



Technical Evaluation Report

TO ASSIST WITH CODE COMPLIANCE

FastenMaster LedgerLOK™ Ledger Board Fasteners for Use in Deck Ledger Applications

TER No. 1203-03

OMG, Inc.
d/b/a/ FastenMaster

153 Bowles Road
Agawam, Massachusetts, 01001
413-789-0252
fastenmaster.com
mguthrie@olyfast.com

Issue Date: March 30, 2012
Updated: April 28, 2016
Subject to Renewal: April 1, 2017

DIVISION: 06 00 00 – WOOD, PLASTICS, AND COMPOSITES
Section: 06 05 23 – Wood, Plastic, and Composite Fastenings
Section: 06 11 00 – Wood Framing
Section: 06 15 00 – Wood Decking

1. Products Evaluated:

- 1.1. LedgerLOK™ Ledger Board Fastener
- 1.2. 1/2" galvanized lag screw for comparative, equivalency and code compliance purposes¹.
- 1.3. For the most recent version of this TER, visit drjengineering.org. For more detailed state professional engineering and code compliance legal requirements and references, visit drjengineering.org/statelaw. DrJ is fully compliant with all state professional engineering and code compliance laws.

2. Applicable Codes and Standards:²

- 2.1. 2009, 2012 and 2015 International Residential Code (IRC)
- 2.2. 2009, 2012 and 2015 International Building Code (IBC)

¹ See [IRC Section R104.11](#) and [IBC Section 104.11](#).

² Unless otherwise noted, all references in this code compliant research report (TER) are from the 2012 version of the codes and the standards referenced therein, including, but not limited to, ASCE 7, SDPWS and WFCM. This product also complies with the 2000-2006 versions of the IBC and IRC and the standards referenced therein. As required by law, where this research report is not approved, the building official shall respond in writing, stating the reasons this research report was not approved. For variations in state and local codes, if any, see [Section 8](#).

DrJ is a Professional Engineering Approved Source

 Learn more about DrJ's Accreditation

- DrJ is an ISO/IEC 17065 accredited product certification body through ANSI Accreditation Services.
- DrJ provides certified evaluations that are signed and sealed by a P.E.
- DrJ's work is backed up by professional liability insurance.
- DrJ is fully compliant with IBC Section 1703.



Technical Evaluation Report (TER)

- 2.3. ASTM A510 – Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel
- 2.4. ASTM A153 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel
- 2.5. ASTM F1575 – Standard Test Method for Determining Bending Yield Moment of Nails
- 2.6. AWC/NDS-2015 – American Wood Council National Design Specification (NDS) for Wood Construction

3. Performance Evaluation:

- 3.1. LedgerLOK™ Ledger Board Fasteners were evaluated to determine their ability to provide code complying attachment of deck ledger boards to the building structure.
- 3.2. For conventionally framed buildings, the ledger is required to be attached to the band joist³ in accordance with [IRC Section R507.2](#)⁴ or [IBC Section 1604.8.3](#) as applicable. [IRC Table R507.2](#) is included for reference.

JOIST SPAN	6' and less	6' 1" to 8'	8' 1" to 10'	10' 1" to 12'	12' 1" to 14'	14' 1" to 16'	16' 1" to 18'
Connection details	On-center spacing of fasteners^{d, e}						
1/2 inch diameter lag screw with 15/32 inch maximum sheathing ^a	30	23	18	15	13	11	10
1/2 inch diameter bolt with 15/32 inch maximum sheathing	36	36	34	29	24	21	19
1/2 inch diameter bolt with 15/32 inch maximum sheathing and 1/2 inch stacked washers ^{b, h}	36	36	29	24	21	18	16

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.
 a. The tip of the lag screw shall fully extend beyond the inside face of the band joist.
 b. The maximum gap between the face of the ledger board and face of the wall sheathing shall be 1/2 inch.
 c. Ledgers shall be flashed to prevent water from contacting the house band joist.
 d. Lag screws and bolts shall be staggered in accordance with [Section R507.2.1](#).
 e. Deck ledger shall be minimum 2 x 8 pressure-preservative-treated No. 2 grade lumber, or other approved materials as established by standard engineering practice.
 f. When solid-sawn pressure-preservative-treated deck ledgers are attached to a minimum 1-inch-thick engineered wood product (structural composite lumber, laminated veneer lumber or wood structural panel band joist), the ledger attachment shall be designed in accordance with accepted engineering practice.
 g. A minimum 1 x 9 1/2 Douglas Fir laminated veneer lumber rimboard shall be permitted in lieu of the 2-inch nominal band joist.
 h. Wood structural panel sheathing, gypsum board sheathing or foam sheathing not exceeding 1 inch in thickness shall be permitted. The maximum distance between the face of the ledger board and the face of the band joist shall be 1 inch.

