

Technical Evaluation Report™

TER 1308-05

Use of TimberLOK® Fasteners to Provide Top Plate Roll Resistance
to Trusses & Rafters Attached to the Tops of Walls

OMG® Inc. DBA FastenMaster®

Product:

**FastenMaster® TimberLOK®
Heavy Duty Wood Screw**

Issue Date:

February 19, 2014

Revision Date:

February 21, 2023

Subject to Renewal:

April 1, 2024



Use the QR code to access the most recent version or a sealed
copy of this Technical Evaluation Report (TER) at drjcertification.org.



COMPANY
INFORMATION:

OMG® Inc. DBA FastenMaster®
153 Bowles Rd
Agawam, MA 01001-2908

P: 800-518-3569

mguthrie@omginc.com

fastenmaster.com

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

SECTION: 06 00 90 - Wood and Plastic Fastenings

1 Product Evaluated^{1,2}

1.1 FastenMaster® TimberLOK® Heavy Duty Wood Screw

2 Applicable Codes and Standards³

2.1 Codes

2.1.1 IBC—15, 18, 21: *International Building Code®*

2.1.2 IRC—15, 18, 21: *International Residential Code®*

2.2 Standards and Referenced Documents

2.2.1 ANSI/AWC NDS: *National Design Specification (NDS) for Wood Construction*

2.2.2 ANSI/AWC SDPWS: *Special Design Provisions for Wind and Seismic*

2.2.3 ASTM A153: *Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware*

2.2.4 ASTM A510: *Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel*

2.2.5 ICC 600: *Standard for Residential Construction in High-wind Regions*

¹ For more information, visit drcertification.org or call us at 608-310-6748.

² This TER is a code defined [research report](#) provided by an [approved source](#) (see [IBC Section 1703.4.2](#)) and an [approved agency](#) (see [IBC Section 1703.1](#)). Given that this TER is for new materials, as defined in [IBC Section 1702](#), for which there are no approved rules or standards, [IBC Section 1707.1](#) states that, "In the absence of approved rules or other approved standards, the building official shall accept duly authenticated reports (i.e. [research reports](#)) from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in [IBC Section 104.11](#)". A professional engineer is approved as an approved source when that professional engineer is properly licensed to transact engineering commerce.

³ Unless otherwise noted, all references in this TER are from the 2021 version of the codes and the standards referenced therein. This material, design, or method of construction also complies with the 2000-2018 versions of the referenced codes and the standards referenced therein.

3 Performance Evaluation

- 3.1 Testing and related engineering evaluations are defined as intellectual property and/or trade secrets.
- 3.2 TimberLOK® fasteners used in truss to top plate connections were evaluated to specifically assess the effect of “Top Plate Roll” (TPR), shown in Figure 1.
 - 3.2.1 TPR is defined as the turning or “rolling” of the top plate of a wall assembly in relation to the truss assembly above and/or off the wall assembly below.
 - 3.2.2 TPR is caused by eccentric load path connections (i.e., the connections of the truss to top plate and the top plate to stud are not directly lined up vertically).

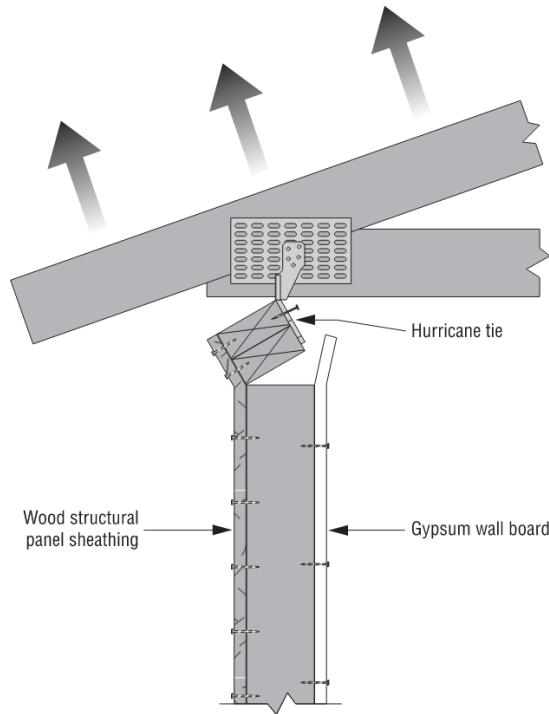


Figure 1. Top Plate Roll (TPR) Illustration

- 3.3 The TPR condition is assessed with respect to existing building code requirements.
- 3.4 For general TimberLOK® truss to top plate connection design information, see [TER 1105-02](#).
- 3.5 Engineering evaluations are conducted with DrJ’s ANAB [accredited ICS code scope](#), which are also its areas of professional engineering competence.
- 3.6 Any regulation specific issues not addressed in this section are outside the scope of this TER.

