RED HEAD®

CONCRETE ANCHORING SOLUTIONS

CONCRETE ANCHORING SPECIALISTS

RED HEAD

CELEBRATING 100 YEARS

1910 2010

PRODUCT & RESOURCE GUIDE

Welcome to the RED HEAD® Product and Resource Book

Our Product and Resource Book is not just a catalog of the quality RED HEAD Anchoring Systems so many of you have come to rely on, but a resource guide to give you the information you need to help you work better, faster and easier.

This highly detailed Application Section allows you to look up your trade or specialty, view a variety of practical applications and receive simple product recommendations. Along with the product recommendations you'll notice page numbers for easy reference to the product selection and specifications pages.

We are continuing the consolidation of our Adhesive Anchoring System under the RED HEAD brand name. The ***EPCON***® name is still prominent on our labels along with our RED HEAD logo. The adhesive anchoring products and formulas remain, providing versatile solutions.

As always this Product and Resource Book continues to provide a wealth of valuable information including: product approvals/listings, applications, selection charts, performance tables and installation steps.

Remember, if you ever need more information about ITW RED HEAD products, technology and service, contact your local distributor, or look on the back cover for a complete listing of ITW RED HEAD facilities. We welcome your calls and feedback, and look forward to answering any questions you might have.

www.itwredhead.com

RED HEAD®
CONCRETE ANCHORING SPECIALISTS

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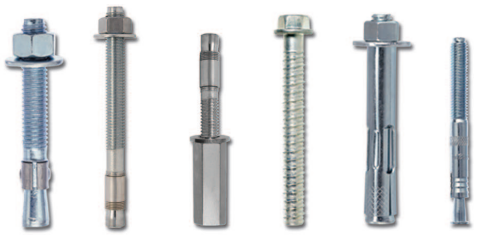
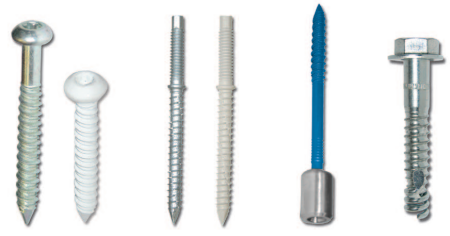
Fastening Applications Guide

Anchoring Systems



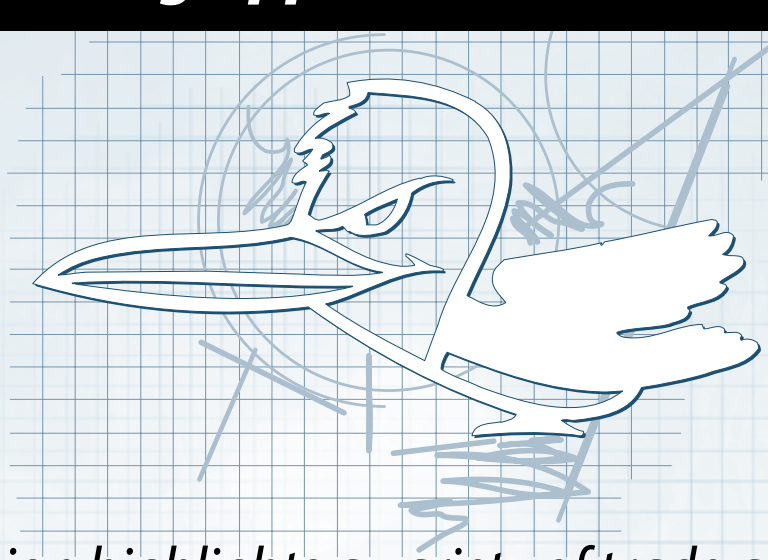


RED HEAD Adhesive Anchoring Systems

RED HEAD Mechanical Anchoring Systems

RED HEAD®

Fastening Applications Guide

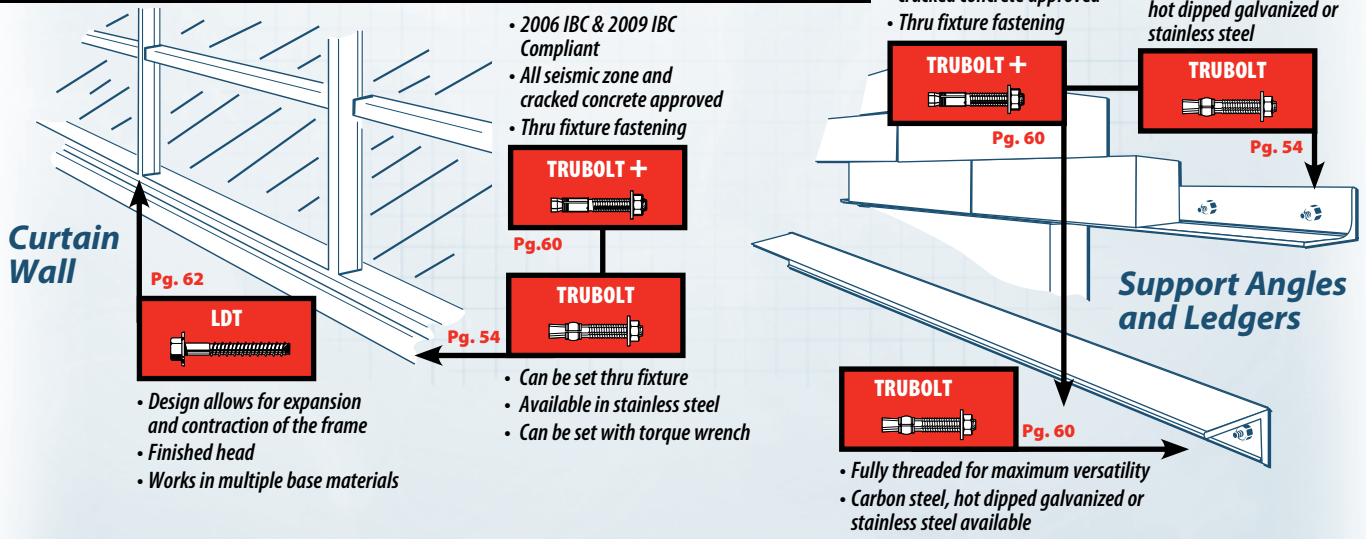


This section highlights a variety of trade applications and provides information that will assist you in selecting the best fastening system for your application.

While these are not to be considered complete, they will give you an idea of how contractors use our products.

For example, on the Electrical Contractor page, you will find applications, such as junction box/panel boards and suspended lighting. Next to the diagrams are the product name(s) and page number in this catalog where you will find complete information on these products needed for that particular application.

Curtain Wall Applications



For seismic recognition, see ICC-ES evaluation reports.

For installation guidelines for your application, please contact our Technical Services Department at 1-800-899-7890.

Electrical Contractor Applications

Junction Box/ Panel Boards

REDI-DRIVE Pg. 76

- Simple to install
- Drill hole, hammer Redi-Drive into hole
- Available in several head styles and lengths

TAPCON Pg. 80

- Counter sunk flathead style for flush installation
- Works in concrete or block
- Available in 3/16" and 1/4" diameters

Conduit Clip

REDI-DRIVE Pg. 76

- Simple to install
- Drill hole, hammer Redi-Drive into hole
- Available in several head styles and lengths

Suspended Lighting

MULTI-SET Pg. 67

- Available in special 3/8" version for precast planks
- Available in sizes 1/4" thru 3/4" internal thread diameters

Transformers Switch Gear Electrical Enclosures

TRUBOLT Pg. 54

- Available in carbon, hot dipped galvanized, 304 and 316 stainless steel

TRUBOLT + Pg. 60

- 2006 IBC & 2009 IBC Compliant
- All seismic zone and cracked concrete approved
- Thru fixture fastening

Unistrut-Cable Tray/Conduit

TRUBOLT Pg. 54

- Used with rod coupler
- 1/4" to 1" diameters

TRUBOLT + Pg. 60

- 2006 IBC & 2009 IBC Compliant
- All seismic zone and cracked concrete approved
- Thru fixture fastening

MULTI-SET Pg. 67

- Available in special 3/8" version for precast planks
- Available in sizes 1/4" thru 3/4" internal thread diameters

Light Standards Poles

A7 ADHESIVE Pg. 20

- Ideal for closely spaced groups of anchors

C6 ADHESIVE Pg. 31

- "Stress Free" anchor–can be used close to edges or in close spacing pattern

Wall Mounted Lighting

DYNABOLT Pg. 71

- Counter sunk and threshold head styles also available
- Works in concrete, block and brick

LDT Pg. 62

- Works in solid concrete, hollow block and brick
- Cuts a thread into the mounted surface
- Finished head appearance

Suspended Pipe or Conduit

MULTI-SET Pg. 67

- Available in special 3/8" version for precast planks
- Available in sizes 1/4" thru 3/4" internal thread diameters

PIPE DRIVE Pg. 76

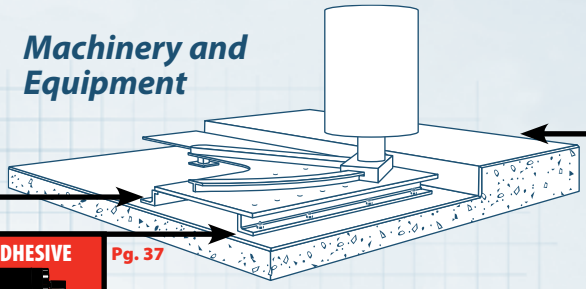
- Single piece anchors (no couplers!)
- Drill hole, hammer in
- 1/4" and 3/8" internally threaded inserts

For seismic recognition, see ICC-ES evaluation reports.

For installation guidelines for your application, please contact our Technical Services Department at 1-800-899-7890.

Mechanical Contractor Applications

Machinery and Equipment



LDT Pg. 62

- Vibration resistant
- Removable

G5 ADHESIVE Pg. 37

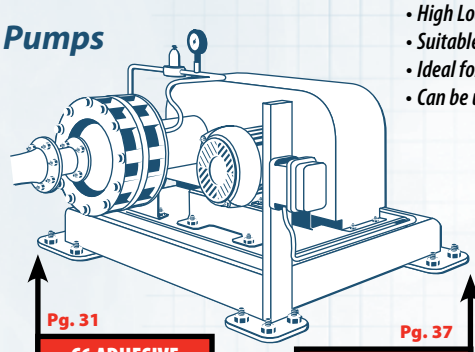
- High Load Capacity
- Suitable for use close to edge of slab
- Ideal for moderate to hot climates
- Can be used for oversized holes

Pg. 31

C6 ADHESIVE

- Vibration resistant
- Can be used in oversized and core drilled holes
- High load capacity

Pumps



Pg. 31

C6 ADHESIVE

- Corrosion resistant
- Vibration resistant
- NSF Approved

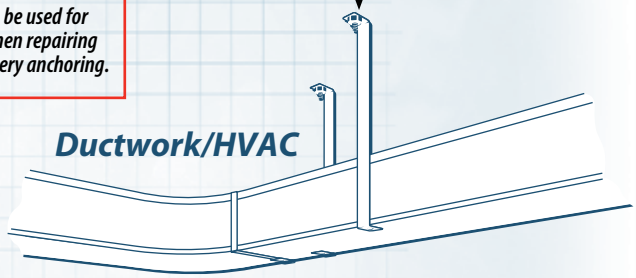
Pg. 37

G5 ADHESIVE

- High Load Capacity
- Suitable for use close to edge of slab
- Ideal for moderate to hot climates
- Can be used for oversized holes

NOTE:
*C6 and G5 both can be used for **oversized** holes when repairing pumps and machinery anchoring.*

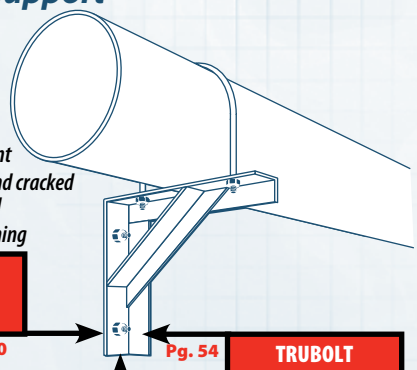
Ductwork/HVAC



- Simple to install–drill hole and hammer in
- Fire resistant

REDI-DRIVE Pg. 76

Heavy-Duty Pipe Support



- 2006 IBC & 2009 IBC Compliant
- All seismic zone and cracked concrete approved
- Thru fixture fastening

TRUBOLT + Pg. 60

Pg. 54

TRUBOLT

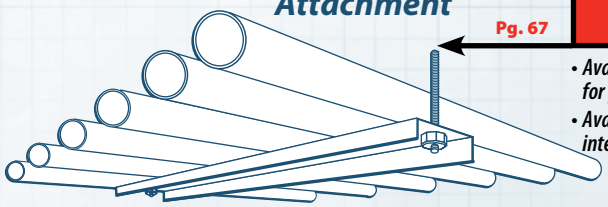
- Carbon, hot dipped galvanized, 304 and 316 stainless steel
- 1/4" to 1" diameters

Pg. 31

C6 ADHESIVE

- High load capacity
- Corrosion resistant
- NSF Approved

Pipe/Strut Attachment

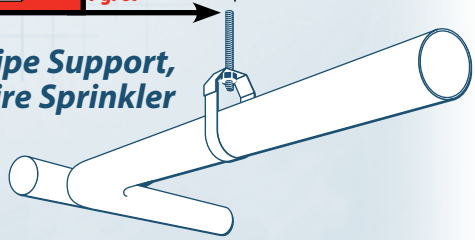


Pg. 67

MULTI-SET

- Available in special 3/8" version for prestressed concrete
- Available in 1/4" thru 3/4" internal thread diameters

Pipe Support, Fire Sprinkler



Pg. 76

PIPE DRIVE

- 1-piece design (no couplers!)
- Drill hole, hammer in
- 1/4" and 3/8" internal threads

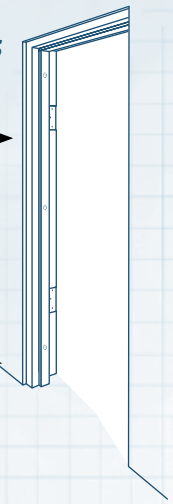
MULTI-SET Pg. 67

- Available in special 3/8" version for prestressed concrete
- Available in 1/4" thru 3/4" internal thread diameters

For seismic recognition, see ICC-ES evaluation reports.
For installation guidelines for your application, please contact our Technical Services Department at 1-800-899-7890.

