

ICC-ES Evaluation Report

ESR-1078*

Reissued January 1, 2012

This report is subject to renewal January 1, 2014.

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 05 23—Wood, Plastic, and Composite Fastenings

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EVALUATION SUBJECT:**FASTENMASTER® LOK SERIES STRUCTURAL WOOD SCREWS****1.0 EVALUATION SCOPE****Compliance with the following codes:**

- 2012, 2009 and 2006 *International Building Code*® (IBC)
- 2012, 2009 and 2006 *International Residential Code*® (IRC)

Properties evaluated:

- Structural
- Corrosion resistance

2.0 USES

The FastenMaster LOK Series fasteners described in this report are alternate dowel-type threaded fasteners used for wood-to-wood connections.

The FastenMaster LOK Series fasteners having a proprietary corrosion-resistant coating with a lubricious clear top coat may be used where fasteners are required to exhibit corrosion resistance when exposed to adverse environmental conditions and/or in preservative-treated wood (subject to the limitations of Section 5.2), and are alternates to hot-dip-zinc galvanized fasteners with a coating weight in compliance with ASTM A153, Class D.

The fasteners have been evaluated for use with wood chemically treated with waterborne alkaline copper quaternary, type D (ACQ-D).

3.0 DESCRIPTION**3.1 General:**

The LOK Series fasteners described in this report are manufactured using a standard cold-forming process and are heat-treated. These fasteners depart from ANSI B18.2.1 and B18.6.1 in thread design, exceed the bending yield strengths documented in Table 5 of American Forest & Paper Association (AF&PA) Technical Report 12, and are not installed with lead holes in accordance with the National Design Specification for Wood Construction (NDS). The LOK Series fasteners recognized in this report are described in Sections 3.1.1 through 3.1.5.

3.1.1 OlyLog and TimberLOK Fasteners: The OlyLog and TimberLOK fasteners have a $\frac{5}{16}$ -inch (7.9 mm) hex-head, rolled threads and a gimlet point. They have a proprietary corrosion-resistant coating with a lubricious clear top coat. See Table 1A for fastener dimensions and a diagram.

3.1.2 HeadLOK Fasteners: The HeadLOK fasteners have a proprietary #3 Spider-drive head, rolled threads and a gimlet point. They have a proprietary corrosion-resistant coating with a lubricious clear top coat. See Table 1B for fastener dimensions and a diagram.

3.1.3 LedgerLOK and LogHog Fasteners: The LedgerLOK and LogHog fasteners have a $\frac{5}{16}$ -inch (7.9 mm) hex-head with integral washer, rolled threads and a gimlet point. They have a proprietary corrosion-resistant coating with a lubricious clear top coat. See Table 1C for fastener dimensions and a diagram.

3.1.4 TrussLOK and TrussLOK-Z Fasteners: The TrussLOK and TrussLOK-Z fasteners have a $\frac{3}{8}$ -inch (9.5 mm) hex-head, rolled threads and proprietary cutting points. They have a proprietary corrosion-resistant coating with a lubricious clear top coat. See Tables 1D and 1E for fastener dimensions and a diagram.

3.1.5 ThruLOK Fasteners: The ThruLOK fasteners have a $\frac{5}{16}$ -inch (7.9 mm) hex-head, rolled threads and a proprietary cutting point. The fasteners are coated with mechanically applied zinc in accordance with ASTM B695, Type I, Class 55. They are supplied with the ThruLOK washer and nut. See Table 1F for fastener dimensions and a diagram.

3.2 Materials:

The fasteners are made of carbon steel grade 1022 or 10B21 wire, conforming to the report holder's material

***Revised August 2012**

specifications, with a minimum ultimate tensile strength of 60 ksi (414 MPa), and have a proprietary finish. Minimum bending yield strengths of the fasteners are listed in Tables 1A through 1F of this report.

4.0 DESIGN AND INSTALLATION

4.1 Design:

Reference withdrawal design values are given in Table 2 of this report. Reference head pull-through design values are given in Table 3 of this report. Reference lateral design values for wood-to-wood connections loaded parallel and perpendicular to the grain, are given in Table 4.

The reference design values given in Tables 2 through 4 must be multiplied by all adjustment factors applicable to wood screws, in accordance with Section 10.3 of the NDS, including the wet service factor, C_M , where applicable. Reference head pull-through design values must be adjusted using the NDS adjustment factors applicable to withdrawal for wood screws.

Wood main and side members must be solid-sawn lumber or boards, or engineered wood products. Solid-sawn members must have an assigned specific gravity, as specified in Table 11.3.3A of the NDS, within the ranges given in Tables 2 through 4 of this report. Engineered wood members must have equivalent specific gravities, as specified in the applicable evaluation report, within the ranges given in Tables 2 through 4 of this report.

