MiTek Industries, Inc. is the leading supplier of connector plates, truss manufacturing equipment, design software, and engineering services for the worldwide component industry. Over 35 years MiTek companies have developed and refined their connector plates into the state-of-the-art products they are today...consistent and dependable!

MiTek products include R & D facility and undergo extensive testing in our facilities.

MiTek’s connector plates meet or exceed all building code and industry association requirements. Acceptances include BOCA, ICBO, HUD/FHA, SBCI, Dade County, Wisconsin/ DILHR, and LA City.

MiTek also offers the very best in framing layout and engineering software for roof and floor trusses, as well as wall panel design. These programs provide our fabricators with fast and accurate layout and design capabilities.

Our engineering department is available to review and seal our customers’ designs. With offices in NC, Missouri and California, MiTek’s professional engineers can furnish seals for all 50 states!

Look to a MiTek fabricator for the best the industry has to offer! This brochure reviews the benefits of roof and floor trusses, but MiTek fabricators also offer a full line of builders hardware and a complement of other building components including wall panels and steel framing.

At MiTek, we are committed to providing the best products and services in the industry and will continue our tradition of customer support.

**TABLE OF CONTENTS**

| Introduction | 2 |
| Wood Truss Advantages | 3 |
| Truss Advantages | 3 |
| Handling, Installation and Bracing | 4 |
| Basic Roof Truss Configurations | 5-6 |
| Construction Details | 8 |
| Support Details | 9 |
| Joint Details | 10 |
| Lateral Bracing Information | 11 |
| Cantilever Framing | 12 |
| Stairway Framing | 13 |
| Technical Information | 14 |
| Architectural Specifications | 15 |
| Recommended Depth, Deflection and Camber Limitations | 16 |
| Construction Guidelines | 17 |
| Mechanical Service Guidelines | 18 |
| Cantilever Concentrated Loads | 19 |
| Floor Decking Information | 20 |
| Connector Plate Code Approvals | 21 |
| Fire Rating Information | 22 |
| Sound Transmission Ratings | 23 |
| Construction Material Weights | 24 |
| Representative Floor and Roof Loads | 25 |
| Floor Loading Max-Span Information | 26 |
| Floor Loading Max-Span Tables | 27 |
| Glossary of Terms | 28 |

**Joint**

The intersection of two or more members. (Also referred to as a Panel Point.)

**Joint Splice**

A splice of the 4x2 chord member at a chord-and-web joint.

**KneeWall**

A short partition stud wall to increase a wall height, typically from the concrete wall plate to the floor decking.

**Lateral Brace**

A member placed and connected at right angles to a chord or web member of a truss.

**Lever Return**

A member placed and connected to the floor truss bearing or support.

**Load-Bearing Wall**

A specifically designed to transfer a load 4x2 or 4x4 member to the foundations.

**Lumber Stress Rated Lumber (MSR) Lumber which has been individually tested by a machine at the lumber mill to determine its structural design properties. MSR Lumber is designated by a number (bending) stress and Modulus of Elasticity, e.g., 1600-1.5E.**

**Moisture Content of Wood**

The weight of moisture in wood expressed as a percentage of its oven-dry weight.

**Moments**

A structural measure of the effects of bending on a member due to applied loading.

**Overhead**

The extent of the top chord of a truss beyond the heel measured horizontally.

**PCT**

Abbreviation for Parallel Chord Truss, the Truss Plate Institute (TPI) specification for trusses with parallel chords and 4x2 chord orientation, lifted.
**Glossary of Terms**

- **Clear Span**: Horizontal distance between the top and bottom chords of a truss.
- **Camber**: An upward curvature built into a span and tight joints—usually 1/4 inch.
- **Beam Pocket**: A rectangular opening within a wall or truss to accommodate a beam or column.
- **Chord Splice**: A splice of the 4x2 chord member between joints, joined by pre-splice connectors, to ensure uniform load transfer.
- **Quarter Turn**: A short beam typically supporting framing adjacent to a stair opening, running perpendicular to the floor trusses.
- **Drop Head**: The maximum vertical displacement of a structural member due to applied loading. (Live load deflection + dead load deflection.)
- **Depth**: The overall distance from the top of the chord to the bottom of the chord.
- **Dimensional Adjustment**: The adjustment necessary to alter standard repetitive floor truss panel modules to achieve the desired overall truss span.
- **Jack Rafter**: A rafter installed to continue the roof line—fixed from wall plate to hip board in hip end construction.
- **Engineer Certified Drawing**: A truss design providing the support condition and necessary web orientation and panel length to create the desired truss span.

