

Technical Evaluation Report™

TER 1009-01

Use of FastenMaster® HeadLOK® Fasteners to Attach Cladding and/or Furring to
Wood Framing through Foam Sheathing

OMG®, Inc. DBA FastenMaster®

Product:

**FastenMaster®
HeadLOK® Heavy Duty
Flathead Fasteners**

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COMPANY
INFORMATION:

OMG®, Inc. DBA FastenMaster®
153 Bowles Rd
Agawam, MA 01001-2908
800-518-3569
mguthrie@omginc.com
fastenmaster.com

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES
SECTION: 06 02 00 - Design Information
SECTION: 06 05 23 - Wood, Plastic, and Composite Fastenings
SECTION: 06 11 00 - Wood Framing
SECTION: 06 12 00 - Structural Panels
SECTION: 06 16 00 - Sheathing
SECTION: 06 17 00 - Shop-Fabricated Structural Wood

1 Product Evaluated^{1,2}

- 1.1 FastenMaster® HeadLOK® Heavy Duty Flathead Fasteners

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 *ASCE/SEI 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures*
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 *AWC TR 12: General Dowel Equations for Calculating Lateral Connection Values*

¹ For more information, visit drjcertification.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 The HeadLOK® fasteners were evaluated, using their tested allowable design values described below, as an alternate means of attaching cladding systems over exterior mounted rigid foam insulation. The following properties were evaluated:
 - 3.2.1 Dowel bending strength of HeadLOK® fasteners for use as an alternative to wood screws or lag screws in shear, where the fasteners are applied horizontally and the load is applied vertically.
 - 3.2.2 Withdrawal strength of HeadLOK® fasteners for use as an alternative to wood screws or lag screws in tension where the fasteners are applied horizontally and the load is applied vertically causing the fastener to pull out.
 - 3.2.3 Head pull through strength of HeadLOK® fasteners for use as an alternative to wood screws or lag screws in tension where the fasteners are applied horizontally and the load is applied vertically causing the fastener head to pull through.
 - 3.2.4 Shear strength of the HeadLOK® fasteners for use as an alternative to wood screws or lag screws in shear where the fasteners are applied horizontally and the load is applied vertically either parallel or perpendicular to wood grain.
- 3.3 Engineering evaluations are conducted with DrJ's ANAB accredited ICS code scope, which are also its areas of professional engineering competence.
- 3.4 Any regulation specific issues not addressed in this section are outside the scope of this TER.

4 Product Description and Materials

- 4.1 HeadLOK® fasteners are manufactured with carbon steel wire conforming to ASTM A510 with a minimum ultimate tensile strength of 60 ksi.
- 4.2 HeadLOK® fasteners are manufactured using a standard cold-formed process followed by a heat-treating process.
- 4.3 HeadLOK® fasteners are approved for use in exterior conditions and in pressure-treated wood. 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).
- 4.4 HeadLOK® fasteners are approved for use in interior conditions.
- 4.5 HeadLOK® fasteners are approved for use in fire-retardant-treated lumber, provided the conditions set forth by the fire retardant-treated lumber manufacturer are met, including appropriate strength reductions.
- 4.6 HeadLOK® fasteners are available in the styles and sizes shown in Table 1.

Table 1. HeadLOK® Fastener Availability

Length (in)	Product SKU	Quantity per Box
2 $\frac{7}{8}$	FMHLGM278 -250	500
3 $\frac{3}{4}$	FMHLGM334 -250	250
4 $\frac{1}{2}$	FMHLGM412 -250	250
5	FMHLGM005 -250	250
5 $\frac{1}{2}$	FMHLGM512 -250	250
6	FMHLGM006 -250	250
6 $\frac{1}{2}$	FMHLGM612 -250	250
7	FMHLGM007 -250	250
7 $\frac{1}{2}$	FMHLGM712 -250	250
8	FMHLGM008 -250	250
8 $\frac{1}{2}$	FMHLGM812 -250	250
9	FMHLGM009 -250	250
9 $\frac{1}{2}$	FMHLGM912 -250	250
10	FMHLGM010 -250	250
11	FMHLGM011 -250	250
12	FMHLGM012 -250	250
13	FMHLGM013 -250	250
14	FMHLGM014 -250	250
15	FMHLGM015 -250	250
16	FMHLGM016 -250	250
18	FMHLGM018 -250	250
SI: 1 in = 25.4 mm		