Drywall Contractor & Carpenter Applications

Window and Door Frames



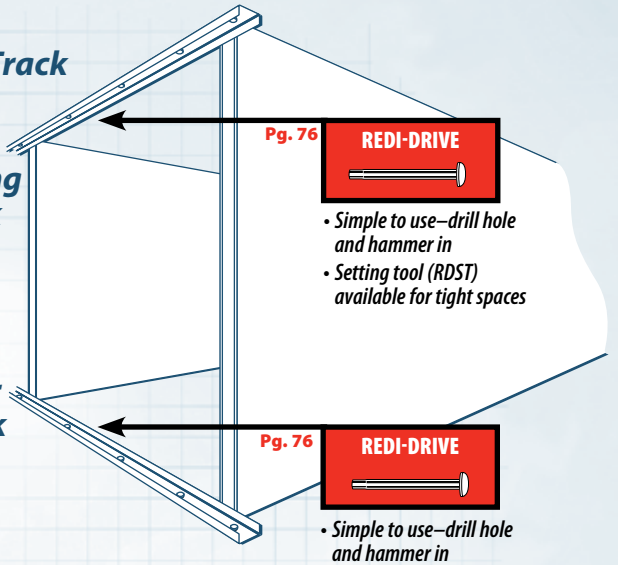
DYNABOLT Pg. 71

- Counter sunk and threshold head styles
- Works in concrete, block and brick

TAPCON Pg. 80

- Works in solid and hollow base material
- Removable
- Can be set flush with Phillips head if counter sunk

Drywall Track



Ceiling Track

Pg. 76 **REDI-DRIVE**

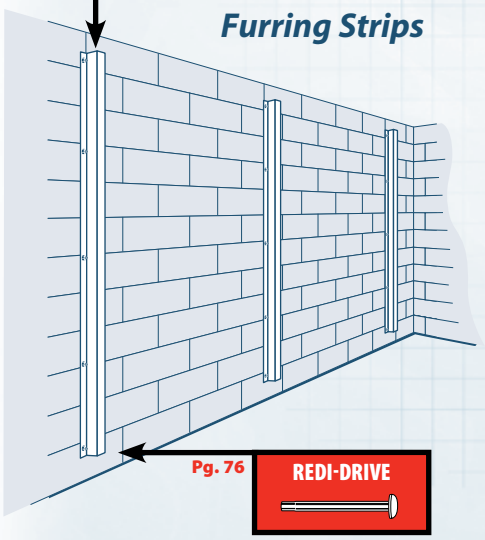
- Simple to use–drill hole and hammer in
- Setting tool (RDST) available for tight spaces

Floor Track

Pg. 76 **REDI-DRIVE**

- Simple to use–drill hole and hammer in
- Setting tool (RDST) available for tight spaces

Furring Strips



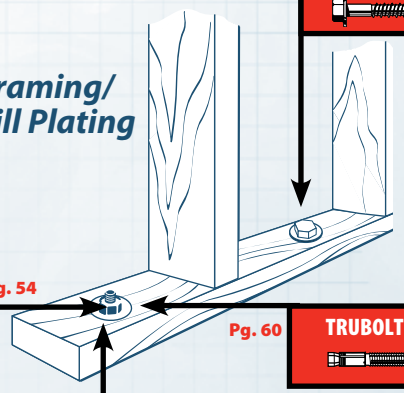
Pg. 80 **TAPCON**

- Counter sunk flathead style for flush installation
- Works in concrete or block
- Available in 3/16" and 1/4" diameters

Pg. 76 **REDI-DRIVE**

- Ideal for fastening to concrete or block
- Simple to use–drill hole and hammer in
- Setting tool (RDST) available for tight spaces

Framing/ Sill Plating



- Drill hole, drive in by hand or impact wrench

LDT Pg. 62

TRUBOLT Pg. 54

- Full threaded for maximum versatility
- Metro-Dade Approved
- Other approvals on page 55

Pg. 60 **TRUBOLT +**

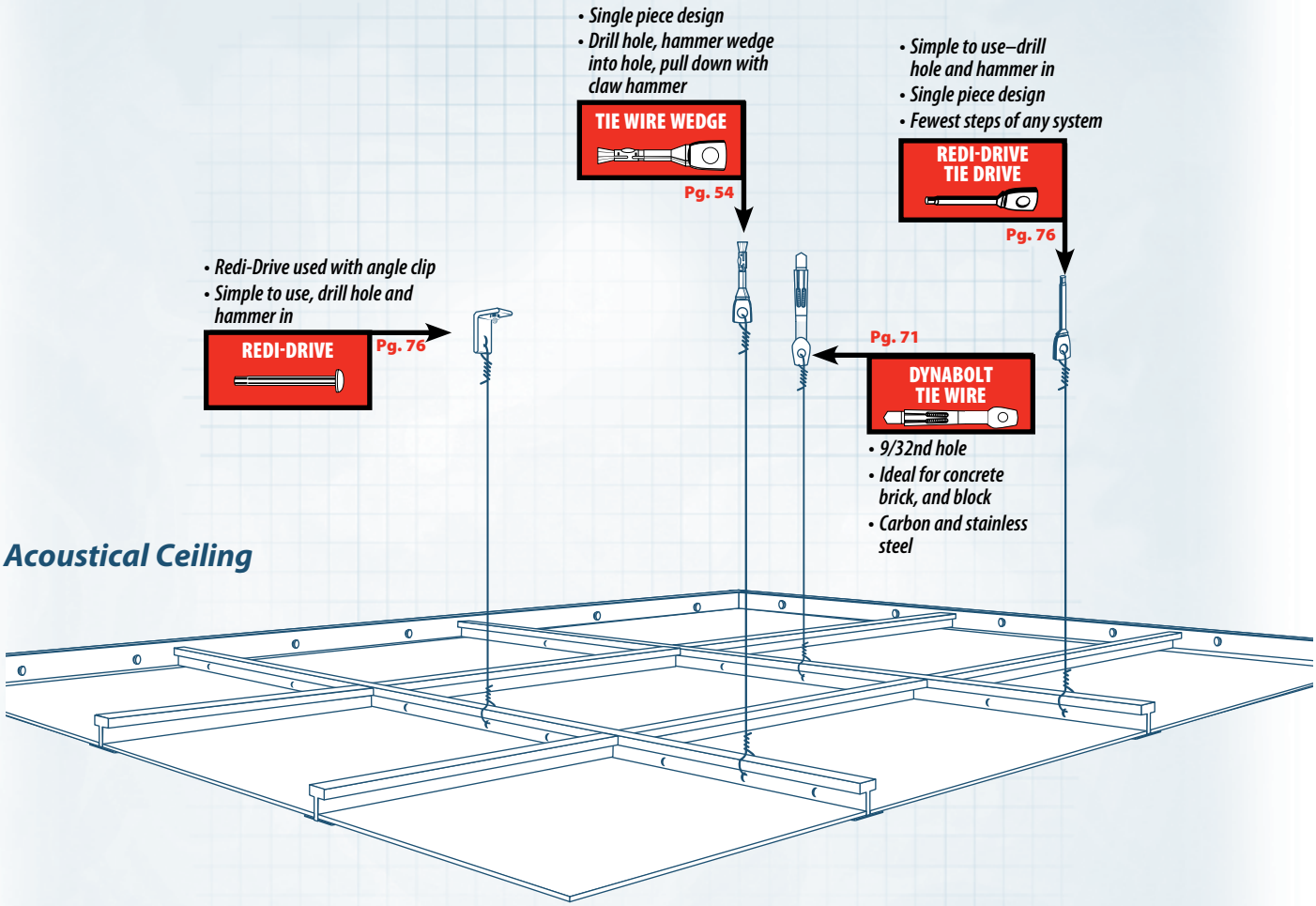
- 2006 IBC & 2009 IBC Compliant
- All seismic zone and cracked concrete approved
- Thru fixture fastening

Pg. 20 **A7 ADHESIVE**

- Fast cure
- Works in damp wet conditions
- Use A7 with threaded rod for this appplication

For seismic recognition, see ICC-ES evaluation reports.
For installation guidelines for your application, please contact our Technical Services Department at 1-800-899-7890.

Acoustical Ceiling Installer *Applications*



For seismic recognition, see ICC-ES evaluation reports.
For installation guidelines for your application, please contact our Technical Services Department at 1-800-899-7890.

Steel Erector Applications

Steel Beams/ Columns

Pg. 37

G5 ADHESIVE

- Longer working time for positioning of steel
- Can be used in oversized holes
- Works in wet/damp conditions

Pg. 20

A7 ADHESIVE

- Ideal for closely spaced groups of anchors

Pg. 96

BOA COIL

- High shear strength
- Removable
- Reusable

Stairs and Ladders

- 2006 IBC & 2009 IBC Compliant
- All seismic zone and cracked concrete approved
- Thru fixture fastening

TRUBOLT +

Pg. 60

TRUBOLT

Pg. 54

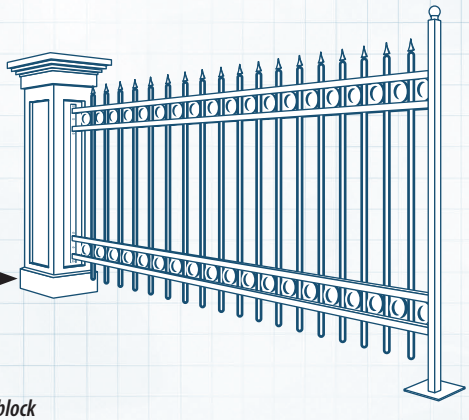
- Can be set thru fixture
- Fast and immediate loading

Pg. 62

LDT

- Finished head
- Removable
- For use in concrete

Ornamental Iron



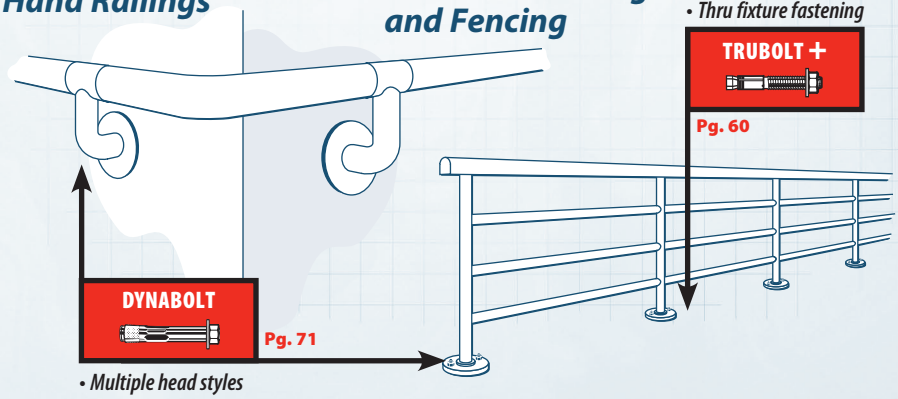
DYNABOLT

Pg. 71

- Multiple head styles
- Ideal for concrete, brick and block
- Carbon and stainless steel

Hand Railings

Protective Railings and Fencing



- 2006 IBC & 2009 IBC Compliant
- All seismic zone and cracked concrete approved
- Thru fixture fastening

TRUBOLT +

Pg. 60

DYNABOLT

Pg. 71

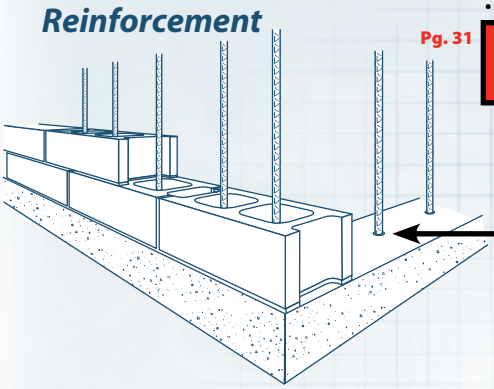
- Multiple head styles
- Ideal for concrete, brick and block
- Carbon and stainless steel

For seismic recognition, see ICC-ES evaluation reports.

For installation guidelines for your application, please contact our Technical Services Department at 1-800-899-7890.

