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RESEARCH REPORT: RR 22668
(CSI #03150)

BASED UPON ICC ES EVALUATION
REPORT NO. ESR-1799

REEVALUATION DUE DATE:
September 1, 2012
Issued Date: July 1, 2010
Code: 2008 LABC

GENERAL APPROVAL - Reevaluation - Ramset Power-Driven Fasteners

DETAILS

The above assemblies and/or products are approved when in compliance with the description, use, identification and findings of Report No. ESR-1799, dated June 1, 2009, of the ICC Evaluation Service, Incorporated. The report, in its entirety, is attached and made part of this general approval.

The parts of Report No.ESR-1799 which are excluded on the attached copy have been removed by the Los Angeles City Building Department as not being included in this approval.

The approval is subject to the following conditions:

1. The fasteners shall not be used to resist seismic loads, except for fasteners used with architectural, electrical, and mechanical components described in Section 13.1.4 of ASCE 7 per condition 4.1.1 of the attached Evaluation Service Report.

2. Shear values for fasteners in concrete are for connections of steel to concrete. Allowable bearing stresses for the steel material being connected shall not be exceeded.

3. The minimum concrete thickness shall be three times the fasteners embedment in concrete, except where noted otherwise in this report.

4. For working values in steel, the fasteners shall have sufficient length so that the entire pointed portion of the shank pierces the steel plate, except where noted otherwise in the tables of the attached evaluation report.

5. The allowable values listed in the attached report and tables are for the fasteners only. Connected members shall be checked for their capacity (which may govern).

6. Use of the low velocity fasteners to the metal deck, the fasteners shall be installed through the metal deck and into the concrete at the upper or lower flute as designated in the table. The fastener must be a minimum of 1 1/8 inches from the edge of the deck web and 4 inches from the end of the deck. The minimum fastener spacing is 4 inches.

7. No increase is permitted in the tabulated allowable load values for short duration loading.

8. The fasteners shall be installed per the manufacturer's instructions, a copy of which shall be available at each job site.

9. The containers of the fasteners shall be labeled with the ITW Ramset company name, the fastener product name, length, catalog number, and quantity, the evaluation report number (ESR-1799); and the manufacturing date and lot number. In addition, all of the fasteners, except the 1600 W series fasteners, shall be identified by the letter "R" stamped into the fastener head.

DISCUSSION

The report is in compliance with 2008 Los Angeles Building Code.

Condition 4 was modified to be consistent with the footnotes of table 3 and 4 of the attached ICC-ES evaluation report.

The approval is based on tests in accordance with ICC-ES Acceptance Criteria for Fasteners Power-driven in to Concrete, Steel and Masonry Elements (AC70), dated October 2006.

This general approval will remain effective provided the Evaluation Report is maintained valid and unrevised with the issuing organization. Any revisions 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 (2008 LABC/2006 IBC) 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.

The status of the referenced Report No.ESR-1799, dated June 1, 2009, which is currently beyond its reexamination date are still valid. The validity of the Report was verified with ICC.

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Attachment: ICC ES Report No. ESR-1799 (5 Pages)

ICC EVALUATION SERVICE

Most Widely Accepted and Trusted

ICC-ES Evaluation Report

ESR-1799

Reissued June 1, 2009

This report is subject to re-examination in one year.

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DIVISION: 03—CONCRETE
Section: 03151—Concrete Anchoring

DIVISION: 05—METALS
Section: 05090—Metal Fastening

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EVALUATION SUBJECT:

RAMSET AND DUO-FAST POWER-DRIVEN FASTENERS, POWER POINT FASTENERS AND ANGLE CLIP FASTENERS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2006 *International Building Code*® (IBC)
- ~~2006 *International Residential Code*® (IRC)~~ *
- ~~1997 *Uniform Building Code*™ (UBC)~~

Property evaluated:

Structural

2.0 USES

Ramset and Duo-Fast 1500, 1600 W and 3300 Series fasteners and SP Series Power Point fasteners are used for general fastening of building components to normal-weight concrete, structural lightweight concrete, and structural lightweight concrete filled steel decks and steel substrates, as noted in this report. Ramset and Duo-Fast SDC and SPC Angle Clip fasteners are used for fastening of building components to normal-weight concrete and structural lightweight concrete filled steel decks.