4 Product Description and Materials

4.1 The product evaluated in this TER is shown in Figure 2.

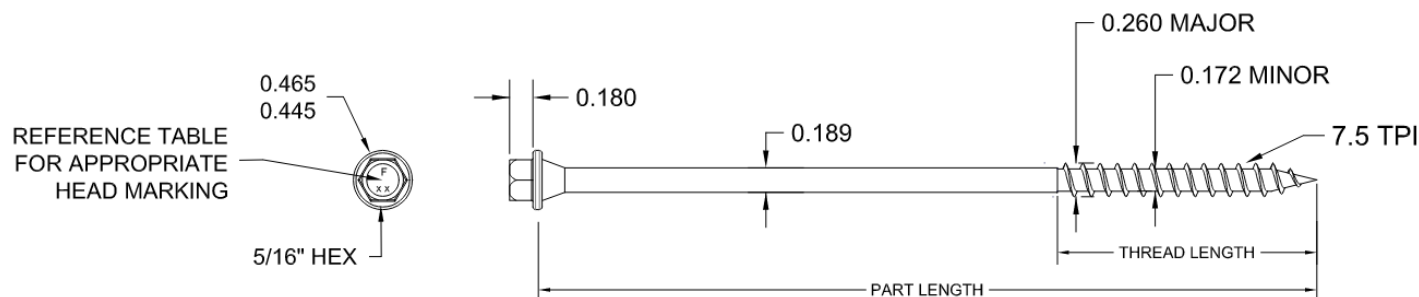


Figure 2. TimberLOK® Fastener

- 4.2 TimberLOK® fasteners are manufactured with carbon steel wire conforming to ASTM A510 with a minimum ultimate tensile strength of 60 ksi using a standard cold-formed process followed by a heat-treating process.
- 4.3 TimberLOK® fasteners are approved for use in interior and exterior conditions and in pressure-treated wood.
- 4.3.1 The proprietary coating has been tested and found to exceed the protection provided by code-approved hot-dipped galvanized coatings meeting ASTM A153 (IBC Section 2304.10.6⁴ and IRC Section R317.3), which allows for its use in alkaline copper quaternary (ACQ) pressure-treated wood.
- 4.4 TimberLOK® fasteners are approved for use in fire retardant treated (FRT) lumber, provided the conditions set forth by the FRT lumber manufacturer are met, including appropriate strength reductions.
- 4.5 The TimberLOK® fasteners evaluated in this report are specified in Table 1.

Table 1. TimberLOK® Fastener Specifications

Product Name	Fastener Designation ¹	Head Marking	Overall Length (in)	Thread Length (in)
TimberLOK® 4"	TLOK04	F4.0	4	2
TimberLOK® 6"	TLOK06	F6.0	6	2

SI: 1 in = 25.4 mm

1. Fastener designations are found on the product packaging. Individual fasteners may be marked according to this table.

5 Applications

5.1 Code Requirements

- 5.1.1 Neither the IBC nor the IRC contain requirements that specifically address the potential for TPR due to an eccentric load path.
- 5.1.2 There are no code-defined deflection requirements for deformations caused by uplift.
- 5.1.3 The design for uplift is an allowable stress design (ASD) load consideration. Uplift loads must be resisted by the fastening system used.

⁴ 2018 IBC Section 2304.10.5

5.1.4 IRC Requirements:

5.1.4.1 IRC Table R602.3(1) requirements are shown in Table 2.

Table 2. Excerpt from IRC Table R602.3(1) Fastener Schedule for Structural Members

Item	Description of Building Elements	Number and Types of Fastener	Spacing of Fasteners
6	Rafter or roof truss to plate, toe nail	3-16d box nails (3 $\frac{1}{2}$ " x 0.135"); or 3-10d common nails (3" x 0.148"); or 4-10d box (3" x 0.128"); or 4-3" x 0.131" nails	2 toenails on one side and 1 toenail on opposite side of each rafter or truss ¹

SI: 1 in = 25.4 mm

1. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule, provide two toenails on one side of the rafter and toenails from the ceiling joist to top plate in accordance with this schedule. The toenail on the opposite side of the rafter shall not be required.

5.1.4.2 IRC Section R802.11 discusses the roof to wall uplift resistance in terms of resistance to load with no deflection criteria: "Where the uplift force does not exceed 200 pounds, rafters and trusses spaced not more than 24 inches (610 mm) on center shall be permitted to be attached to their supporting wall assemblies in accordance with IRC Table R602.3(1)."

5.1.4.3 IRC Section R802.11.1⁵ addresses truss to top plate connections for trusses: "Trusses shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as specified on the truss design drawings. Uplift forces shall be permitted to be determined as specified by Table R802.11, if applicable, or as determined by accepted engineering practice."

5.1.4.4 IRC Section R802.11.2⁶ addresses the connection for rafters: "Individual rafters shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as determined by Table R802.11 or as determined by accepted engineering practice. Connections for beams used in a roof system shall be designed in accordance with accepted engineering practice."

5.1.5 IBC Requirements:

5.1.5.1 IBC Section 1604.8.1 contains the following requirements: "Anchorage of the roof to walls and columns, and of walls and columns to foundations, shall be provided to resist the uplift and sliding forces that result from the application of the prescribed loads."

5.1.5.2 There are a number of other requirements in the IBC addressing specific conditions, all of which only address the resistance to applied load. There is no mention of deformation requirements.

5.1.6 There are two standards referenced by the IRC and IBC that contain provisions that could prescriptively address the potential for TPR.

5.1.6.1 ICC 600 Section 504.1 states, "...Connectors resisting uplift of the roof framing shall be fastened to the top plate on the same side of the wall as the top plate to wall uplift connection."

5.1.6.2 SDPWS Section 4.4.1.5 states that, when using wood structural panels for top plate to stud uplift resistance, "Roof or upper level uplift connectors shall be on the same side of the wall as the sheathing unless other methods are used to prevent twisting of the top plate due to eccentric loading."

5.2 Testing and Design Values

5.2.1 The test assembly construction is shown in Figure 3 and consisted of the following:

5.2.1.1 Double 2x4 top plates and trusses constructed from Spruce-Pine-Fir (SPF) #2.

5.2.1.2 Half-inch ($\frac{1}{2}$ ") gypsum wallboard installed on the interior side of the wall using #6 x 1 $\frac{1}{4}$ " drywall screws. Fasteners along the top edge of the drywall were installed into the lower top plate at 7" o.c.