**Why Use Wood Trusses? Contractors and Builders Know!**

- Contractors and Builders know that a MiTek engineered roof or floor truss system ensures quality and efficiency.

**MiTek Trusses Are Reliable**

Every MiTek truss has been individually designed and that design is checked and approved by certified engineers for structural adequacy.

**MiTek Trusses Are Versatile**

MiTek trusses provide more design flexibility, inside and out, than conventional framing. Offering numerous custom design options, our trusses present an economical and structurally superior method for rapid erection.

**Architects and Developers**

- Savings in design costs—one basic structure can be adapted for shell with minor floor plan variations.
- Better project cost control, with component costs known in advance.
- Better cash flow with earlier occupancy due to reduced on-site construction.
- Faster shell completion time.
- Using trusses of smaller dimension lumber, in place of beams and columns.
- Greater flexibility in locating plumbing, duct work, and electrical wiring.
- Floor plan freedom in locating interior partitions often without additional support required.

**Contractors/Builders**

- Pre-determined, pre-engineered truss components reduces job site material shortages and pilferage.
- Lower construction costs.
- Clearspan flexibility.
- More flexibility in architectural appearance and floor plans.
- Easier remodeling possibilities in moving interior walls.

**ADVANTAGES OF TRUSSES OVER CONVENTIONAL FRAMING...**

- Faster shell completion time.
- Using trusses of smaller dimension lumber, in place of beams and columns.
- Greater flexibility in locating plumbing, duct work, and electrical wiring.
- Floor plan freedom in locating interior partitions often without additional support required.
HANDLING, INSTALLATION AND BRACING

It is the responsibility of the installer to select the most suitable method and sequence of installation available to him which is consistent with the owner’s (architectural) plans and specifications and such other information which may be furnished to him prior to installation. Trusses may be installed either by hand or by mechanical means. The method generally depends upon the span of the trusses, their installed height above grade, and/or the accessibility or availability of mechanical installation equipment (such as a crane or forklift).

Temporary Bracing

Temporary or installation bracing is the responsibility of the installer. Temporary bracing should remain in place as long as necessary for the safe and acceptable completion of the roof or floor and may remain in place after permanent bracing is installed.

Installation equipment (such as availability of mechanical means) may be furnished to him prior to installation. It is the responsibility of the installer to be knowledgeable about the truss drawings, truss placement plans, and all notes and cautions thereon.

Temporary or installation bracing can be found in the Truss Plate Institute (TPI) publications HIB-91 and DSB 89, available from TPI, 583 D’Onofrio Drive, Suite 200, Madison, WI 53719.

Storage

Trusses should be stored in a stable position to prevent toppling and/or shifting. If trusses are stored horizontally, the blocking should be eight to ten feet centers to prevent lateral bending. If the truss bundle is to be stored for more than one week, the solid-blocking, generally provided by the receiving party, should be at a sufficient height to lessen moisture gain from the ground.

During long-term storage, trusses should be protected from the elements in a manner that provides for adequate ventilation of the trusses. If tarpaulins or other water resistant materials are used, the ends should be left open for ventilation. If trusses are made with interior rated fire retardant lumber, extreme care should be taken to limit outside exposure.

Field Assembly

In some cases, the size or shape of wood trusses is such that some field assembly is required. The installer is responsible for proper field assembly.

Complete details on handling, installing and bracing can be found in the Truss Plate Institute (TPI) publications HIB-91 and DSB 89, available from TPI, 583 D’Onofrio Drive, Suite 200, Madison, WI 53719. *Reprinted from the “Commentary & Recommendation for Handling, Installing & Bracing, Metal Plate Connected Wood Trusses, HIB-91”, by permission of Truss Plate Institute, Inc.

Note:

Above max-spans are valid for lumber design only. Plating or other considerations may further limit the truss design.

