Ramset®-I-F

Insulation Fastening System

SUBMITTAL PACKAGE

The Thermal Break Fastener that Installs in Seconds

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ICC-ES Evaluation Report

ESR-1955

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Reissued 08/2017
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DIVISION: 03 00 00—CONCRETE
SECTION: 03 16 00—CONCRETE ANCHORS
DIVISION: 04 00 00—MASONRY
SECTION: 04 05 19.16—MASONRY ANCHORS
DIVISION: 05 00 00—METALS
SECTION: 05 05 23—METAL FASTENINGS
DIVISION: 09 00 00—FINISHES
SECTION: 09 22 16.23—FASTENERS

REPORT HOLDER:

ITW RAMSET

700 HIGH GROVE BOULEVARD
GLENDALE HEIGHTS, ILLINOIS 60139

EVALUATION SUBJECT:

RAMSET T3 POWER DRIVEN FASTENERS

ICC-ES Evaluation Report

ESR-1955

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Revised March 2018
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DIVISION: 03 00 00—CONCRETE
Section: 03 16 00—Concrete Anchors

DIVISION: 04 00 00—MASONRY
Section: 04 05 19.16—Masonry Anchors

DIVISION: 05 00 00—METALS
Section: 05 05 23—Metal Fastenings

DIVISION: 09 00 00-FINISHES
Section: 09 22 16.23-Fasteners

REPORT HOLDER:

ITW RAMSET
700 HIGH GROVE BOULEVARD
GLENDALE HEIGHTS, ILLINOIS 60139
(800) 726-7386
www.ramset.com

EVALUATION SUBJECT:

RAMSET T3 POWER DRIVEN FASTENERS

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)

For evaluation for compliance with codes adopted by the Los Angeles Department of Building and Safety (LADBS), see ESR-1955 LABC and LARC Supplement.

Property evaluated:

Structural

2.0 USES

Ramset T3 power-driven fasteners are power-actuated fasteners used to fasten building components such as light-gage cold-formed steel framing to normalweight concrete, sand-lightweight concrete, sand-lightweight concrete filled steel deck panels, concrete masonry units (CMUs) and structural steel substrate materials. The fasteners are used as alternatives to the cast-in-place concrete anchors described in 2015 IBC Section 1901.3 (2012 IBC Section 1908; 2009 and 2006 IBC Section 1911) for placement in concrete; the embedded anchors described in Section 8.1.3 of TMS 402-13 referenced in Section 2107 of the 2015 IBC (Section 2.1.4 of TMS 402-11, -08 and -05, referenced in Section 2107 of the 2012, 2009 and 2006 IBC, respectively); and to the welds and bolts used to attach to steel, described in IBC Sections 2204.1 and 2204.2. For structures regulated under the IRC, the fasteners may also be used where an engineered design is submitted in accordance with IRC Section R301.1.3.

3.0 DESCRIPTION

3.1 Ramset T3 Power Driven Fasteners:

Ramset T3 power-driven fasteners are manufactured from steel complying with ASTM A510, Grade 1060, and austempered to a Rockwell "C" 52 to 56 core hardness. See Table 1 for shank descriptions, fastener dimensions, coating information and applicable base materials. See Figure 1 for fastener images.

3.2 Substrate Materials:

3.2.1 Concrete: Normalweight and lightweight concrete must comply with IBC Chapter 19 or IRC Section R402.2, as applicable. The minimum concrete compressive strength at the time of fastener installation must be as noted in the applicable allowable load table.

3.2.2 Steel Deck Panels: Steel deck panels must conform to a code-referenced material standard, with the minimum thickness, minimum yield strength and specified tensile strength noted in Table 5. See Figures 2 and 3 for panel configuration requirements.

3.2.3 Concrete Masonry: CMUs must be minimum 8-inch-thick blocks, lightweight blocks conforming to ASTM C90. Mortar must be Type N or Type S in accordance with Section 2103 of the IBC or Section R607 of the IRC, as applicable.

3.2.4 Structural Steel: Structural steel used in supports must comply with the minimum strength requirements of ASTM A36, ASTM A572 Grade 50 or ASTM A992, and must have thicknesses as noted in Tables 6 and 7, as applicable.

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 General: Selection of fasteners must take into consideration the applicable base material and the length of the fastener. The minimum fastener length must be determined as follows:

- Unless otherwise noted, for installation into concrete, concrete-filled steel deck panels, concrete masonry and steel base materials, the minimum effective shank length shown in Table 1 must equal or exceed the sum of the thickness of the attached material and the minimum embedment depth (penetration) shown in the applicable tables in this report.

- For installation through steel base materials, the minimum effective shank length shown in Table 1 must equal or exceed the sum of the following: the thickness of the attached material, the thickness of the base material and the required point penetration shown in the applicable tables in this report.