TABLE R507.2:

FASTENER SPACING FOR A SOUTHERN PINE OR HEM-FIR DECK LEDGER AND A 2-INCH-NOMINAL SOLID-SAWN SPRUCE-PINE-FIR BAND JOIST^{c, f, g} (Deck live load = 40 psf, deck dead load = 10 psf)

3.2.1. Where a band joist is not used, as in some truss installations, an engineered design is required. See [Appendix A](#) for additional code requirements for ledger attachments.

3.3. Ultimate connection capacities and deflections of typical ledger board connections were match tested and evaluated pursuant to the provisions of the IRC and IBC. See [Appendix B](#) for a description of testing methods.

3.4. Any code compliance issues not specifically addressed in this section are outside the scope of this evaluation.

4. Product Description and Materials:

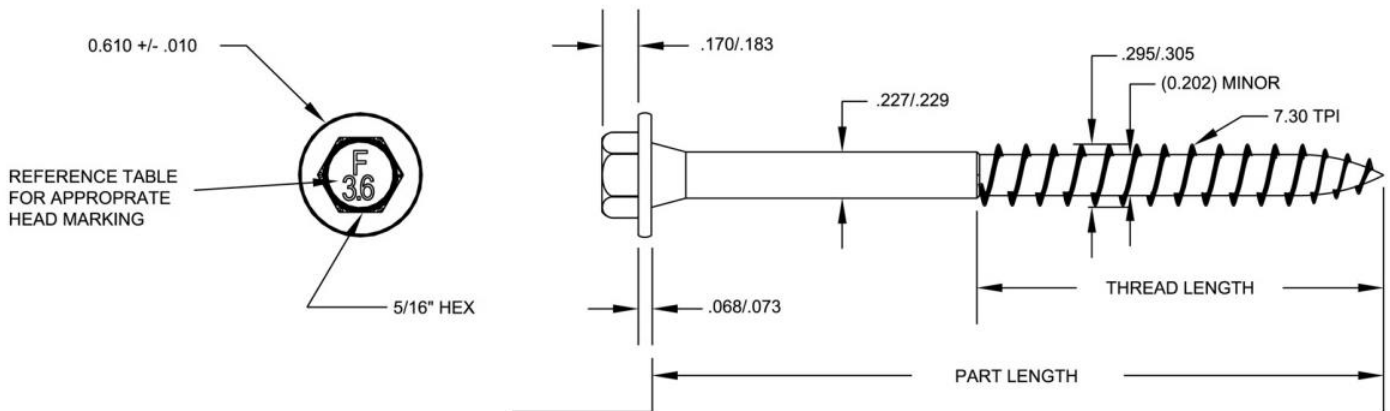


Figure 1: LedgerLOK™ Ledger Board Fasteners (in.)

³ The term "band joist" is used throughout this report. Other regionally used terms that are synonymous with band joist include: rim board, band board, header board and header joist.

⁴ [2009 IRC Section R502.2.2](#).

Technical Evaluation Report (TER)

- 4.1. LedgerLOK™ fasteners are manufactured with carbon steel grade 1022 or 10B21 wire conforming to *ASTM A510* with a minimum ultimate tensile strength of 60 ksi.
- 4.2. LedgerLOK™ fasteners are manufactured using a standard cold-formed process followed by a heat-treating process. Allowable bending yield and critical dimensions are found in [Figure 1](#) and [Table 1](#).
 - 4.2.1. LedgerLOK™ fastener heads are a $5/16$ " hex drive with a built-in oversized washer.
 - 4.2.2. LedgerLOK™ fasteners have a gimlet point.
 - 4.2.3. The following LedgerLOK™ fasteners were evaluated for this Technical Evaluation Report (TER).

Fastener Name	Fastener Designation	Head Marking	Length ¹ (in.)	Thread Length ² (in.)	Unthreaded Shank Diameter (in.)	Minor Thread (Root) Diameter (in.)	Nominal Bending Yield (psi) ³
LedgerLOK™	FMLL358	F3.6	3 $\frac{5}{8}$ "	2"	0.228"	0.202"	200,700
LedgerLOK™	FMLL005	F5.0	5"	3"			

- 1. Measured from the underside of the head to the bottom of the tip.
- 2. Includes tip; see [Figure 1](#).
- 3. Determined in accordance with methods specified in *ASTM F1575*, based on minor thread diameter using a 5% offset of the load displacement curves developed from bending tests.