⁴ 2018 IBC Section 2304.10.5



5 Applications

- 5.1 HeadLOK® fasteners are used to attach wall sheathing, furring and/or cladding to the wall framing through an intermediate layer of foam sheathing to provide resistance to transverse loads in conventional light-frame wood construction.
 - 5.1.1 See Table 2 for a prescriptive solution to fastener spacing requirements for various installation conditions.
- 5.2 HeadLOK® fasteners are used to support the dead load of wall sheathing, furring and/or cladding when connected to the wall framing through an intermediate layer of foam sheathing.
 - 5.2.1 See Table 2 for fastening requirements for various siding weight and framing conditions.
- 5.3 *Design Procedure*
 - 5.3.1 *Calculate the Fastener Spacing:*
 - 5.3.1.1 Step 1: Determine the spacing between studs or framing members, either 16" or 24" o.c.
 - 5.3.1.2 Step 2: Calculate the correct thickness of rigid foam, up to 4", needed to obtain the required insulation effect or R-value.
 - 5.3.1.3 Step 3: Choose the furring or sheathing (substrate) material that the cladding will be affixed to:
 - 5.3.1.3.1 Minimum ¾" x 3½" wood or Wood Structural Panel (WSP) furring,
 - 5.3.1.3.2 Minimum ¾" WSP sheathing, or
 - 5.3.1.3.3 Ensure that the substrate allows for cladding connections that are compliant with the cladding manufacturer installation and connection instructions and meet the applicable building code.
 - 5.3.1.4 Step 4: Determine the actual weight for the cladding materials being installed, per square foot, as given by the cladding manufacturer specifications.
 - 5.3.1.4.1 Typical cladding weights are 1.3 psf for vinyl siding, 2.5 psf for cement board siding, 11 psf for Portland cement stucco and 25 psf for adhered masonry veneer; use actual weights for materials installed.
 - 5.3.1.4.2 Wood furring may add up to 1 psf of additional weight; wood sheathing may add up to 1.5 psf, depending on thickness.

5.3.1.5 Step 5: Using these four values together, find the proper fastening pattern of between 6" and 24" o.c. using Table 2.

Table 2. Recommended Fastener Spacing for Various Thicknesses of Foam Sheathing, Stud Spacing, And Cladding Weight when Connected to Wood Studs Using HeadLOK® Fasteners^{1,2,3,4,6,7,8,9}

Stud Spacing ¹ (in)	Foam Thickness (in)	Maximum Allowable Cladding Weight (psf) to be Supported ⁵									
		10	15	20	25	30	10	15	20	25	30
		Fastener Spacing (in) When Using Minimum 3/4" x 3 1/2" Wood or WSP Furring					Fastener Spacing (in) When Using Minimum 3/8" WSP Sheathing				
16	1	24 o.c.					12 o.c.				
	1.5	16 o.c.					12 o.c.				
	2	12 o.c.					8 o.c.				
	3	8 o.c.					6 o.c.				
	4	6 o.c.					NA				
24	1	24 o.c.					12 o.c.				
	1.5	12 o.c.					8 o.c.				
	2	8 o.c.					6 o.c.				
	3	6 o.c.					NA				
	4	NA					NA				

SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m²

- Wood framing (studs) shall be a minimum of 2" nominal thickness.
- Wood framing and furring shall be minimum Spruce-Pine-Fir or any species with specific gravity, G, of 0.42 or greater.
- Wood framing, furring, and sheathing shall be designed by others and shall be of adequate size, species, and grade to resist design loads and requirements in accordance with the applicable building code.
- Furring may be installed vertically or horizontally and shall be installed at the same on-center spacing as the studs. All fasteners shall be installed through the furring and into the studs with a minimum 2" of penetration. Alternately, where the furring is installed horizontally, and where the required fastener spacing is 8" o.c. or 12" o.c., the furring may be installed at 16" o.c. or 24" o.c., respectively, provided two (2) fasteners are installed at stud location. Likewise, where the fastener spacing is 6" o.c., the furring may be installed horizontally at 12" o.c. and two (2) fasteners used at each stud. Where multiple fasteners are used, furring or sheathing (substrate) shall be of adequate size to provide proper edge, end, and fastener spacing distances.
- Maximum allowable cladding weight shall include weight of furring, sheathing, cladding and other supported materials.
- Furring type and thickness shall be selected based on the cladding manufacturer installation requirements (e.g., required fastener penetration into furring).
- When using horizontal furring, or where durability of the furring is a concern due to moisture between the cladding and the sheathing, consideration should be given to using preservative treated furring.
- Tabulated solutions are limited to 4" maximum thickness of foam sheathing. Special design required for thicknesses of foam sheathing greater than 4". For cladding attachment over foam sheathing exceeding 4" thickness, a design professional should be consulted.
- Foam plastic insulation shall be a minimum 15 psi compressive strength and shall be in conformance to ASTM C578 or ASTM C1289, as applicable.
- For cladding system weights exceeding 30 psf, a design professional should be consulted.

5.3.2 Check for wind resistance:

5.3.2.1 Step 1: Using the information derived from Steps 1 through 5 in Section 5.3.1, determine the allowable design wind pressure using HeadLOK® fasteners from Table 3.

Table 3. Allowable Design Wind Pressure for Connections Using HeadLOK® Fasteners^{1,3,4}

Furring or WSP Installation Condition	Min. 1x4 Wood Furring ² 16" o.c. studs				Min. 1x4 Wood Furring ² 24" o.c. studs				Min. 3/8" WSP ² 16" o.c. studs			Min. 3/8" WSP ² 24" o.c. studs		
HeadLOK® Fastener Spacing in Furring or Sheathing (in)	24	16	12	8	24	16	12	8	12	8	6	12	8	6
Connection Allowable Design Wind Pressure (psf) ⁵	49	73	98	147	33	49	65	98	49	73	98	33	49	65

SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m²

1. Wood framing and furring shall be minimum Spruce-Pine-Fir or any species with specific gravity, G, of 0.42 or greater.
2. Wood framing, furring, and sheathing shall be designed by others and shall be of adequate size, species, and grade to resist design loads and requirements in accordance with the applicable building code.
3. Connection allowable design wind pressure applies to connection resistance only and shall meet or exceed design wind pressure.
4. Where required by the applicable building code, adequate resistance of connections and materials to seismic forces shall be provided based on local seismic ground motion hazard and the weight of the supported cladding system.
5. For use with the Allowable Stress Design load combinations of ASCE 7.

5.3.2.2 Step 2: Based on the design wind speed (105-150 mph) and wind exposure category (B-D) specific to your region, determine the design wind pressure to be resisted for your application from Table 4.

Table 4. Example of Components & Cladding Design Wind Loads^{1,2,3,4,5,7}

Wind Speed (V _{ult}) (mph) / Exposure	105/B	110/B	115/B	120/B	130/B	140/B	150/B
	-	-	-	-	110/C	120/C	130/C
	-	-	-	-	-	110/D	120/D
Design Negative Wind Pressure Load to be Resisted (psf)⁶	15.9	17.5	19.1	20.8	24.4	29.1	34.5

SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m²

1. Mean roof height shall not exceed 30' (K_z=0.70) (measured vertically from grade plane to middle of roof slope).
2. Refer to applicable building code for wind exposure descriptions (B = typical suburban/wooded terrain; C = open flat terrain; D = ocean/lake exposure).
3. Where topographic effects occur (e.g., wind speed up due to hilltop exposure), refer to the building code for wind load.
4. Tabulated wind pressures are from ASCE 7-16, for wall corner zones. For lesser values away from wall corners, refer to the building code.
5. Tabulated wind pressures assume 100% of wind load is resisted by the cladding/foam sheathing or furring/foam sheathing layer and are not otherwise distributed or shared with other wall assembly layers.
6. Wind pressures are given as 0.6W as defined in ASCE 7-16 for comparison to the allowable Design Wind Pressure of the fasteners as shown in Table 3
7. Topographic factor K_{zt}=1.0, Ground elevation factor K_e=1.0, Wind directionality factor K_d=0.85, Enclosed building GC_{pi}=0.18

5.3.2.3 Step 3: Verify that the allowable design wind pressure using HeadLOK® fasteners (Table 3) meets or exceeds the design wind pressure for your project (Table 4).



5.3.3 Design Example:

Given

Foam Sheathing Thickness:	3"
Cladding Material:	Fiber cement lap siding
Cladding Weight from Manufacturer Data:	3 psf
Design Wind Speed/Exposure:	120/B
Seismic Design Category:	B (exempt)
Wood Framing:	2x6 at 24" o.c.

Solution

- Step 1: Choose the furring type and orientation that will be used. This example uses 1x4 (min.) wood furring in a vertical orientation over studs (Figure 1).
- Step 2: Consult siding manufacturer data for siding weight (3 psf) and add 1 psf for furring. Total = 4 psf.
- Step 3: Using Table 2, min. 1x4 wood furring at 24" o.c. attached to studs at 24" o.c. supporting up to 10 psf requires maximum 16" o.c. fastener spacing.
- Step 4: From Table 3, the connection allowable design wind pressure resistance is 49 psf.
- Step 5: Check the applicable building code to verify the wind pressure resistance required. Table 4 gives an example of the IBC wind pressures (ASCE 7-16), and this example's connection resistance of 49 psf exceeds the required resistance of 34.5 psf for wind speeds of 150 mph in Exposure B, 130 mph in Exposure C and 120 mph in Exposure D.
- Step 6: The required minimum length of HeadLOK® fasteners is 0.75" (furring) + 3" (foam) + 2.0" (penetration) = 5.75". Select a 6" HeadLOK® fastener.

Note:

1. Add length for thickness of additional sheathing material layer behind foam, if included.
2. Verify that furring provides adequate thickness for siding fastener per code or siding manufacturer installation instructions, or specify an appropriate siding fastener for use in ¾-thick furring.
3. Verify that furring is adequate to resist the required design loads.