HANDLING, INSTALLATION AND BRACING

FLOOR TRUSS MAX-SPANS

FLOOR TRUSS MAX-SPANS
**Residential Flooring**

- 40 psf TC Live Load
- 10 psf TC Dead Load (3/4" plywood decking)
- 0 psf BC Live Load
- 5 psf BC Dead Load (1/2" to 5/8" drywall)
- 55 psf Total Load

(If heavy insulation or 2-ply drywall ceiling, BC Dead Load = 10 psf and 40/10/0/10 = 60 psf Total Load)

**Commercial Floors**

(Concrete deck)

- 50 psf TC Live Load (commercial use)
- 35 psf TC Dead Load (3" concrete floor)
- 0 psf BC Live Load
- 10 psf BC Dead Load
- 95 psf Total Load

**Residential and Commercial Roofing**

- 20, 25, 30, 40, 50 psf TC Live Load (dependent on local building code requirements)
- 10 psf TC Dead Load (includes future re-roofing)
- 0 psf BC Live Load
- 10 psf BC Dead Load
- 40 to 70 psf Total Load (dependent on TC Live Load)

**Notes:**

- Above representative loads are typical loading requirements for many regions in the country. However, the required applied loading for design purposes is the responsibility of the building designer, within the limitations of the prevailing local, state, or regional building code specifications.
- Roof trusses to be checked for local wind loadings.
- Commercial floors may require additional load cases.

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**MiTek Floor Truss Max-Spans**

The chord max-spans shown on the next page are intended for use in bidding, estimating, and preliminary design applications. They are presented for six representative floor loadings. For proper interpretation of these max-spans, note the following:

- The max-spans are valid for the following (or better) species grades: No. 1 KD Southern Yellow Pine, No. 1 and better Douglas Fir 2100Fb-1.8E Machine Stress Rated (MSR) lumber.
- Shorter spans will be achieved using lesser grade 4x2 lumber, while longer spans are generally possible with higher grade lumber.
- The max-spans represent truss overall lengths, assuming 3-1/2” bearing at each end. The spans are equally valid for top chord-bearing and bottom chord-bearing support conditions.
- The minimum truss span-to-live load deflection is 360 for floor application. For example, the maximum permissible live load deflection for a 20’ span floor truss is \((20 \times 12)/360=0.67’\).
- In addition to the consideration of lumber strength and deflection limitations, the maximum truss span-to-depth ratio is limited to 20 for floor loadings. For example the maximum span of a floor application truss 15° deep is 15° x 20’ = 300’ span = 25’ - 0” span.
- Floor loadings have included 1.00 Load Duration Increase and 1.15 Repetitive Stress Increase.
### Sound Transmission Ratings

Various floor-ceiling systems exhibit different abilities to reduce sound transfer from one room to another. This sound transmission resistance is measured by two indices - the Sound Transmission Class (STC) which rates airborne sounds to evaluate the comfortability of a particular living space and the Impact Insulation Class (IIC) which rates the impact sound transmission performance of an assembly. These ratings are used by regional building codes to regulate permissible sound transfer.

For more detailed information reference the Metal Plate Connected Wood Truss Handbook, ©1993 Wood Truss Council of America, Section 18.0 - Transitory Floor Vibration and Sound Transmission.

### Calculation Example

<table>
<thead>
<tr>
<th>Description</th>
<th>STC</th>
<th>IIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpet and Padding</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>3/4&quot; Gypcrete</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Wood Truss Floor</td>
<td>36</td>
<td>33</td>
</tr>
<tr>
<td>Resilient Channel</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>53</td>
<td>62</td>
</tr>
</tbody>
</table>