Table 1: Fastener Designation

- 4.3. The fasteners have a proprietary galvanized and epoxy coating, which provides corrosion protection that exceeds that provided by code approved hot-dipped galvanized coatings meeting *ASTM A153* ([IBC Section 2304.9.5](#)⁵ and [IRC Section 317.3](#)).
 - 4.3.1. Fasteners are approved for use in exterior conditions and in pressure-treated wood, including ground contact ACQ. The proprietary coating has been tested and found to exceed the corrosion protection provided by code approved hot-dipped galvanized coatings meeting *ASTM A153* ([IBC Section 2304.9.5](#)⁵ and [IRC Section 317.3](#)).
- 4.4. 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.
- 4.5. In-plant quality control procedures, under which the LedgerLOK™ fasteners are manufactured, are audited through an inspection process performed by an approved agency.

5. Applications:

- 5.1. LedgerLOK™ Ledger Board Fasteners are designed specifically for attaching the deck ledger to the rim joist of a building in accordance with [IRC Section R507.2](#) and [IBC Section 1604.8.3](#).
- 5.2. The *IRC* provides prescriptive fastener spacing for the attachment of a deck ledger to a rim joist with $1/2$ "-diameter lag screws or through bolts as shown in [IRC Table R507.2](#).
- 5.3. [Table 2](#) provides the LedgerLOK™ fastener spacing required to provide performance at least equivalent to the lag screws found in [IRC Table R507.2](#) in accordance with [IRC Section R104.11](#) and [Section R507.2](#), [IBC Section 104.11](#) and [Section 1604.8.3](#), and in accordance with generally accepted engineering practice.
 - 5.3.1. [Table 2](#) provides LedgerLOK™ fastener spacing for items found in [IRC Table R507.2](#), as well as a wider range of materials commonly used for rim joists.
 - 5.3.1.1. In addition, an alternate loading condition (i.e., deck live load = 60 psf, deck dead load = 10 psf) required by some jurisdictions is shown.
- 5.4. Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and good technical judgment.

⁵ [2015 IBC Section 2304.10.5](#)

Technical Evaluation Report (TER)

Loading Condition (Live Load, psf)	2x Nominal Ledger Species	Rim Joist Material	Maximum Deck Joist Spans (ft.)						
			Up to 6'	Up to 8'	Up to 10'	Up to 12'	Up to 14'	Up to 16'	Up to 18'
			Maximum On-Center Spacing of LedgerLOK™ Ledger Board Fasteners (in.)						
40	HF/SPF	2x Nominal Sawn Lumber	20	15	12	10	8	7	6
		1" min EWP	25	19	15	12	10	9	8
	DF/SP	Nominal Sawn Lumber	24	18	14	12	10	9	8
		1" min EWP	25	19	15	12	10	9	8
60	HF/SPF	2x Nominal Sawn Lumber	14	11	8	7	6	5	4
		1" min EWP	18	13	10	9	7	6	6
	DF/SP	Nominal Sawn Lumber	17	13	10	8	7	6	5
		1" min EWP	18	13	10	9	7	6	6

1. Based on load duration of 1.0. Spacing may be adjusted by the applicable load duration as specified in *NDS 2012*.
2. Fasteners are required to have full thread penetration into the main member. Excess fastener length extending beyond the main member is not reflected in the table above.
3. Solid sawn band joists shall be HF, SPF, DF-L or SP species, designed by others.
4. Fastener spacing is based on tested loads. The design values use the lesser of a $\frac{1}{8}$ " deflection or a factor of safety equivalent to or greater than that of the code compliant lag screw application as defined in [Figure 2](#).
5. A maximum $\frac{1}{2}$ " structural sheathing may be installed between the ledger and the band joist.
6. Table values assume 10 psf dead load.

Table 2: LedgerLOK™ Fastener Spacing for Items in *IRC Table 507.2* & Other Materials & Loading Conditions

5.5. When installed in accordance with the spacing requirements of [Table 2](#), LedgerLOK™ Ledger Board Fasteners provide equivalent performance to [IRC Table R507.2](#).

6. Installation:

- 6.1.** Choose a $3\frac{3}{8}$ " or 5" LedgerLOK™ Ledger Board Fastener so that the threads fully engage the rim material and the fastener tip extends beyond the back face of the rim material when fully seated against the installed ledger.
- 6.2.** Using a high-torque, $\frac{1}{2}$ " variable-speed drill (18V if cordless), drive the fasteners through the ledger and sheathing. Continue into the rim joist until the built-in washer head is drawn firm and flush to the ledger board. Do not overdrive.
- 6.3.** [Figure 2](#) shows a detail of the LedgerLOK™ Ledger Board Fastener deck connection, including minimum edge and end distances.

