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Legacy report on the 1997 Uniform Building Code™, the 2000 International Building Code®, and the 2000 International Residential Code®

DIVISION: 03—CONCRETE
Section: 03150—Concrete Accessories

POWERS TRAK-IT FASTENERS

POWERS FASTENERS, INC.
2 POWERS SQUARE
NEW ROCHELLE, NEW YORK 10801

1.0 SUBJECT

Powers Trak-It Fasteners for Concrete, Masonry and Steel.

2.0 DESCRIPTION

2.1 General:

Powers Trak-It fasteners are smooth-shank drive pins designed to attach cold-formed steel tracks to a variety of base materials, including normal-weight concrete, structural lightweight concrete, concrete masonry units, steel, and metal decking with structural lightweight concrete fill.

The fasteners are collated into plastic strips of ten fasteners each, available in various lengths. Fasteners with a 3/4-inch (19.1 mm) length have a 0.102-inch (2.6 mm) diameter and a black oxide finish.

The fasteners are alternatives to cast-in-place anchors described in Section 1923.1 of the 1997 Uniform Building Code™ (UBC) and Section 1912 of the 2000 International Building Code® (IBC).

2.2 Design:

The allowable tension (pullout) and shear service loads for Trak-It fasteners installed in accordance with this report are listed in Tables 1 through 5. Earthquake load resistance is beyond the scope of this report.

vertical loads acting alone. Allowable loads for anchors subjected to combined tension and shear forces are determined by the following equation:

(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:

Powers Trak-It fasteners are installed with a liquid fuel cell combustion-fastening tool in accordance with the Powers Fasteners, Inc., recommendations.

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 the foundation below the plate.
2. No track is installed on slabs supported by masonry foundation walls.

2.5 Identification:

The Powers Trak-It fasteners are identified by a "P" stamped onto the head of the drive pin. Packages bear the company name of Powers Fasteners, Inc., along with a label that denotes the fastener catalog number, length and diameter, and evaluation report number (ER-6157).

3.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Interim Criteria for Power-driven Fasteners in Concrete, Steel, and Masonry Elements (AC70), dated September 1995, and a quality control manual.

4.0 FINDINGS

That the Powers Trak-It fasteners described in this report comply with the 1997 Uniform Building Code™, the 2000 International Building Code® and the 2000 International Residential Code® (IRC), subject to the following conditions:

ICC-ES legacy reports are not to be construed as representing aesthetics or any other attributes not specifically addressed, nor are they to be construed as an endorsement of the subject of the report or a recommendation for its use.



- 4.1 Fasteners are manufactured and identified in accordance with this report. Fastener sizes, dimensions, and installation are as set forth in this report and according to instructions from the manufacturer.
- 4.2 Allowable tension and shear values comply with Section 2.2 of this report.
- 4.3 Calculations justifying that the applied loads comply with this report are 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 to attach cold-formed steel tracks to foundations complies with Section 2.4 of this report.
- 4.6 The use of fasteners is limited to installation in uncracked concrete or masonry. Cracking occurs when $f_t > f_r$ due to service loads or deformations.
- 4.7 Fasteners are limited to nonfire-resistive construction (UBC) or nonfire-resistance-rated construction (IBC or IRC) unless appropriate data is submitted to demonstrate that anchor performance is maintained in fire-resistive or fire-resistance rated situations.
- 4.8 Fasteners are limited to dry, interior locations.

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

TABLE 1—ALLOWABLE SERVICE LOADS FOR TRAK-IT 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 | | 5,000 psi | |
| | | | | Tension (lbf) | Shear (lbf) | Tension (lbf) | Shear (lbf) | Tension (lbf) | Shear (lbf) | Tension (lbf) | Shear (lbf) |
| 0.102 | $\frac{3}{4}$ | 4 | 3 | 80 | 25 | 70 | 25 | 55 | 30 | 45 | 30 |
| 0.102 | $\frac{7}{8}$ | 4 | 3 | 85 | 25 | 70 | 25 | 50 | 30 | 35 | 30 |

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 tabulated compressive strength.

