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## Legacy report on the BOCA® *National Building Code/1999*

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**DIVISION: 06—WOOD AND PLASTIC**

**Section: 06175—Truss Plates**

**REPORT HOLDER:**

**MITEK INDUSTRIES, INC.**  
**818 SOUTHSIDE ROAD**  
**EDENTON, NORTH CAROLINA 27932**

**EVALUATION SUBJECT:**

**MITEK MT20 METAL PLATE CONNECTOR**

**EVALUATION SCOPE:**

Compliance with the following code:

BOCA® *National Building Code/1999*

- Section 2313.3 Prefabricated Trusses

Compliance with the following reference standard:

- ANSI/TPI 1-1995 - *National Design Standard for Metal-Plate-Connected Wood Truss Construction*

**DESCRIPTION**

MiTek MT20 Metal Plate Connectors are 20 gauge steel plates used in fabrication of metal-plate-connected wood trusses. The connector plate is stamped from ASTM A653, Grade 40 (formerly ASTM A446, Grade C), 20-gauge steel, zinc coated (galvanized) by the hot dip process, and is identified by the letters and numbers MiTek MT20 permanently stamped on each plate. The MiTek MT20 plate has <sup>3</sup>/<sub>8</sub>-inch-long (9.5 mm) teeth punched in pairs formed at right angles to face of the plate, two per hole along the plate length. Plates are installed hydraulically, by double pass roller systems, or by single pass rollers with a diameter not less than 20 inches (508 mm). See Figures 1 and 2 of this report for tooth pattern and dimensions.

MiTek MT20 Metal Plate Connectors are available in the following sizes:

Plate widths begin at 1-inch (25.4 mm) and progress in 1/2-inch (12.7 mm) increments up to a maximum width of 12 inches (305 mm). The standard plate lengths begin at 1-inch and progress in 1-inch increments up to 24 inches (610 mm). Greater lengths are available.

**CONDITIONS OF USE**

This report is limited to the applications and products as stated in this report. The ICC-ES Subcommittee on National Codes intends that the report be used by the code official to determine that the report subject complies with the code requirements specifically addressed, provided that this product is installed in accordance with the following conditions:

- Design stresses for MiTek MT20 Metal Plate Connector shall not exceed those listed in Tables 1, 2 and 3 of this report. These values shall be used in accordance with the TPI 1-1995, *National Design Standard for Metal-Plate-Connected Wood Truss Construction*. The scope of this report is limited to the use of these values when the connection is made with a plate on each side of the joint. Design stresses for joints formed with a MiTek MT20 Metal Plate Connector on only one side of the wood members is outside the scope of this report.
- Design stresses given in Tables 1, 2 and 3 of this report shall apply only to MiTek MT20 Metal Plate Connectors that are applied by roller or hydraulic press into non-pressure-treated wood.
- Design of the MiTek MT20 Metal Plate Connectors in pressure-treated wood is outside the scope of this report.
- Design stresses given in Table 1 of this report apply only to MiTek MT20 Metal Plate Connectors in the designated species of wood.
- Trusses shall be installed as designed with required lateral bracing specified on the truss design in addition to bracing specified by building designer.
- Connector plate values in Table 1 of this report shall be permitted to be adjusted for duration of load in accordance with the provisions of the American Forest and Paper Association *National Design Specification*, AFPA NDS-91. Values provided in Tables 2 and 3 of this report shall not be adjusted for duration of load but shall be increased in accordance with Section 1613.0, Combination of Loads, of the BOCA® *National Building Code/1999*. For loads of greater than 10-year duration, in accordance with Table 2.3.2 of AFPA NDS-91, a load duration factor of 0.9 shall be applied.

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- Wood trusses fabricated using MiTek MT20 Metal Plate Connectors shall comply with TPI 1-95, Section 4, and the following quality control procedures:
  - Any shipping, storage, handling, erecting or fabricating procedures that cause damage or defects to lumber or truss plate connections shall be cause for rejecting the truss.
- The code official shall be furnished with evidence that the manufacturer of the trusses is in compliance with Special Inspection requirements of Section 1705.2 and 2313.4 of the BOCA® *National Building Code/1999*, and Section 4.1 and 6.6 of the TPI 1-95.

#### ITEMS REQUIRING VERIFICATION

The following items are related to installation of the report subject, but are not within scope of this evaluation. However, these items are related to determination of code compliance.

- ✓ Submission of trusses design/shop drawings indicating compliance with this report.
- ✓ Trusses constructed utilizing MiTek MT20 Metal Plate Connectors shall be labeled indicating compliance with the special inspection requirements of Sections 4.1 and 6.6 of the TPI 1-1995.

