CITY OF LOS ANGELES

CALIFORNIA

ERIC GARCETTI
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

MiTek USA, Inc
14305 Southcross Drive, suite 200
Burnsville, MN 55306

Attn: Jim Collins, P.E.
(952) 898-8602

RESEARCH REPORT: RR 25850
(CSI #06090)

BASED UPON ICC EVALUATION SERVICE
REPORT NO. ESR-2761

Expires: February 1, 2019
Issue Date: June 1, 2017
Code: 2017 LABC

GENERAL APPROVAL – Reevaluation/Clerical Modification/Technical Modification – MiTek Pro Series Wood Screws (WS, WSBH, and WSWH) and LumberLok Series Wood Screws.

DETAILS

The above assemblies and/or products are approved when in compliance with the uses, design, installation, conditions of use and identification of ICC-ES Report No. ESR-2761, reissued October 2015, revised March 2017 of the ICC Evaluation Service, LLC. The report, in its entirety, is attached and made part of this general approval.

The parts of ES Report No. ESR-2761 marked by the asterisks are deleted or revised by the Los Angeles City Building Department from this approval.

The approval is subject to the following conditions:

1. Fastener shall be installed in accordance with Section 4.2 of ESR-2761. Installation shall also meet the requirements of 2015 NDS Section 12.1.5 wherever applicable.

2. All construction details shall be indicated on the approved plans by the engineer of record of the building. The details shall be approved by the structural plan check division.

3. Where screws are used on lumber with moisture content more than 19%, a reduction per 2015 NDS Section 11.3.3 must be applied to the allowable value of the screws.

4. The allowable strength of the connection is not permitted to be multiplied by the adjustment factors specified in the NDS if the capacity of a connection is controlled by fastener or side plate metal strength

5. Corrosion protection of the WS Series Wood Screws is not included in the scope of the approval.

DISCUSSION

The clerical modification is to change the name of petitioning organization and update the report to the 2017 City of Los Angeles Building Code.

The technical modification is to add the WSBH, WSWH and LumberLok Series Wood Screws to the original approval.

The report is in compliance with the 2017 City of Los Angeles Building Code

The approval is based on tests in accordance with ICC ES (AC 233).

This general approval will remain effective provided the Evaluation Report is maintained valid and unrevised with the issuing organization. Any revision to the report must be submitted to this Department for review with appropriate fee to continue the approval of the revised report.

Addressee to whom this Research Report is issued is responsible for providing copies of it, complete with any attachments indicated, to architects, engineers and builders using items approved herein in design or construction which must be approved by Department of Building and Safety Engineers and Inspectors.

This general approval of an equivalent alternate to the Code is only valid where an engineer and/or inspector of this Department has determined that all conditions of this Approval have been met in the project in which it is to be used.

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QUAN NGHIEM, Chief
Engineering Research Section
201 N. Figueroa St., Room 880
Los Angeles, CA 90012
Phone - 213-202-9812
Fax - 213-202-9943

DE
RR25850
TLB1700068 and TLB1700144
R03/10/2017
104.2.6, NDS 11.3.3 and 12.1.5

Attachment: ICC ES Report No. ESR-2761 (10 Pages)

ICC-ES Evaluation Report

ESR-2761

Reissued October 2015

Revised March 2017

This report is subject to renewal October 2017.

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES

Section: 06 05 23—Wood, Plastic, and Composite Fastenings

REPORT HOLDER:

MITEK USA, INC.
(FORMERLY USP STRUCTURAL CONNECTORS)
14305 SOUTHCROSS DRIVE, SUITE 200
BURNSVILLE, MINNESOTA 55306
(952) 898-8772
www.uspconnectors.com
uspcustomerservice@mii.com

EVALUATION SUBJECT

MITEK® PRO SERIES AND LUMBERLOK SERIES WOOD SCREWS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2015, 2012, 2009 and 2006 *International Building Code®* (IBC)
- * 2015, 2012, 2009 ~~and 2006~~ *International Residential Code®* (IRC)

Property evaluated:

Structural

2.0 USES

The MiTek Pro Series and LumberLok Series wood screws described in this report are used for wood-to-wood and steel-to-wood connections that are designed in accordance with the IBC. For structures regulated under the IRC, the screws may be used where an engineered design is submitted in accordance with Section R301.1.3 of the IRC.