5.2.1.3 Wood structural panel (WSP) sheathing was installed on the exterior wall in accordance with the code.

⁵ 2018 IRC Section R802.11.1.1

⁶ 2018 IRC Section R802.11.1.2



Figure 3. Wall Construction Test Setup

5.2.2 Three fasteners were tested, and their performance was compared as follows:

- 5.2.2.1 TimberLOK® TLOK06 fasteners installed at a 22.5° angle from vertical, beginning ½" from the inside edge of the lower top plate and driven up through both plates and into the truss.
- 5.2.2.2 Simpson SDWC15600-KT fasteners installed at a 22.5° angle from vertical, beginning ½" from the inside edge of the lower top plate and driven up through both plates and into the truss.
- 5.2.2.3 Simpson H2.5A connectors applied to the exterior side of the wall, over the oriented strand board (OSB), per the manufacturer installation instructions.
- 5.2.2.4 Simpson H2.5A connectors applied to the interior side of the wall, under the gypsum wallboard, per the manufacturer installation instructions.

5.2.3 The published allowable design loads for the TimberLOK® fasteners are shown in Table 3.

Table 3. TimberLOK® Fasteners Allowable Loads for Uplift & Lateral Resistance

Fastener Designation	Minimum Penetration ¹ (in)	Species Group (Specific Gravity ^{2,4})	Uplift ³ (lbf)			Lateral (lbf)					
						F1 – Parallel to Wall			F2 – Perpendicular to Wall ³		
			1.0 ⁵	1.33	1.60	1.0 ⁵	1.33	1.60	1.0 ⁵	1.33	1.60
TimberLOK® TLOK04 or TLOK06	2	Southern Pine (0.55)	390	520	620	255	340	410	280	375	450
		Douglas Fir-Larch (0.50)	340	450	540	240	320	385	265	350	425
		Spruce-Pine-Fir/Hem-Fir (0.42)	260	350	420	210	280	340	230	305	370

SI: 1 in = 25.4 mm, 1 lb/ft = 0.0146 kN/m

1. Penetration is into truss/rafter/wood structural support. Wood truss and rafter members shall be a minimum of 2" nominal thickness. Design of truss and rafter members by others.
2. Equivalent specific gravity of structural composite lumber (SCL) shall be equal to or greater than the specific gravities provided in this table. Refer to product information from SCL manufacturer.
3. Uplift and F2 lateral load values have been adjusted using Hankinson's equation per NDS.
4. For applications involving members with different specific gravities, use the allowable load corresponding to the lowest specific gravity.
5. Allowable uplift and lateral loads for applications in which the controlling load duration (C_d) is two months (i.e., 115%) or seven days (i.e., 125%) may be obtained by multiplying the corresponding tabular value in the column marked "1.0" by 1.33 or 1.60, respectively.

- 5.2.4 Where it is anticipated that loads will be applied to a single fastener simultaneously in more than one direction, additional evaluation is required to account for the combined effect of these loads using accepted engineering practice. Consult a professional engineer as needed for complex design conditions.
- 5.2.5 The following conditions were monitored throughout the tests:
 - 5.2.5.1 Constant measurement and recording of load vs. displacement.
 - 5.2.5.2 Separation measured between the stud and top plate at both the interior (B) and exterior (A) faces of the wall (Figure 4).
 - 5.2.5.3 Separation measured between the truss and top plate at the interior (D) and exterior (C) faces of the wall (Figure 4).
 - 5.2.5.4 Ultimate load at failure.

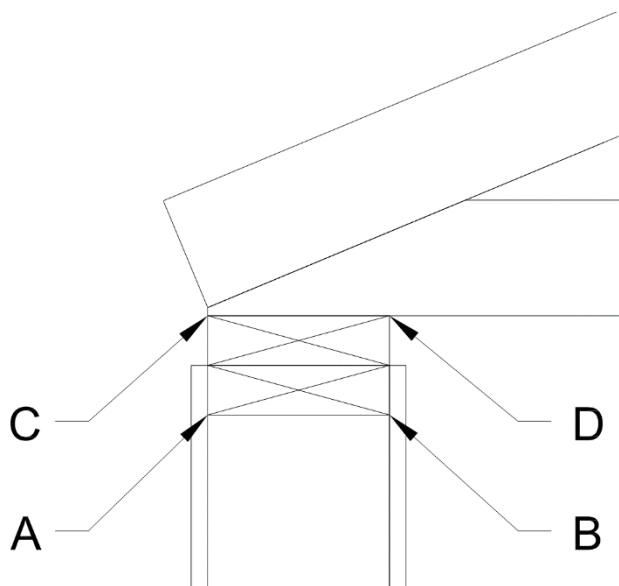


Figure 4. Locations of Deformation Measurements

5.3 TPR Results

5.3.1 Definition of Significant TPR:

- 5.3.1.1 $\frac{1}{8}$ " (0.125") deformation at exterior joints (A and C) – the gap at which exterior materials assumed to cause potential serviceability issues.
- 5.3.1.2 $\frac{1}{32}$ " (0.031") at interior joints (B and D) – the gap at which drywall or drywall joints assumed to start cracking.
- 5.3.2 Ultimate loads for each fastener type correlated to their respective published design loads.
- 5.3.3 The TimberLOK® fasteners experienced no significant TPR at allowable design loads, as shown in Table 4.
- 5.3.4 The H2.5A connectors experienced significant TPR at their respective design loads, when defined per this section, due to the higher eccentricity of the connection (Table 4).

- 5.4 Where the application falls outside of the performance evaluation, conditions of use and/or installation requirements set forth herein, alternative techniques shall be permitted in accordance with accepted engineering practice and experience. This includes but is not limited to the following areas of engineering: mechanics or materials, structural, building science and fire science.

Table 4. TPR Results¹

Fastener	Installation Location	Design Load (lb)	Deflection/Separation ² at 450 lb (in)			
			Plate to Stud		Truss to Plate	
			Exterior (A)	Interior (B)	Exterior (C)	Interior (D)
H2.5A	Exterior	480	0.007	0.002	0.098	0.111
	Interior	480	0.005	0.014	0.043	0.035
TimberLOK®	Interior	420	0.011	0.008	0.004	0.013
Serviceability Limit			0.125	0.031	0.125	0.031
SI: 1 in = 25.4mm, 1 lb = 0.45 kg 1. Cells highlighted in yellow indicate deflection/separation exceeding the serviceability limit (defined as significant TPR per Section 5.3.1). 2. For deflection/separation locations, see Figure 4.						