Concrete & Masonry Contractor Applications

Concrete Block Reinforcement



- NSF Approved
- Vibration resistant
- Corrosion resistant

Pg. 31 **C6 ADHESIVE**

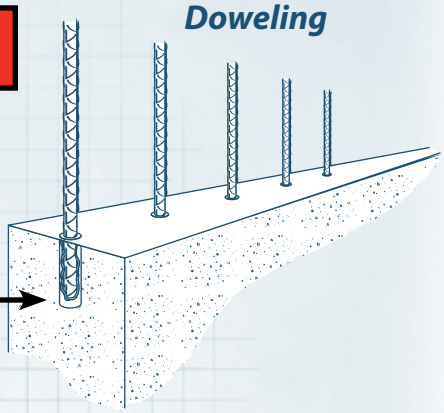
- Fast curing adhesive–ideal for moderate to hot climates

Pg. 37 **G5 ADHESIVE**

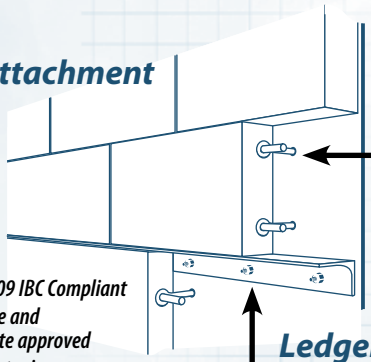
Pg. 20 **A7 ADHESIVE**

- Fast curing adhesive–ideal for moderate to cold climates

Rebar Doweling



Stone Attachment



- 2006 IBC & 2009 IBC Compliant
- All seismic zone and cracked concrete approved
- Thru fixture fastening

Pg. 54 **TRUBOLT +**

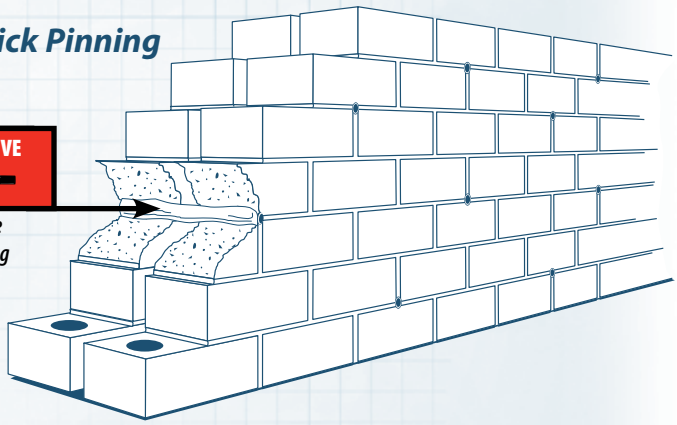
Pg. 60

TRUBOLT

- Fully threaded for maximum versatility
- Available in carbon, hot dipped galvanized and stainless steel

Ledger Angle Attachment

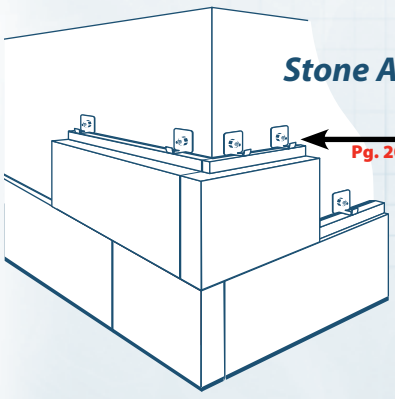
Brick Pinning



Pg. 20 **A7 ADHESIVE**

- Compact space
- No-drip–no sag formula
- Easy clean up

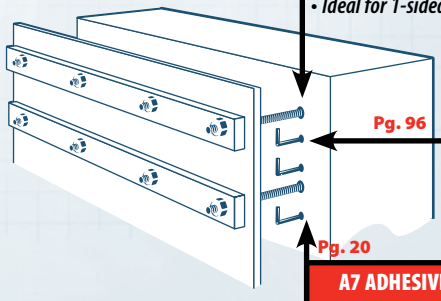
Stone Attachment



Pg. 20 **A7 ADHESIVE**

- High load capacity in concrete block
- No drip–no sag formula
- Easy clean up

Concrete Formwork



Pg. 67 **COIL THREAD DROP-IN ANCHOR**

- Designed for 1/2" and 3/4" coil rods
- Ideal for 1-sided forming

BOA COIL

Pg. 96

- High shear strength
- Removable
- Reusable

Pg. 20 **A7 ADHESIVE**

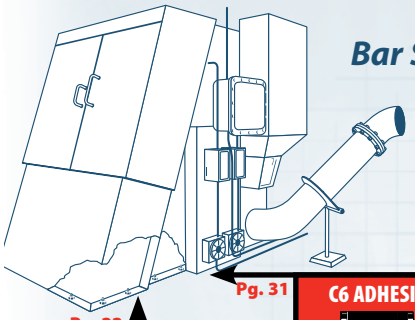
- Fast curing adhesive for rebar doweling

For seismic recognition, see ICC-ES evaluation reports.

For installation guidelines for your application, please contact our Technical Services Department at 1-800-899-7890.

Water & Waste Water Treatment *Applications*

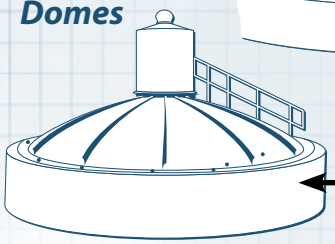
Bar Screens



Pg. 22
A7 ADHESIVE
- Fast dispensing, fast curing adhesive
- Works with epoxy coated dowels
- NSF Approved

Pg. 31
C6 ADHESIVE
- NSF Approved
- Vibration resistant
- Corrosion resistant

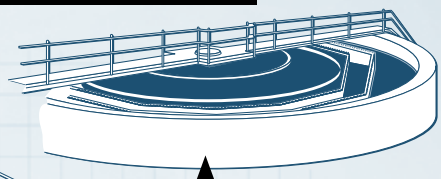
Covers and Domes



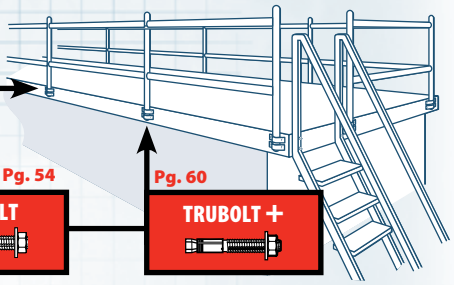
Pg. 31
C6 ADHESIVE
- NSF Approved
- Vibration resistant
- Corrosion resistant

Pg. 20
A7 ADHESIVE
- Fast dispensing, fast curing adhesive
- Works with epoxy coated dowels

Weirs and Gates



Railings and Ladders

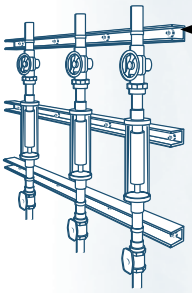


Pg. 31
C6 ADHESIVE
- NSF Approved
- Vibration resistant
- Corrosion resistant

Pg. 54
TRUBOLT
- Multiple head styles
- Heavy duty
- 360˚ hole contact
- 304 and 316 stainless steel

Pg. 60
TRUBOLT +
- 2006 IBC & 2009 IBC Compliant
- All seismic zone and cracked concrete approved
- Thru fixture fastening

Instrumentation and Controls



Pg. 54
TRUBOLT
- Multiple head styles
- Heavy duty
- 360˚ hole contact
- 304 and 316 stainless steel

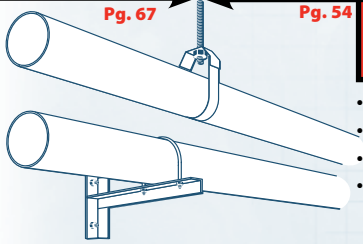
Pg. 60
TRUBOLT +
- 2006 IBC & 2009 IBC Compliant
- All seismic zone and cracked concrete approved
- Thru fixture fastening

Pipe Supports

- Special 3/8″ version for prestressed concrete
- Available in 1/4″ thru 3/4″ internal diameters
- Stainless steel available

MULTI-SET

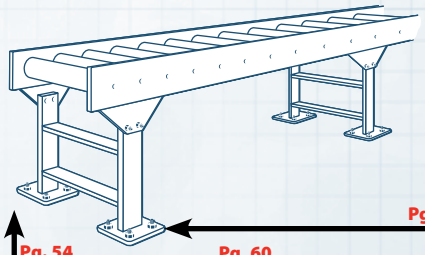
Pg. 67



Pg. 60
TRUBOLT +
- 2006 IBC & 2009 IBC Compliant
- All seismic zone and cracked concrete approved
- Thru fixture fastening

Pg. 54
TRUBOLT
- Multiple head styles
- Heavy duty
- 360˚ hole contact
- 304 and 316 stainless steel

Conveyors



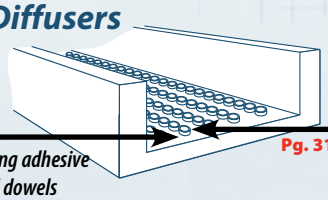
Pg. 62
LDT
- Finished head
- Removable
- Install by hand or with impact wrench

Pg. 54
TRUBOLT
- Fully threaded for maximum versatility
- Available in 304, 316 stainless steel, and galvanized steel

Pg. 60
TRUBOLT +
- 2006 IBC & 2009 IBC Compliant
- All seismic zone and cracked concrete approved
- Thru fixture fastening

Diffusers

Pg. 20
A7 ADHESIVE
- Fast dispensing, fast curing adhesive
- Works with epoxy coated dowels
- NSF Approved



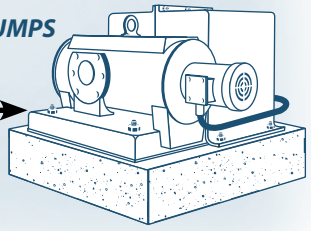
- NSF Approved
- Vibration resistant
- Corrosion resistant
- Can be installed underwater

Pg. 31
C6 ADHESIVE

Pumps

C6 ADHESIVE
- NSF Approved
- Vibration resistant
- Corrosion resistant
- Can be used in oversize holes

Pg. 31

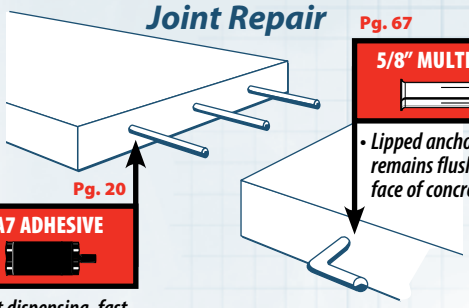


For seismic recognition, see ICC-ES evaluation reports.

For installation guidelines for your application, please contact our Technical Services Department at 1-800-899-7890.

Highway & Bridge Contractor Applications

Concrete Pavement Lane Addition and Joint Repair



Pg. 67
5/8" MULTI-SET
- Lipped anchor– remains flush with face of concrete

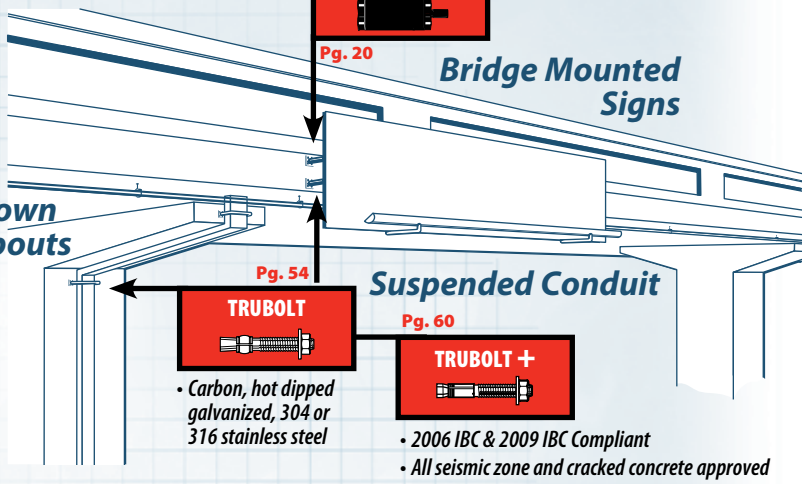
"J" Bolt

Pg. 20
A7 ADHESIVE
- Fast dispensing, fast curing adhesive
- Works with epoxy coated dowels

Bridge Mounted Signs

- Can be used overhead
- Full cure in 1/2 hour at 70 degrees F

A7 ADHESIVE
Pg. 20



Down Spouts

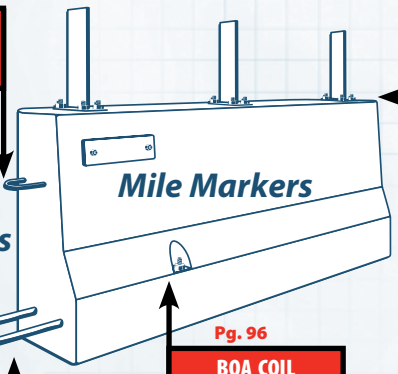
Suspended Conduit

Pg. 54
TRUBOLT
- Carbon, hot dipped galvanized, 304 or 316 stainless steel

Pg. 60
TRUBOLT +
- 2006 IBC & 2009 IBC Compliant
- All seismic zone and cracked concrete approved
- Thru fixture fastening

Glare Screens

Pg. 20
A7 ADHESIVE
- Fast curing
- Can be used in damp or water filled holes



Mile Markers

Pg. 62
LDT
- Finished head
- Removable
- Install by hand or with impact wrench

Wire Loops

Rebar Doweling

Pg. 96
BOA COIL
- High shear strength
- Removable
- Reusable

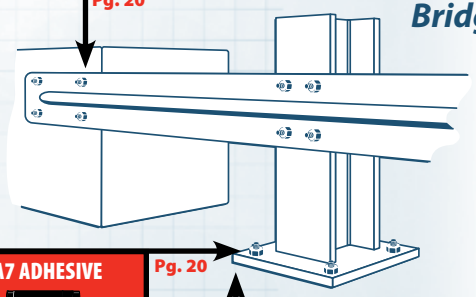
Pg. 20
A7 ADHESIVE
- Fast curing
- Can be used in damp or water filled holes

Temporary Fastening of Jersey Barriers to Concrete

- Can be used in wet/damp conditions
- Fast cure
- Easy to pump

A7 ADHESIVE
Pg. 20

Guard Rail Attachments to Bridges



A7 ADHESIVE
Pg. 20
- Can be used in wet/ damp conditions
- Fast cure
- Easy to pump

Steel Guard Rail Post Attachment to Concrete

Pg. 37
G5 ADHESIVE
- High Load Capacity
- Suitable for use close to edge of slab
- Ideal for moderate to hot climates
- Can be used for oversized holes

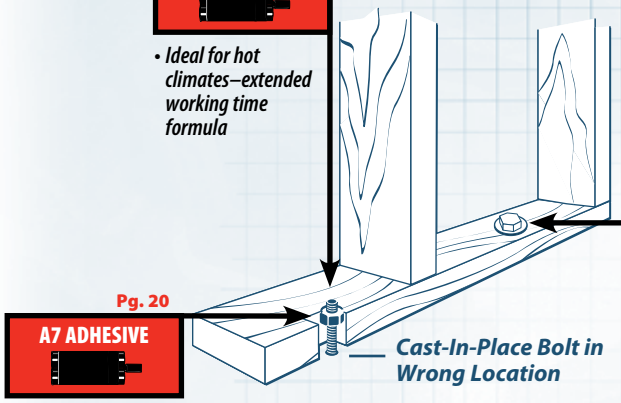
For seismic recognition, see ICC-ES evaluation reports.
For installation guidelines for your application, please contact our Technical Services Department at 1-800-899-7890.