4.1.2 Allowable Loads: The applicable allowable shear and tension load tables for the fasteners driven into different base materials may be determined by referencing Table 1. The most critical applied loads, excluding seismic load effects, resulting from the load combinations in IBC Section 1605.3.1 or 1605.3.2 must not exceed the allowable loads described in this section. For fasteners which are subjected to seismic loads, see Section 4.1.5 for additional information.

The allowable shear and tension (pullout) values in the tables of this report are for use in allowable stress design (ASD). The allowable loads apply to the interaction between the fasteners and the specified base materials only, and limit states such as pull-over and lateral bearing, which are governed by the properties of attached materials, are outside the scope of this report. Design of the connection to the attached material must comply with the applicable requirements of the IBC. The stress increases and load reductions described in IBC Section 1605.3 are not allowed.

4.1.3 Combined Loading: For fasteners subjected to both shear and tension loads, compliance with the following interaction equation must be verified:

$$(p/P_a) + (v/V_a) \leq 1$$

where:

p	=	Actual applied tension load on fastener, lbf(N)
P_a	=	Allowable tension load for the fastener, lbf (N)
v	=	Actual applied shear load on fastener, lbf (N)
V_a	=	Allowable shear load for the fastener, lbf (N)

4.1.4 Steel-to-steel Connections: When the fasteners listed in Tables 6 and 7 are used in connections of two steel elements in accordance with Section E5 of AISI S100-12, connection capacity must be determined in accordance with Sections 4.1.4.1 and 4.1.4.2, as applicable.

4.1.4.1 Connection Strength - Tension: To determine tensile connection strength in accordance with Section E5.2 of AISI S100-12, the fastener tension strength, pull-out strength and pull-over strength must be known. These characteristics must be determined as follows:

- **PAF Tensile Strength:** The allowable fastener tension strengths must be calculated in accordance with Section E5.2.1 of AISI S100-12 using a value of 260,000 psi for F_{uh}.
- **Pull-out Strength:** See Tables 6 or 7, as applicable, for available pull-out strength.
- **Pull-over Strength:** The available pull-over strengths must be calculated in accordance with Section E5.2.3 of AISI S100-12.

4.1.4.2 Connection Strength - Shear: To determine shear connection strength in accordance with Section E5.3 of AISI S100-12, the fastener shear strength, bearing and tilting strength, pull-out strength in shear, net section rupture strength and shear strength limited by edge distance must be known. These characteristics must be determined as follows:

- **PAF Shear Strength:** The allowable fastener shear strengths must be calculated in accordance with Section E5.3.1 of AISI S100-12 using a value of 260,000 psi for F_{uh}.
- **Bearing and Tilting Strength:** The available bearing and tilting strengths must be calculated in accordance with Section E5.3.2 of AISI S100-12.
- **Pull-out Strength in Shear:** The available pull-out strength in shear must be the applicable allowable shear strength from Table 6 or 7, as applicable, or must be calculated in accordance with Section E5.3.3 of AISI S100-12.
- **Net Section Rupture Strength and Shear Strength Limited by Edge Distance:** The net section rupture strength must be determined in accordance with Section E5.3.4 of AISI S100-12 and the shear strength limited by edge distance must be determined in accordance with Section E5.3.5 of AISI S100-12.

4.1.5 Seismic Considerations: The fasteners are recognized for use when subjected to seismic loads as follows:

1. The fasteners may be used for attachment of nonstructural components listed in Section 13.1.4 of ASCE 7, which are exempt from the requirements of ASCE 7.
2. Concrete Base Materials: The fasteners installed in concrete base materials may be used to support acoustical tile or lay-in panel suspended ceiling systems, distributed systems and distribution systems where the service load on any individual fastener does not exceed the lesser of 90 lbf (400 N) or the published allowable load shown in Tables 2, 3 and 5, as applicable.
3. Steel Base Materials: The fasteners installed in steel may be used for attaching nonstructural components where the service load on any individual fastener does not exceed the lesser of 250 lbf (1112 N) or the published allowable load shown in Tables 6 and 7, as applicable.
4. Interior, Nonstructural Walls: For interior, nonstructural walls that are not subject to sustained tension loads and are not a bracing application, the power-driven fasteners described in Section 3.0 may be used to attach steel track to concrete or steel in all Seismic Design Categories. In Seismic Design Categories D, E and F, the allowable shear load due to transverse pressure must be no more than 90 pounds (400 N) when attaching to concrete; or 250 pounds (1,112 N) when attaching to steel. Substantiating calculations are submitted addressing the fastener-to-base-material capacity and the fastener-to-attached-material capacity. Interior nonstructural walls are limited to locations where bearing walls, shear walls or braced walls are not required by the approved plans. The design load on the fastener must not exceed the allowable load shown in Tables 2, 3, 5, 6 and 7, as applicable.