3.0 DESCRIPTION

3.1 General:

The fasteners are power-driven fasteners, which are fasteners that are installed using a power-driven fastening system. Power-driven fastening systems are systems that use explosive powder, gas combustion, compressed air or other gas to embed the fastener into base materials.

3.2 Ramset and Duo-Fast 1500, 1600 W and 3300 Series Fasteners:

The smooth-shank 1500 and 3300 series fasteners are manufactured from steel complying with ASTM A 510, Grades 1060 or 1062, and austempered to a Rockwell "C" core hardness of 52 to 56. The knurled-shank 1500 series fasteners are manufactured from steel complying with ASTM A 510, Grade 1060 or 1062, and austempered to a Rockwell "C" core hardness of 54 to 56. The 1600 W series fasteners are manufactured from ASTM A 510, Grades 1060 or 1062, steel and austempered to Rockwell "C" core hardness of 52 to 56 for smooth-shank fasteners and 54 to 56 for knurled-shank fasteners. Except for the 1600 series fasteners, the ITW Ramset fasteners have an approximate head diameter of 0.3 inch (7.6 mm). The 1600 series fasteners have $^1/_4$-20 (6.4 mm - 7.87 threads/cm) threads on the end of the fasteners to be used with a nut and washer. All of the fasteners have a zinc-plated finish, except for the smooth-shank 1506B and 1508B fasteners which have a black oxide finish instead of zinc. The 1506B and 1508B fasteners are limited to installation in normal-weight concrete.

The nominal diameter of the shanks of the fasteners is as noted in Tables 1 through 4 of this report. The tables also indicate whether the shanks are straight or have a stepped shank, and indicate whether the shanks are smooth or knurled. The 1500, 1600W and 3300 series fasteners are available in lengths to achieve embedment depths as noted in the tables of this report.

3.3 Power Point Fasteners:

Ramset and Duo-Fast SP Series Power Point fasteners are straight or stepped shank series fasteners manufactured from ASTM A 510, Grade 1060 or 1062, steel austempered to a Rockwell "C" hardness of 55 to 56.

The SP Series fasteners have a head diameter of 0.3 inch (7.62 mm). Fasteners having nominal shank lengths of $^7/_8$ inch (22 mm) and less have a smooth, straight, nominally 0.150-inch-diameter (3.81 mm) shank. Fasteners having a nominal shank length of 1 inch (25.4 mm) or

* Deleted by City of Los Angeles

longer have a smooth, stepped shank with a nominally 0.150-inch (3.81 mm) diameter at the tapered end and a nominally 0.180-inch (4.57 mm) diameter at the headed end. The SP Series Power Point fasteners have a zinc-plated finish.

3.4 Angle Clip Fasteners:

Ramset and Duo-Fast SDC and SPC Angle Clip Fasteners are preassembled, power-actuated fasteners with a steel clip angle.

SDC 100 and SDC 125 fasteners have 1500 series, smooth, straight shank fasteners, described in Section 3.2 of this report, with shank lengths of 1 inch and $1^1/_4$ inches (25.4 and 31.7 mm), respectively. The clip angles have a 120-degree angle between the legs of the clip and are manufactured from $^3/_4$-inch-wide steel strips conforming to ASTM A 635, Grade 1010, having a minimum yield strength of 33,000 psi (227 kPa) and a base-metal thickness of 0.074 inch (1.88 mm). One leg of the clip is $^{29}/_{32}$ inch long (23 mm) and the opposite leg is $^3/_4$ inch long (19.1 mm). The fasteners are assembled through dimples * formed in a horizontal leg of the clip angle.

SPC 78 and SPC 114 fasteners have SP series Power Point smooth, straight shank fasteners, described in Section 3.3 of this report, with shank length of $^7/_8$ inch and $1^1/_4$ inches (22 and 31.7 mm), respectively. The clip angles * have a 90-degree angle between the legs of the clips and are manufactured from $^3/_4$-inch-wide (19.1 mm), No. 14 gage [0.0747 inch (1.90 mm) base-metal thickness], steel strips conforming to ASTM A 635, Grades 1010 or AISI 1020, steel having a minimum yield strength of 33 ksi (228 MPa) and a base-metal thickness of 0.074 inch (1.88 mm). One leg of the clip is 1 inch long (25.4 mm) and the opposite leg is $^3/_4$ inch long (19.1 mm). The fasteners are assembled through the clip with an eyelet manufactured from 5052-0 grade aluminum having a thickness of 0.032 inch (0.81 mm).