The allowable load for a single-screw connection in which the screw is subject to tension must be taken as the least of: (a) the reference withdrawal design value given in Table 2, adjusted by all applicable adjustment factors; (b) the reference head pull-through design value given in Table 3, adjusted by all applicable adjustment factors; and (c) the allowable screw tension strength given in Tables 1A through 1F.

The allowable lateral load for a single-screw connection must be taken as the lesser of: (a) the reference lateral design value given in Table 4, adjusted by all applicable adjustment factors, and (b) the allowable screw shear strength given in Tables 1A through 1F.

When designing a connection, the structural members must be checked for load-carrying capacity in accordance with Section 10.1.2 of the NDS, and local stresses within multiple-fastener connections must be checked against Appendix E of the NDS to ensure the capacity of the connection and fastener group. Connections containing multiple screws must also be designed in accordance with Sections 10.2.2 and 11.6 of the NDS.

Where the screws are subjected to combined lateral and withdrawal loads, connections shall be designed in accordance with Section 11.4.1 of the NDS.

The FastenMaster LOK Series fasteners having a proprietary corrosion-resistant coating with a lubricious clear top coat are recognized for use in wood chemically treated with waterborne alkaline copper quaternary, type D (ACQ-D), with a maximum retention of 0.40 pcf (6.4 kg/m³). These fasteners must be limited to use in typical applications and limitations defined in Table 6.

4.2 Installation:

The fasteners must be installed with a $\frac{1}{2}$ -inch (12.7 mm), low RPM/high torque electric drill (450 rpm) using the driver bit included in each box. Lead holes are not required at the minimum end and edge distances listed in Table 5 of this report. When use is in engineered wood products, the minimum fastener end and edge distances and spacing must be in accordance with Table 5 of this report or in accordance with the recommendations of the engineered wood manufacturer, whichever is more restrictive.

The ThruLOK fastener must be installed with the ThruLOK washer and nut (supplied with the fastener). The ThruLOK fastener must penetrate through the opposite face of the main member a sufficient distance to allow the nut to be tightened snugly against the main member, with at least $\frac{1}{2}$ inch (12.7 mm) of the threaded portion of the shank engaging the internal threads of the nut.

5.0 CONDITIONS OF USE

The fasteners described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 Design and installation of connections with FastenMaster LOK Series fasteners must comply with this report, the manufacturer's published instructions and the applicable code. In the event of a conflict between the manufacturer's published installation instructions and this report, the more restrictive governs.
- 5.2 Use of the fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this evaluation report.
- 5.3 The fasteners are manufactured under a quality control program with inspections by FM Approvals (AA-653).

6.0 EVIDENCE SUBMITTED

- 6.1 Data in accordance with the ICC-ES Acceptance Criteria for Alternate Dowel-type Threaded Fasteners (AC233), dated June 2012.
- 6.2 Data in accordance with the ICC-ES Acceptance Criteria for Corrosion-resistant Fasteners and Evaluation of Corrosion Effects of Wood Treatment Chemicals (AC257), dated October 2009 (editorially revised May 2012).

7.0 IDENTIFICATION

The fasteners are identified by the designation "TimberLOK[®]," "HeadLOK[®]," "LedgerLOK[®]," "TrussLOK[®]" (also known as "TrussLOK-EWP"), "TrussLOK-Z[®]" (also known as "TrussLOK-Girder") "ThruLOK[®]," "OlyLog[®]," or "LogHog[®]," on the packaging. In addition, each container of fasteners has a label noting OMG's name and address, fastener size, the inspection agency name (FM Approvals) and the evaluation report number (ICC-ES ESR-1078). Head markings on the fasteners indicate fastener length and are applied as noted in Tables 1A through 1F.

TABLE 1A—FASTENER SPECIFICATIONS: OLYLOG AND TIMBERLOK FASTENERS

| OLYLOG®/TIMBERLOK® FASTENER DESIGNATION | HEAD MARKING | OVERALL LENGTH ¹ (inches) | LENGTH OF THREAD ^{2,4} (inches) | UNTHREADED SHANK DIAMETER (inch) | MINOR THREAD (ROOT) DIAMETER (inch) | BENDING YIELD ^{3,5} (F _{yb} , psi) | ALLOWABLE FASTENER STRENGTH | |
|---|--------------|--------------------------------------|--|----------------------------------|-------------------------------------|--|-----------------------------|--------------------------|
| | | | | | | | Tensile (lbf) | Shear ⁶ (lbf) |
| TLOK212 or LOG212 | F2.5 | 2 1/2 | 1 1/4 | 0.189 | 0.172 | 167,300 | 1,300 | 940 |
| TLOK04 or LOG004 | F4.0 | 4 | 2 | | | | | |
| TLOK06 or LOG006 | F6.0 | 6 | 2 | | | | | |
| TLOK08 or LOG008 | F8.0 | 8 | 2 | | | | | |
| LOG009 | F9.0 | 9 | 2 | | | 190,600 | 1,145 | 800 |
| TLOK10 or LOG010 | F10.0 | 10 | 2 | | | | | |
| LOG012 | F12.0 | 12 | 2 | | | | | |
| LOG014 | F14.0 | 14 | 2 | | | | | |
| LOG016 | F16.0 | 16 | 2 | | | | | |

For SI: 1 inch = 25.4 mm, 1 lbf = 4.4 N, 1 psi = 6.895 kPa.