3.0 DESCRIPTION

3.1 General:

3.1.1 MiTek Pro Series: MiTek Pro Series wood screws are manufactured using a cold-forming process, and are heat-treated. The screws have rolled threads, spaced 10 threads per inch (0.393 thread per millimeter), and a Type 17 self-drilling (fluted) tip. MiTek Pro Series wood screws have either a plain (unslotted) hex washer head, a fluted bugle head, or a flat washer head. The bugle and washer head styles each have a six lobe recess which accepts a #30 Torx® bit. The screws' major and minor diameters are 0.250 inch and 0.183 inch (6.4 mm and 4.6 mm), respectively, and the unthreaded shank diameter is 0.237 inch (6.0 mm). Screws having a nominal length of 2.5 inches or greater have a built-in reamer to facilitate installation. Table 1A provides a description of the MiTek Pro Series screws recognized in this report, and specifies the screws' bending yield strength and allowable tensile and shear strengths. See Figure 1A for a diagram of the MiTek Pro Series wood screws.

3.1.2 LumberLok Series: The LumberLok Series wood screws are manufactured using a cold-forming process and are heat-treated. The screws have rolled threads spaced 12 threads per inch (0.472 thread per millimeter) in a twin-lead configuration. The fillister style head has a six lobe recess that accepts a #20 Torx bit. The tip style is a sharp gimlet point. The screws' major and minor diameters are 0.170 inch and 0.109 inch (4.3 mm and 2.8 mm), respectively. The LL915 screw is almost fully threaded, with an unthreaded shank diameter of 0.170 inch (4.3 mm). The LL930 screw is partially threaded with a stepped smooth shank having diameters of 0.170 inch (4.3 mm) and 0.145 inch (3.7 mm). Table 1B provides a description of the LumberLok Series wood screws recognized in this report, and specifies the screws' bending yield strength and allowable tensile and shear strengths. See Figure 1B for a diagram of the LumberLok Series wood screw.

3.2 Materials:

3.2.1 MiTek Pro Series Wood Screws: The MiTek Pro Series wood screws (WS. WSBH, and WSWH) are manufactured from ASTM A510, grade 1022 steel or C1022A / SAE1022 steel, and are heat-treated. The screws have either a zinc yellow chromate finish, or a hot-dipped galvanized (HDG) finish.

3.2.2 LumberLok Series Wood Screws: The LumberLok Series screws are manufactured from low carbon steel complying with ASTM F2282 grade 1022 and are heat-treated. The screws have a multi-layered coating consisting of zinc, a clear trivalent finish and a proprietary gold tone finish.

3.2.3 Wood Members: Wood members must be solid-sawn lumber having a minimum assigned specific gravity as indicated in Tables 2A, 2B, 3A, 3B, 4A, 4B, 5A and 5B, as applicable, or one of the following types of engineered wood recognized in an ICC-ES evaluation report: LVL grade 1.3E or higher, LSL grade 1.35E or better, or PSL grade 1.8E or higher. Assigned specific gravity for solid-sawn lumber must be determined in accordance with Table 12.3.3A of the 2015 ANSI/AWC *National Design*

* Deleted by City of Los Angeles

Specification® for Wood Construction (NDS) (Table 11.3.3A of NDS-12 for the 2012 IBC; Table 11.3.2A of NDS-05 for the 2009 and 2006 IBC). Engineered wood must be recognized as having the equivalent specific gravities noted in Tables 2A, 3A, 4A, and 5A, as applicable. Solid-sawn wood main members must have a moisture content of less than 19 percent both at the time of screw installation, and in service. For engineered wood, the moisture content at the time of screw installation and in service must be in accordance with the applicable ICC-ES evaluation report on the engineered wood product. The thickness of the wood main member, t_m, must be equal to or greater than the screw length less the thickness of the side member.

3.2.4 Steel Members: Steel side members with design thicknesses of 0.046 inch, 0.058 inch, 0.074 inch, 0.136 inch, and 0.180 inch (1.2 mm, 1.5 mm, 1.9 mm, 3.5 mm, and 4.6 mm) must have a minimum tensile strength, F_u, of 45 ksi (310.1 MPa). Steel side members with a design thickness of 0.250 inch (6.4 mm) must have a minimum tensile strength, F_u, of 58 ksi (400 MPa). The hole in the steel side member for the MiTek Pro Series screws must be predrilled or pre-punched, and must have a standard round hole diameter no greater than 0.281 inch (7.14 mm). The hole in the steel side member for the LumberLok Series screws must be predrilled or pre-punched, and must have a standard round hole diameter no greater than 0.180 inch (4.57 mm). Hole sizes may deviate from these limitations when the screws are recognized in a current ICC-ES evaluation report for use with a specific steel connector.