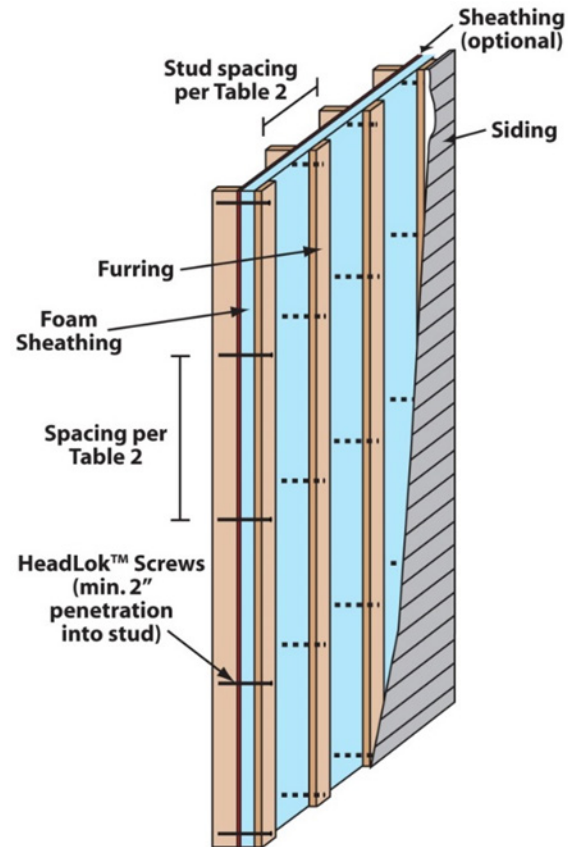


Figure 1. Exterior Wall Covering Assembly with Vertically Oriented Furring

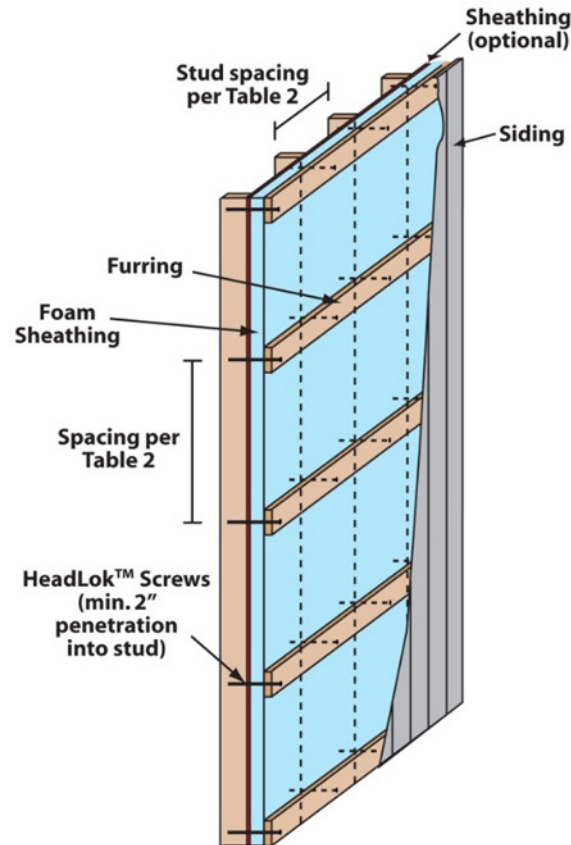


Figure 2. Exterior Wall Covering Assembly with Horizontally Oriented Furring

- 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.

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 *Installation Procedure*
 - 6.3.1 Add up the total thickness of furring, rigid insulation and sheathing, and then select the appropriate length of HeadLOK® fastener (see Table 1) that will attach these combined materials and provide a minimum 2" penetration into the wood framing.
 - 6.3.2 Using a high torque ½" drill, drive the HeadLOK® through the center of the furring strip and into the insulation and wall framing.
 - 6.3.3 Fasteners should be aligned perpendicular to the face of the wall stud so that the point engages the center of the wall stud and at a minimum distance of 3" from the end of the stud or furring material.
 - 6.3.4 Fasteners must be installed in a manner to avoid over-driving yet snug enough to remove any gaps between the layers of materials being fastened.
 - 6.3.5 Figure 1 and Figure 2 provide example graphics of two types of furring installations as a guide.

7 Substantiating Data

- 7.1 HeadLOK® fastener design property calculations for HeadLOK® screws based on TR 12, NDS, and NYSERDA reports; Crandell
- 7.2 HeadLOK® fastener performance from the FastenMaster® Technical Bulletin for HeadLOK® fasteners
- 7.3 FastenMaster® installation instructions for HeadLOK® fasteners
- 7.4 Cladding Attachment Over Thick Exterior Insulating Sheathing; P. Baker, P. Eng, and R. Lepage, Building Science Corporation
- 7.5 Initial and Long-Term Movement of Cladding Installed Over Exterior Rigid Insulation; Peter Baker; Building Science Corporation
- 7.6 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.
- 7.7 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.
- 7.8 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.
- 7.9 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.⁵