### TYPICAL CONSTRUCTION MATERIAL WEIGHTS

<table>
<thead>
<tr>
<th>Floors</th>
<th>Material Details</th>
<th>Weight (psf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardwood (1 in. thick)</td>
<td></td>
<td>3.8</td>
</tr>
<tr>
<td>Concrete</td>
<td></td>
<td>12.0</td>
</tr>
<tr>
<td>Lightweight (1 in. thick)</td>
<td></td>
<td>8.0</td>
</tr>
<tr>
<td>Linoleum</td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td>3/4&quot; ceramic or quarry tile</td>
<td></td>
<td>10.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Floors Truss Weights</th>
<th>Material Details</th>
<th>Weight (psf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single chord</td>
<td>5.5 plf (approx.) @ 24&quot; o.c. spacing</td>
<td>2.75 psf (approx.)</td>
</tr>
<tr>
<td>Double chord</td>
<td>8.5 plf (approx.) @ 24&quot; o.c. spacing</td>
<td>4.25 psf (approx.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Partition Wall Weights</th>
<th>Material Details</th>
<th>Weight (psf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior partition</td>
<td>(stud @ 16&quot; o.c.)</td>
<td>2.3</td>
</tr>
<tr>
<td>Exterior partition</td>
<td>(stud @ 16&quot; o.c.)</td>
<td>3.4</td>
</tr>
</tbody>
</table>

### Technical Information

- Curtain Wall 4 layers of 1/2" Gypsum wallboard directly attached to ceiling.
- Cushioned Vinyl or Linoleum
- Non-cushioned Vinyl of Linoleum
- 3/4" Gypcrete or Elastizell
- 1-1/2" Lightweight Concrete
- 1/2" Sound Deadening Board (USG)
- Quiet-Cor Underlayment by Tarkett, Inc.
- Enkasonic by American Enka Company
- Sempafloor by Laminating Services, Inc.

*Estimates based on proprietary literature. Verify with individual companies.

**Floor Truss One-Hour Fire Rating**

The Truss Plate Institute has authorized fire tests to be conducted to achieve a one-hour fire rating for typical floor and ceiling assemblies. Copies of these reports are available from the issuing agencies.

Additional information regarding one-hour fire ratings using wood trusses with gypsum board ceiling may be obtained from the International Conference of Building Officials Research Reports No. 1632 and 1352.

Fire rating test results are summarized in the adjacent illustrations.

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**Support Details**

- **Bottom Chord Bearing on Exterior Frame Wall or Masonry Wall**
- **Bottom Chord Bearing on Exterior Frame Wall with Masonry Fascia Wall**
- **Intermediate Bearing - Simple Span Trusses** (Special Engineering Required)
- **Intermediate Bearing - Continuous Floor Truss** (Special Engineering Required)
- **Header Beam Pocket - Floor Truss Supporting Header Beam** (Special Engineering Required)

---

**Technical Information**

* International Conference of Building Officials
1313 East 60th Street • Chicago, IL 60637
** Underwriters Laboratory, Inc.
333 Pfingsten Road • Northbrook, IL 60062
*** Factory Mutual Research
1151 Boston-Providence Road • Norwood, MA 02062

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**ICBO* Design No. 4431**

- 3/4" T&G plywood, glued and nailed with light weight concrete
- 4x2 Wood Block
- Z-clips
- 1 layer 5/8" thick USG Firecode C, Type C gypsum wallboard fastened with 1 7/8" Type S screws @ 8" o.c.

**UL** Design No. L528

- 3/4" T&G plywood, glued and nailed with light weight concrete
- Furring Channels
- 1 layer 5/8" thick Type C, USG gypsum wallboard secured with screws, joints finished

**UL** Design No. L529

- 3/4" T&G plywood, glued and nailed with light weight concrete
- Steel Cross Tees and Runners
- 1 layer 5/8" thick Type C, USG gypsum wallboard secured with screws, joints finished

**Factory Mutual*** Design FC214

- 3/4" T&G plywood, glued and nailed
- 2 layers 1/2" thick Type FSW-1, NGC gypsum wallboard, secured with screws, joints finished

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**Floor Truss Construction Details**
FLOOR DECKING INFORMATION
Virtually all decking systems may be easily applied to MiTek floor trusses. The wide 3-1/2” nailing surface assures that floor decks are installed accurately and quickly. The adjacent table is a summary of plywood deck requirements presented by various American Plywood Association publications.