6 Installation

- 6.1 Installation shall comply with the approved construction documents, the manufacturer installation instructions, this TER, and the applicable building code.
- 6.2 In the event of a conflict between the manufacturer installation instructions and this TER, the more restrictive shall govern.
- 6.3 *Double Top Plate Installation*
- 6.3.1 *Upward From Below Truss, Rafter, or Structural Composite Lumber (SCL):*
- 6.3.1.1 Select a TimberLOK® fastener with a length sufficient to fully embed the 2" threaded portion of the fastener into the truss or rafter, see Table 1.
- 6.3.1.2 Use a ½" low RPM/high torque drill to drive the fastener head flush with the surface of the wall framing.
- 6.3.1.3 Install one (1) TimberLOK® fastener upward through the wall top plate(s) or wood structural framing member and into the center of the truss, rafter, or SCL.
- 6.3.1.3.1 If the truss, rafter, or SCL is located directly over a wall stud or header, insert the fastener at the joint between the inside top edge of the stud or header and the inside bottom edge of the top plate at an upward angle from vertical of 20° to 30° as shown in Figure 5.
- 6.3.1.3.1.1 Ensure that the angle is sufficient to prevent the fastener from protruding out of the truss, rafter, or SCL.

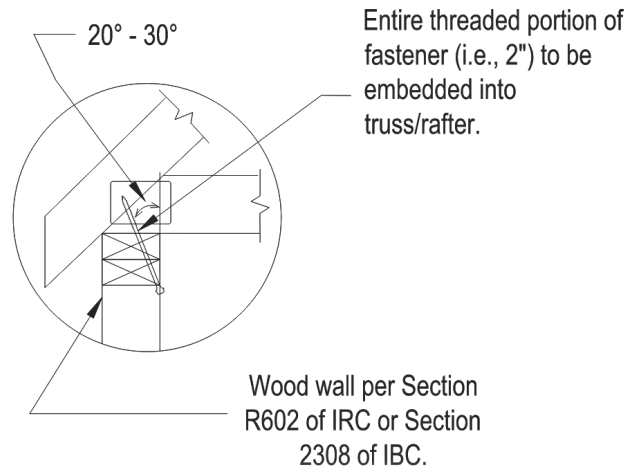


Figure 5. TimberLOK® Installation at Wall Stud from Below

- 6.3.1.3.2 If the truss, rafter, or SCL is located between the wall studs (double top plate application only), insert the fastener near the middle of the bottom face of the bottom top plate(s) straight upward into the truss, rafter, or SCL as shown in Figure 6.

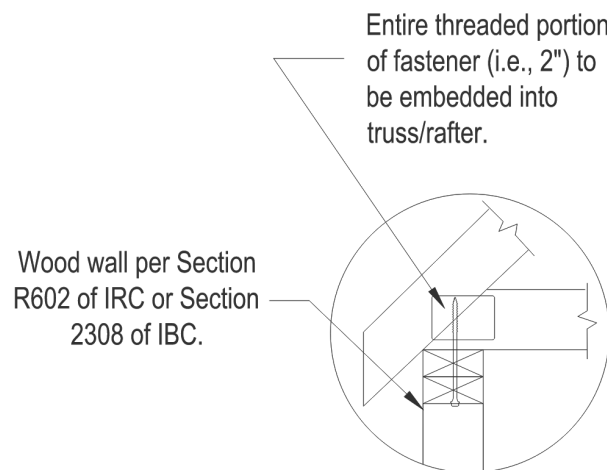


Figure 6. TimberLOK® Installation through Double Top Plates at Locations Away From Studs

- 6.3.1.4 Locate the fastener in line with the above truss, rafter, or SCL so it penetrates within $\pm 1/4$ " of the centerline of the narrow edge of the truss, rafter, or SCL as shown in Figure 7.

Entire threaded portion of fastener (i.e., 2") to be embedded into truss/rafter.

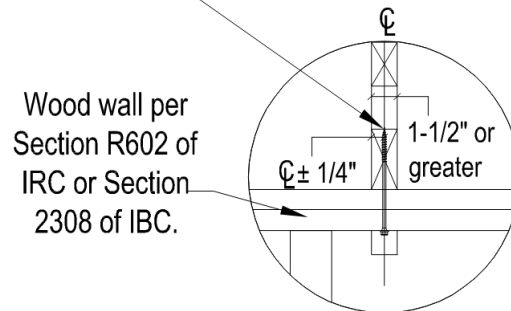


Figure 7. End View of Fastener Connection through Double Top Plate and into Rafter/Truss (Typical)

6.3.2 Downward from Top of the Truss, Rafter, or SCL:

- 6.3.2.1 Select a TimberLOK® fastener with a length sufficient to fully embed the 2" threaded portion of the fastener into the wall top plates or wood structural framing member, see Table 1.
- 6.3.2.2 Use a 1/2" low RPM/high torque drill to drive the fastener head flush with the surface of the wood structural framing member.
- 6.3.2.3 Install one (1) TimberLOK® fastener at a downward angle from vertical of 20° to 30° through the center of the truss, rafter, or SCL and into the wall top plate(s) or wood structural framing member as shown in Figure 8.