4.2 Installation:

4.2.1 General: The fasteners must be installed in accordance with this report and the ITW Ramset published installation instructions. A copy of these instructions must be available on the jobsite at all times during installation.

The fasteners are installed with a power fastening tool in accordance with ITW Ramset recommendations. The fastener penetration, spacing and edge distances must be as noted in the tables of this report. For fasteners installed into concrete, the fasteners must not be driven until the concrete has reached the designated compressive strength.

5.0 CONDITIONS OF USE

The ITW Ramset T3 power driven 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 must be manufactured and identified in accordance with this report.

5.2 Fastener installation must comply with this report and ITW Ramset published installation instructions. In the event of a conflict between this report and the ITW Ramset published installation instructions, this report governs.

5.3 Calculations demonstrating that the applied loads are less than the allowable loads described in this report must be submitted to the code official. The calculations must 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 Refer to Section 4.1.5 for seismic considerations.

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

5.6 The use of fasteners is limited to uncracked concrete or masonry. Cracking occurs when $f_t > f_r$ due to service loads or deformations.

5.7 Installation must be limited to dry interior environments, which include exterior walls which are protected by an exterior wall envelope.

5.8 The use of fasteners in contact with preservative-treated or fire-retardant-treated wood is outside the scope of this report.

5.9 The fasteners are manufactured under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Power-actuated Fasteners Driven into Concrete, Steel, and Masonry Elements (AC70), dated February 2016 (editorially revised November 2017).

7.0 IDENTIFICATION

The containers of the fasteners must be labeled with the manufacturer's name (ITW Ramset); the product name, length catalog number, and quantity; the evaluation report number (ESR-1955); and the manufacturing date. In addition, all the fasteners must be identified by the letter "R" stamped into the fastener head.

TABLE 1—RAMSET T3 FASTENERS

FASTENER[1]	SHANK TYPE	SHANK DIAMETER (inch)	HEAD DIAMETER (inch)	MAXIMUM POINT LENGTH (inch)	MINIMUM EFFECTIVE SHANK LENGTH (inch)	FASTENER COATING	APPLICABLE BASE MATERIAL	APPLICABLE LOAD TABLES
T3###	Smooth, straight	0.125	0.253	0.230	Designated shank length	Black oxide, Zinc	Concrete	2, 3, 5
							Masonry	4
							Steel	6, 7
T3034S	Smooth, stepped	0.104/0.125	0.253	n/a	0.725	Zinc	Concrete	2, 5

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

[1]### denotes numbers used in fastener designation.

TABLE 2—ALLOWABLE TENSION AND SHEAR VALUES FOR T3 FASTENERS INSTALLED IN NORMAL-WEIGHT CONCRETE (lbf)

SHANK TYPE	NOMINAL SHANK DIAMETER (inch)	MINIMUM EDGE DISTANCE (inches)	MINIMUM SPACING (inches)	MINIMUM EMBEDMENT DEPTH (inch)	ALLOWABLE LOADS (lbf)					
Concrete Compressive Strength:					2,000 psi		4,000 psi		6,000 psi	
Load Direction:					Tension	Shear	Tension	Shear	Tension	Shear
Straight	0.125	3.2	4.0	5/8 3/4	83 107	109 156	78 104	80 195	95 —	128 —
Stepped	0.104/0.125	3.0	4.0	5/8	—	—	102	138	101	119

For **SI**: 1 inch = 25.4 mm, 1 psi = 6.89 kPa, 1 lbf = 4.45 N.

[1]The fasteners must not be driven until the concrete has reached the designated minimum compressive strength. Minimum concrete thickness is three times the fastener embedment into the concrete.

TABLE 3—ALLOWABLE TENSION AND SHEAR VALUES FOR T3 FASTENERS INSTALLED IN MINIMUM 3,000 psi SAND-LIGHTWEIGHT CONCRETE (lbf)

SHANK TYPE	NOMINAL SHANK DIAMETER (inch)	MINIMUM SPACING (inches)	MINIMUM EDGE DISTANCE (inches)	MINIMUM EMBEDMENT DEPTH (inch)			ALLOWABLE LOADS (lbf)		
								Tension	Shear
Straight	0.125	4.0	3.2	5/8 3/4				84 108	108 173
Stepped	0.104/0.125	4.0	3.0	5/8				109	181

For **SI**: 1 inch = 25.4 mm, 1 psi = 6.89 kPa, 1 lbf = 4.45 N.

[1]The fasteners must not be driven until the concrete has reached the designated minimum compressive strength. Minimum concrete thickness is three times the fastener embedment into the concrete, unless noted otherwise.