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 General: Reference lateral, withdrawal and pull-through design values given in this report are for allowable stress design, and must be multiplied by all adjustment factors, as applicable to wood screws, in accordance with the NDS to determine adjusted design values, except as otherwise noted in this report. When the capacity of a connection is controlled by fastener or side plate steel strength, rather than wood strength, the allowable strength of the connection is not permitted to be multiplied by the adjustment factors specified in the NDS. Connections containing multiple screws must be designed in accordance with Sections 11.2.2 and 12.6 of NDS-15 (Sections 10.2.2 and 11.6 of the NDS-12 and NDS-05 for the 2012, 2009 and 2006 IBC). Where the screws are subjected to combined lateral and withdrawal loads, connections must be designed in accordance with Section 12.4.1 of NDS-15 (Section 11.4.1 of the NDS-12 and NDS-05 for the 2012, 2009 and 2006 IBC). Design of connections having steel side members shall comply with Section 11.2.3 of NDS-15 (Section 10.2.3 of the NDS-12 and NDS-05 for the 2012, 2009 and 2006 IBC). When designing a connection, the structural members must be checked for load-carrying capacity in accordance with Section 11.1.2 of NDS-15 (Section 10.1.2 of the NDS-12 and NDS-05 for the 2012, 2009 and 2006 IBC), and local stresses within the connection must be checked according to Appendix E in the NDS to ensure the capacity of the connection and fastener group.

4.1.2 Lateral Design Values: Reference lateral (Z) design values for MiTek Pro Series wood screws for single shear wood-to-wood connections loaded perpendicular and parallel to grain, are as shown in Table 3A. Reference lateral (*Z*) design values for MiTek Pro Series wood screws for single shear steel-to-wood connections loaded perpendicular and parallel to grain, are as shown in Table 4A. Reference lateral (Z) design values for LumberLok Series wood screws for single shear wood-to-wood connections loaded perpendicular and parallel to grain, are as shown in Table 3B. Reference lateral (Z) design values for LumberLok Series wood screws for single shear steel-to-wood connections loaded perpendicular and parallel to grain, are as shown in Table 4B. The allowable lateral load for a single-screw connection is the lesser of: (a) the reference lateral design value (*Z*) given in Table 3A, 3B, 4A or 4B, as applicable, adjusted by all applicable adjustment factors; and (b) the allowable screw shear strength given in Table 1A or 1B, as applicable.

4.1.3 Withdrawal and Pull-through Design Values: Reference withdrawal (*W*) design values are shown in Table 2A for MiTek Pro Series wood screws and Table 2B for LumberLok Series wood screws. The thread lengths for the MiTek Pro Series screws are provided in Table 2A, and the thread lengths for the LumberLok Series screws are provided in Table 2B. Reference pull-through design values for the MiTek Pro Series screws are provided in Table 5A and the reference pull-through design values for the LumberLok Series screws are provided in Table 5B. The allowable load for a single-screw connection in which the screw is subject to tension is the least of: (a) the reference withdrawal design value given in Table 2A or 2B, multiplied by the thread length shown in Table 2A or 2B, adjusted by all applicable adjustment factors, (b) the allowable screw tension strength given in Table 1A or 1B, as applicable and (c) the reference pull-through design value given in Table 5A or 5B, for wood-to-wood connections.

4.2 Installation:

MiTek Pro Series hex head wood screws must be installed using a low-speed clutch drill with a $^3/_8$-inch hex-head driver. MiTek Pro Series bugle head and washer head wood screws are installed using a low-speed clutch drill with a T30 Torx bit. The screws must be installed perpendicular to the plane of the steel or wood side member. For hex head and washer head screws, the underside of the head must be flush to the surface of the steel or wood side member. The top of the bugle head screws must be flush with the surface of the wood member. Screws must not be overdriven. MiTek Pro Series wood screws should be installed using the minimum amount of torque necessary to drive the screw. Installation may be performed without predrilling wood members.

LumberLok Series wood screws must be installed using a low-speed clutch drill with a T20 Torx bit. The underside of the fillister head must be flush to the surface of the steel or wood side member. LumberLok Series wood screws should be installed using the minimum amount of torque necessary to drive the screw. Installation may be performed without predrilling wood members.

Edge distances, end distances and spacing of the screws must be sufficient to prevent splitting of the wood, or as required by Table 6 of this report, whichever is more restrictive.

5.0 CONDITIONS OF USE

The MiTek Pro Series wood screws and LumberLok Series wood screws 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 MiTek Pro Series and LumberLok Series wood screws must be installed in accordance with this report and the manufacturer's installation instructions.