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

TABLE 2—ALLOWABLE SERVICE LOADS FOR TRAK-IT FASTENERS INSTALLED IN 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 (Lower Flute) | | | |
|-----------------------|--------------------------|--------------------------|---|-------------------------------|-------------|-------------------|-------------|--|-------------|-------------------|-------------|
| | | | | Concrete Compressive Strength | | | | Concrete Compressive Strength | | | |
| | | | | 3,000 psi minimum | | 3,500 psi minimum | | 3,000 psi minimum | | 3,500 psi minimum | |
| | | | | Tension (lbf) | Shear (lbf) | Tension (lbf) | Shear (lbf) | Tension (lbf) | Shear (lbf) | Tension (lbf) | Shear (lbf) |
| 0.102 | $\frac{3}{4}$ | 4 | 6 | 100 | 35 | 110 | 40 | 80 | 105 | 85 | 115 |
| 0.102 | $\frac{7}{8}$ | 4 | 6 | 110 | 45 | 120 | 50 | 85 | 120 | 90 | 130 |

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 its design compressive strength.

²The allowable tension and shear values are for the fasteners only. 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 inch 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. The steel deck must have a minimum base-metal thickness of 0.034 inch, a minimum yield point, F_y , of 33,000 psi, and conform to the Steel Deck Institute requirements for Standard Wide Rib Deck, Type B. Concrete fill must be at least $\frac{3}{4}$ inches above top ribs.

TABLE 3—ALLOWABLE SERVICE LOADS FOR TRAK-IT 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) |
| 0.102 | $\frac{7}{8}$ | 4 | $3\frac{3}{4}$ | 65 | 80 |

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

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

²Concrete masonry units must be Grade N, Type II, units conforming to ASTM Standard C 90.

³Fasteners must be placed into unit face only. Face shell thickness of the concrete masonry units shall be $\frac{1}{4}$ inches, minimum.

TABLE 4—ALLOWABLE SERVICE LOADS FOR TRAK-IT FASTENERS INSTALLED IN ASTM A 36 STEEL¹

| FASTENER TYPE | MINIMUM SPACING (inch) | MINIMUM EDGE DISTANCE (inch) | STEEL THICKNESS (inch) | | | | | | | |
|--|------------------------------|---------------------------------------|-----------------------------|----------------|----------------------------|----------------|----------------------------|----------------|----------------------------|----------------|
| | | | $\frac{3}{16}$ ² | | $\frac{1}{4}$ ³ | | $\frac{3}{8}$ ³ | | $\frac{1}{2}$ ³ | |
| | | | Tension (lbf) | Shear (lbf) | Tension (lbf) | Shear (lbf) | Tension (lbf) | Shear (lbf) | Tension (lbf) | Shear (lbf) |
| $\frac{1}{2}$ -inch-long step shank | 1 | $\frac{1}{2}$ | 130 | 120 | 115 | 120 | 115 | 120 | 110 | 120 |

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

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

²Fasteners installed in $\frac{3}{16}$ -inch-thick steel shall penetrate the steel such that the shank pierces the steel and protrudes $\frac{1}{8}$ inch.

³Fasteners installed in $\frac{1}{4}$ -, $\frac{3}{8}$ - and $\frac{1}{2}$ -inch-thick steel must have a minimum embedment depth of $\frac{1}{4}$ inch.

TABLE 5—ALLOWABLE SERVICE LOADS FOR TRAK-IT FASTENERS INSTALLED IN ASTM A 572 GRADE 50 STEEL¹

| FASTENER TYPE | MINIMUM SPACING (inch) | MINIMUM EDGE DISTANCE (inch) | STEEL THICKNESS (inch) | | | | | |
|--|------------------------------|---------------------------------------|----------------------------|-------------|----------------------------|-------------|----------------------------|-------------|
| | | | $\frac{1}{4}$ ² | | $\frac{3}{8}$ ² | | $\frac{1}{2}$ ³ | |
| | | | Tension (lbf) | Shear (lbf) | Tension (lbf) | Shear (lbf) | Tension (lbf) | Shear (lbf) |
| $\frac{1}{2}$ -inch-long step shank | 1 | $\frac{1}{2}$ | 95 | 115 | 65 | 90 | 25 | 55 |

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

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

²Fasteners installed in $\frac{1}{4}$ - and $\frac{3}{8}$ -inch-thick steel must have a minimum embedment depth of $\frac{3}{16}$ inch.

³Fasteners installed in $\frac{1}{2}$ -inch-thick steel must have a minimum embedment depth of $\frac{1}{8}$ inch.