TABLE 4—ALLOWABLE TENSION AND SHEAR VALUES FOR T3 FASTENERS INSTALLED IN HOLLOW CONCRETE MASONRY UNITS (CMUs)[1,2] (lbf)

SHANK TYPE	NOMINAL SHANK DIAMETER (inch)	MINIMUM EDGE DISTANCE (inches)	MINIMUM SPACING (inches)	MINIMUM EMBEDMENT DEPTH (inch)	ALLOWABLE LOADS (lbf)					
Fastener Location:					Face Shell[1]		Horizontal Mortar Joint (Bed Joint)[2]			
Load Direction:					Tension	Shear	Tension		Shear[3]	
							Type N[4]	Type S[5]	Type N[4]	Type S[5]
Straight	0.125	2	4	$^5/_8$	133	—	14	21	22	33

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N.

[1]Fasteners must be located a minimum of 2 inches from the mortar joints, center web and end web of the CMU.
[2]Fasteners must not be installed in the head joints. Fasteners installed in the bed joint must be installed a minimum of 8 inches from the end of the wall. Multiple fasteners in a bed joint must be spaced a minimum of 8 inches.
[3]Value applies to loads both parallel and perpendicular to the bed joint.
[4]Value applies to fasteners installed into Type N mortar.
[5]Value applies to fasteners installed into Type S mortar.

TABLE 5 – ALLOWABLE TENSION AND SHEAR VALUES FOR FASTENERS INSTALLED THROUGH METAL DECK INTO MINIMUM 3000 psi SAND-LIGHTWEIGHT CONCRETE[1]

SHANK TYPE	NOMINAL SHANK DIAMETER (inch)	MINIMUM SPACING (inches)	MINIMUM EMBEDMENT DEPTH (inch)	ALLOWABLE LOADS (lbf)							
Deck Type:				3-inch deep "W3" type steel deck[2]				$1^1/_2$-inch deep "B" type steel deck[3]			
Fastener Location:				Upper flute		Lower flute		Upper flute		Lower flute	
Load Direction:				Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear
Straight	0.125	4.0	5/8	—	—	72	242	—	—	—	—
			3/4	—	—	93	288	—	—	—	—
Stepped	0.104/0.125	4.0	5/8	103	221	95	219	101	215	107	224

For **SI**: 1 inch = 25.4 mm, 1 psi = 6.89 kPa, 1 lbf = 4.45 N.

[1]The fasteners must not be driven until the concrete has reached the designated minimum compressive strength. Minimum concrete thickness is three times the fastener embedment into the concrete.
[2]The steel deck must have a minimum base-metal thickness of 0.035 inch, a minimum yield strength of 38 ksi, and a minimum tensile strength of 52 ksi. Fasteners installed though the lower flutes of the deck must have a minimum edge distance of $1^1/_8$ inches from the edge of the steel deck and 3 inches from the end of the deck. Concrete thickness above the deck must be a minimum of $3^1/_2$ inches. See Figure 3 of this report.
[3]The steel deck must have a minimum base-metal thickness of 0.035 inch, a minimum yield strength of 38 ksi, and a minimum tensile strength of 52 ksi. Fasteners installed though the lower flutes of the deck must have a minimum edge distance of $^7/_8$ inches from the edge of the steel deck and 3 inches from the end of the deck. Concrete thickness above the deck must be a minimum of 2¼ inches. See Figure 2 of this report.

TABLE 6—ALLOWABLE TENSION AND SHEAR VALUES FOR T3 FASTENERS INSTALLED IN ASTM A36 STEEL[1] (lbf)

NOMINAL SHANK DIAMETER (inch)	MINIMUM EDGE DISTANCE (inch)	MINIMUM SPACING (inch)	STEEL THICKNESS (inch)					
			$^3/_{16}$		$^1/_4$		$^3/_8$[2]	
			Tension[3]	Shear	Tension[3]	Shear	Tension	Shear
0.125	0.5	1.0	63	162	239	211	113	197

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N.

[1]The allowable tension and shear values are for fastenings that have the point end of the fastener driven through the steel base material, unless otherwise noted.
[2]Fastener penetration in $^3/_8$ inch steel is a minimum of 0.29 inch.
[3]For steel-to-steel connections designed in accordance with Section 4.1.4, the tabulated allowable load may be increased by a factor of 1.25, and the design strength may be taken as the tabulated allowable load multiplied by a factor of 2.0.

TABLE 7—ALLOWABLE TENSION AND SHEAR VALUES FOR T3 FASTENERS INSTALLED IN ASTM A572 GRADE 50 OR ASTM A992 STEEL[1] (lbf)

NOMINAL SHANK DIAMETER (inch)	MINIMUM EDGE DISTANCE (inch)	MINIMUM SPACING (inch)	STEEL THICKNESS (inch)					
			$^3/_{16}$		$^1/_4$		$^3/_8$[2]	
			Tension[3]	Shear	Tension[3]	Shear	Tension	Shear
0.125	0.5	1.0	103	222	147	119	147	112

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N.