8 Findings

- 8.1 As delineated in Section 3, FastenMaster® HeadLOK® Heavy Duty Flathead Fasteners have performance characteristics that were tested and/or meet pertinent standards and is suitable for use pursuant to its specified purpose.
- 8.2 When used and installed in accordance with this TER and the manufacturer installation instructions, FastenMaster® HeadLOK® Heavy Duty Flathead Fasteners shall be approved for the following applications:
 - 8.2.1 Use as an alternative material, design and method of construction for the attachment of furring, sheathing or cladding over foam sheathing and into wood framing.
 - 8.2.2 Use per the listed editions of the IRC for positive and negative wind pressure resistance.
 - 8.2.3 Use per the listed editions of the IRC for lateral shear strength to support cladding materials installed over foam sheathing.
 - 8.2.4 Use per the listed editions of the IBC for positive and negative wind pressure resistance.
 - 8.2.5 Use per the listed editions of the IBC for lateral shear strength to support cladding materials installed over foam sheathing.
- 8.3 Use of HeadLOK® fasteners to connect bracing materials in braced wall panels or shear walls is outside the scope of this TER.

⁵ See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition.

- 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 104.10⁶ 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:⁷ Building codes require that the building official shall accept duly authenticated reports⁸ or research reports⁹ 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.*”

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 HeadLOK® fasteners covered by this TER shall be installed in accordance with this TER and the manufacturer installation instructions.
- 9.4 HeadLOK® fastener spacing shall not exceed Table 2 for the installation conditions considered.
- 9.5 For conditions not covered in this TER, connections shall be designed in accordance with accepted engineering practice.
- 9.6 Install fasteners prior to utility installations in exterior walls to avoid accidental penetration of utilities (e.g. electrical wiring, plumbing, etc.).
- 9.7 Foam sheathing shall be minimum Type II (expanded polystyrene) or Type X (extruded polystyrene) per ASTM C578 or Type 1 (polyiso) per ASTM C1289.
- 9.7.1 Types with greater compressive strength are acceptable.

⁶ 2018 IFC Section 104.9

⁷ 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.

⁸ <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>

⁹ <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1703.4.2>

- 9.8 Ensure furring or sheathing material provides adequate substrate and thickness for the application of the siding fastener per the code requirements for siding application and the siding manufacturer installation instructions.
- 9.8.1 For example, if the siding manufacturer requires the fastener for the siding to penetrate more than $\frac{3}{4}$ " into the furring, a 1" x 4" furring strip (actual dimension of $\frac{3}{4}$ " x 3 $\frac{1}{2}$ ") would not be adequate, and a thicker furring strip, such as a 2" x 4", would be required.
- 9.9 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:
- 9.9.1 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.
- 9.9.2 This TER and the installation instructions shall be submitted at the time of permit application.
- 9.9.3 This product has an internal quality control program and a third-party quality assurance program.
- 9.9.4 At a minimum, this product shall be installed per Section 6 of this TER.
- 9.9.5 The review of this TER, by the AHJ, shall be in compliance with IBC Section 104 and IBC Section 105.4.
- 9.9.6 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.
- 9.9.7 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.
- 9.10 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).
- 9.11 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.
- 10.1.1 The fasteners are identified by the designation, "HeadLOK®" on the packaging. The head of each fastener is marked with an "F" followed by a number corresponding to the length of the fastener.
- 10.1.2 The packaging shall include the OMG® name and address, fastener size, third-party inspection agency, and TER number.
- 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® HeadLOK® Heavy Duty Flathead Fasteners are 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® HeadLOK® Heavy Duty Flathead Fasteners 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 materials¹⁰ 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.¹¹

¹⁰ <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706.2>

¹¹ [IBC 2021, Section 1706.1 Conformance to Standards](#)

- 1.3 **Approved¹² 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.¹³ 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 1707.1.¹⁴
- 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 deemed¹⁵ 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 agreement¹⁶ (i.e., ANAB, International Accreditation Forum (IAF), etc.).

¹² See section 8.3 for the distilled building code definition of Approved.

¹³ Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES

¹⁴ <https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1>

¹⁵ New York City, The Rules of the City of New York, § 101-07 Approved Agencies

¹⁶ 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,¹⁷ 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)".¹⁸ 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".

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

¹⁸ <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 3282.14¹⁹ and Part 3280,²⁰ 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.

¹⁹ <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14>

²⁰ <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280>