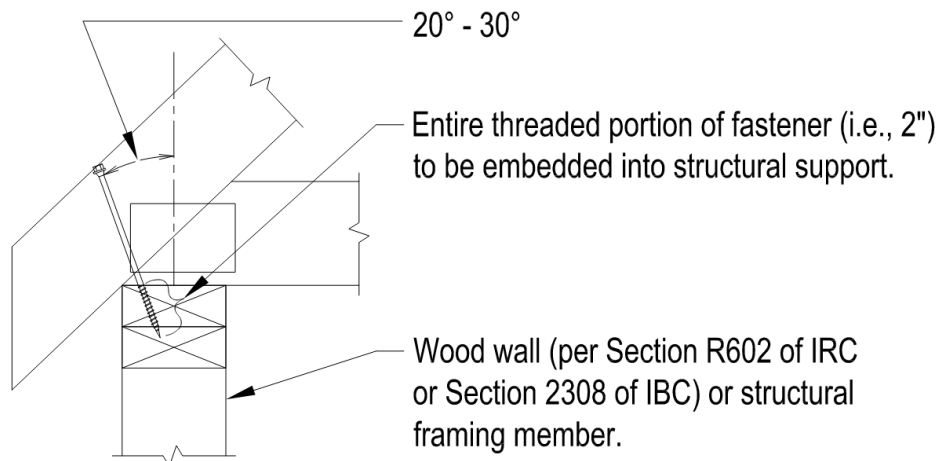


Figure 8. TimberLOK® Installation through Wood Trusses, Rafters, or SCL from Above

- 6.3.2.4 Locate the fastener so that it penetrates within $\pm 1/4''$ of the centerline of the narrow edge of the truss, rafter, or SCL and at or near the center of the wall top plate(s) or wood structural framing member.

6.4 Single Top Plate Installation

- 6.4.1 Select a TimberLOK® fastener with a length sufficient to fully embed the 2" threaded portion of the fastener into the wall top plates or wood structural framing member, see Table 1.
- 6.4.2 Use a 1/2" low RPM/high torque drill to drive the fastener head flush with the surface of the wall framing or wood structural framing member.

- 6.4.3 Where the truss, rafter, or SCL is located directly over a wall stud, insert the fastener at the joint between the inside top edge of the stud and the inside bottom edge of the top plate at an upward angle from vertical of 20° to 30° as shown in Figure 9.
- 6.4.3.1 For minimum truss heel heights (<4½"), use a 4" TimberLOK® to avoid end or top plate top plate penetration.
- 6.4.3.2 Ensure that the angle is sufficient to prevent the fastener from protruding out of the truss, rafter, or SCL.

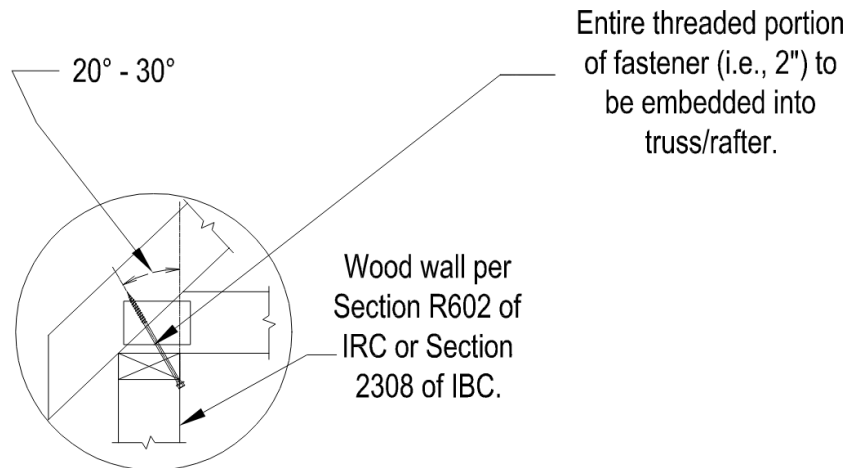


Figure 9. TimberLOK® Installation into a Single Top Plate from Below

- 6.4.4 Where the centerline of the truss, rafter, or SCL is not located directly over the stud, install the fastener vertically up through the top plate and into the truss, rafter, or SCL as shown in Figure 10.

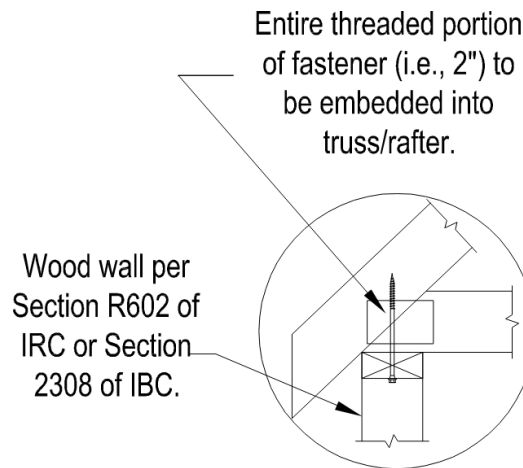


Figure 10. TimberLOK® Installation through Single Top Plate at Locations Away From Studs

- 6.4.5 Locate the fastener so that it penetrates within $\pm 1/4"$ of the centerline of the narrow edge of the truss, rafter, or SCL and at or near the center of the wall top plate(s) or wood structural framing member as shown in Figure 11.

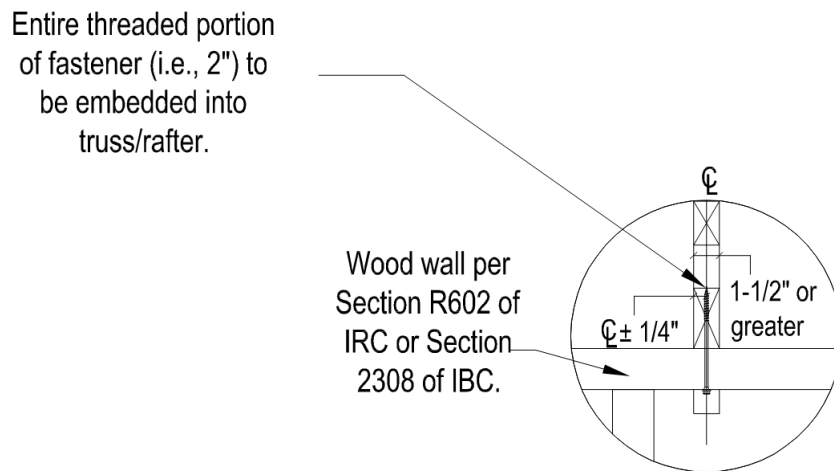


Figure 11. End View of Fastener Connection through Single Top Plate and into Rafter/Truss (Typical)