<table>
<thead>
<tr>
<th>Floor Construction</th>
<th>Panel Indent</th>
<th>Thickness</th>
<th>Floor Truss Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional Double-Layer Plywood Underlayment over Plywood Sub-Flooring</td>
<td>48/24, 40/20, 30/16, 24/16</td>
<td>23/32”, 3/4”, 7/8”</td>
<td>24” Spacing</td>
</tr>
<tr>
<td>Wood Strip Flooring over Plywood Sub-Flooring (installed at right angles)</td>
<td>32/16, 40/20</td>
<td>15/32”, 1/2”, 5/8”, 19/32”</td>
<td>19.2” Spacing</td>
</tr>
<tr>
<td>1-1/2” to 2” Lightweight Concrete Cap over Plywood Sub-Flooring</td>
<td>40/20</td>
<td>19/32”, 5/8”, 3/4”, 23/32”</td>
<td>24” Spacing Permitted</td>
</tr>
<tr>
<td>APA Sturd 1-Floor (must be glued or nailed according to APA)</td>
<td>24, 20, 16, 32, 48</td>
<td>23/32”, 3/4”, 7/8”</td>
<td>24” Spacing (Spacing equal to Panel Indent.)</td>
</tr>
<tr>
<td>APA Glued Floor System (must be glued according to APA Spec. AG-01 and nailed)</td>
<td>24” Spacing 19.2” Spacing</td>
<td>7/8”, 1”</td>
<td>24” Spacing (Available thickness for either conventional subflooring plywood or for Sturd-I-Floor Panels.)</td>
</tr>
</tbody>
</table>

MiTek connector plates have been approved by all recognized national and regional model building code groups, based on extensive structural testing. The following approvals may be referenced for more detailed information:

- BOCA National Building Code
- Uniform Building Code (UBC)
- Standard Building Code (SBC)
- Southern Building Code Congress International (SBCCI)
- APA Glued Floor System
- Federal Housing Administration (FHA/HUD)
- Federal Housing Administration (HUD) Truss Connector Bulletin No. TCB 17.08.
- Wisconsin State Code
- Wisconsin Department of Industry, Labor and Human Relations (DILHR) Approval No. 960022-W, 970036-N.

CONNECTOR PLATE CODE APPROVALS

MiTek connector plates have been approved by all recognized national and regional model building code groups, based on extensive structural testing. The following approvals may be referenced for more detailed information:
**Floor Truss Construction Details**

**Lateral Bracing Suggestions**

2x6 “Strongback” lateral supports should be located on edge approximately every 10 feet along the floor truss. They should be securely fastened to vertical webs. Blocking behind the vertical web is recommended while nailing the strongback. The strongbacks should either be secured to adjacent partition walls or alternate “X”-bridging should be used to terminate the bracing member.

**Floor Truss Cantilever Concentrated Loads**

Floor truss cantilevers often support load-bearing walls carrying roof live loads and wall material dead loads. The adjacent chart provides a convenient means of determining an equivalent concentrated load for representative roof loads which incorporate a 15% load duration factor for the roof load only.

**Concentrated Load Sample Calculation**

Room Load = 20/10/0/10 = 40 psf @ 1.15

Roof Load (Roof Truss Reaction) = 40 psf x (30/12) x 2'-0" o.c. - 1200 lbs.

8'-0” Stud Wall Weight (@ 85 lbs./lineal ft.) = 85 plf x 2'-0” o.c.

= 170 lbs.

Equivalent Floor Truss Load = (1200/1.15) + 170 = 1215 lbs.

Concentrated Load

Note: Also check floor truss for dead load only at end of cantilever.

---

**Overall Truss Depth (Inches)**

<table>
<thead>
<tr>
<th>Overall Truss Depth (Inches)</th>
<th>Width (W) (Inches)</th>
<th>Diameter (D) (Inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>13</td>
<td>14</td>
<td>8</td>
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<td>14</td>
<td>15</td>
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<td>24</td>
<td>17</td>
</tr>
<tr>
<td>24</td>
<td>25</td>
<td>18</td>
</tr>
</tbody>
</table>

---

**Floor Cantilevered Perpendicular to Floor Truss Span**

---

**Floor Cantilevered Perpendicular and Parallel to Floor Truss Span**

---

**Notes**

- Special engineering required for girder floor trusses.
- Slope for drainage, as required.
- Cantilever span controlled by lumber size and grade deflection limitations.
**Minimum Depth**

<table>
<thead>
<tr>
<th>Floor</th>
<th>Roof</th>
</tr>
</thead>
<tbody>
<tr>
<td>Span/24</td>
<td>Span/360</td>
</tr>
<tr>
<td>(Live Load)</td>
<td>(Live Load)</td>
</tr>
<tr>
<td>Dead Load Deflection</td>
<td>Dead Load Deflection *</td>
</tr>
</tbody>
</table>