[1]The allowable tension and shear values are for fastenings that have the pointed end of the fastener driven through the steel base material, unless otherwise noted.
[2]Fastener penetration in $^3/_8$ inch steel is a minimum of 0.27 inch.
[3]For steel-to-steel connections designed in accordance with Section 4.1.4, the tabulated allowable load may be increased by a factor of 1.25, and the design strength may be taken as the tabulated allowable load multiplied by a factor of 2.0.

From left to right: T3034B, T3100 and T3034S.

FIGURE 1—RAMSET T3 FASTENERS

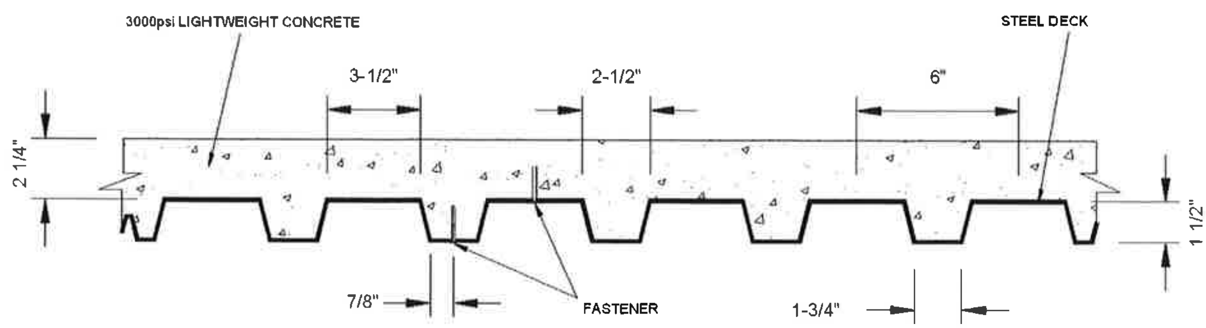

FIGURE 2—FASTENER INSTALLATION SAND-LIGHTWEIGHT CONCRETE FILLED "B" STEEL DECK

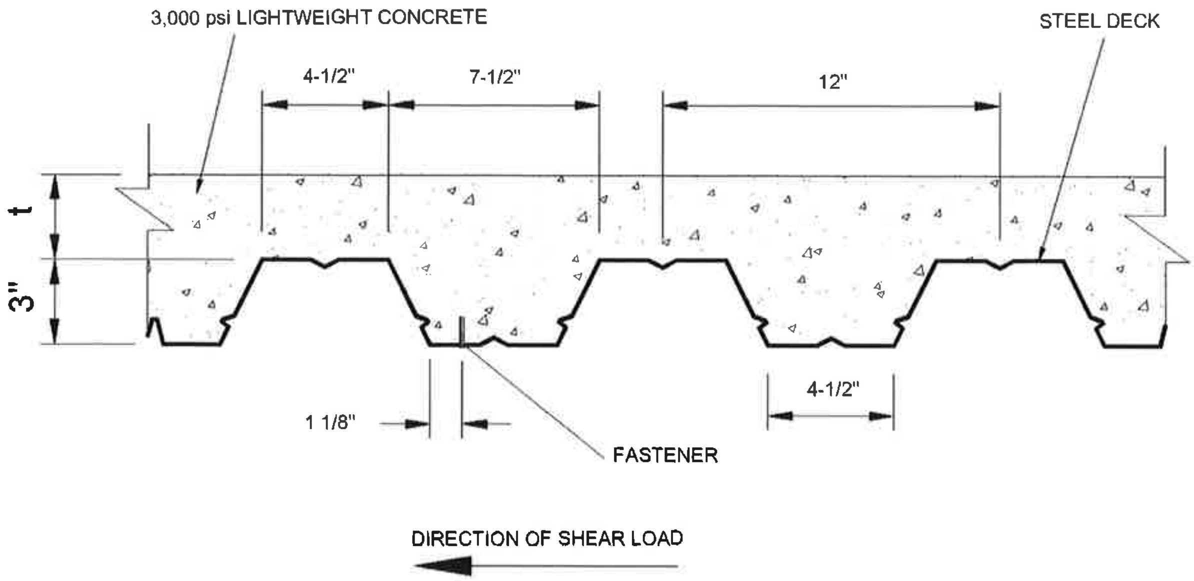

FIGURE 3—FASTENER INSTALLATION SAND-LIGHTWEIGHT CONCRETE FILLED "W3" STEEL DECK

ICC-ES Evaluation Report

ESR-1955 LABC and LARC Supplement

Issued March 2018

This report is subject to renewal August 2019.

