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Legacy report on the 1997 Uniform Building Code™

DIVISION: 03—CONCRETE
Section: 03150—Concrete Accessories

ITW RAMSET/RED HEAD TRAKFAST FASTENERS

ITW RAMSET/RED HEAD
1300 NORTH MICHAEL DRIVE
WOOD DALE, ILLINOIS 60191

1.0 SUBJECT

ITW Ramset/Red Head Trakfast Fasteners.

2.0 DESCRIPTION

2.1 General:

ITW Ramset/Red Head Trakfast Fasteners are drive pins used to attach cold-formed steel tracks to concrete, lightweight concrete, metal deck with lightweight concrete fill, concrete masonry units and steel. The fasteners have smooth shanks and are manufactured from steel conforming to AISI 1060 to 1062, with all fasteners except the FFP012 fasteners austempered to a Rockwell "C" hardness of 52 to 55. The FFP012 fasteners are for installations into steel and are austempered to a Rockwell "C" hardness of 54 to 56. All fasteners have a straight, smooth shank with a 0.109-inch (2.77 mm) diameter. Fasteners for installation into concrete have either a black oxide or a zinc-plated finish. Fasteners for installation into steel and concrete masonry have a zinc-plated finish.

2.2 Design:

The allowable shear and tension (pullout) service loads for Trakfast fasteners installed in concrete, structural lightweight concrete, metal deck with structural lightweight concrete fill, concrete masonry units, and steel are set forth in Tables 1 through 4. Earthquake load resistance is beyond the scope of this report. The stress increases or load reductions described in Section 1612.3 of the 1997 Uniform Building Code™ (UBC) are not allowed for wind loads acting alone or when combined with other loads. No stress increase is allowed for gravity loads acting alone. When fasteners are subjected to combined shear and tension loads, the following equation shall be met:

(Ps/Pt) + (Vs/Vt) <= 1

where:

- Ps = Applied service tension load.
Pt = Allowable service tension load.
Vs = Applied service shear load.
Vt = Allowable service shear load.

2.3 Installation:

The fasteners are installed with an ITW Ramset/Red Head Trakfast tool in accordance with ITW Ramset/Red Head recommendations, with fastener spacing and edge distances in accordance with Tables 1 through 4. Except as noted in Figure 1, concrete shall have a minimum thickness of 3 inches (76 mm). Installation is limited to dry, interior environments.

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

2.4 Connections of Drywall Tracks to Foundation:

Attachment of cold-formed steel tracks to the perimeter of concrete is allowed under the following conditions:

- 1. No cold joint exists between the slab and foundation below the plate.
2. No plate is installed on slabs supported by concrete block foundation walls.

2.5 Identification:

The Trakfast fasteners are identified by an "R" stamped onto the head of the fasteners. Packages bear the name and address of ITW Ramset/Red Head, along with fastener size, fastener type (Trakfast), part number and evaluation report number (ER-5001).

3.0 EVIDENCE SUBMITTED

Reports of fastener shear and tension tests; data in accordance with the Acceptance Criteria for Power-Driven Fasteners in Concrete, Steel and Masonry Elements (AC70), dated October 2003; and a quality control manual.

4.0 FINDINGS

That the ITW Ramset/Red Head Trakfast fasteners described in this report comply with the 1997 Uniform Building Code™ (UBC), subject to the following conditions:

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- 4.1 Fasteners are manufactured and identified in accordance with this report.
- 4.2 Fasteners are installed according to this report and instructions from ITW Ramset/Red Head.
- 4.3 The allowable tension and shear values comply with Section 2.2 of this report. Calculations demonstrating that the applied loads are less than the allowable loads described in this report shall be submitted to the building official for approval.
- 4.4 Use of fasteners in resisting earthquake loads is beyond the scope of this report.
- 4.5 The use of fasteners attaching cold-formed steel tracks to foundations complies with Section 2.4 of this report.
- 4.6 The fasteners are limited to dry, interior locations.
- 4.7 Allowable loads in Tables 1 through 3 are limited to installations in uncracked concrete and masonry. Cracking occurs when $f_t > f_r$ due to service loads and deformations.
- 4.8 Fasteners are limited to nonfire-resistive construction unless appropriate data is submitted to demonstrate that anchor performance is maintained in fire-resistive situations.

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

TABLE 1—ALLOWABLE SERVICE LOADS FOR TRAKFAST FASTENERS INSTALLED IN NORMAL-WEIGHT CONCRETE^{1,2}

SHANK DIAMETER (inch)	MINIMUM EMBEDMENT (inch)	MINIMUM SPACING (inches)	MINIMUM EDGE DISTANCE (inches)	CONCRETE COMPRESSIVE STRENGTH					
				2,000 psi		3,000 psi		4,000 psi	
				Tension (lbf)	Shear (lbf)	Tension (lbf)	Shear (lbf)	Tension (lbf)	Shear (lbf)
0.109	$\frac{5}{8}$	4	$\frac{3}{16}$	60	55	55	75	55	95
0.109	$\frac{3}{4}$	4	$\frac{3}{16}$	60	80	55	95	55	115

For SI: 1 lbf = 4.448 N, 1 inch = 25.4 mm, 1 psi = 6.895 kPa.

¹The fasteners must not be driven until the concrete has reached the designated ultimate compressive strength.

²The allowable shear and tension values are for the fasteners only. Steel members connected to the concrete must be investigated in accordance with accepted design criteria.