¹For purposes of measuring overall fastener length, fasteners must be measured from the underside of head to bottom of tip.

²Length of thread includes tip. See detailed illustration.

³Bending yield strength determined per methods specified in ASTM F1575 and based on the minor thread diameter.

⁴Fastener installation and design values require complete threaded portion to be embedded in the main member.

⁵Fastener bending yield strength is determined by the 5 percent diameter (0.05D) offset method of analyzing load-displacement curves developed from bending tests.

⁶Allowable shear strength values apply only to shearing in the unthreaded shank portion of the fastener.

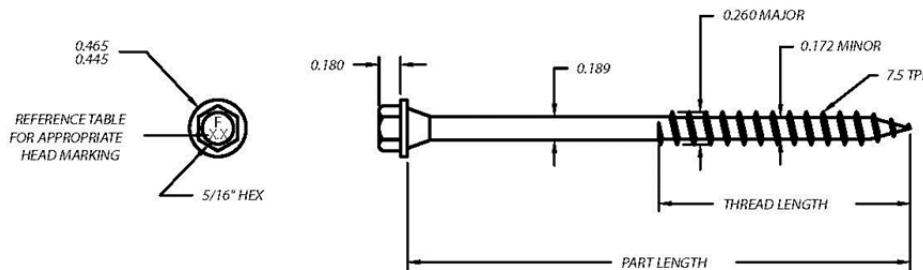


TABLE 1B—FASTENER SPECIFICATIONS: HEADLOK FASTENERS

| HEADLOK® FASTENER DESIGNATION | HEAD MARKING | OVERALL LENGTH ¹ (inches) | LENGTH OF THREAD ^{2,4} (inches) | UNTHREADED SHANK DIAMETER (inch) | MINOR THREAD (ROOT) DIAMETER (inch) | BENDING YIELD ^{3,5} (F _{yb} , psi) | ALLOWABLE FASTENER STRENGTH | |
|-------------------------------|--------------|--------------------------------------|--|----------------------------------|-------------------------------------|--|-----------------------------|--------------------------|
| | | | | | | | Tensile (lbf) | Shear ⁶ (lbf) |
| HLM278 | F2.8HL | 2 7/8 | 2 | 0.191 | 0.172 | 187,300 | 1,215 | 965 |
| HLM412 | F4.5HL | 4 1/2 | 2 | | | | | |
| HLM6 | F6.0HL | 6 | 2 | | | | | |
| HLM8 | F8.0HL | 8 | 2 | | | | | |
| HLM10 | F10HL | 10 | 2 | | | | | |

For SI: 1 inch = 25.4 mm, 1 lbf = 4.4 N, 1 psi = 6.895 kPa.

¹For purposes of measuring overall fastener length, fasteners must be measured from the underside of head to bottom of tip.

²Length of thread includes tip. See detailed illustration.

³Bending yield strength determined per methods specified in ASTM F1575 and based on the minor thread diameter.

⁴Fastener installation and design values require complete threaded portion to be embedded in the main member.

⁵Fastener bending yield strength is determined by the 5 percent diameter (0.05D) offset method of analyzing load-displacement curves developed from bending tests.

⁶Allowable shear strength values apply only to shearing in the unthreaded shank portion of the fastener.