Department of Transportation Approvals & Listings

For approvals contact local engineering on a per project basis.
Call your local RED HEAD sales person for more information.

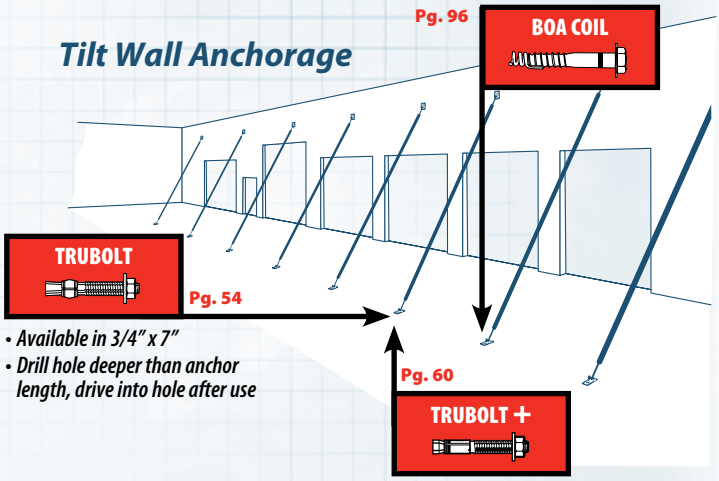
General Contractor Applications

Replacement of Misplaced Anchors

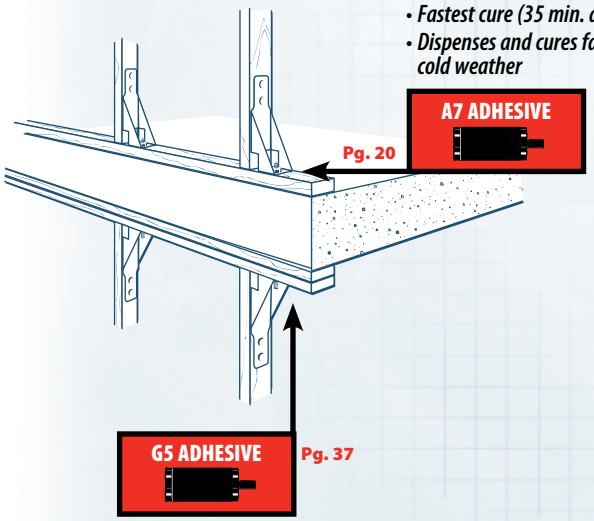


- Damp holes or underwater
- Fastest cure (35 min. at 60°F)
- Dispenses and cures faster in cold weather

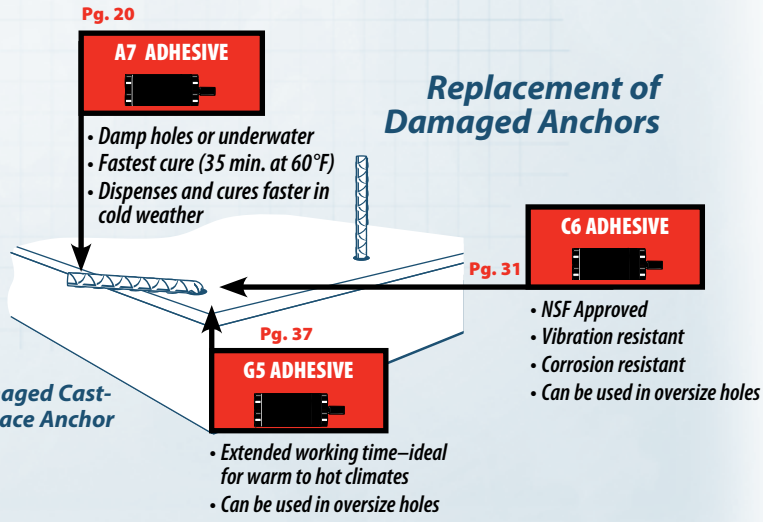
Tilt Wall Anchorage



Seismic Hold Downs



Replacement of Damaged Anchors

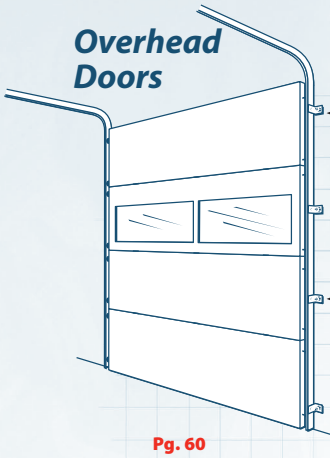


For seismic recognition, see ICC-ES evaluation reports.

For installation guidelines for your application, please contact our Technical Services Department at 1-800-899-7890.

Material Handling *Applications*

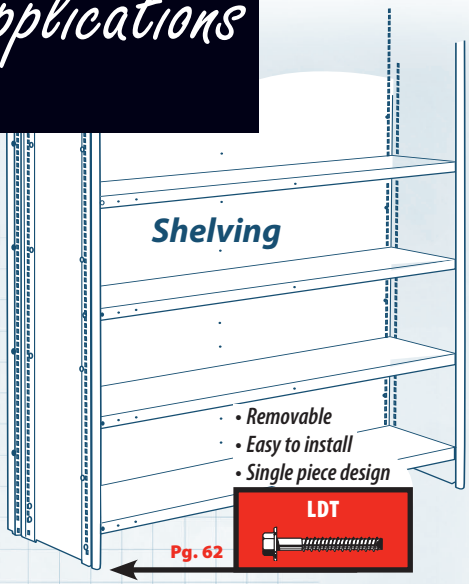
Overhead Doors



Pg. 62 — **LDT**
- Hand installation block or concrete

Pg. 20 — **A7 ADHESIVE WITH UMBRELLA**
- High load in hollow block or concrete

Shelving



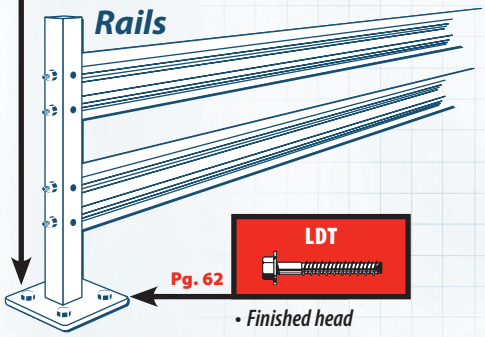
- Removable
- Easy to install
- Single piece design

Pg. 62 — **LDT**

Pg. 54 — **TRUBOLT WEDGE**
- Thru fixture fastening
- Available in hot-dipped galvanized steel

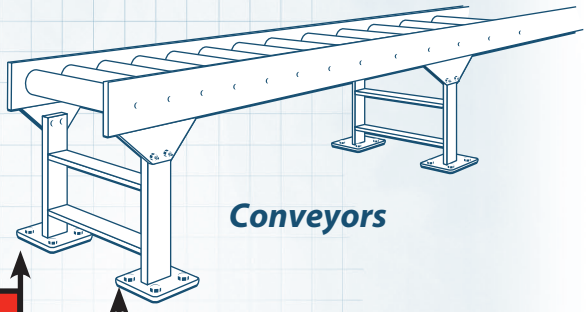
Pg. 60 — **TRUBOLT +**
- 2006 IBC & 2009 IBC Compliant
- All seismic zone and cracked concrete approved
- Thru fixture fastening

Rails



Pg. 62 — **LDT**
- Finished head
- Removable
- Installs with impact wrench

Conveyors

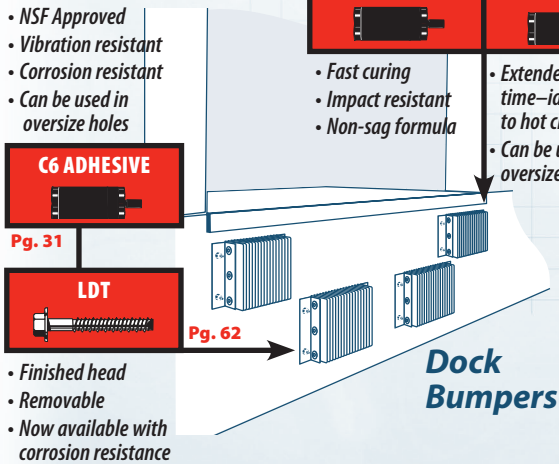


Pg. 62 — **LDT**
- Finished head
- Removable
- Installs with impact wrench
- Single piece design

Pg. 54 — **TRUBOLT WEDGE**
- Thru fixture fastening
- Installs fast with no spotting of holes

Pg. 60 — **TRUBOLT +**
- 2006 IBC & 2009 IBC Compliant
- All seismic zone and cracked concrete approved
- Thru fixture fastening

Dock Bumpers



Pg. 20 — **A7 ADHESIVE**
- Fast curing
- Impact resistant
- Non-sag formula

Pg. 37 — **G5 ADHESIVE**
- Extended working time–ideal for warm to hot climates
- Can be used in oversize holes

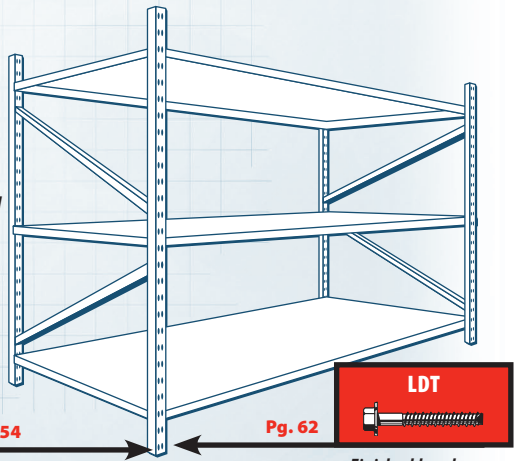
C6 ADHESIVE
- NSF Approved
- Vibration resistant
- Corrosion resistant
- Can be used in oversize holes

Pg. 31 — **LDT**

Pg. 62

- Finished head
- Removable
- Now available with corrosion resistance

Racks



- 2006 IBC & 2009 IBC Compliant
- All seismic zone and cracked concrete approved
- Thru fixture fastening

TRUBOLT +

Pg. 60 — **TRUBOLT WEDGE**

Pg. 54

- Thru fixture fastening
- Installs fast with no spotting of holes

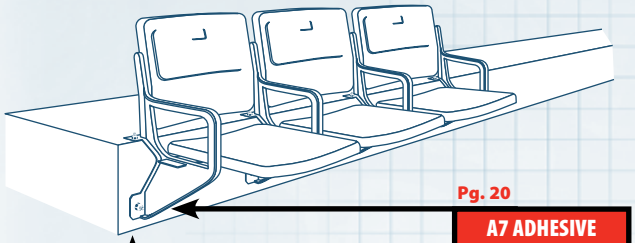
Pg. 62 — **LDT**
- Finished head
- Removable
- Installs with impact wrench
- Single piece design

For seismic recognition, see ICC-ES evaluation reports.

For installation guidelines for your application, please contact our Technical Services Department at 1-800-899-7890.