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REPORT HOLDER:

ITW RAMSET
700 HIGH GROVE BOULEVARD
GLENDALE HEIGHTS, ILLINOIS 60139
(800) 726-7386
www.ramset.com

EVALUATION SUBJECT:

RAMSET T3 POWER DRIVEN FASTENERS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that Ramset T3 Power Driven Fasteners, described in ICC-ES master evaluation report ESR-1955, have also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2017 *City of Los Angeles Building Code* (LABC)
- 2017 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The Ramset T3 Power Driven Fasteners, described in Sections 2.0 through 7.0 of the master evaluation report ESR-1955, comply with the LABC Chapters 19, 21 and 22 and the LARC, and are subject to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The Ramset T3 Power Driven Fasteners described in this evaluation report must comply with all of the following conditions:

- All applicable sections in the master evaluation report ESR-1955.
- The design, installation, conditions of use and identification of the Ramset T3 Power Driven Fasteners are in accordance with the 2015 *International Building Code®* (IBC) provisions noted in the master evaluation report ESR-1955.
- The design and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, as applicable.
- For seismic applications, the Ramset fasteners must comply with Section 4.1.5 of the master report ESR-1955.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.

- The allowable load values listed in the master evaluation report and tables are for the connection of the fasteners to normalweight concrete, lightweight concrete, lightweight concrete over metal decks, concrete masonry and steel. The connection between the fasteners and the connected members must be checked for capacity (which may govern).

This supplement expires concurrently with the master report, reissued August 2017 and revised March 2018.

Ramset®-I-F
Insulation Fastening System

The Thermal Break Fastener that Installs in Seconds

Ramset-I-F


Above acoustical ceilings


Foundations & basements


Interior walls on concrete block


Behind cladding over wood stud walls


Behind cladding over concrete block walls


Behind cladding over steel stud walls

Ramset-I-F Insulation Fastening System Is...

Safer and up to 4X faster than stick-pin fasteners:

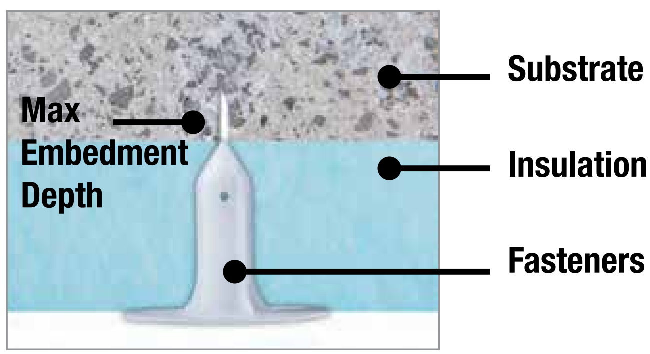
- No need to pre-measure fastener location or prepare substrate
- No need to wait for fastener plate adhesive to dry
- No need for fastener pins base plate
- No need to push washers on pins and trim pin length
- No need to tape over washers

Safer than gun-powder-driven fastening:

- Delivers less recoil to the installer
- No spent powder casings on the jobsite
- Does not require installer licensing

Safer and faster than screw and washer fasteners:

- Delivers less torque to the installer's wrist and elbow
- Does not require assembly
- Drives faster than a screw taps



Ramset-I-F will fasten into:

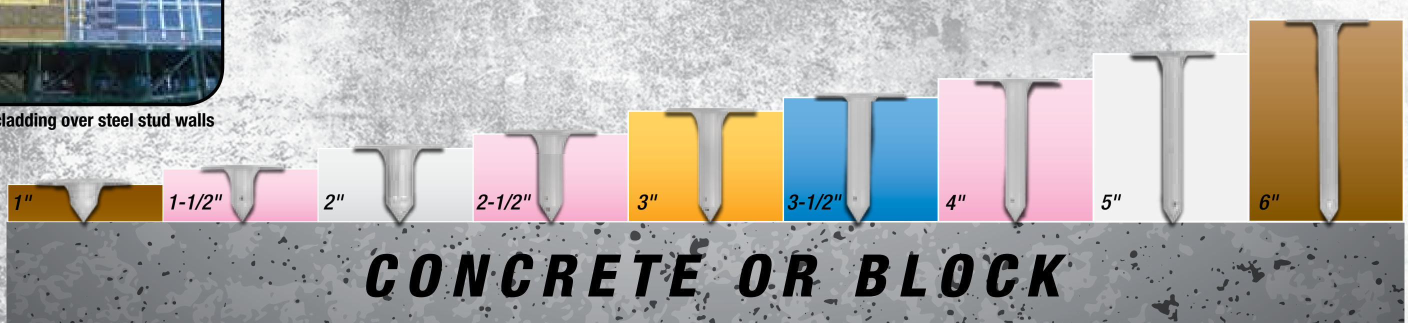

Mineral Wool


Extruded Polystyrene


Expanded Polystyrene


Fiberglass


Polyisocyanurate



Ramset-I-F®

Integrated Cap
For improved thermal efficiency and esthetics

Flanges to ensure the insulation remains in place, the insulation panel does not slide on fastener during the installation process

Specialty Shaped Shaft – Reduces friction and force required to insert fastener into insulation

Point designed to pierce difficult insulation material

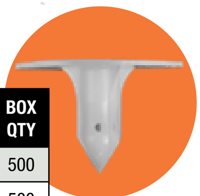
Engineered curved design limits insulation compression which enables full thermal performance

C Series pin provides exceptional performance in the hardest conrete.