7 Substantiating Data

- 7.1 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:
- 7.1.1 Fastener head pull-through and withdrawal testing in accordance with ASTM D1761.
- 7.2 TimberLOK® fasteners were evaluated for heavy-duty wood screw performance when used as a truss hold-down.
- 7.3 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies (i.e. ANAB accredited agencies), approved sources (i.e., registered design professionals [RDP]), and/or professional engineering regulations. Accuracy of external test data and resulting analysis is relied upon.
- 7.4 Where pertinent, DrJ's analysis is based upon provisions that have been codified into law through state or local adoption of codes and standards. The developers of these codes and standards are responsible for the reliability of published content. DrJ's engineering practice may use a code-adopted provision as the control sample. A control sample versus a test sample establishes a product as being equivalent to the code-adopted provision in terms of quality, strength, effectiveness, fire resistance, durability, and safety.
- 7.5 The accuracy of the provisions provided herein may be reliant upon the published properties of raw materials, which are defined by the grade mark, grade stamp, mill certificate, Listings, certified reports, duly authenticated reports from approved agencies, and research reports prepared by approved agencies and/or approved sources provided by the suppliers of any raw materials. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this TER, may be dependent upon published design properties by others.
- 7.6 Testing and engineering analysis: The strength, rigidity and/or general performance of component parts and/or the integrated structure are determined by suitable tests that simulate the actual conditions of application that occur and/or by accepted engineering practice and experience.⁷

⁷ See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition.

8 Findings

- 8.1 As delineated in Section 3, the FastenMaster® TimberLOK® Heavy Duty Wood Screw has performance characteristics that were tested and/or meet pertinent standards and is suitable for use pursuant to its specified purpose.
- 8.2 TPR is not a significant concern for TimberLOK® fasteners at allowable design load levels.
- 8.2.1 The H2.5A connectors had some significant TPR as defined in Section 5.3.4, but in no case was TPR in excess of 1/8" at the allowable design load.
- 8.2.2 Comparing the fastener test results in Table 4, TPR is not expected to be a significant concern for TimberLOK® fasteners in 2x6 walls, since the loading is less eccentric than the H2.5A connectors and only slightly more eccentric than the tested 2x4 connection.
- 8.3 When used and installed in accordance with this TER and the manufacturer installation instructions, TimberLOK® fasteners can be used as an acceptable alternative to toenail connections, metal hurricane and seismic clips/straps, or nails to resist the uplift and lateral loads as provided for in Table 3.
- 8.4 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from OMG® Inc. DBA FastenMaster®.
- 8.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10⁸ are similar) in pertinent part states:
- 104.11 Alternative materials, design and methods of construction and equipment.** The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code. Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons the alternative was not approved.
- 8.6 Approved:⁹ Building codes require that the building official shall accept duly authenticated reports¹⁰ or research reports¹¹ from approved agencies and/or approved sources (i.e., licensed RDP) with respect to the quality and manner of use of new products, materials, designs, services, assemblies or methods of construction.
- 8.6.1 Acceptability of an approved agency, by a building official, is performed by verifying that the agency is accredited by a recognized accreditation body of the International Accreditation Forum (IAF).
- 8.6.2 Acceptability of a licensed RDP, by a building official, is performed by verifying that the RDP and/or their business entity is listed by the licensing board of the relevant jurisdiction.
- 8.6.3 Federal law, Title 18 US Code Section 242, requires that where the alternative product, material, service, design, assembly and/or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved, as denial without written reason deprives a protected right to free and fair competition in the marketplace.
- 8.7 DrJ is an engineering company, employs RDPs and is an ISO/IEC 17065 ANAB-Accredited Product Certification Body – Accreditation #1131.
- 8.8 Through ANAB accreditation and the IAF Multilateral Agreements, this TER can be used to obtain product approval in any jurisdiction or country that has IAF MLA Members & Signatories to meet the Purpose of the MLA – “*certified once, accepted everywhere.*”

⁸ 2018 IFC Section 104.9

⁹ Approved is an adjective that modifies the noun after it. For example, Approved Agency means that the Agency is accepted officially as being suitable in a particular situation. This example conforms to IBC/IRC/IFC Section 201.4 where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.

¹⁰ <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>

¹¹ <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1703.4.2>



9 Conditions of Use

- 9.1 Material properties shall not fall outside the boundaries defined in Section 3.
- 9.2 As defined in Section 3, where material and/or engineering mechanics properties are created for load resisting design purposes, the resistance to the applied load shall not exceed the ability of the defined properties to resist those loads using the principles of accepted engineering practice.
- 9.3 Structural framing members (e.g., wood, masonry, concrete, steel) connected with TimberLOK® fasteners shall be designed in accordance with the requirements of their specific design standards/specifications as referenced in the building code adopted by the jurisdiction in which the project is to be constructed.
- 9.4 Loads applied shall not exceed those recommended by the manufacturer or as defined in this TER.
- 9.5 When required by regulation and enforced by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed:
 - 9.5.1 Any calculations, incorporated into the construction documents that are required to show compliance with this TER, shall conform to accepted engineering practice, and shall be approved when requirements of the pertinent regulations are met.
 - 9.5.2 This TER and the installation instructions shall be submitted at the time of permit application.
 - 9.5.3 This product has an internal quality control program and a third-party quality assurance program.
 - 9.5.4 At a minimum, this product shall be installed per Section 6 of this TER.
 - 9.5.5 The review of this TER, by the AHJ, shall be in compliance with IBC Section 104 and IBC Section 105.4.
 - 9.5.6 This product has an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.4, IBC Section 110.4, IBC Section 1703, IRC Section R104.4 and IRC Section R109.2.
 - 9.5.7 The application of this product in the context of this TER is dependent upon the accuracy of the construction documents, implementation of installation instructions, inspection as required by IBC Section 110.3, IRC Section R109.2 and any other regulatory requirements that may apply.
- 9.6 Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed and/or by the building designer (e.g., owner or RDP).
- 9.7 The actual design, suitability, and use of this TER, for any particular building, is the responsibility of the owner or the owner's authorized agent.