Specialty Applications

Stadium Seating

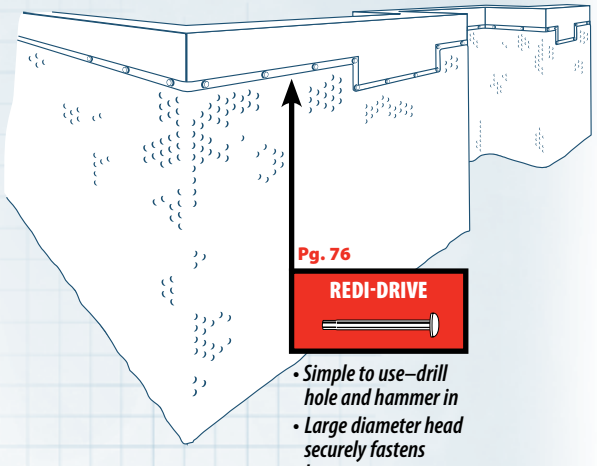


Pg. 20
A7 ADHESIVE
- Corrosion resistant
- Normal weight or lightweight concrete
- Used in major stadiums across the country

Pg. 60
TRUBOLT +
- 2006 IBC & 2009 IBC Compliant
- All seismic zone and cracked concrete approved
- Thru fixture fastening

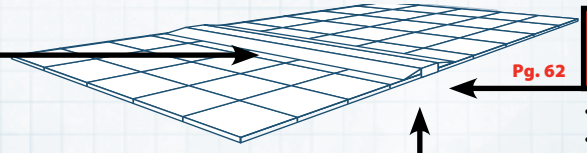
Pg. 54
TRUBOLT
- Corrosion resistant
- Normal weight or lightweight concrete
- Used in major stadiums across the country
- Immediate loading

Basement Wrap



Pg. 76
REDI-DRIVE
- Simple to use–drill hole and hammer in
- Large diameter head securely fastens basement wrap

Expansion Joints



Pg. 60
TRUBOLT +
- 2006 IBC & 2009 IBC Compliant
- All seismic zone and cracked concrete approved
- Thru fixture fastening

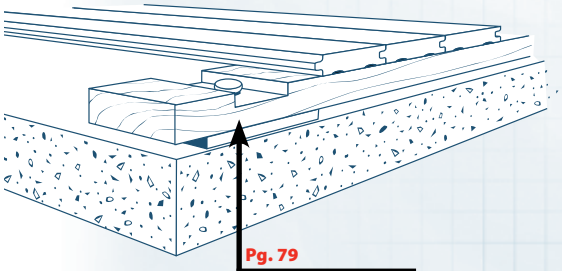
TRUBOLT WEDGE
- High load capacity
- Fast installation

Pg. 54

Pg. 62
LDT
- Finished head
- Removable
- Installs by hand or with impact wrench

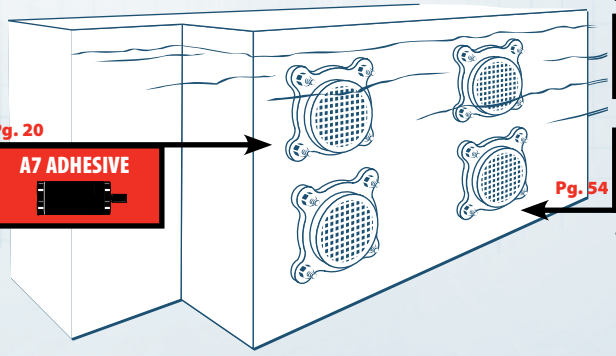
Pg. 37
G5 ADHESIVE
- High load capacity
- Suitable for use close to edge of slab

Flooring Systems



Pg. 79
REDI-DRIVE
- Simple to use–drill hole and hammer in
- Setting tool available for tight locations

Underwater Installation



- 2006 IBC & 2009 IBC Compliant
- All seismic zone and cracked concrete approved
- Thru fixture fastening

TRUBOLT +

Pg. 60
TRUBOLT WEDGE

Pg. 54
- Vibration resistant
- Corrosion resistant
- Available in 316 stainless steel

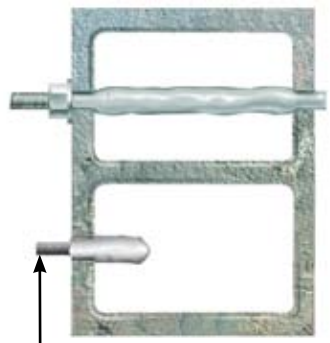
Pg. 20
A7 ADHESIVE

For seismic recognition, see ICC-ES evaluation reports.
For installation guidelines for your application, please contact our Technical Services Department at 1-800-899-7890.

RED HEAD®
CONCRETE ANCHORING SPECIALISTS

The Inside Story About Mechanical and Adhesive Anchors

Types, Base Materials, Installation Procedures and More



Top View

For attachments to single face of block, see page 43 for information on "umbrella anchors" and "stubby screens"

HOLLOW CONCRETE BLOCK

Maximum holding strength in concrete block can be obtained by fastening to both the front and back of the block using an adhesive screen tube and threaded rod.

TYPES OF ANCHORS

Expansion Type—

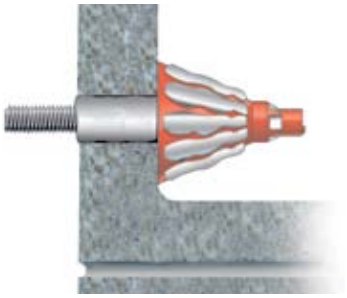
Tension loads are transferred to the base material through a portion of the anchor that is expanded inside the drill hole.

Examples: Red Head Trubolts, Dynabolts, Multi-Set II Anchors and Hammer-Sets

Adhesive Type—

Resistance to tension loads is provided by the presence of an adhesive between the threaded rod (or rebar) and the inside walls of the drill hole.

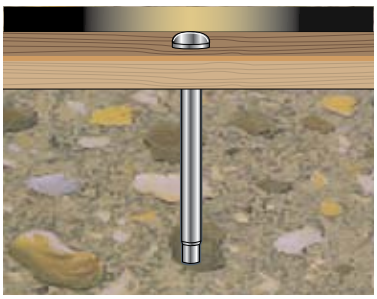
Examples: A7, C6, and G5 Adhesives



Keying Type—

Holding strength comes from a portion of an anchor that is expanded into a hollow space in a base material that contains voids such as concrete block or brick.

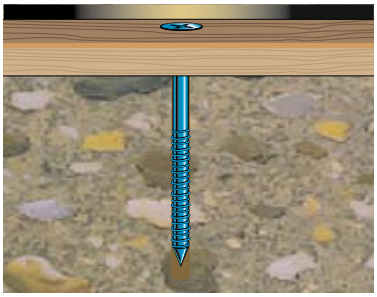
Examples: Adhesives used in screen tubes or umbrella insert



Friction Type—

Load capacity is created by driving a fastener into a pre-drilled hole that is slightly smaller than the fastener itself.

Examples: Redi-Drives



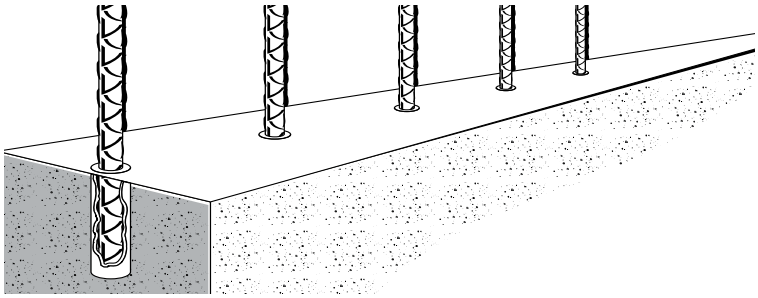
Mechanical Interlocking Type—

Tension loads are resisted by threads on the fastener engaging with threads cut into the base material.

Examples: LDT, Tapcon and E-Z Ancors

Anchoring Working Principles

BASE MATERIALS



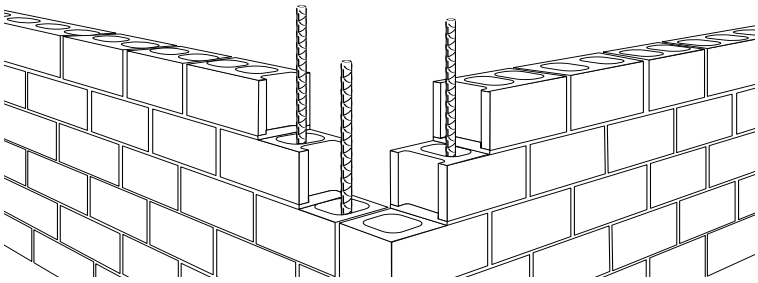
Concrete

Normal Weight Concrete is made from Portland cement, coarse and fine aggregates, water and various admixtures. The proportioning of these components controls the strength of the concrete. In the United States, concrete strength is specified by the compressive strength* of concrete test cylinders. These test cylinders measure six inches in diameter by 12 inches in length and are tested on the 28th day after they are produced.

Lightweight Concrete consists of the same components (cement, coarse and fine aggregates, water and admixtures) as normal weight concrete, except it is made with lightweight aggregate. One of the most common uses of lightweight concrete has been as a structural fill of steel decking in the construction of strong, yet light floor systems.

Typical fasteners for both normal weight and lightweight concrete include Trubolt Wedge Anchors, LDT Self-Threading Anchors, Dynabolt Sleeve Anchors, Multi-Set II Drop-In Anchors, Stud Anchors and Adhesive Anchoring Systems.

* Compressive strengths shown in this catalog were the actual strengths at the time of testing. The load values listed were determined by testing in un-reinforced concrete.



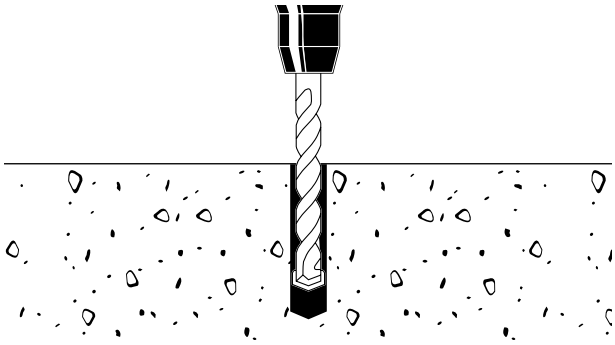
Masonry

Grout-Filled Concrete Block consists of three components: concrete, mortar and grout. The mortar is designed to join the units into an integral structure with predictable performance properties. Typical fasteners for grout-filled block include Dynabolt Sleeve Anchors, and C6 or A7 Adhesive Anchoring Systems.

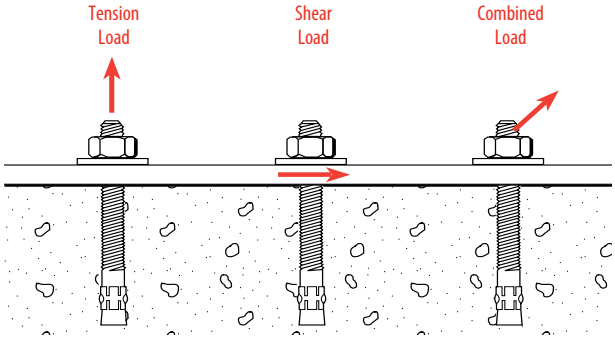
Hollow Concrete Block, Brick and Clay Tile are grouped together because they require special anchoring products that can be installed into a substrate that contains voids and still provide reliable holding values. Typical fasteners used in hollow block, brick and clay tile include Dynabolt Sleeve Anchors, Tapcon Self-Tapping Concrete Anchors, Adhesives with Screen Tubes and Adhesives used with the Umbrella Insert.

INSTALLATION PROCEDURES

Anchor drill holes are typically produced using carbide tipped drill bits and rotary hammer drills. Look at the product sections of this catalog for the correct drill hole diameter and depth of each type of anchoring system.



Careful cleaning of the anchor drill hole is important in order to obtain the best possible functioning of the anchor system. For each product in this catalog, detailed installation instructions are provided. Suggested clamping torques and curing times (for adhesive anchors) are also provided.



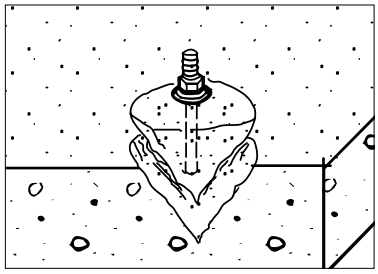
Loading

Holding values for the following types of loading are provided in this catalog:

- ***Tension loads—***
  when load is applied along the axis of the anchor
- ***Shear loads—***
  when the loads are applied perpendicular to the axis of the anchor
- ***Combined loads—***
  when both tension and shear loads are applied to an anchor, a combined loading equation is provided to determine the maximum loads that can be applied to the anchor at the same time

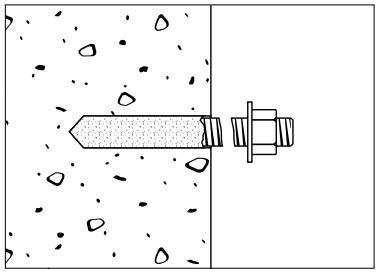
MODES OF FAILURE

When anchors are loaded to their maximum capacity, several different types (modes) of failure are possible depending on the type of anchor, strength of the base material, embedment depth, location of the anchor, etc. Common modes of failure include:



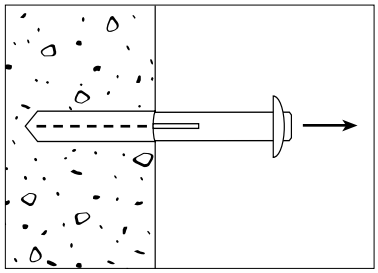
Concrete Spall Cone—

Occurs at shallow embedments where the resistance of the base material is less than the resistance of the anchor and the base material fails.



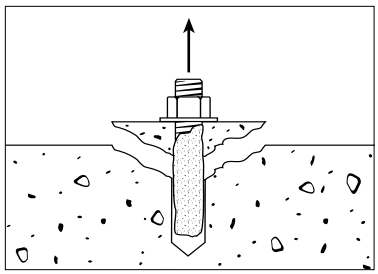
Steel Breakage—

The capacity of the anchorage exceeds the tensile or shear strength of the steel anchor or rod material.



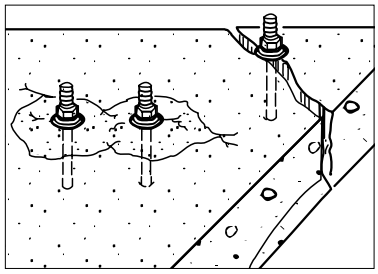
Anchor Pullout—

Base material adjacent to the extension portion of an anchor crushes, resulting in the anchor pulling out of the hole until the capacity of the spall cone is reached, at which point the concrete will spall. This type of failure happens more commonly when anchors are set with deep embedment depths.



Bond Failure—

Shear failure of the adhesive at rod-adhesive interface or adhesive-base material interface. Occurs more commonly in deep embedments using high strength steel rods.



Edge Distance and Spacing Reduction—

Reduces the holding values, when anchors are placed too close to the edge. This also occurs when two or more anchors are spaced closely together. See suggested edge distance, anchor spacing distances and reduction values in the product sections.