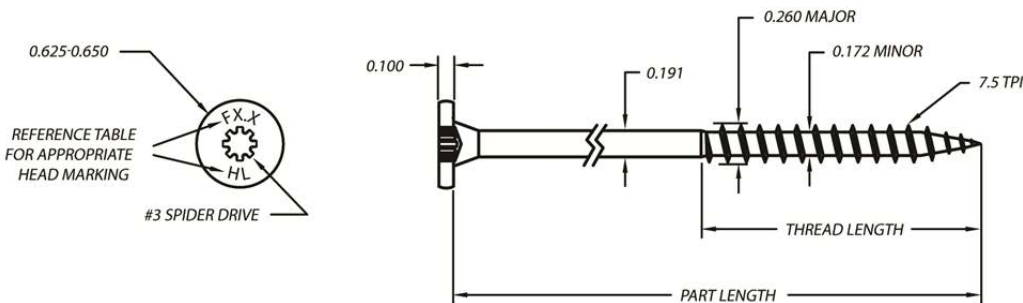


TABLE 1C—FASTENER SPECIFICATIONS: LEDGERLOK AND LOGHOG FASTENERS

| LEDGERLOK®/ LOGHOG® FASTENER DESIGNATION | HEAD MARKING | OVERALL LENGTH ¹ (inches) | LENGTH OF THREAD ^{2,4} (inches) | UNTHREADED SHANK DIAMETER (inch) | MINOR THREAD (ROOT) DIAMETER (inch) | BENDING YIELD ^{3,5} (F _{yb} , psi) | ALLOWABLE FASTENER STRENGTH | |
|---|-----------------|--|--|---|--|--|--------------------------------|-----------------------------|
| | | | | | | | Tensile (lbf) | Shear ⁶ (lbf) |
| LL358 | F3.6 | 3 ⁵ / ₈ | 2 | 0.228 | 0.202 | 200,700 | 1,833 | 1,235 |
| LL005 | F5.0 | 5 | 3 | | | | | |
| LHOG009 | F9.0 | 9 | 3 | | | | | |
| LHOG011 | F11.0 | 11 | 3 | | | 183,200 | 1,335 | 890 |
| LHOG013 | F13.0 | 13 | 3 | | | | | |
| LHOG015 | F15.0 | 15 | 3 | | | | | |

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.4 N, 1 psi = 6.895 kPa.

¹For purposes of measuring overall fastener length, fasteners must be measured from the underside of head to bottom of tip.

²Length of thread includes tip. See detailed illustration.

³Bending yield strength determined per methods specified in ASTM F1575 and based on the minor thread diameter.

⁴Fastener installation and design values require complete threaded portion to be embedded in the main member.

⁵Fastener bending yield strength is determined by the 5 percent diameter (0.05D) offset method of analyzing load-displacement curves developed from bending tests.

⁶Allowable shear strength values apply only to shearing in the unthreaded shank portion of the fastener.

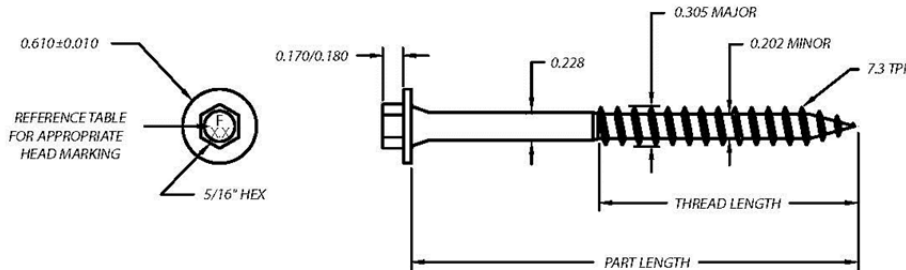


TABLE 1D—FASTENER SPECIFICATIONS: TRUSSLOK FASTENERS

| TRUSSLOK® FASTENER DESIGNATION | HEAD MARKING | OVERALL LENGTH ¹ (inches) | LENGTH OF THREAD ^{2,4} (inches) | UNTHREADED SHANK DIAMETER (inch) | MINOR THREAD (ROOT) DIAMETER (inch) | BENDING YIELD ^{3,5} (F _{yb} , psi) | ALLOWABLE FASTENER STRENGTH | |
|--------------------------------------|-----------------|--|--|---|--|--|--------------------------------|-----------------------------|
| | | | | | | | Tensile (lbf) | Shear ⁶ (lbf) |
| EWS338 | F3.3 | 3 ³ / ₈ | 1 ¹ / ₂ | 0.228 | 0.215 | 218,400 | 1,833 | 1,235 |
| EWS005 | F5.0 | 5 | | | | | | |
| EWS670 | F6.7 | 6 ⁷ / ₁₀ | | | | | | |

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.4 N, 1 psi = 6.895 kPa.

¹For purposes of measuring overall fastener length, fasteners must be measured from the underside of head to bottom of tip.

²Length of thread includes tip. See detailed illustration.

³Bending yield strength determined per methods specified in ASTM F1575 and based on the minor thread diameter.

⁴Fastener installation and design values require complete threaded portion to be embedded in the main member.

⁵Fastener bending yield strength is determined by the 5 percent diameter (0.05D) offset method of analyzing load-displacement curves developed from bending tests.

⁶Allowable shear strength values apply only to shearing in the unthreaded shank portion of the fastener.