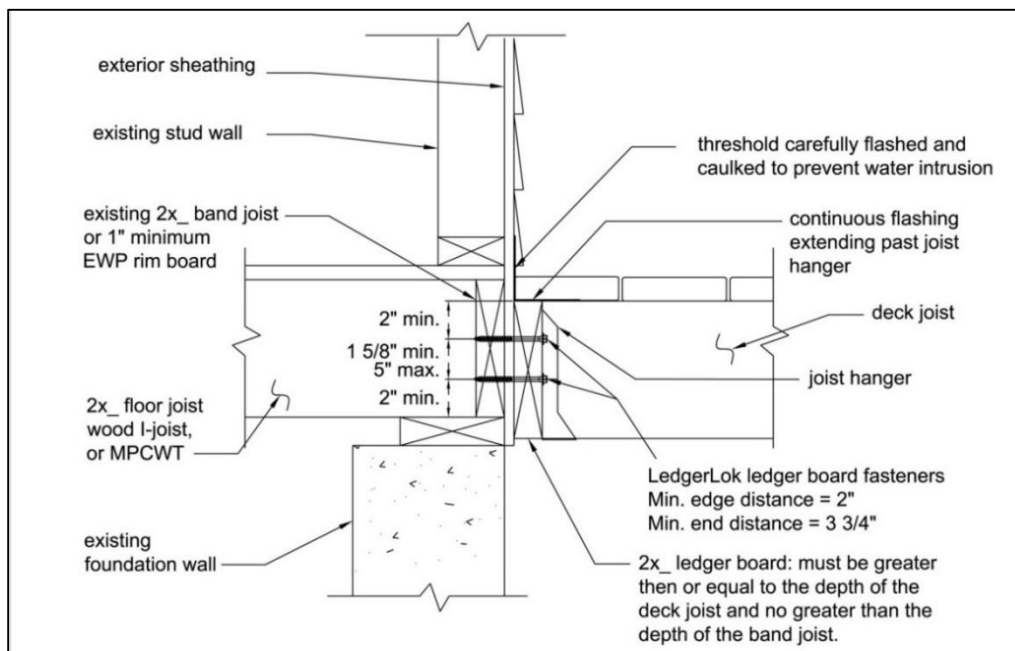


Figure 2: LedgerLOK™ Ledger Board Fastener Deck Connection

6.4. For applications outside the scope of this TER, an engineered design is required.

Technical Evaluation Report (TER)

7. Test and Engineering Substantiating Data:

- 7.1. Testing conducted by the SBC Research Institute (SBCRI) under contract with Qualtim, Inc. for OMG; *SBCRI-12-0101*; Final report date: March 23, 2012.
- 7.2. *DCA 6, Prescriptive Residential Wood Deck Construction Guide*; AF&PA; 2010.
- 7.3. Proprietary testing conducted by Washington State University for OMG; Final report date: August 4, 2005.
- 7.4. FastenMaster Technical Bulletin; *LedgerLOK™ Ledger Board Fastener*, 2011.
- 7.5. The product(s) evaluated by this TER falls within the scope of one or more of the model, state or local building codes for building construction. The testing and/or substantiating data used in this TER is limited to buildings, structures, building elements, construction materials and civil engineering related specifically to buildings.
- 7.6. The provisions of model, state or local building codes for building construction do not intend to prevent the installation of any material or to prohibit any design or method of construction. Alternatives shall use consensus standards, performance-based design methods or other engineered alternative means of compliance. This TER assesses compliance with defined standards, generally accepted engineering analysis, performance-based design methods, etc. in the context of the pertinent building code requirements.
- 7.7. Some information contained herein is the result of testing and/or data analysis by other sources, which DrJ relies on to be accurate as it undertakes its engineering analysis.
- 7.8. DrJ has reviewed and found the data provided by other professional sources are credible. This information has been approved in accordance with DrJ's procedure for acceptance of data from approved sources.
- 7.9. DrJ's responsibility for data provided by approved sources is in accordance with professional engineering law.
- 7.10. Where appropriate, DrJ relies on the derivation of design values, which have been codified into law through codes and standards (e.g., *IRC, WFCM, IBC, SDPWS*, etc.). This includes review of code provisions and any related test data that helps with comparative analysis or provides support for equivalency to an intended end-use application.

8. Findings:

- 8.1. When used in accordance with this TER and the [manufacturer's installation instructions](#), FastenMaster LedgerLOK™ Ledger Board Fasteners are a suitable alternative to the requirements of the [IRC Section R507.2](#) and [IBC Section 1604.8.3](#).
- 8.2. [IBC Section 104.11](#) and [IRC Section R104.11](#) ([IFC Section 104.9](#) is similar) state:

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, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in 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*.⁶
- 8.3. This product has been evaluated with the codes listed in [Section 2](#), and is compliant with all known state and local building codes. Where there are known variations in state or local codes that are applicable to this evaluation, they are listed here:
 - 8.3.1. No known variations
- 8.4. This TER uses professional engineering law, the building code, ANSI/ASTM consensus standards and generally accepted engineering practice as its criteria for all testing and engineering analysis. DrJ's professional engineering work falls under the jurisdiction of each state Board of Professional Engineers, when signed and sealed.