RED HEAD®
ADHESIVE ANCHORING SPECIALISTS

Adhesive Anchoring Selection Guide

COLD WEATHER USE
and lower 0°F 20°F 50°F
A7 – BEST FORMULA
C6 and G5

HOT WEATHER USE
80°F 90°F 100°F and higher
G5 – BEST FORMULA
C6 and A7

Doweling into Concrete with Rebar

Fastening to Concrete with Threaded Rod

EPCON A7	EPCON C6	EPCON G5
Fast Dispensing, Fast Curing	*Fast Curing for All Conditions*	*Extended Working Time*
10:1 ACRYLIC	*1:1 EPOXY*	*1:1 EPOXY*
fast 35 minute cure time at 60˚F 7 minute working time at 60˚F	*fast 1 hour cure time at 70˚F 7 minute working time at 70˚F*	*24 hour cure time per (AC308) PLUS extended 15 minute working time at 70˚F*
NSF STANDARD 61 Certified for drinking water applications	*NSF STANDARD 61 Certified for drinking water applications*	*ODORLESS for indoor applications*
COLD WEATHER no heating of cartridges required	*Suitable for extreme temperature ranges*	*HOT WEATHER more time to install anchors*
18 month shelf life	**2 year shelf life**	**18 month shelf life**
Damp holes	Damp holes	Damp holes
Underwater installations	Underwater installations	Underwater installations
Screens in hollow block and brick	Screens in hollow block and brick	Screens in hollow block and brick
Oversized holes will reduce loads	Oversized holes no reduction	Oversized holes no reduction
Cored-drilled holes will reduce load	Cored-drilled holes with no reduction	Cored-drilled holes with no reduction

Solid Concrete Applications

Best Formula | Suitable Formula | Not Suitable

PRODUCT SYSTEMS	KEY FEATURES	PROPERTIES	ULTIMATE TENSILE PERFORMANCE[1,2]

A7 *Fast Dispensing, Fast Curing Acrylic*

Install more anchors in less time

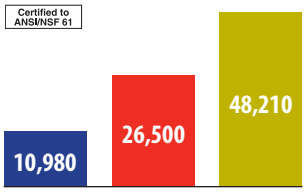
MADE IN USA

5 fluid oz. (150 ml), 8 fluid oz. (235 ml) 10 fluid oz. (275 ml) and 28 fluid oz. (825 ml) cartridges
(see page 20)

- Solid or hollow base materials
- Dispenses easier and faster
- Damp holes or underwater
- Fastest cure (35 min. at 60°F)
- Dispenses and cures faster in cold weather
- Can be used in smaller diameter holes
- No-drip formula reduces clean-up time
- Hand dispensable 28-oz. cartridge

BASE MATERIAL (F°/C°)	WORKING TIME	FULL CURE TIME
100°/ 38°	5 minutes	25 minutes
80°/ 27°	5.5 minutes	30 minutes
60°/ 16°	7 minutes	35 minutes
40°/ 4°	15 minutes	75 minutes
20°/ -7°	35 minutes	6 hours
0°/ -18°	4 hours	24 hours

NSF Certified to ANSI/NSF 61



C6 *Fast Curing Epoxy for All Conditions*

Consistently handles all applications

MADE IN USA

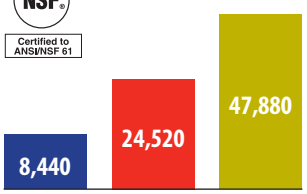
18 fluid oz. (530 ml) cartridges
(see page 31)

- **NEW!** Base Material Temperature 15°F (cartridge temperature must be ≥ 70°F)
- Solid or hollow base materials
- Hammer drilled or diamond cored holes
- Oversized holes
- Cold or warm weather
- Damp holes or underwater
- Horizontal or overhead installations
- Fast curing epoxy (1 hour at 70°F)

BASE MATERIAL[1] (F°/C°)	WORKING TIME[2]	FULL CURE TIME
120°/ 49°	4 minutes	1 hour
110°/ 43°	4 minutes	1 hour
90°/ 32°	5 minutes	1 hour
80°/ 26°	6 minutes	1 hour
70°/ 21°	7 minutes	1 hour
60°/ 16°	7 minutes	2 hours
50°/ 10°	7 minutes	2 hours
40°/ 4°	7 minutes	24 hours
15°/ -9°	6 minutes	24 hours

[1] Cartridge must be ≥ 70°F.
[2] Working time is max time from the end of mixing to when the insertion of the anchor into the adhesive shall be completed.
Gel Time per ASTM D2471 = 10 minutes at 72°F

NSF Certified to ANSI/NSF 61



G5 *High Strength Epoxy tested in accordance to ICC-ES AC308*

2009 IBC Compliant ICC-ES Report No. 1137

15 min. working time; 24 hour cure time (Per AC308) (70°F)

MADE IN USA

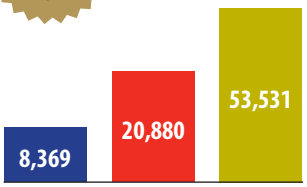
22 fluid oz. (650 ml) cartridge
(see page 37)

- Solid base materials
- Fire rated: tested up to 4hrs FRP
- Works in dry, damp, saturated, and underwater applications
- Gives more time to install anchors
- Easier to install anchors in hot weather
- Odorless
- Oversized and cored holes
- Improved wet/water filled
- Resist wind loads

BASE MATERIAL (F°/C°)	WORKING TIME	FULL CURE TIME
110°/ 43°	9 minutes	24 hours
90°/ 32°	9 minutes	24 hours
70°/ 20°	15 minutes	24 hours

RECOGNIZED WORLDWIDE Fire Tested BS476 4 Hrs FRP

International Standard Fire Resistance Performance



[1] Diameter x Embedment in 4000 psi concrete. [2] All loads given in pounds.

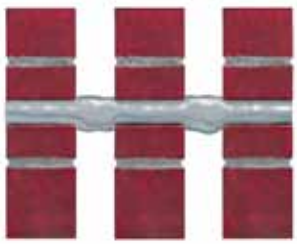
ALL *Red Head Adhesive/Epoxies comply with Made in U.S.A. requirements for Government jobs.*

ITW Red Head

Call our toll free number **800-899-7890** or visit our web site for the most current product and technical information at **www.itwredhead.com**

Hollow Base Material Applications

Use the following accessories with the A7 and C6 adhesive anchoring systems for all of your hollow base material applications.



Brick Pinning

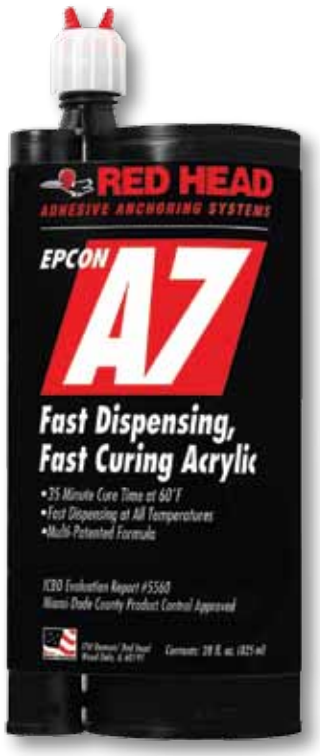
Fastening to hollow concrete block

SYSTEM ACCESSORIES	KEY FEATURES	ULTIMATE TENSILE[1,2] PERFORMANCE (LBS)
Nylon Screens  **Makes it possible to use adhesive for fastening to hollow block or brick walls** (see page 46)	■ 3/8″ to 3/4″ diameter sizes ■ 30%-50% lower cost than stainless screens ■ Special design makes screens easier to insert through block or brick ■ Does not get bent or crushed ■ Corrosion resistant	A7: 2,360 (3/8″ x 8″); 2,647 (3/4″ x 8″) C6: 2,800 (3/8″ x 8″); 3,487 (3/4″ x 8″)
Stainless Steel Screens  **Makes it possible to use adhesive for fastening to hollow block or brick walls** (see page 46)	■ 1/4″ to 3/4″ diameter sizes ■ Corrosion resistant ■ Available in multiple lengths to accommodate various material thicknesses	A7: 2,360 (3/8″ x 8″); 2,647 (3/4″ x 8″) C6: 2,800 (3/8″ x 8″); 3,487 (3/4″ x 8″)
Stubby Screens  **Makes it possible to use adhesive for fastening to the face of hollow block or tile** (see page 43)	■ 1/4″, 3/8″, 1/2″, 5/8″ diameter sizes ■ Fasten to front face of block ■ Anchor remains perpendicular in wall	A7: 2,458 (1/2″); 2,543 (5/8″) C6: 1,873 (1/2″); 1,970 (5/8″)
Umbrella and Umbrella Inserts  Umbrella Insert **Makes it possible to use adhesive for fastening to the face of hollow block or tile** (see page 43)	■ 1/4″, 3/8″, or 1/2″ rods ■ 3/8″ internal inserts (HBU-FS) ■ Fasten to front face of blocks ■ Creates large bearing surface inside block to achieve high loads	A7: 3,558 (3/8″); 3,558 (1/2″) C6: 1,875 (3/8″); 1,875 (1/2″)

[1] Testing performed in hollow concrete block. [2] Diameter x Embedment.

A7

Easy to Use—A7 Saves You Time and Money



A7-28

A102

DESCRIPTION/SUGGESTED SPECIFICATIONS*

*Suggested Specifications see pages 23

Fast Dispensing, Fast Curing Acrylic Adhesive

The acrylic resin and hardening agent are completely mixed as they are simultaneously dispensed from the dual cartridge through a static mixing nozzle, directly into the anchor hole. A7 can be used with threaded rod or rebar (for fastening to hollow base materials, see page 43 and 46).

How Can An Adhesive Anchor Save You Money?

- Incredibly fast dispensing and rod installation times
- Significantly faster curing times
- Easy to use (no-heating) even at freezing cold temperatures
- Requires less adhesive

ADVANTAGES

- All weather formula
- No drip, no sag, easy clean up
- Fast & easy dispensing, even 28 ounce cartridge can be hand dispensed
- Fast curing time, 35 minutes at 60°F
- Not mix ratio sensitive
- NSF 61 approved
- Rods are easier to insert into the hole with A7 compared with other adhesives
- Works in damp holes and underwater applications
- Requires less adhesive—can be used in 1/16" oversized or 1/8" oversized holes
- **One formula** for both hollow and solid base materials

Curing Times

MADE IN USA

BASE MATERIAL (F°/C°)	WORKING TIME	FULL CURE TIME
100°/ 38°	5 minutes	25 minutes
80°/ 27°	5.5 minutes	30 minutes
60°/ 16°	7 minutes	35 minutes
40°/ 4°	15 minutes	75 minutes
20°/ -7°	35 minutes	6 hours
0°/ -18°	4 hours	24 hours

APPLICATIONS

Stadium Seating

The fast dispensing, fast curing properties of A7 made it ideal for installing over 70,000 seats in this NFL football stadium and many others.

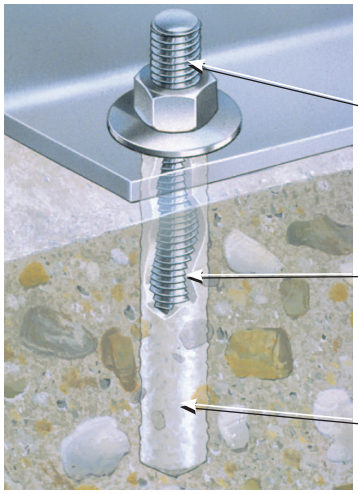
Roadway Doweling

A7 dispenses so quickly and rebar inserts so easily that contractors find installed costs are lower than many other products including grout for doweling.

Scaffolding Attachment

Fast curing adhesive in 28 ounce cartridges kept this project moving upwards without delays.

FEATURES



ANCHORAGE TO SOLID CONCRETE

Threaded Rod (Carbon or Stainless Steel) or Rebar supplied by contractor; rod does not need to be chisel pointed

A7 adhesive completely fills area between rod and hole creating a stress free, high load anchorage

Pre-drilled hole in concrete; see performance tables for suggested hole sizes

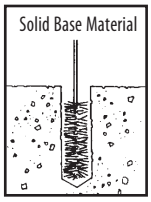
APPROVALS/LISTINGS

ICC Evaluation Service, Inc. – #ER-5560
City of Los Angeles – RR#25379
DOT Approvals
NSF Standard 61 Certified for Drinking Water Components

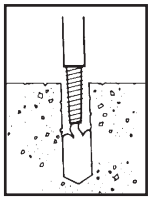
NSF Certified to ANSI/NSF 61

For the most current approvals/listings visit: www.itw-redhead.com

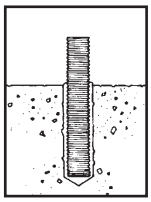
INSTALLATION STEPS



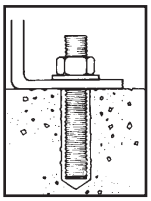
1. Drill 1/16" oversize diameter holes for 1/4"–1/2" diameter threaded rods and #3 rebar. Drill 1/8" oversize diameter holes for 5/8"–1-1/4" diameter threaded rods, #4 rebar, grout filled blocks and brick pinning. Clean out hole from bottom with forced air. Complete hole preparation with brush and repeat cleaning with forced air (leave no dust or slurry).



2. When starting new cartridge or new nozzle, dispense and discard enough adhesive until uniform light grey color is achieved. Insert the nozzle into the bottom of the hole and fill to 1/2 the hole depth.



3. Insert rod slowly by hand into the bottom of the hole with a slow twisting motion. This insures adhesive fills voids and crevices and uniformly coats the anchor rod.



4. See table for working times and curing times. After the suggested cure time is met, install and tighten fixture into place.