S Series pin is equipped with a 2" spiral steel stud pin which fastens insulation through exterior gypsum sheathing to exterior steel or wood studs

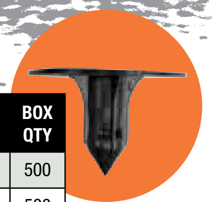
Selection Charts:

FASTENERS FOR CONCRETE AND CMU

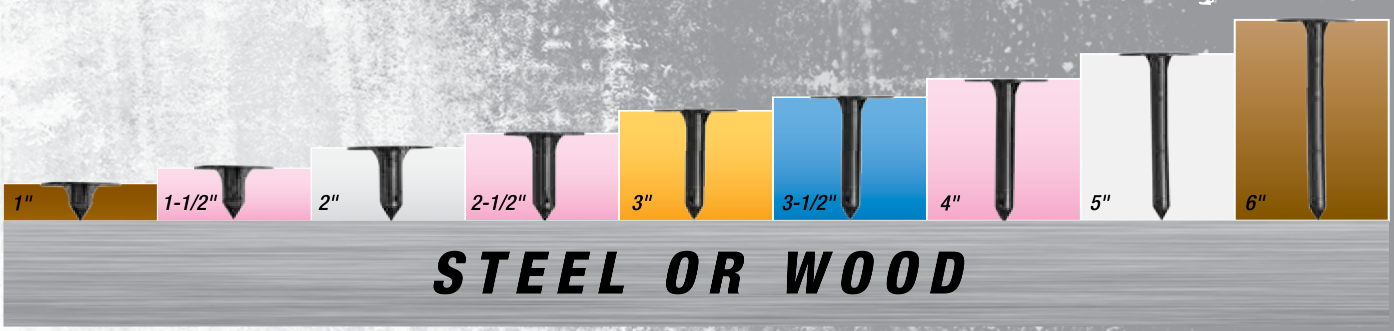


PART NUMBER	DESCRIPTION	INSULATION THICKNESS	BOX QTY
IFC-100v2	1" Ramset-I-F w/Concrete Pin	1"	500
IFC-112v2	1-1/2" Ramset-I-F w/Concrete Pin	1-1/2"	500
IFC-200v2	2" Ramset-I-F w/Concrete Pin	2"	500
IFC-212v2	2-1/2" Ramset-I-F w/Concrete Pin	2-1/2"	500
IFC-300v2	3" Ramset-I-F w/Concrete Pin	3"	500
IFC-312v2	3-1/2" Ramset-I-F w/Concrete Pin	3-1/2"	500
IFC-400v2	4" Ramset-I-F w/Concrete Pin	4"	500
IFC-500v2	5" Ramset-I-F w/Concrete Pin	5"	500
IFC-600v2	6" Ramset-I-F w/Concrete Pin	6"	400
T3IF-6v2	T3 Ramset-I-F Tool (6" Capacity)	-	1
T3FUEL	Fuel Cells	-	1

FASTENERS FOR STEEL OR WOOD STUDS



PART NUMBER	DESCRIPTION	INSULATION THICKNESS	BOX QTY
IFS-100	1" Ramset-I-F w/Steel Pin	1"	500
IFS-112	1-1/2" Ramset-I-F w/Steel Pin	1-1/2"	500
IFS-200	2" Ramset-I-F w/Steel Pin	2"	500
IFS-212	2-1/2" Ramset-I-F w/Steel Pin	2-1/2"	500
IFS-300	3" Ramset-I-F w/Steel Pin	3"	500
IFS-312	3-1/2" Ramset-I-F w/Steel Pin	3-1/2"	500
IFS-400	4" Ramset-I-F w/Steel Pin	4"	500
IFS-500	5" Ramset-I-F w/Steel Pin	5"	500
IFS-600	6" Ramset-I-F w/Steel Pin	6"	400
T3IF-6	T3 Ramset-I-F Tool (6" Capacity)	-	1
T3fuel	Fuel Cells	-	1



Ramset-I-F

Performance

		Insulation Thickness					
		1 in	2 in	3 in	4 in	5 in	6 in
Reference	U – Factor (W/m2 °C)	1.1786	0.7122	0.5103	0.3976	0.3257	0.2758
	Efficiency (%)	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
Stick Pin	U – Factor (W/m2 °C)	1.2422	0.7706	0.5597	0.4397	0.3621	0.3078
	Efficiency (%)	**94.88%**	**92.42%**	**91.17%**	**90.43%**	**89.94%**	**89.59%**
Ramset-I-F	U – Factor (W/m2 °C)	1.1845	0.7162	0.5132	0.3999	0.3276	0.2773
	Efficiency (%)	**99.50%**	**99.45%**	**99.44%**	**99.43%**	**99.42%**	**99.42%**

For tool repair, please visit www.**ramsetrepair.com** or call **800-222-6990**.