⁶ The last sentence is adopted language in the 2015 codes.

Technical Evaluation Report (TER)

9. Conditions of Use:

- 9.1. Where required by the authority having jurisdiction (AHJ) in which the project is to be constructed, this report and the installation instructions shall be submitted at the time of permit application.
- 9.2. Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the code official for review and approval.
- 9.3. Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed.
- 9.4. LedgerLOK™ fasteners covered by this TER shall be installed in accordance with this report and the [manufacturer's installation instructions](#).
- 9.5. LedgerLOK™ fastener spacing shall not exceed [Table 2](#) for code compliance and the installation conditions considered.
- 9.6. For conditions not covered in this TER, connections shall be designed in accordance with generally accepted engineering practice.
- 9.7. Manufacturer's installation instructions shall be followed as provided in [Section 6](#) and at fastenmaster.com/details/product/LedgerLOK™-ledger-board-fastener.html.
- 9.8. LedgerLOK™ fasteners are produced by OMG, Inc.'s facility located in Agawam, Massachusetts.
- 9.9. LedgerLOK™ fasteners are produced under a quality control program subject to periodic inspections in accordance with [IBC Section 1703.5.2](#).
- 9.10. Design
 - 9.10.1. Building Designer Responsibility
 - 9.10.1.1. Unless the AHJ allows otherwise, the Construction Documents shall be prepared by a Building Designer (e.g., Owner, Registered Design Professional, etc.) for the Building and shall be in accordance with [IRC Section R106](#) and [IBC Section 107](#).
 - 9.10.1.2. The Construction Documents shall be accurate and reliable and shall provide the location, direction and magnitude of all applied loads and shall be in accordance with [IRC Section R301](#) and [IBC Section 1603](#).
 - 9.10.2. Construction Documents
 - 9.10.2.1. Construction Documents shall be submitted to the Building Official for approval and shall contain the plans, specifications and details needed for the Building Official to approve such documents.
- 9.11. Responsibilities
 - 9.11.1. The information contained herein is a product, engineering or building code compliance research report performed in accordance with the referenced building codes, testing and/or analysis through the use of accepted engineering procedures, experience and good technical judgment.
 - 9.11.2. DrJ research reports provide an assessment of only those attributes specifically addressed in the Products Evaluated or Code Compliance Process Evaluated section.
 - 9.11.3. The engineering evaluation was performed on the dates provided in this TER, within DrJ's professional scope of work.
 - 9.11.4. This product is manufactured under a third-party quality control program in accordance with [IRC Section R104.4](#) and [R109.2](#) and [IBC Section 104.4](#) and [110.4](#).
 - 9.11.5. The actual design, suitability and use of this research report for any particular building is the responsibility of the Owner or the Owner's authorized agent, and the report shall be reviewed for code compliance by the Building Official.
 - 9.11.6. The use of this TER is dependent on the manufacturer's in-plant QC, the ISO/IEC 17020 third-party inspection process, proper installation per the manufacturer's instructions, the Building Official's inspection and any other code requirements that may apply to assure accurate compliance with the applicable building code.

Technical Evaluation Report (TER)

10. Identification:

- 10.1. The LedgerLOK™ fasteners described in this TER are identified by a label on the board or packaging material bearing the manufacturer's 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 of this TER, visit drjengineering.org.
- 11.2. For information on the current status of this report, contact DrJ Engineering.



- [Mission and Professional Responsibilities](#)
- [Product Evaluation Policies](#)
- [Product Approval – Building Code, Administrative Law and P.E. Law](#)

Technical Evaluation Report (TER)

Appendix A: Code Requirements for Ledger Attachments

For guidance on designing the connection of the deck ledger to trusses where a band joist is not used, see SBCA's Tech Note, [Attachment of Residential Deck Ledger to Metal Plate Connected Wood Truss Floor System](#).

1. [IRC Section R507.2](#) contains the following code requirements ([IBC Section 1604.8.3](#) is similar):
 - 1.1. Where supported by attachment to an exterior wall, decks shall be positively anchored to the primary structure and designed for both vertical and lateral loads.
 - 1.1.1. Attachment shall not be accomplished by the use of toenails or nails subject to withdrawal.
 - 1.2. [IRC Section R507.2](#) outlines the requirements for a deck ledger connection to band joist:

For decks supporting a total design load of 50 pounds per square foot (2394 Pa) [40 pounds per square foot (1915 Pa) live load plus 10 pounds per square foot (479 Pa) dead load], the connection between a deck ledger of pressure-preservative-treated Southern Pine, incised pressure-preservative-treated Hem-Fir or *approved* decay-resistant species, and a 2-inch (51 mm) nominal lumber band joist bearing on a sill plate or wall plate shall be constructed with 1/2-inch (12.7 mm) lag screws or bolts with washers in accordance with Table R507.2. Lag screws, bolts and washers shall be hot-dipped galvanized or stainless steel.