TABLE 2—ALLOWABLE SERVICE LOADS FOR TRAKFAST FASTENERS IN MINIMUM 3,000 psi STRUCTURAL LIGHTWEIGHT CONCRETE^{1,2}

SHANK DIAMETER (inch)	MINIMUM EMBEDMENT (inch)	MINIMUM SPACING (inches)	MINIMUM EDGE DISTANCE ³ (inches)	INSTALLED IN CONCRETE		INSTALLED THROUGH METAL DECK ⁴ (LOWER FLUTE)	
				Tension (lbf)	Shear (lbf)	Tension (lbf)	Shear (lbf)
0.109	$\frac{5}{8}$	6	6	35	55	30	205
0.109	$\frac{3}{4}$	6	6	80	100	40	235

For SI: 1 lbf = 4.448 N, 1 inch = 25.4 mm, 1 psi = 6.895 kPa, 1 ksi = 6.895 MPa.

¹The fasteners must not be driven until the concrete has reached the designated ultimate compressive strength.

²The allowable shear and tension values are for the fasteners only. Steel members connected to the concrete must be investigated in accordance with accepted design criteria.

³For fasteners installed through metal deck, minimum edge distance is $1\frac{1}{8}$ inches from the edge of the deck rib and 6 inches from the end of the deck.

⁴The allowable values are applicable to fasteners installed through the underside of a steel deck at the ribs and into minimum 3,000 psi structural lightweight concrete. See Figure 1. The steel deck must have a minimum base-metal thickness of 0.034 inch and shall conform to ASTM A653 SS Grade 40. For ASTM A 653 SS Grade 33 deck with a yield strength of 33 ksi, the tabulated shear values must be multiplied by 0.68. For steel decks having a yield strength of 38 ksi, tabulated shear values must be multiplied by 0.78.

TABLE 3—ALLOWABLE SERVICE LOADS FOR TRAKFAST FASTENERS INSTALLED IN CONCRETE MASONRY UNITS^{1,2,3}

SHANK DIAMETER (inch)	MINIMUM EMBEDMENT (inch)	MINIMUM SPACING (inches)	MINIMUM EDGE DISTANCE (inches)	HOLLOW CMU (ANY LOCATION)	
				Tension (lbf)	Shear (lbf)
0.109	$\frac{5}{8}$	6	5	35	50

For SI: 1 lbf = 4.448 N, 1 inch = 25.4 mm.

¹The allowable shear and tension values are for the fasteners only. Steel members connected to the concrete masonry shall be investigated in accordance with accepted design criteria.

²Concrete masonry units shall be Grade N, Type 1, units conforming to UBC Standard 21-4. Mortar shall conform to Table 21-A of the UBC as Type S, cement-lime mortar.

³Face shell thickness of the concrete masonry units shall be a minimum of $1\frac{1}{4}$ inches.

TABLE 4—ALLOWABLE SERVICE LOADS FOR TRAKFAST FASTENERS INSTALLED IN ASTM A 36 STEEL¹

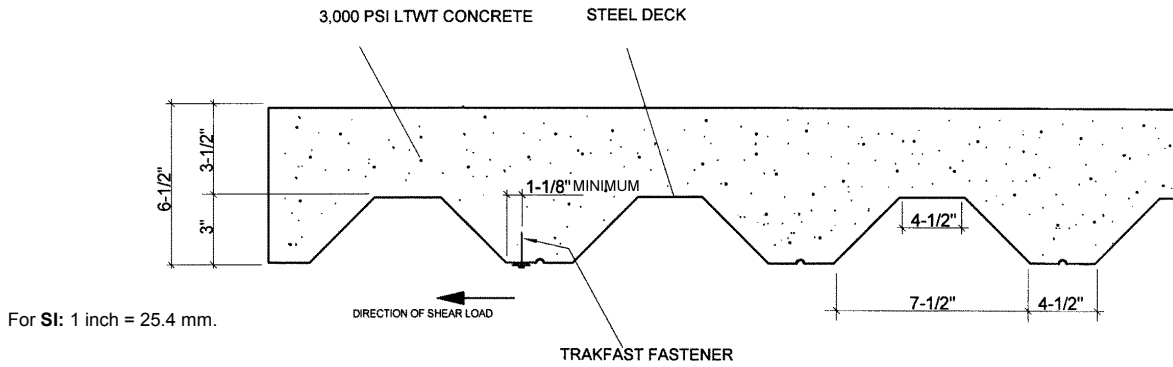
FASTENER PART NUMBER	SHANK DIAMETER (inch)	MINIMUM SPACING (inch)	MINIMUM EDGE DISTANCE (inch)	STEEL THICKNESS (inch)					
				^{3/16} ²		^{1/4} ²		^{3/8} ³	
				Tension (lbf)	Shear (lbf)	Tension (lbf)	Shear (lbf)	Tension (lbf)	Shear (lbf)
FPP012	0.109	1	^{1/2}	195	292	223	278	181	186

For SI: 1 lbf = 4.448 N, 1 inch = 25.4 mm.

¹The allowable shear and tension values are for the fasteners only. Steel members connected to the steel must be investigated in accordance with accepted design criteria.

²Fasteners installed in ^{3/16}- and ^{1/4}-inch-thick steel shall penetrate the steel such that the shank pierces the steel and protrudes 0.16 and 0.10 inch, respectively.

³Fasteners shall have 0.32-inch fastener penetration when installed into ^{3/8}-inch-thick steel.



For SI: 1 inch = 25.4 mm.

SECTION - COMPOSITE DECK - NO SCALE

FIGURE 1—TRAKFAST FASTENER INSTALLATION LOCATION IN COMPOSITE DECK