3.5 Concrete:

* Normal-weight and structural lightweight concrete shall conform to IBC ~~and UBC~~ Sections 1903 and 1905.

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 General: The allowable shear and tension (pullout) values in the tables of this report are for use in allowable stress design, and are for fasteners driven into the materials specified in the tables. The stress increases and * load reductions described in IBC Section 1605.3, ~~and the stress increases described in UBC Section 1612.3~~, shall not be allowed for wind loads acting alone or combined with vertical loads. No adjustment shall be allowed for vertical loads acting alone. Seismic load resistance is outside the scope of this report, except for fasteners used under the IBC ~~and IRC~~ for attachment of architectural, electrical and mechanical components as described in the exceptions to Section 13.1.4 of ASCE/SEI 7-05, Minimum Design Loads for Buildings and Other Structures (American Society of Civil Engineers/Structural Engineering Institute).

The allowable shear and tension values for the fasteners and SP Series Power Point fasteners driven into normal-weight concrete are shown in Table 1 of this report. Allowable shear and tension values for these fasteners driven into structural lightweight concrete with or without a metal deck are shown in Table 2 of this report. Allowable shear and tension values for these fasteners driven into steel are shown in Tables 3 and 4 of this report.

The allowable shear and tension values for the angle clip fasteners installed in normal-weight concrete are shown in Table 5 of this report. Allowable shear and tension values for the angle clip fasteners installed through metal decks and into the structural lightweight concrete fill of the metal deck are shown in Table 6 of this report.

Allowable loads for fasteners installed into concrete and subjected to combined shear and tension loads are permitted to be calculated by the following equation:

$$\left(\frac{P_s}{P_t}\right)+\left(\frac{V_s}{V_t}\right)\le 1$$

where:

P_s = Applied service tension load, pounds (N).

P_t = Allowable service tension load, pounds (N).

V_S = Applied service shear load, pounds (N).

V_t = Allowable service shear load, pounds (N).

4.1.2 Wood to Steel or Concrete: Lateral design values shall be determined in accordance with Part II of the ANSI/AF&PA NDS-05 (IBC) ~~or Part 12 of the ANSI/NFoPA NDS-91 (UBC), as applicable~~, with Ramset fasteners of equal or greater diameters. The wood element is the side member. The fastener bending yield strength shall be the value noted in the NDS-05 ~~or NDS-91, as applicable~~, based on fastener diameter.

4.2 Installation:

A low-velocity, powder-actuated fastening tool, recommended by ITW Ramset or ITW Brands - Duo-Fast, shall be used to install the fasteners. The fastening procedures shall comply with the fastener manufacturer's published installation instructions. The fasteners shall be installed with the fastener penetration, spacing and edge distances specified in this report. Except as noted in Figure 1 of this report, concrete shall have a thickness of at least three times the fastener penetration. Installation is limited to dry, interior environments.

For fasteners installed into concrete, the fasteners shall not be driven until the concrete has reached the designated compressive strength.

5.0 CONDITIONS OF USE

The ITW Ramset and ITW Brands - Duo-Fast power-actuated 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 The fasteners shall be manufactured and identified in accordance with this report.

5.2 Fasteners shall be installed in accordance with this report and ITW Ramset or ITW Brands - Duo-Fast instructions. In the event of a conflict between this report and the instructions, this report shall govern.

5.3 Allowable loads shall be in accordance with Section 4.1 of this report. Calculations demonstrating that the applied loads are less than the maximum allowable loads described in this report shall be submitted to the code official. The calculations shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.4 The minimum concrete thickness shall be three times the fastener embedment in concrete, except where noted otherwise in this report.

5.5 Seismic load resistance is outside the scope of this report, except as noted in Section 4.1.1 of this report.