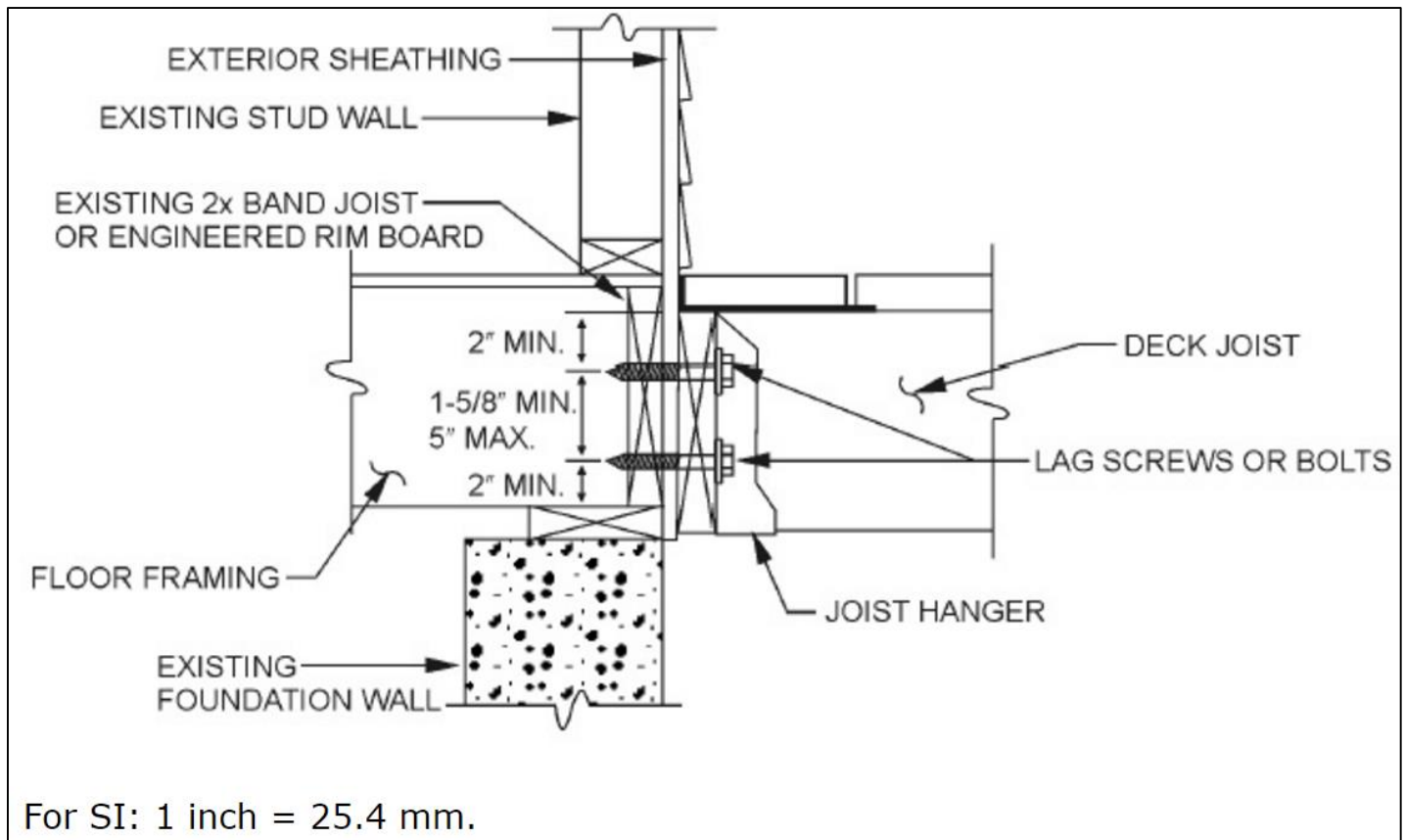


FIGURE R507.2.1(2):
PLACEMENT OF LAG SCREWS AND BOLTS IN BAND JOISTS

- 1.3. [IRC Section R507.2.1](#) covers the placement of lag screws or bolts in deck ledgers:

The lag screws or bolts in deck ledgers and band joists shall be placed in accordance with Table R507.2.1 and Figures R507.2.1(1) and R507.2.1(2).
- 1.3.1. The 2012 IRC provides further clarification of lag screw and bolt location requirements as shown in [IRC Figure R507.2.1\(1\)](#).