A100 Dispenser

A7–28 fl. oz. Ordering Information

PART NUMBER	DESCRIPTION	BOX QTY
 A7-28	28 Fluid Ounce Cartridge A7	4
 E55	Mixing Nozzle for A7-28 and G5-22 Cartridge Nozzle diameter fits 3/8" to 5/8" holes. (overall length of nozzle 14")	24
 A102	*Largest hand dispensable cartridge—still easy to dispense* Hand Dispenser for A7-28 Cartridge	1

PART NUMBER	DESCRIPTION	BOX QTY
E25-6	6-Foot Straight Tubing (can cut to proper size) (.39 in I.D. x .43 in. O.D.)	6
 A200	Pneumatic Dispenser for A7-28 Cartridge	1

ESTIMATING TABLE

A7 — 28 Fluid Ounce Cartridge

Number of Anchoring Installations per Cartridge* Using Reinforcing Bar with A7 Adhesive in Solid Concrete

REBAR	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES (mm)														
		1 (25.4)	2 (50.8)	3 (76.2)	4 (101.6)	5 (127.0)	6 (152.4)	7 (177.8)	8 (203.2)	9 (228.6)	10 (254.0)	11 (279.4)	12 (304.8)	13 (330.2)	14 (355.6)	15 (381.0)
# 3	7/16	662.5	331.3	220.8	165.6	132.5	110.4	94.6	82.8	73.6	66.3	60.2	55.2	51.0	47.3	44.2
# 4	5/8	373.0	186.5	124.3	93.2	74.6	62.2	53.3	46.6	41.4	37.3	33.9	31.1	28.7	26.6	24.9
# 5	3/4	286.1	143.0	95.4	71.5	57.2	47.7	40.9	35.8	31.8	28.6	26.0	23.8	22.0	20.4	19.1
# 6	7/8	231.0	115.5	77.0	57.7	46.2	38.5	33.3	28.8	25.7	23.1	21.0	19.2	17.8	16.5	15.4
# 7	1	213.4	106.7	71.1	53.3	42.7	35.6	30.5	26.7	23.7	21.3	19.4	17.8	16.4	15.2	14.2
# 8	1-1/8	177.3	88.6	59.1	44.3	35.5	29.5	25.3	22.2	19.7	17.7	16.1	14.8	13.6	12.7	11.8
# 9	1-1/4	102.8	51.4	34.3	25.7	20.6	17.1	14.7	12.8	11.4	10.3	9.3	8.6	7.9	7.3	6.9
# 10	1-1/2	84.1	42.0	28.0	21.0	16.8	14.0	12.0	10.5	9.3	8.4	7.6	7.0	6.5	6.0	5.6
# 11	1-3/4	51.4	25.7	17.1	12.8	10.3	8.6	7.3	6.4	5.7	5.1	4.7	4.3	4.0	3.7	3.4

* The number of anchoring installations is based upon calculations of hole volumes using ANSI tolerance carbide tipped drill bits, the nominal areas of the reinforcing bars and the stress areas of the threaded rods. These estimates do not account for waste.

ESTIMATING TABLE

CLAMPING FORCE PROVIDED ON PAGE 26

A7 — 28 Fluid Ounce Cartridge

Number of Anchoring Installations per Cartridge* Using Threaded Rod with A7 Adhesive in Solid Concrete

ROD In. (mm)	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES (mm)														
		1 (25.4)	2 (50.8)	3 (76.2)	4 (101.6)	5 (127.0)	6 (152.4)	7 (177.8)	8 (203.2)	9 (228.6)	10 (254.0)	11 (279.4)	12 (304.8)	13 (330.2)	14 (355.6)	15 (381.0)
1/4 (6.4)	5/16	915.5	457.7	305.2	228.9	183.1	152.8	130.8	114.4	101.7	91.5	83.2	76.3	70.4	65.4	61.0
3/8 (9.5)	7/16	530.0	265.0	176.7	132.5	106.0	88.3	75.7	66.3	58.9	53.0	48.2	44.2	40.8	37.9	35.3
1/2 (12.7)	9/16	381.4	190.7	127.1	95.4	76.3	63.6	54.5	47.7	42.4	38.1	34.7	31.8	29.3	27.2	25.4
5/8 (15.9)	11/16 3/4	273.6 195.6	136.8 97.8	91.2 65.1	68.4 48.8	54.7 39.0	45.6 32.5	39.1 27.9	34.2 24.4	30.4 21.7	27.4 19.5	24.9 17.7	22.8 16.3	21.0 15.0	19.5 13.9	18.2 13.0
3/4 (19.1)	13/16 7/8	192.9 154.4	96.5 77.2	64.3 51.5	48.2 38.6	38.6 30.9	32.2 25.7	27.6 22.1	24.1 19.3	21.4 17.2	19.3 15.4	17.5 14.0	16.1 12.9	14.8 11.9	13.8 11.0	12.9 10.3
7/8 (22.2)	15/16 1	185.1 128.0	92.6 64.0	61.7 42.8	46.3 32.0	37.0 25.6	30.9 21.4	26.8 18.3	23.1 16.0	20.6 14.2	18.5 12.8	16.8 11.6	15.4 10.7	14.2 9.9	13.2 9.2	12.3 8.5
1 (25.4)	1 -1/16 1 -1/8	158.3 105.2	79.2 52.6	52.8 35.2	39.6 26.3	31.7 21.1	26.4 17.6	22.6 15.0	19.8 13.2	17.6 11.7	15.8 10.5	14.4 9.6	13.2 8.8	12.2 8.1	11.3 7.6	10.6 7.0
1-1/4 (31.8)	1 -5/16 1 -3/8	101.3 80.0	50.7 40.0	33.8 26.6	25.3 20.0	20.3 15.9	16.9 13.3	14.5 11.4	12.7 10.0	11.3 8.9	10.1 8.0	9.2 7.2	8.4 6.6	7.8 6.1	7.2 5.7	6.8 5.3

* The number of anchoring installations is based upon calculations of hole volumes using ANSI tolerance carbide tipped drill bits, the nominal areas of the reinforcing bars and the stress areas of the threaded rods. These estimates do not account for waste.

A7–10 fl. oz. Ordering Information

PART NUMBER	DESCRIPTION	BOX QTY
 A7-10	9.3 Fluid Ounce Cartridge with Nozzle	6
 A24	Mixing Nozzle for A7-10 Cartridge Nozzle diameter fits 3/8″ to 5/8″ holes (overall length of nozzle 6-3/8″)	24
 A100	Hand Dispenser Designed for A7-10 Cartridge Contractor Quality 26:1 Thrust Ratio	1

Refer to page 49 for ordering information on brushes , hole plugs, and extension tubing for deep holes.

PACKAGING

1. Disposable, self-contained cartridge system capable of dispensing both components in the proper mixing ratio
2. Acrylic components dispensed through a static mixing nozzle that thoroughly mixes the material and places the material at the base of the pre-drilled hole
3. Cartridge markings: Include manufacturer's name, batch number and best-used-by date, mix ratio by volume, ANSI hazard classification, and appropriate ANSI handling precautions

SUGGESTED SPECIFICATIONS

ACRYLIC ADHESIVE:

High Strength ACRYLIC ADHESIVE: USA Made, ARRA Certified

1. Two component methyl methacrylate adhesive, non-sag paste, moisture insensitive when cured, dark gray in color, and early gel and cure times.
2. Meets NSF Standard 61, certified for use in conjunction with drinking water systems.
3. Works in wet, damp, submerged holes.
4. Shelf life: Best if used within 18 months.
5. All weather, cure time (35 min. at 60°F).
6. Dispenses easier and faster.
7. Dispenses and cures faster in cold weather, but works in hot weather.
8. Pumpable at 0°F without preheating.
9. Formula for use in solid and hollow base materials.
10. Suitable for oversized and diamond cored holes with increased depths.
11. Quick insertion time = less labor cost.

ESTIMATING TABLES

A7 10 Fluid Ounce Cartridge

Number of Anchoring Installations per Cartridge* Using Reinforcing Bar and Threaded Rod with A7 Adhesive in Solid Concrete

REBAR	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES (mm)			
		2 (50.8)	4 (101.6)	6 (152.4)	8 (203.2)
# 3	7/16	110	55	37	27
# 4	5/8	63	31	20	14
# 5	3/4	48	24	16	11
# 6	7/8	39	18	13	9
# 7	1	35	18	11	9
# 8	1-1/8	29	14	9	7

* The number of anchoring installations is based upon calculations of hole volumes using ANSI tolerance carbide tipped drill bits, the nominal areas of the reinforcing bars and the stress areas of the threaded rods. These estimates do not account for waste.

ROD In (mm)	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES (mm)				
		2 (50.8)	4 (101.6)	6 (152.4)	8 (203.2)	10 (254.0)
3/8 (9.5)	7/16	88	44	28	22	18
1/2 (12.7)	9/16	65	31	22	16	13
5/8 (15.9)	11/16 3/4	46 33	22 16	14 11	11 7	9 6.5
3/4 (19.1)	13/16 7/8	33 26	16 13	11 9	7 7	7 5
7/8 (22.2)	15/16 1	31 22	14 11	11 7	7 5	6 4.5
1 (25.4)	1-1/16 1-1/8	26 18	13 9	9 5	7 3	5.5 3.5

A7–8 fl. oz. Ordering Information

PART NUMBER	DESCRIPTION	BOX QTY
 A7-8	*Fits Hilti® P2000 dispensing tools* 8 Fluid Ounce Cartridge A7	12
 A24	Mixing Nozzle for A7-8 Cartridge Nozzle diameter fits 3/8″ to 5/8″ holes (overall length of nozzle 6-3/8″)	24
 A101	Heavy Duty Hand Dispenser for A7-8 Cartridge	1

Refer to page 49 for ordering information on brushes , hole plugs, and extension tubing for deep holes.

ESTIMATING TABLE

A7 — 8 Fluid Ounce Cartridge

Number of Anchoring Installations per Cartridge* Using Reinforcing Bar with A7 Adhesive in Solid Concrete

REBAR	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES (mm)														
		1 (25.4)	2 (50.8)	3 (76.2)	4 (101.6)	5 (127.0)	6 (152.4)	7 (177.8)	8 (203.2)	9 (228.6)	10 (254.0)	11 (279.4)	12 (304.8)	13 (330.2)	14 (355.6)	15 (381.0)
# 3	7/16	187.8	93.9	62.6	46.9	37.6	31.3	26.8	23.5	20.9	18.8	17.1	15.6	14.4	13.4	12.5
# 4	5/8	105.7	52.9	35.2	26.4	21.1	17.6	15.1	13.2	11.7	10.6	9.6	8.8	8.1	7.6	7.0
# 5	3/4	81.1	40.5	27.0	20.3	16.2	13.5	11.6	10.1	9.0	8.1	7.4	6.8	6.2	5.8	5.4
# 6	7/8	65.5	32.7	21.8	16.4	13.1	10.9	9.4	8.2	7.3	6.5	6.0	5.5	5.0	4.7	4.4
# 7	1	60.5	30.2	20.2	15.1	12.1	10.1	8.6	7.6	6.7	6.0	5.5	5.0	4.7	4.3	4.0
# 8	1-1/8	50.2	25.1	16.7	12.6	10.0	8.4	7.2	6.3	5.6	5.0	4.6	4.2	3.9	3.6	3.3
# 9	1-1/4	29.1	14.6	9.7	7.3	5.8	4.9	4.2	3.6	3.2	2.9	2.6	2.4	2.2	2.1	1.9
# 10	1-1/2	23.8	11.9	7.9	6.0	4.8	4.0	3.4	3.0	2.6	2.4	2.2	2.0	1.8	1.7	1.6
# 11	1-3/4	14.6	7.3	4.9	3.6	2.9	2.4	2.1	1.8	1.6	1.5	1.3	1.2	1.1	1.0	1.0

* The number of anchoring installations is based upon calculations of hole volumes using ANSI tolerance carbide tipped drill bits, the nominal areas of the reinforcing bars and the stress areas of the threaded rods. These estimates do not account for waste.

ESTIMATING TABLE

CLAMPING FORCE PROVIDED ON PAGES 26

A7 — 8 Fluid Ounce Cartridge

Number of Anchoring Installations per Cartridge* Using Threaded Rod with A7 Adhesive in Solid Concrete

ROD In. (mm)	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES (mm)														
		1 (25.4)	2 (50.8)	3 (76.2)	4 (101.6)	5 (127.0)	6 (152.4)	7 (177.8)	8 (203.2)	9 (228.6)	10 (254.0)	11 (279.4)	12 (304.8)	13 (330.2)	14 (355.6)	15 (381.0)
1/4 (6.4)	5/16	259.5	129.7	86.5	64.9	51.9	43.2	37.1	32.4	28.8	25.9	23.6	21.6	20.0	18.5	17.3
3/8 (9.5)	7/16	150.2	75.1	50.1	37.6	30.0	25.0	21.5	18.8	16.7	15.0	13.7	12.5	11.6	10.7	10.0
1/2 (12.7)	9/16	108.1	54.1	36.0	27.0	21.6	18.0	15.4	13.5	12.0	10.8	9.8	9.0	8.3	7.7	7.2
5/8 (15.9)	11/16 3/4	77.6 55.4	38.8 27.7	25.9 18.4	19.4 13.8	15.5 11.1	12.9 9.2	11.1 7.9	9.7 6.9	8.6 6.1	7.8 5.5	7.1 5.0	6.5 4.6	6.0 4.3	5.5 4.0	5.2 3.7
3/4 (19.1)	13/16 7/8	54.7 43.6	27.3 21.8	18.2 14.6	13.7 10.9	10.9 8.8	9.1 7.3	7.8 6.3	6.8 5.5	6.1 4.9	5.5 4.4	5.0 4.0	4.6 3.6	4.2 3.4	3.9 3.1	3.6 2.9
7/8 (22.2)	15/16 1	52.5 36.4	26.2 18.2	17.5 12.2	13.1 9.1	10.5 7.3	8.7 6.1	7.5 5.2	6.6 4.5	5.8 4.0	5.2 3.6	4.8 3.3	4.4 3.0	4.0 2.8	3.7 2.6	3.5 2.4
1 (25.4)	1 -1/16 1 -1/8	44.9 34.4	22.4 17.2	15.0 12.0	11.2 8.6	9.0 7.5	7.5 6.0	6.4 5.0	5.6 4.3	5.0 3.7	4.5 3.3	4.1 3.0	3.7 2.7	3.5 2.5	3.2 2.3	3.0 2.1
1-1/4 (31.8)	1 -5/16 1 -3/8	28.7 22.4	14.4 11.2	9.6 7.6	7.2 5.6	5.7 4.5	4.8 3.8	4.1 3.2	3.6 2.8	3.2 2.5	2.9 2.3	2.6 2.1	2.4 1.9	2.2 1.7	2.1 1.6	1.9 1.5

* The number of anchoring installations is based upon calculations of hole volumes using ANSI tolerance carbide tipped drill bits, the nominal areas of the reinforcing bars and the stress areas of the threaded rods. These estimates do not account for waste.