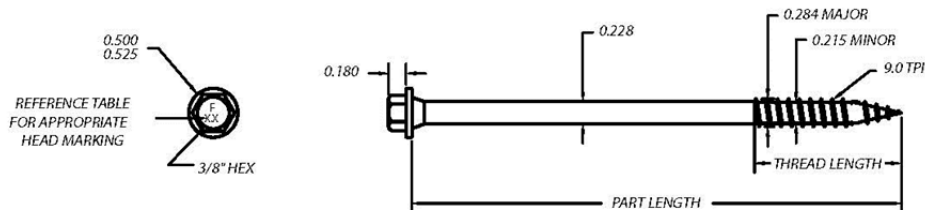


TABLE 1E—FASTENER SPECIFICATIONS: TRUSSLOK-Z FASTENERS

| TRUSSLOK-Z® FASTENER DESIGNATION | HEAD MARKING | OVERALL LENGTH ¹ (inches) | LENGTH OF THREAD ^{2,4} (inches) | UNTHREADED SHANK DIAMETER (inch) | MINOR THREAD (ROOT) DIAMETER (inch) | BENDING YIELD ^{3,5} (F _{yb} , psi) | ALLOWABLE FASTENER STRENGTH | |
|----------------------------------|--------------|--------------------------------------|--|----------------------------------|-------------------------------------|--|-----------------------------|--------------------------|
| | | | | | | | Tensile (lbf) | Shear ⁶ (lbf) |
| TSLZ278 | F2.8 | 2 ⁷ / ₈ | 1 ¹ / ₄ | 0.228 | 0.202 | 218,400 | 1,833 | 1,235 |
| TSLZ412 | F4.5 | 4 ¹ / ₂ | | | | | | |
| TSLZ006 | F6.0 | 6 | | | | | | |

For SI: 1 inch = 25.4 mm, 1 lbf = 4.4 N, 1 psi = 6.895 kPa.

¹For purposes of measuring overall fastener length, fasteners must be measured from the underside of head to bottom of tip.

²Length of thread includes tip. See detailed illustration.

³Bending yield strength determined per methods specified in ASTM F1575 and based on the minor thread diameter.

⁴Fastener installation and design values require complete threaded portion to be embedded in the main member.

⁵Fastener bending yield strength is determined by the 5 percent diameter (0.05D) offset method of analyzing load-displacement curves developed from bending tests.

⁶Allowable shear strength values apply only to shearing in the unthreaded shank portion of the fastener.

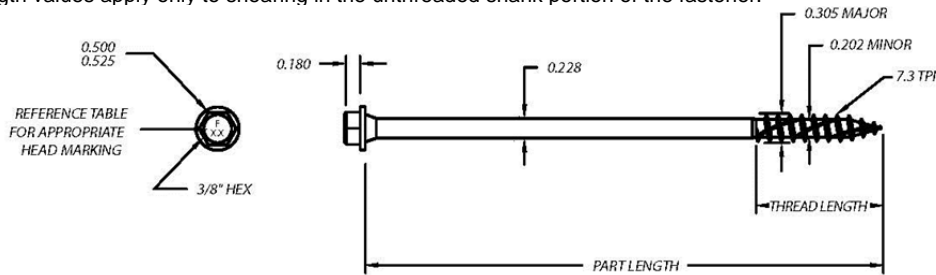


TABLE 1F—FASTENER SPECIFICATIONS: THRULOK FASTENERS⁷

| THRULOK® FASTENER DESIGNATION | HEAD MARKING | OVERALL LENGTH ¹ (inches) | LENGTH OF THREAD ^{2,4} (inches) | | UNTHREADED SHANK DIAMETER (inch) | MINOR THREAD (ROOT) DIAMETER (inch) | BENDING YIELD ^{3,5} (F _{yb} , psi) | ALLOWABLE FASTENER STRENGTH | |
|-------------------------------|--------------|--------------------------------------|--|--------------------------------|----------------------------------|-------------------------------------|--|-----------------------------|--------------------------|
| | | | A | B | | | | Tensile (lbf) | Shear ⁶ (lbf) |
| THR614 | FT6.2 | 6 ¹ / ₄ | 5 ⁵ / ₉ | 1 ² / ₁₀ | 0.228 | 0.201 | 218,400 | 1,970 | 1,235 |
| THR007 | FT7.0 | 7 | | | | | | | |
| THR008 | FT8.0 | 8 | | | | | | | |

For SI: 1 inch = 25.4 mm, 1 lbf = 4.4 N, 1 psi = 6.895 kPa.

¹For purposes of measuring overall fastener length, fasteners must be measured from the underside of head to bottom of tip.

²Length of thread includes tip. See detailed illustration.