Technical Evaluation Report (TER)

MINIMUM END AND EDGE DISTANCES AND SPACING BETWEEN ROWS				
	TOP EDGE	BOTTOM EDGE	ENDS	ROW SPACING
Ledger ^a	2 inches ^d	1/4 inch	2 inches ^b	1 ⁵ / ₈ inches ^b
Band Joist ^c	3/4 inch	2 inches	2 inches ^b	1 ⁵ / ₈ inches ^b

For SI: 1 inch = 25.4 mm.

- a. Lag screws or bolts shall be staggered from the top to the bottom along the horizontal run of the deck ledger in accordance with Figure R507.2.1(1).
- b. Maximum 5 inches.
- c. For engineered rim joists, the manufacturer's recommendations shall govern.
- d. The minimum distance from bottom row of lag screws or bolts to the top edge of the ledger shall be in accordance with Figure R507.2.1(1).

TABLE 507.2.1:
PLACEMENT OF LAG SCREWS AND BOLTS IN DECK LEDGERS AND BAND JOISTS

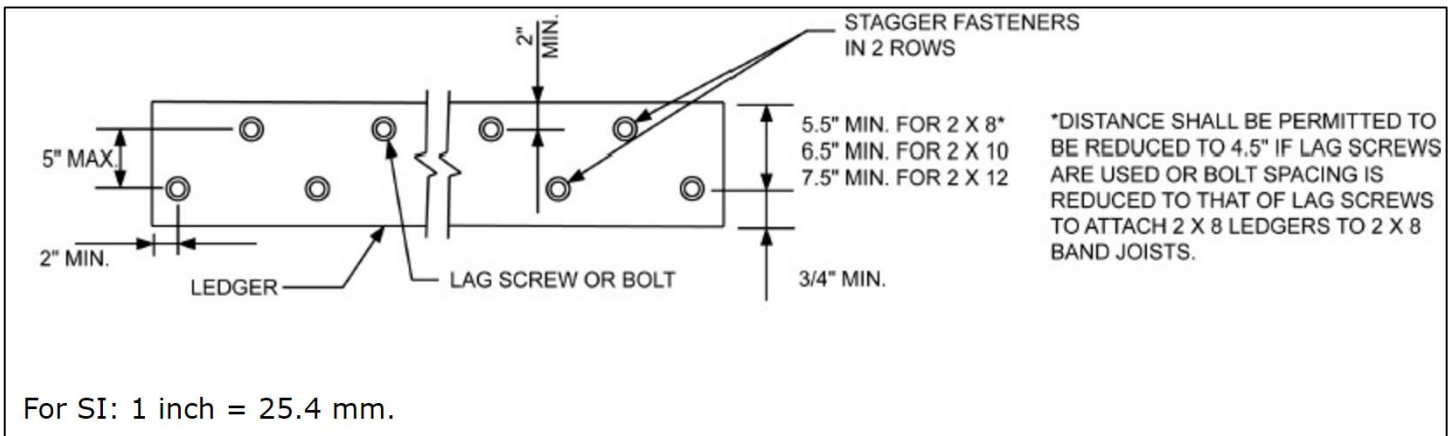


FIGURE R507.2.1(1):
PLACEMENT OF LAG SCREWS AND BOLTS IN LEDGERS

- 1.3.2.** [IRC Table R507.2.1](#) applies to 2" nominal solid-sawn lumber or minimum 1x9 1/2" DF LVL band joist material, and 40 psf live load / 10 psf dead load applications as shown in [IRC Table R507.2.1](#).

JOIST SPAN Connection details	On-center spacing of fasteners ^{d, e}						
	6' and less	6' 1" to 8'	8' 1" to 10'	10' 1" to 12'	12' 1" to 14'	14' 1" to 16'	16' 1" to 18'
1/2 inch diameter lag screw with 15/32 inch maximum sheathing ^a	30	23	18	15	13	11	10
1/2 inch diameter bolt with 15/32 inch maximum sheathing	36	36	34	29	24	21	19
1/2 inch diameter bolt with 15/32 inch maximum sheathing and 1/2 inch stacked washers ^{b, h}	36	36	29	24	21	18	16

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tip of the lag screw shall fully extend beyond the inside face of the band joist.

b. The maximum gap between the face of the ledger board and face of the wall sheathing shall be 1/2 inch.

c. Ledgers shall be flashed to prevent water from contacting the house band joist.

d. Lag screws and bolts shall be staggered in accordance with [Section R507.2.1](#).

e. Deck ledger shall be minimum 2 x 8 pressure-preservative-treated No. 2 grade lumber, or other approved materials as established by standard engineering practice.

f. When solid-sawn pressure-preservative-treated deck ledgers are attached to a minimum 1-inch-thick engineered wood product (structural composite lumber, laminated veneer lumber or wood structural panel band joist), the ledger attachment shall be designed in accordance with accepted engineering practice.

g. A minimum 1 x 9/2 Douglas Fir laminated veneer lumber rimboard shall be permitted in lieu of the 2-inch nominal band joist.

h. Wood structural panel sheathing, gypsum board sheathing or foam sheathing not exceeding 1 inch in thickness shall be permitted. The maximum distance between the face of the ledger board and the face of the band joist shall be 1 inch.