10 Identification

- 10.1 The product listed in Section 1.1 is identified by a label on the board or packaging material bearing the manufacturer name, product name, TER number, and other information to confirm code compliance.
- 10.2 Additional technical information can be found at fastenmaster.com.

11 Review Schedule

- 11.1 This TER is subject to periodic review and revision. For the most recent version, visit drjcertification.org.
- 11.2 For information on the current status of this TER, contact DrJ Certification.

12 Approved for Use Pursuant to US and International Legislation Defined in Appendix A

- 12.1 FastenMaster® TimberLOK® Heavy Duty Wood Screw is included in this TER published by an approved agency that is concerned with evaluation of products or services, maintains periodic inspection of the production of listed materials or periodic evaluation of services, and whose TER Listing states either that the material, product, or service meets identified standards or has been tested and found suitable for a specified purpose. This TER meets the legislative intent and definition of being acceptable to the AHJ.

1 Appendix A: Legislation that Authorizes AHJ Approval

- 1.1 **Fair Competition:** State legislatures have adopted Federal regulations for the examination and approval of building code referenced and alternative products, materials, designs, services, assemblies and/or methods of construction that:
 - 1.1.1 Advance Innovation,
 - 1.1.2 Promote competition so all businesses have the opportunity to compete on price and quality in an open market on a level playing field unhampered by anticompetitive constraints, and
 - 1.1.3 Benefit consumers through lower prices, better quality, and greater choice.
- 1.2 **Adopted Legislation:** The following local, state, and federal regulations affirmatively authorize FastenMaster® TimberLOK® Heavy Duty Wood Screw to be approved by AHJs, delegates of building departments, and/or delegates of an agency of the federal government:
 - 1.2.1 Interstate commerce is governed by the Federal Department of Justice to encourage the use of innovative products, materials, designs, services, assemblies and/or methods of construction. The goal is to “protect economic freedom and opportunity by promoting free and fair competition in the marketplace.”
 - 1.2.2 Title 18 US Code Section 242 affirms and regulates the right of individuals and businesses to freely and fairly have new products, materials, designs, services, assemblies and/or methods of construction approved for use in commerce. Disapproval of alternatives shall be based upon non-conformance with respect to specific provisions of adopted legislation, and shall be provided in writing stating the reasons why the alternative was not approved, with reference to the specific legislation violated.
 - 1.2.3 The federal government and each state have a public records act. In addition, each state also has legislation that mimics the federal Defend Trade Secrets Act 2016 (DTSA).
 - 1.2.3.1 Compliance with public records and trade secret legislation requires approval through the use of listings, certified reports, Technical Evaluation Reports, duly authenticated reports and/or research reports prepared by approved agencies and/or approved sources.
 - 1.2.4 For new materials¹² that are not specifically provided for in any building code, the design strengths and permissible stresses shall be established by tests, where suitable load tests simulate the actual loads and conditions of application that occur.
 - 1.2.5 The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design using accepted engineering practice.¹³

¹² <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706.2>

¹³ IBC 2021, Section 1706.1 Conformance to Standards

- 1.3 **Approved¹⁴ by Los Angeles:** The Los Angeles Municipal Code (LAMC) states in pertinent part that the provisions of LAMC are not intended to prevent the use of any material, device, or method of construction not specifically prescribed by LAMC. The Department shall use Part III, Recognized Standards in addition to Part II, Uniform Building Code Standards of Division 35, Article 1, Chapter IX of the LAMC in evaluation of products for approval where such standard exists for the product or the material and may use other approved standards, which apply. Whenever tests or certificates of any material or fabricated assembly are required by Chapter IX of the LAMC, such tests or certification shall be made by a testing agency approved by the Superintendent of Building to conduct such tests or provide such certifications. The testing agency shall publish the scope and limitation(s) of the listed material or fabricated assembly.¹⁵ The Superintendent of Building roster of approved testing agencies is provided by the Los Angeles Department of Building and Safety (LADBS). The Center for Building Innovation (CBI) Certificate of Approval License is TA24945. Tests and certifications found in a CBI Listing are LAMC approved. In addition, the Superintendent of Building shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in the California Building Code (CBC) Section 1707.1.¹⁶
- 1.4 **Approved by Chicago:** The Municipal Code of Chicago (MCC) states in pertinent part that an Approved Agency is a Nationally Recognized Testing Laboratory (NRTL) acting within its recognized scope and/or a certification body accredited by the American National Standards Institute (ANSI) acting within its accredited scope. Construction materials and test procedures shall conform to the applicable standards listed in the MCC. Sufficient technical data shall be submitted to the building official to substantiate the proposed use of any product, material, service, design, assembly and/or method of construction not specifically provided for in the MCC. This technical data shall consist of research reports from approved sources (i.e., MCC defined Approved Agencies).
- 1.5 **Approved by New York City:** The NYC Building Code 2022 (NYCBC) states in pertinent part that an approved agency shall be deemed¹⁷ an approved testing agency via ISO/IEC 17025 accreditation, an approved inspection agency via ISO/IEC 17020 accreditation, and an approved product evaluation agency via ISO/IEC 17065 accreditation. Accrediting agencies, other than federal agencies, must be members of an internationally recognized cooperation of laboratory and inspection accreditation bodies subject to a mutual recognition agreement¹⁸ (i.e., ANAB, International Accreditation Forum (IAF), etc.).