#### INFORMATION SUBMITTED

- “A Test Report on the Evaluation of the TEE-LOK 20 Gauge Metal Connector Plate” by LAW Engineering and Environmental Services, Inc.; signed by Dan D. Blair, Jr., P.E., Principal Engineer and Donald B. Chandler, P.E., Assistant Vice President, Managing Principal; dated October 9, 1995, containing testing performed in accordance with TPI 1-1995 to determine lateral resistance strength, and strength properties of plates under shear and tensile force. Tables 1, 2 and 3 of this report are based on the test results.
- “Calculations on the Test Results of the TEE-LOK 20 Gauge Metal Connector Plate” by Truss Engineering Company; signed and sealed by Robert J. Shupe, P.E.; dated October 5, 1995, performed in accordance with TPI 1-1995 to determine shear effectiveness ratios and tension effectiveness ratios given in Tables 2 and 3 of this report.

#### APPLICATION FOR PERMIT

To aid in the determination of compliance with this report, the following represents the minimum level of information to accompany the application for permit:

- The language “See ICC-ES Legacy Report No. 95-43.”
- Slope or depth, span and spacing of the truss.
- Reaction and location of each bearing support, as well as the minimum bearing width and length.
- Design loading includes the following, as applicable:
  - Top chord live load;
  - Top chord dead load;
  - Bottom chord live load;
  - Bottom chord dead load;
  - Concentrated loads and their points of application.

- Adjustments to lumber and plate design values for conditions of use.
- Lumber size, species, grade and moisture content for each member.
- Each reaction force.
- Plate type, thickness of gage size; basic plate design value, consistent with this report; and the location of each plate, except where symmetrically located relative to the joint interface.
- Truss design drawings and calculations specifying MiTek MT20 Metal Plate Connectors shall be furnished to the code official verifying compliance with this report. These documents shall utilize the properties given in this report. The individual preparing such documents shall be competent and qualified in the application of the structural design principals involved, and shall possess the registration or license in accordance with the professional registration laws of the state in which the project is constructed.

#### PRODUCT IDENTIFICATION

All MiTek MT20 Metal Plate Connectors, or the packaging, manufactured in accordance with this report shall be marked at the plant with the following identification:

- “See ICC-ES Legacy Report No. 95-43.”
- All MiTek MT20 Metal Plate Connectors greater than 3 inches (76 mm) in width, and 25 percent of the plates less than 3 inches (76 mm) in width, shall be individually marked with the plate name.
- All packages shall be marked to indicate the production run and master coil of steel.