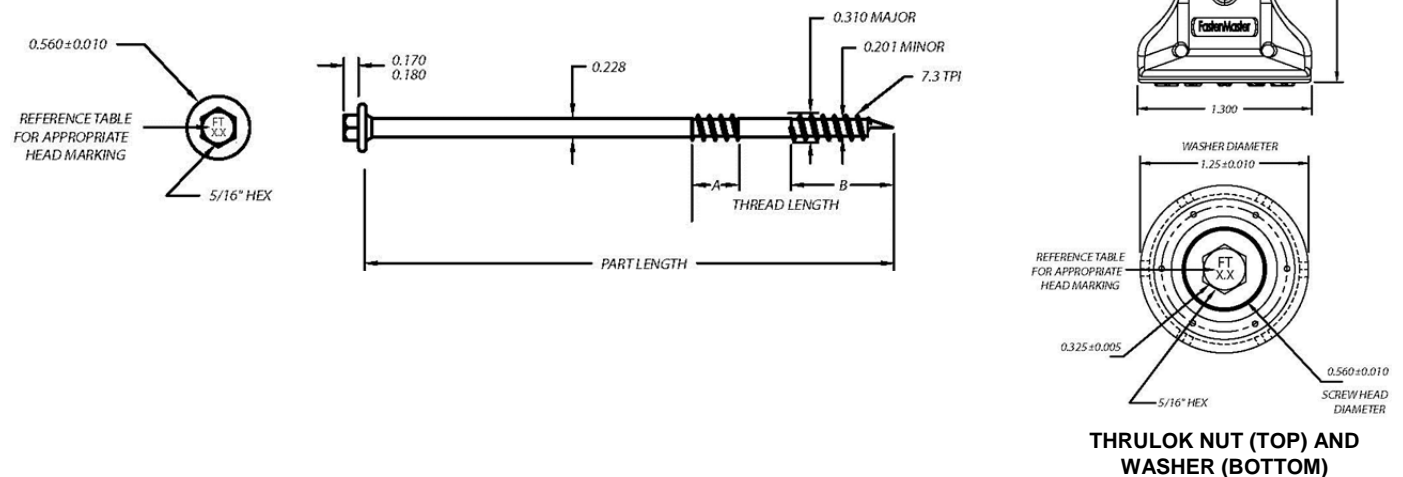
³Bending yield strength determined per methods specified in ASTM F1575 and based on the minor thread diameter.

⁴The thread lengths given for the ThruLOK are for zones A and B, as depicted in the diagram below.

⁵Fastener bending yield strength is determined by the 5 percent diameter (0.05D) offset method of analyzing load-displacement curves developed from bending tests.

⁶Allowable shear strength values apply only to shearing in the unthreaded shank portion of the fastener.

⁷The ThruLOK fastener must be used with the ThruLOK washer and nut (supplied with the fastener).



THRULOK NUT (TOP) AND WASHER (BOTTOM)

TABLE 2—REFERENCE WITHDRAWAL DESIGN VALUES (*W*)^{1,2,3}
 [Reference withdrawal design values (*W*) are in pounds per inch of thread penetration into side grain of main member]

| FASTENER | THREAD LENGTH, <i>L</i> ⁴ (inches) | <i>W</i> (lbf./in.) FOR SPECIFIC GRAVITIES OF: | | | | | |
|------------------------|---|--|---------------------|--------------------|--------------------|--------------------|--------------------|
| | | 0.57 | 0.55 | 0.5 | 0.46 | 0.43 | 0.42 |
| OlyLog/ TimberLOK | 1.25 or 2.0 | 270 | 260 | 220 | 200 | 180 | 170 |
| HeadLOK | 2.0 | 290 | 270 | 230 | 200 | 180 | 170 |
| LedgerLOK/ LogHog | 2.0 or 3.0 | 330 | 310 | 270 | 240 | 220 | 210 |
| TrussLOK | 1½ | — | — | 180 | — | — | — |
| TrussLOK-Z | 1¼ | 290 | 270 | 220 | 180 | 160 | 150 |
| ThruLOK ⁽⁵⁾ | NA ⁽⁶⁾ | 1140 ⁽⁶⁾ | 1060 ⁽⁶⁾ | 900 ⁽⁶⁾ | 780 ⁽⁶⁾ | 700 ⁽⁶⁾ | 680 ⁽⁶⁾ |

For **SI**: 1 inch = 25.4 mm, 1 lbf/in = 175 N/m.

¹Tabulated reference withdrawal design values, *W*, apply to fasteners driven into the side grain of the main member, such that the screws are oriented perpendicular to the grain and loaded in direct withdrawal.

²Reference withdrawal design values must be multiplied by all applicable adjustment factors, in accordance with Section 4.1.

³Reference withdrawal design values are to be multiplied by the length of thread penetration into the main member, but must not exceed the head pull-through design values given in Table 3. Threaded length includes the tapered tip.

⁴See Tables 1A through 1F for thread lengths corresponding to specific fastener model numbers.

⁵The ThruLOK must be used with the ThruLOK washer and nut (supplied with the fastener). The nut must be installed such that it is snug against the main member, and at least ½ inch of the threaded portion of the shank (not including the tip) is within the nut.

⁶Tabulated withdrawal values for the ThruLOK are based on the head pull-through design values given in Table 3, as these values will govern designs in which the screw is subject to axial tension, where the ThruLOK is properly installed with the ThruLOK washer and nut (see footnote 5 above).

