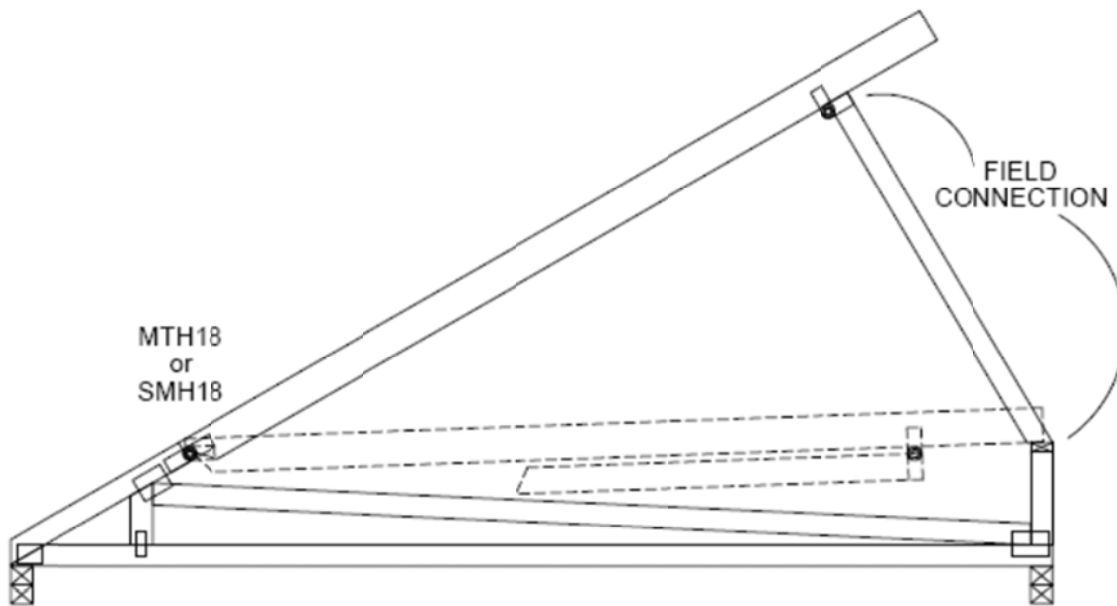


FIGURE 2—MITEK® SMH18 HINGE CONNECTOR PLATE
For SI: 1 inch = 25.4 mm



Conventional Truss OverHeight Hinge Replaces Piggyback or Cap Truss

These drawings are for illustration purposes only. They are not intended for use as construction documents for the purpose of fabrication, design or erection.



Modular Construction uses MTH18 or SMH18 to reduce shipping height

FIGURE 3—EXAMPLES OF TRUSSES INCORPORATING MITEK® HINGE CONNECTOR PLATES

ICC-ES Evaluation Report**ESR-3282 CBC and CRC Supplement**

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14515 NORTH OUTER FORTY, SUITE 300
CHESTERFIELD, MISSOURI 63017
(314) 434-1200
www.mii.com**EVALUATION SUBJECT:****MITEK® MTH18 AND SMH18 HINGE PLATE CONNECTORS****1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that Mitek® MTH18 and SMH18 Hinge Plate Connectors, recognized in ICC-ES master evaluation report ESR-3282, have also been evaluated for compliance with the codes noted below:

Applicable code editions:

- 2013 *California Building Code* (CBC)
- 2013 *California Residential Code* (CRC)

2.0 CONCLUSIONS**2.1 CBC**

The use of the Mitek® MTH18 and SMH18 Hinge Plate Connectors, as described in Sections 2.0 through 7.0 of the master report ESR-3282, complies with the 2013 *CBC*, Chapter 23, provided the design and installation are in accordance with the 2012 *International Building Code*® (IBC) provisions noted in the master report and the additional requirements of *CBC* Chapters 16, 16A, 17, 17A and 23, as applicable..

2.2 CRC

The use of the Mitek® MTH18 and SMH18 Hinge Plate Connectors, as described in Sections 2.0 through 7.0 of the master evaluation report ESR-3282, complies with *CRC* Sections R502.11 and R802.10, provided the design and installation are in accordance with the 2012 *International Residential Code*® (IRC) provisions noted in the master report.

This supplement expires concurrently with the master evaluation report, reissued October 2016.

ICC-ES Evaluation Report**ESR-3282 FBC Supplement**

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Applicable code editions:

- 2014 and 2010 *Florida Building Code—Building*
- 2014 and 2010 *Florida Building Code—Residential*

2.0 CONCLUSIONS

The MiTek® MTH18 and SMH18 Hinge Plate Connectors described in Sections 2.0 through 7.0 of master report ESR-3282 comply with the 2014 and 2010 *Florida Building Code—Building* and the 2014 and 2010 *Florida Building Code—Residential*, when designed and installed in accordance with the master evaluation report.

Use of the MiTek® MTH18 and SMH18 Hinge Plate Connectors has also been found to be in compliance with the High-Velocity Hurricane Zone provisions of the 2014 and 2010 *Florida Building Code—Building* and the 2014 and 2010 *Florida Building Code—Residential*.

For products falling under Florida Rule 9N-3, verification that the report holder's quality-assurance program is audited by a quality-assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official, when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the master report, reissued October 2016.