CONCRETE

PART NUMBER SERIES	SHANK DIAMETER (INCH)	MINIMUM. PENETRATION (INCH)	INSTALLED IN STONE AGGREGATE CONCRETE			
			MINIMUM CONCRETE COMPRESSIVE STRENGTH (PSI)			
			2000 PSI		4000 PSI	
			TENSION	SHEAR	TENSION	SHEAR
IFC	0.125	5/8	83 - 414	109 - 611	78 - 426	80 - 574
		3/4	107 - 541	156 - 855	104 - 593	195 - 977

HOLLOW CONCRETE BLOCK

PART NUMBER SERIES	SHANK	MINIMUM.	3000 PSI LT WT CONCRETE		HOLLOW CONCRETE MASONRY UNITS (CMU) - ANY LOCATION	
			TENSION	SHEAR	TENSION	SHEAR
IFC	0.125	5/8	84 - 418	108 - 540	20 - 243	34 - 264
		3/4	108 - 540	173 - 864	-----	-----

STEEL STUDS

PART NUMBER SERIES	SHANK DIAMETER (INCH)	INSTALLED IN COLD FORMED STEEL FRAMING (lbf)					
		22 Gage	20 Gage	18 Gage	16 Gage	14 gage	12gage
IFS (Knurled)	0.100	20 - 120	33 - 200	46 - 280	60 - 360	62 - 371	75 - 448

WOOD

PART NUMBER SERIES	SHANK DIAMETER (INCH)	INSTALLED IN 15/32" (1/2 NOMINAL) 4 PLY PLYWOOD SHEATHING (lbf)
IFS (Knurled)	0.100	16-93

Add this specification to the project...

Specification: CSI Division07-Thermal and moisture protection insulation shall be mechanically fastened to the building substrate or component with Ramset-I-F Thermal-Break insulation fasteners from ITW Ramset, Glendale Heights, IL.

Ramset

700 High Grove Blvd. • Glendale Heights, IL 60139
phone: 800-848-5611 • www.ramset.com

Evaluations:

ICC-ESR-1955
ASTM E331 (Water Penetration)
ASTM 2.78 (Air Leakage)
ASTM 84 (Surface Burning Characteristics)

Fastener Specifications:

- Pin Material: Heat treated carbon steel
- Pin Finish: Mechanical Zinc Plated
- Washer Material: High Density Polyethylene (HDPE)
- Pin Diameter: 0.125
- 2-3/8" Holding Diameter
- The fastener assembly is clearly branded Ramset along with the length of the fastener assembly

		Ramset-I-F	STICK PINS	PAT
SYSTEM COMPATIBILITY	**INSULATION TYPE**			
	Rigid	Yes	Yes	Yes
	Semi-rigid (rockwool)	Yes	Yes	Not Recommended
	Delta membrane + insulation	Yes	No	No
	Insulation thickness	1” to 6”	1” to 6”	1” to 4-3/4”
	Washer incremental	1/2” incriments 1-4” 1” incriments 4-6”	Random	Not relevant (metric)
	Insulation compression @ fastener	No	Yes	Yes
	SUBSTRATE COMPATABILITY			
	Concrete	Yes	Yes	Yes
	Hollow Block	Yes	Yes	No
	Steel	Yes	Yes	Yes
	Gypsum board + steel stud	Yes	Yes	No
	Vapor membrane	Yes	Not Recommended	No Published
	Wood Frame	Yes	No	No
STRENGTH	**PULLOUT STRENGTH (ULTIMATE - LBS)**			
	Concrete	211	6	240
	Hollow Block	184	6	-
	Steel	360	6	387
	Gypsum board + steel stud (20Ga)	200	6	-
LABOR	*Productivity (avg 1,000 sqft)*	20 min	2 days 6h	24 min
	Surface preparation	No	Cleaning + Chalk Lining	No
	Working Temp (F)	0 to 113	30.2 to 104	-4 to 113
	Cure Time	No	48h	No
	Health Hazards & VOC Emissions	0	404.5 g/L	Lead exposure + fatigue
	Licensing Required	No	No	Yes
	Operator Fatigue	Low fatigue	High	High
	Price (Material +Labor-avg/sqft)	$0.62	$0.67	$0.62
THERMAL PROPERTIES	*Water Infiltration / Condensation Risk*	Low	High	Low
	Thermal Efficiency (6”)	99.4%	89.6%	77.7%

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