TABLE 3—REFERENCE HEAD PULL-THROUGH DESIGN VALUES (*P*)^{1,2}

| FASTENER | MINIMUM SIDE MEMBER THICKNESS (inches) | <i>P</i> (lbf) FOR SPECIFIC GRAVITIES OF: | | | | | |
|------------------------|---|---|---------------------|--------------------|--------------------|--------------------|--------------------|
| | | 0.57 | 0.55 | 0.5 | 0.46 | 0.43 | 0.42 |
| OlyLog/ TimberLOK | 1.5 | 220 | 200 | 160 | 130 | 110 | 110 |
| HeadLOK | 1.5 | 630 | 600 | 520 | 460 | 410 | 400 |
| LedgerLOK/ LogHog | 1.5 | 320 | 290 | 240 | 200 | 180 | 170 |
| TrussLOK | 1.5 | — | — | 260 | — | — | — |
| TrussLOK-Z | 1.5 | 370 | 330 | 250 | 200 | 170 | 160 |
| ThruLOK ⁽³⁾ | 1.5 | 1140 ⁽³⁾ | 1060 ⁽³⁾ | 900 ⁽³⁾ | 780 ⁽³⁾ | 700 ⁽³⁾ | 680 ⁽³⁾ |

For **SI**: 1 inch = 25.4 mm, 1 pound = 4.448 kPa.

¹Reference head pull-through design values, *P*, must be multiplied by all applicable adjustment factors, in accordance with Section 4.1.

²Design values apply to connections with minimum side member thicknesses, *t_s*, as given above.

³The ThruLOK must be used with the ThruLOK washer and nut (supplied with the fastener). The nut must be installed such that it is snug against the main member, and at least ½ inch of the threaded portion of the shank (not including the tip) is within the nut.

TABLE 4—REFERENCE LATERAL DESIGN VALUES (Z) FOR SINGLE SHEAR (TWO-MEMBER) WOOD-TO-WOOD CONNECTIONS LOADED PARALLEL (Z_{||}) OR PERPENDICULAR (Z_⊥) TO THE GRAIN^{1,2}

| FASTENER | | MINIMUM SIDE MEMBER THICKNESS ³ , t _s (inches) | MINIMUM MAIN MEMBER PENETRATION ⁴ , p (inches) | | Z (lbf) FOR MINIMUM SPECIFIC GRAVITIES OF: | | | | | |
|----------------------|-------------------------------|--|---|--|--|----------------|-----------------|----------------|-----------------|----------------|
| Designation | Length (inches) | | | | 0.5 | | 0.46 | | 0.42 | |
| | | | | | Z | Z _⊥ | Z | Z _⊥ | Z | Z _⊥ |
| OlyLog/ TimberLOK | 2 ¹ / ₂ | 1 ¹ / ₂ | 1 | | 240 | 220 | 220 | 200 | 200 | 180 |
| | 4 & longer | 1 ¹ / ₂ | 2 ¹ / ₂ | | 280 | 260 | 260 | 230 | 240 | 210 |
| | 6 & longer | 2 ¹ / ₂ | 3 ¹ / ₂ | | 290 | 270 | 270 | 250 | 250 | 230 |
| | 8 & longer | 3 | 5 | | 290 | 270 | 260 | 250 | 240 | 230 |
| HeadLOK | 2 ⁷ / ₈ | 1 ¹ / ₂ | 1 ³ / ₈ | | 240 | 210 | 220 | 180 | 210 | 150 |
| | 4 ¹ / ₂ | 1 ¹ / ₂ | 3 | | 280 | 260 | 260 | 240 | 250 | 220 |
| | 6 & longer | 1 ¹ / ₂ | 4 ¹ / ₂ | | 290 | 270 | 270 | 250 | 250 | 230 |
| | 6 & longer | 2 ¹ / ₂ | 3 ¹ / ₂ | | 300 | 280 | 280 | 260 | 270 | 240 |
| | 8 & longer | 3 | 5 | | 290 | 280 | 280 | 260 | 260 | 230 |
| LedgerLOK | 3 ⁵ / ₈ | 1 ¹ / ₂ | 1 ¹ / ₂ | | — | 260 | — | 220 | — | 220 |
| | 3 ⁵ / ₈ | 1 ¹ / ₂ | 2 ¹ / ₈ | | 310 | 310 | 290 | 280 | 270 | 250 |
| | 5 | 1 ¹ / ₂ | 3 ¹ / ₂ | | 320 | 300 | 300 | 280 | 280 | 260 |
| LogHog | 9 & longer | 6 | 3 | | 310 | 300 | 290 | 280 | 270 | 260 |
| TrussLOK | 3 ³ / ₈ | 1 ³ / ₄ | 1 ⁵ / ₈ | | 320 | 290 | 300 | 270 | 280 | 260 |
| | 5 | 1 ³ / ₄ | 3 ¹ / ₄ | | 330 | 300 | 310 | 270 | 290 | 250 |
| | 6 ³ / ₄ | 1 ³ / ₄ | 5 | | 330 | 310 | 310 | 290 | 290 | 270 |
| TrussLOK-Z | 2 ⁷ / ₈ | 1 ¹ / ₂ | 1 ³ / ₈ | | 310 | 290 | 300 | 270 | 280 | 240 |
| | 4 ¹ / ₂ | 1 ¹ / ₂ | 3 | | 320 | 290 | 300 | 270 | 290 | 250 |
| | 6 | 1 ¹ / ₂ | 4 ¹ / ₂ | | 330 | 300 | 310 | 280 | 290 | 250 |