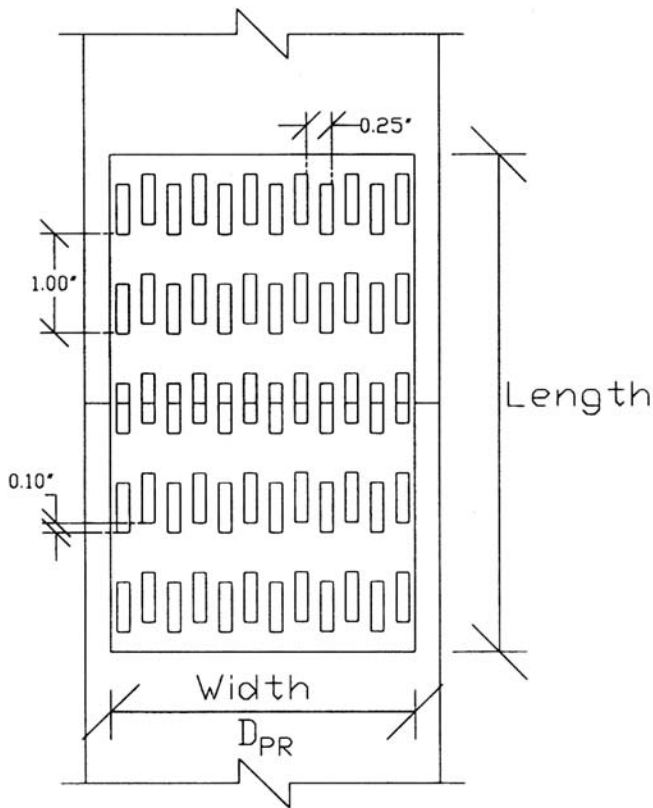


Figure 1\*

**METAL CONNECTOR PLATE WIDTH  
PERPENDICULAR TO GRAIN OF WOOD MEMBERS**

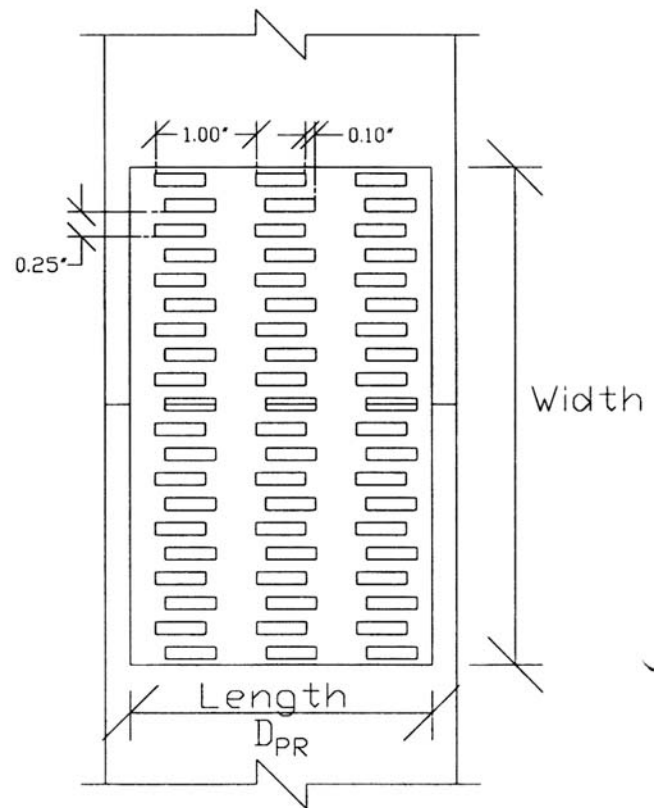


Figure 2\*

**METAL CONNECTOR PLATE LENGTH  
PERPENDICULAR TO GRAIN OF WOOD MEMBERS**

\*THESE DRAWINGS ARE FOR ILLUSTRATION PURPOSES ONLY. THEY ARE NOT INTENDED FOR USE AS CONSTRUCTION DOCUMENTS FOR THE PURPOSE OF DESIGN, FABRICATION OR ERECTION.

**TABLE 1—SUMMARY OF LATERAL RESISTANCE OF MITEK MT20 METAL PLATE CONNECTORS**

PLATE ORIENTATION AND LOAD DIRECTION	LUMBER SPECIES			
	Southern Yellow Pine	Spruce-Pine-Fir	Douglas-Fir	Hem-Fir
<b>Allowable Lateral Resistance (lb/in<sup>2</sup>/plate) with TPI/BOCA Factors</b>				
0° Parallel	244.6	206.5	248.2	188.9
90° Parallel	192.5	162.1	203.2	159.7
0° Perpendicular	171.2	125.7	170.5	133.4
90° Perpendicular	178.4	122.5	171.3	141.1

<sup>1</sup> Value based on the gross area of single plate.

<sup>2</sup> Adjustment of values for duration of load shall be in accordance with this report.

**TABLE 2—SUMMARY OF SHEAR STRENGTH OF MITEK MT20 METAL PLATE CONNECTORS**

CONNECTOR TYPE	PLATE ORIENTATION					
	0°	30°	60°	90°	120°	150°
Ultimate Shear Stress (psi)	17144	24685	27479	19465	14271	16934
Average Shear Efficiency Ratio (percent)	.515	.742	.826	.585	.429	.509

<sup>1</sup> Value based on a single plate

<sup>2</sup> t = .036 inch

<sup>3</sup> Allowable Shear Resistance =  $.4 \cdot F_y \cdot ((t - .001) / 0.95) \cdot \text{Efficiency Ratio}$ ;  $F_y = 40,000$  psi

<sup>4</sup> Where determined to be appropriate by the designer, values shall be adjusted for loadings in accordance with Chapter 16, Structural Loads, of the BOCA® *National Building Code/1999*.

**TABLE 3—SUMMARY OF TENSILE STRENGTH OF MITEK MT20 METAL PLATE CONNECTORS**

PLATE ORIENTATION	ULTIMATE TENSILE VALUE (psi)	TENSION EFFECTIVENESS RATIO (percent)
0°	33423	.580
90°	30355	.527

<sup>1</sup> Value based on a single plate

<sup>2</sup> t = .036 inch

<sup>3</sup> Allowable Tension Resistance =  $.6 \cdot F_y \cdot ((t - .0003) / 0.95) \cdot \text{Effectiveness Ratio}$ ;  $F_y = 40,000$  psi

<sup>4</sup> Where determined to be appropriate by the designer, values shall be adjusted for loadings in accordance with Chapter 16, Structural Loads, of the BOCA® *National Building Code/1999*.