TABLE R507.2

FASTENER SPACING FOR A SOUTHERN PINE OR HEM-FIR DECK LEDGER AND A 2-INCH-NOMINAL SOLID-SAWN SPRUCE-PINE-FIR BAND JOIST^{c, f, g} (Deck live load = 40 psf, deck dead load = 10 psf)

- 1.3.3.** The 2012 IRC further specifies the required edge and end distances for lag screws and bolts connecting the ledger to the band joist.

- 1.4.** [IRC Section R507.2.2](#) outlines alternate deck ledger connections:

Deck ledger connections not conforming to Table R507.2 shall be designed in accordance with accepted engineering practice. Girders supporting deck joists shall not be supported on deck ledgers or band joists. Deck ledgers shall not be supported on stone or masonry veneer.

Technical Evaluation Report (TER)

Appendix B: Testing Procedure and Methodology

1. To determine the strength and load-deflection performance of the fasteners in a ledger connection, a two-joint assembly with connection of a ledger to a rim board was created. Load was applied to the joists, which transferred load to the ledger via hangers. String potentiometers were placed along the bottom of the ledger to measure vertical deflection during the test, while a load cell attached to an actuator measured load applied. The rim board was fixed to prevent deflection and rotation during the test. To limit the variability, the comparison product was tested simultaneously with the FastenMaster LedgerLOK™ with ledgers and rim boards cut congruently from the same piece of lumber. Immediately after testing, a section was cut near each fastener location to determine the moisture content and oven-dry specific gravity of each piece of lumber.
2. The performance of the code defined lag screw connection was then compared to the performance of the LedgerLOK™ Ledger Board Fasteners in the ledger application built per the code requirements.
 - 2.1. Testing was undertaken to directly compare fastener performance using matched lumber specimen testing where the FastenMaster LedgerLOK™ Ledger Board Fastener was tested side by side with ½" diameter lag screws (see [Figure 3](#) and [Photo 1](#)).

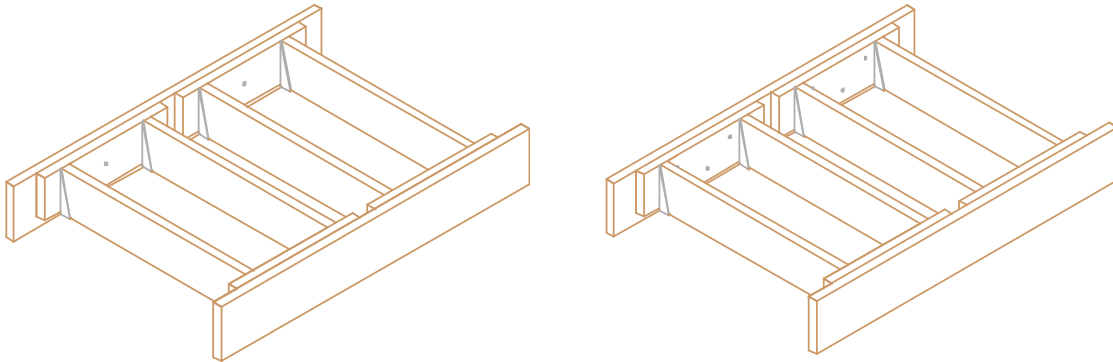


Figure 3: Single & Three-Fastener Setups

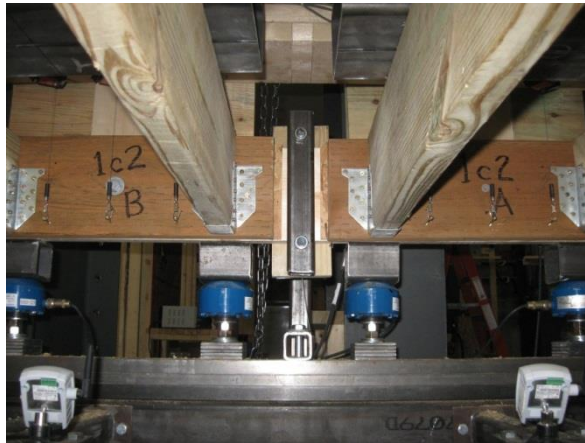


Photo 1: Matched Lumber Specimen Testing of LedgerLOK™ Ledger Board Fastener & ½" Lag Screw

- 2.1.2. The testing and resulting analysis define comparative performance and the design parameters required for the LedgerLOK™ to be considered an equivalent alternative to the specified fasteners required by the building code in accordance with the provisions of [IRC Section R104.11](#) and [IBC Section 104.11](#).