**Recommended Camber**

<table>
<thead>
<tr>
<th>Floor</th>
<th>Roof</th>
</tr>
</thead>
<tbody>
<tr>
<td>Span/24</td>
<td>Span/240</td>
</tr>
<tr>
<td>(Live Load)</td>
<td>(Live Load)</td>
</tr>
<tr>
<td>Dead Load Deflection</td>
<td>Dead Load Deflection</td>
</tr>
</tbody>
</table>

*Provide slope of 1/4” per foot of span for proper drainage to prevent water ponding.*

In addition to allowable lumber stress limitations, floor truss designs are also regulated by maximum permissible deflection-to-span and depth-to-span limitations, as shown in the chart below. The suggested camber to be built into the truss during fabrication is also included. The truss deflection is calculated by complex engineering methods and verified by extensive full-scale load tests. The floor span-to-depth limitation is intended to prevent objectionable floor vibration. All of the following recommended limitations should be achieved to provide a quality floor system and assure complete customer satisfaction.

**ARCHITECTURAL SPECIFICATION**

- Trusses shall be fabricated by a MiTek truss manufacturer in accordance with MiTek floor truss engineering specifications.
- MiTek engineering design drawings bearing the seal of the Registered Engineer preparing the design shall be provided to the Project Architect for his approval.
- Truss designs shall be in accordance with the latest version of ANSI/TPI1 National Design Standard for Metal Plates Converted Wood Construction, a publication of Truss Plate Institute and generally accepted engineering practice.
- Delivery, handling, and erection of MiTek trusses shall be in accordance with the “TPI Quality Standard for Metal Plate Connected Wood Trusses,” published by Truss Plate Institute.
- Truss hangers, anchorage, permanent bracing, and required design loads shall be the responsibility of the Project Architect.
- MiTek truss connector plates are manufactured under rigid quality control using structural Grade C hot-dipped, galvanized steel meeting ASTM Specifications A653.
- Trusses shall be fabricated by a MiTek truss manufacturer in accordance with MiTek floor truss engineering specifications.
- MiTek engineering design drawings bearing the seal of the Registered Engineer preparing the design shall be provided to the Project Architect for his approval.
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- Truss hangers, anchorage, permanent bracing, and required design loads shall be the responsibility of the Project Architect.
- MiTek truss connector plates are manufactured under rigid quality control using structural Grade C hot-dipped, galvanized steel meeting ASTM Specifications A653.

**RECOMMENDED DEPTH, DEFLECTION, AND CAMBER LIMITATIONS**

**ROOFS**

- **DON'T** unload trusses on rough terrain or uneven surfaces, which could cause damage to the trusses.
- **DO** support trusses that are stored horizontally on blocking to prevent excessive lateral bending and lessen moisture gain.
- **DON'T** break banding until installation begins and the trusses are in a stable, horizontal position.
- **DON'T** lift bundled trusses by the bands and do not use damaged trusses.
- **DO** brace trusses that are stored vertically, to prevent toppling or tipping.
- **DON'T** walk on trusses that are lying flat. This is a dangerous practice.
- **DON'T** use floor trusses when exposed to weather, chemically corrosive environment, or extremely high humidity.
- **DON'T** cut truss chords or webs or modify any part during construction.

**FLOORS**

- **DO** color-code floor truss ends for correct non-symmetrical installations.
- **DO** locate trusses to allow for plumbing or duct riser clearances.
- **DO** assure that trusses are installed with a joint located over an interior bearing.
- **DO** use warning tags on floor trusses to provide proper installation orientation and to warn against cutting or modifying trusses.
- **DON'T** permit stacking of drywall or plywood sheathing during construction on floor truss balcony cantilevers or at truss mid-span without proper shoring.
- **DON'T** use floor trusses when exposed to weather, chemically corrosive environment, or extremely high humidity.
- **DON'T** cut truss chords or webs or modify any part during construction.

**CONSTRUCTION GUIDELINES**

**FLOOR TRUSS CONSTRUCTION DETAILS**

800.325.8075 • www.mii.com

**TECHNICAL INFORMATION**