¹⁴ See section 8.3 for the distilled building code definition of Approved.

¹⁵ Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES

¹⁶ <https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1>

¹⁷ New York City, The Rules of the City of New York, § 101-07 Approved Agencies

¹⁸ New York City, The Rules of the City of New York, § 101-07 Approved Agencies

- 1.6 **Approved by Florida:** Statewide approval of products, methods, or systems of construction shall be approved, without further evaluation, by 1) A certification mark or listing of an approved certification agency, 2) A test report from an approved testing laboratory, 3) A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, from an approved product evaluation entity; 4) A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a professional engineer or architect, licensed in Florida. For local product approval, products or systems of construction shall demonstrate compliance with the structural wind load requirements of the Florida Building Code (FBC) through one of the following methods; 1) A certification mark, listing, or label from a commission-approved certification agency indicating that the product complies with the code; 2) A test report from a commission-approved testing laboratory indicating that the product tested complies with the code; 3) A product-evaluation report based upon testing, comparative or rational analysis, or a combination thereof, from a commission-approved product evaluation entity which indicates that the product evaluated complies with the code; 4) A product-evaluation report or certification based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a Florida professional engineer or Florida registered architect, which indicates that the product complies with the code; 5) A statewide product approval issued by the Florida Building Commission. The Florida Department of Business and Professional Regulation (DBPR) website provides a listing of companies certified as a Product Evaluation Agency (i.e., EVLMiami 13692), a Product Certification Agency (i.e., CER10642), and as a Florida Registered Engineer (i.e., ANE13741).
- 1.7 **Approved by Miami-Dade County (i.e., Notice of Acceptance [NOA]):** A Florida statewide approval is an NOA. An NOA is a Florida local product approval. By Florida law, Miami-Dade County shall accept the statewide and local Florida Product Approval as provided for in Florida legislation 553.842 and 553.8425.
- 1.8 **Approved by New Jersey:** Pursuant to Building Code 2018 of New Jersey in IBC Section 1707.1 General,¹⁹ it states: “In the absence of approved rules or other approved standards, the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in the administrative provisions of the Uniform Construction Code (N.J.A.C. 5:23)”.²⁰ Furthermore N.J.A.C 5:23-3.7 states: Municipal approvals of alternative materials, equipment, or methods of construction. **(a) Approvals:** Alternative materials, equipment, or methods of construction shall be approved by the appropriate subcode official provided the proposed design is satisfactory and that the materials, equipment, or methods of construction are suitable for the intended use and are at least the equivalent in quality, strength, effectiveness, fire resistance, durability and safety of those conforming with the requirements of the regulations. 1. A field evaluation label and report or letter issued by a nationally recognized testing laboratory verifying that the specific material, equipment, or method of construction meets the identified standards or has been tested and found to be suitable for the intended use, shall be accepted by the appropriate subcode official as meeting the requirements of (a) above. 2. Reports of engineering findings issued by nationally recognized evaluation service programs, such as, but not limited to, the Building Officials and Code Administrators (BOCA), the International Conference of Building Officials (ICBO), the Southern Building Code Congress International (SBCCI), the International Code Council (ICC), and the National Evaluation Service, Inc., shall be accepted by the appropriate subcode official as meeting the requirements of (a) above. The New Jersey Department of Community Affairs has confirmed that technical evaluation reports, from any accredited entity listed by ANAB, meets the requirements of item 2 given that the listed entities are no longer in existence and/or do not provide “reports of engineering findings”.

¹⁹ https://up.codes/viewer/new_jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1

²⁰ <https://www.nj.gov/dca/divisions/codes/codreg/ucc.html>

- 1.9 **Approved by the Code of Federal Regulations Manufactured Home Construction and Safety Standards:** Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14²¹ and Part 3280,²² the Department encourages innovation and the use of new technology in manufactured homes. The design and construction of a manufactured home shall conform with the provisions of Part 3282 and Part 3280 where key approval provisions in mandatory language follow: 1) “All construction methods shall be in conformance with accepted engineering practices”; 2) “The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur.”; and 3) “The design stresses of all materials shall conform to accepted engineering practice.”
- 1.10 **Approved by US, Local, and State Jurisdictions in General:** In all other local and state jurisdictions, the regulations require approval per Section 8 above.
- 1.11 **Approved by International Jurisdictions:** The USMCA and GATT agreements provide for approval of innovative materials, products, designs, services, assemblies and/or methods of construction through the Technical Barriers to Trade agreements and the International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA), where these agreements:
- 1.11.1 Permit participation of conformity assessment bodies located in the territories of other Members (defined as GATT Countries) under conditions no less favourable than those accorded to bodies located within their territory or the territory of any other country.
 - 1.11.2 State that conformity assessment procedures (i.e., ISO/IEC 17020, 17025, 17065, etc.) are prepared, adopted, and applied so as to grant access for suppliers of like products originating in the territories of other Members under conditions no less favourable than those accorded to suppliers of like products of national origin or originating in any other country, in a comparable situation.
 - 1.11.3 State that conformity assessment procedures are not prepared, adopted, or applied with a view to or with the effect of creating unnecessary obstacles to international trade. This means that conformity assessment procedures shall not be more strict or be applied more strictly than is necessary to give the importing Member adequate confidence that products conform to the applicable technical regulations or standards.
 - 1.11.4 **Approved:** The purpose of the IAF MLA is to ensure mutual recognition of accredited certification and validation/verification statements between signatories to the MLA, and subsequently acceptance of accredited certification and validation/verification statements in many markets based on one accreditation for the timely approval of innovative materials, products, designs, services, assemblies and/or methods of construction. Accreditations granted by IAF MLA signatories are recognised worldwide based on their equivalent accreditation programs, therefore reducing costs and adding value to businesses and consumers.

²¹ <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14>

²² <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280>