| FASTENER | | MINIMUM SIDE MEMBER THICKNESS ³ , t _s (inches) | MAIN MEMBER THICKNESS ⁵ (inches) | | Z (lbf) FOR MINIMUM SPECIFIC GRAVITIES OF: | | | | | |
|------------------------|-------------------------------|--|---|-------------------------------|--|----------------|-----------------|----------------|-----------------|----------------|
| Designation | Length (inches) | | | | 0.5 | | 0.46 | | 0.42 | |
| | | | Min | Max | Z | Z _⊥ | Z | Z _⊥ | Z | Z _⊥ |
| ThruLOK ⁽⁵⁾ | 6 ¹ / ₄ | 1 ¹ / ₂ | 3 ¹ / ₄ | 4 ¹ / ₄ | 350 | 320 | 320 | 300 | 300 | 270 |
| | 7 | 1 ¹ / ₂ | 4 | 5 | 350 | 330 | 320 | 300 | 300 | 270 |
| | 8 | 3 | 3 ¹ / ₂ | 4 ¹ / ₂ | 350 | 330 | 320 | 300 | 300 | 270 |

For **SI**: 1 inch = 25.4 mm, 1 pound = 4.448 kPa.

¹Tabulated reference lateral design values, Z, apply to single shear (two-member) connections with wood main and side members having specific gravity as shown, in which the screw is oriented perpendicular to the grain and loaded laterally either parallel or perpendicular to the grain. For connections in which the main and side members have different specific gravities, use the lower of the two. Gaps are not permitted between the main and side members.

²Values must be multiplied by all applicable adjustment factors, in accordance with Section 4.1.

³Side members with thicknesses greater than the tabulated minimum side member thickness may be used, provided the corresponding tabulated minimum main member penetration is still achieved for the given screw length.

⁴Minimum main member penetration is the minimum length of the screw (including threaded, unthreaded and tip length) that must be embedded within the main member.

⁵The ThruLOK must be installed with the washer and nut, and must penetrate through the opposite face of the main member a sufficient distance to allow the nut to be tightened snugly against the main member, with at least 1/2 inch, and no more than 1 1/2 inches of the ThruLOK screw engaged within the nut.

TABLE 5—CONNECTION GEOMETRY REQUIREMENTS¹

| CONDITION | | MINIMUM DISTANCE OR SPACING (inches) | | |
|------------------------------------|--------------------------------|--------------------------------------|--|-------------------------------|
| | | TimberLOK, OlyLog and HeadLOK | LedgerLOK, LogHog, TrussLOK and TrussLOK-Z | ThruLOK |
| End distance | Loading toward end | 3 | 3 ³ / ₄ | 3 ³ / ₈ |
| | Loading away from end | 2 | 2 ³ / ₈ | 2 ³ / ₈ |
| | Loading perpendicular to grain | 2 | 2 ³ / ₈ | 2 ³ / ₈ |
| Edge distance | Any load direction | 1 ³ / ₄ | 1 ³ / ₄ | 2 |
| Spacing between fasteners in a row | Loading parallel to grain | 2 ⁷ / ₈ | 3 ¹ / ₂ | 3 ¹ / ₂ |
| | Loading perpendicular to grain | 2 | 2 ³ / ₈ | 2 ³ / ₈ |
| Spacing between rows | In-line rows | 1 | 1 ¹ / ₄ | 1 ¹ / ₄ |
| | Staggered rows ² | 1 ¹ / ₂ | 5 ⁵ / ₈ | 5 ⁵ / ₈ |

For **SI**: 1 inch = 25.4 mm.

¹End distances, edge distances and screw spacing must be sufficient to prevent splitting of the wood, or as required by this table, whichever is more restrictive.

²Values for spacing between staggered rows apply where screws in adjacent rows are offset by half of the spacing between screws in a row.

TABLE 6—RECOGNIZED EXPOSURE CONDITIONS FOR COATED FASTENMASTER LOK SERIES FASTENERS¹

| EXPOSURE CONDITION | TYPICAL APPLICATIONS | RECOGNITION LIMITATIONS |
|--------------------|--------------------------------------|--|
| 1 | Treated wood in dry use applications | Limited to use where equilibrium moisture content of the chemically treated wood meets the dry service conditions as described in the NDS. |
| 3 | General construction | Limited to freshwater and chemically treated wood exposure, e.g., no saltwater exposure. |

¹Recognized exposure conditions apply only to FastenMaster LOK Series fasteners having the recognized proprietary corrosion-resistant coating with a lubricious clear top coat.