A7–5 fl. oz. Ordering Information

PART NUMBER	DESCRIPTION	BOX QTY
 A7-5	5 Fluid Ounce Cartridge A7	12
 A500	Reusable Plastic Dispenser	12
 A500 KIT	Convenient Dispensing Kit Packaged in a Solid Plastic Shell with (1) A500 Plastic Dispenser (1) A7-5 Cartridge and (1) A24 Nozzle Nozzle diameter fits 3/8" to 5/8" holes	8

PART NUMBER	DESCRIPTION	BOX QTY
 A7-5	5 Fluid Ounce Cartridge A7	12
 A501	Reusable Caulking Gun Adaptor	12
 A501 KIT	Convenient Dispensing Kit Packaged in a Solid Plastic Shell with (1) A501 Plastic Dispenser (1) A7-5 Cartridge and (1) A24 Nozzle Nozzle diameter fits 3/8" to 5/8" holes	8

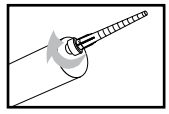
AVAILABLE WITH YOUR CHOICE OF TWO, EASY DISPENSING SYSTEMS

A500 PLASTIC DISPENSER

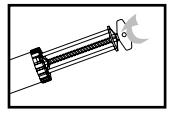
Attaches directly to cartridge allowing for easy hand dispensing. **No extra tools are required.**

Simple Assembly and Dispensing

1. Twist-lock dispenser onto cartridge.



2. Thread nozzle onto cartridge.



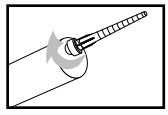
3. Turn lever in order to dispense adhesive.

A501 CAULKING GUN ADAPTOR

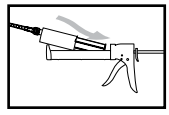
Allows cartridge to work with most standard caulking guns (caulking gun supplied by contractor).

Simple Assembly and Dispensing

1. Push adaptor tightly against back of cartridge.



2. Thread nozzle onto cartridge.



3. Place assembly in caulking gun and dispense adhesive.

EASY PACKAGING!

A500 and A501 kits are perfect for both counter or pegboard hanging display.

A500 Kit

A501 Kit

ESTIMATING TABLES

A7 — 5 Fluid Ounce Cartridge

Number of Anchoring Installations per Cartridge* Using Reinforcing Bar and Threaded Rod with A7 Adhesive in Solid Concrete

REBAR	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES (mm)			
		2 (50.8)	4 (101.6)	6 (152.4)	8 (203.2)
# 3	7/16	60	30	20	15
# 4	5/8	34	17	11	8
# 5	3/4	26	13	9	6
# 6	7/8	21	10	7	5
# 7	1	19	10	6	5
# 8	1-1/8	16	8	5	4

* The number of anchoring installations is based upon calculations of hole volumes using ANSI tolerance carbide tipped drill bits, the nominal areas of the reinforcing bars and the stress areas of the threaded rods. These estimates do not account for waste.

ROD In (mm)	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES (mm)			
		2 (50.8)	4 (101.6)	6 (152.4)	8 (203.2)
3/8 (9.5)	7/16	48	24	16	12
1/2 (12.7)	9/16	35	17	12	9
5/8 (15.9)	11/16 3/4	25 18	12 9	8 6	6 4
3/4 (19.1)	13/16 7/8	18 14	9 7	6 5	4 4
7/8 (22.2)	15/16 1	17 12	8 6	6 4	4 3
1 (25.4)	1-1/16 1-1/8	14 10	7 5	5 3	4 2

PERFORMANCE TABLE

A7 Acrylic Adhesive

Average Ultimate Tension and Shear Loads [1,2,3] for Threaded Rod Installed in Solid Concrete

THREADED ROD DIA. In. (mm)	DRILL HOLE DIAMETER In. (mm)	MAX. CLAMPING FORCE AFTER PROPER CURE Ft.-Lbs. (Nm)	EMBEDMENT IN CONCRETE In. (mm)	2000 PSI (13.8 MPa) CONCRETE		4000 PSI (27.6 MPa) CONCRETE	
				ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)	ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)
3/8 (9.5)	7/16 (11.1)	13 - 18 (17-24)	1-1/2 (38.1)	N/A	N/A	3,734 (16.6)	4,126 (18.3)
			3-3/8 (85.7)	5,852 (26.0)	5,220 (23.2)	10,977 (48.8)	5,220 (23.2)
			4-1/2 (114.3)	7,729 (34.4)	5,220 (23.2)	11,661 (51.9)	5,220 (23.2)
1/2 (12.7)	9/16 (14.3)	22 - 25 (29-33)	2 (50.8)	N/A	N/A	6,022 (26.8)	8,029 (35.7)
			4-1/2 (114.3)	10,798 (48.0)	8,029 (35.7)	17,162 (76.3)	8,029 (35.7)
			6 (152.4)	14,210 (63.2)	8,029 (35.7)	17,372 (77.3)	8,029 (35.7)
5/8 (15.9)	11/16 (17.5) or 3/4 (19.1)	55 - 80 (74-108)	2-1/2 (63.5)	N/A	N/A	7,330 (32.6)	11,256 (50.1)
			5-5/8 (142.9)	16,417 (73.0)	15,967 (71.0)	26,504 (117.9)	15,967 (71.0)
			7-1/2 (190.5)	18,747 (83.4)	15,967 (71.0)	29,381 (130.7)	15,967 (71.0)
3/4 (19.1)	13/16 (20.6) or 7/8 (22.2)	106 - 160 (143-216)	3 (76.2)	N/A	N/A	8,634 (38.4)	20,126 (89.5)
			6-3/4 (171.5)	18,618 (82.8)	20,126 (89.5)	29,727 (132.2)	20,126 (89.5)
			9 (228.6)	23,934 (106.5)	20,126 (89.5)	37,728 (167.8)	20,126 (89.5)
7/8 (22.2)	15/16 (23.8) or 1 (25.4)	185 - 250 (250-338)	3-1/2 (88.9)	N/A	N/A	13,650 (60.7)	20,920 (92.9)
			7-7/8 (200.0)	N/A	29,866 (132.9)	44,915 (199.8)	29,866 (132.9)
			10-1/2 (266.7)	36,881 (164.1)	29,866 (132.9)	48,321 (215.0)	29,866 (132.9)
1 (25.4)	1-1/16 (27.0) or 1-1/8 (28.6)	276 - 330 (374-447)	4 (101.6)	N/A	N/A	16,266 (72.2)	33,152 (147.5)
			9 (228.6)	32,215 (143.3)	37,538 (167.0)	48,209 (214.5)	37,538 (167.0)
			12 (304.8)	46,064 (204.9)	37,538 (167.0)	63,950 (284.5)	37,538 (167.0)
1-1/4 (31.8)	1-5/16 (33.3) or 1-3/8 (34.9)	370 - 660 (501-894)	5 (127.0)	N/A	N/A	21,838 (97.1)	33,152 (147.5)
			11-1/4 (285.8)	45,962 (204.5)	58,412 (259.8)	56,715 (252.3)	58,412 (259.8)
			15 (381.0)	62,208 (276.7)	58,412 (259.8)	84,385 (375.4)	58,412 (259.8)

1 Allowable working loads for the single installations under static loading should not exceed 25% capacity or the allowable load of the anchor rod.

2 Ultimate load values in 2000 and 4000 psi stone aggregate concrete. Ultimate loads are indicated for the embedment shown in the Embedment in Concrete column. Performance values are based on the use of high strength threaded rod (ASTM A193 Gr. B7). The use of lower strength rods will result in lower ultimate tension and shear loads.

3 Linear interpolation may be used for intermediate spacing and edge distances (see pages 28-29).

PERFORMANCE TABLE

A7 Acrylic Adhesive

Allowable Tension Loads[1] for Threaded Rod Installed in Solid Concrete

THREADED ROD DIA. In. (mm)	DRILL HOLE DIAMETER In. (mm)	MIN. EMBEDMENT DEPTH In. (mm)	ALLOWABLE TENSION LOAD BASED ON ADHESIVE BOND STRENGTH		ALLOWABLE TENSION LOAD BASED ON STEEL STRENGTH		
			2000 PSI (13.8 MPa) CONCRETE Lbs. (kN)	4000 PSI (27.6 MPa) CONCRETE Lbs. (kN)	ASTM A307 (SAE 1018) Lbs. (kN)	ASTM A193 GR. B7 (SAE 4140) Lbs. (kN)	ASTM F593 AISI 304 SS Lbs. (kN)
3/8 (9.5)	7/16 (11.1)	1-1/2 (38.1)	N/A	934 (4.2)	2,080 (9.3)	4,340 (19.3)	3,995 (17.8)
		3-3/8 (85.7)	1,460 (6.5)	2,740 (12.2)	2,080 (9.3)	4,340 (19.3)	3,995 (17.8)
		4-1/2 (114.3)	1,930 (8.6)	2,915 (13.0)	2,080 (9.3)	4,340 (19.3)	3,995 (17.8)
1/2 (12.7)	9/16 (14.3)	2 (50.8)	N/A	1,505 (6.7)	3,730 (16.6)	7,780 (34.6)	7,155 (31.8)
		4-1/2 (114.3)	2,700 (12.0)	4,290 (19.1)	3,730 (16.6)	7,780 (34.6)	7,155 (31.8)
		6 (152.4)	3,550 (15.8)	4,340 (19.3)	3,730 (16.6)	7,780 (34.6)	7,155 (31.8)
5/8 (15.9)	11/16 (17.5) or 3/4 (19.1)	2-1/2 (63.5)	N/A	1,832 (8.2)	5,870 (26.1)	12,230 (54.4)	11,250 (50.0)
		5-5/8 (142.9)	4,100 (18.3)	6,625 (29.5)	5,870 (26.1)	12,230 (54.4)	11,250 (50.0)
		7-1/2 (190.5)	4,685 (20.8)	7,345 (32.7)	5,870 (26.1)	12,230 (54.4)	11,250 (50.0)
3/4 (19.1)	13/16 (20.6) or 7/8 (22.2)	3 (76.2)	N/A	2,158 (9.6)	8,490 (37.8)	17,690 (78.7)	14,860 (66.1)
		6-3/4 (171.5)	4,655 (20.7)	7,430 (33.1)	8,490 (37.8)	17,690 (78.7)	14,860 (66.1)
		9 (228.6)	5,980 (26.6)	9,430 (42.0)	8,490 (37.8)	17,690 (78.7)	14,860 (66.1)
7/8 (22.2)	15/16 (23.8) or 1 (25.4)	3-1/2 (88.9)	N/A	3,413 (15.2)	11,600 (51.6)	25,510 (113.5)	20,835 (92.7)
		7-7/8 (200.0)	N/A	11,230 (49.9)	11,600 (51.6)	25,510 (113.5)	20,835 (92.7)
		10-1/2 (266.7)	9,220 (41.0)	12,080 (53.7)	11,600 (51.6)	25,510 (113.5)	20,834 (92.7)
1 (25.4)	1-1/16 (27.0) or 1-1/8 (28.6)	4 (101.6)	N/A	4,067 (18.1)	15,180 (67.5)	31,620 (140.7)	26,560 (118.1)
		9 (228.6)	8,050 (35.8)	12,050 (53.6)	15,180 (67.5)	31,620 (140.7)	26,560 (118.1)
		12 (304.8)	11,515 (51.2)	15,985 (71.1)	15,180 (67.5)	31,620 (140.7)	26,560 (118.1)
1-1/4 (31.8)	1-5/16 (33.3) or 1-3/8 (34.9)	5 (127.0)	N/A	5,460 (24.3)	23,800 (105.9)	49,580 (220.6)	34,670 (154.2)
		11-1/4 (285.8)	11,490 (51.1)	14,175 (63.1)	23,800 (105.9)	49,580 (220.6)	34,670 (154.2)
		15 (381.0)	15,550 (69.2)	21,095 (93.8)	23,800 (105.9)	49,580 (220.6)	34,670 (154.2)

1 Use lower value of either bond or steel strength for allowable tensile load.

PERFORMANCE TABLE

DRILL HOLE DIAMETERS PROVIDED ON PAGES 22, 24 AND 25

A7 Acrylic Adhesive — Allowable Shear Loads[1] for Threaded Rod Installed in Solid Concrete

THREADED ROD DIA. In. (mm)	DRILL HOLE DIAMETER In. (mm)	MIN. EMBEDMENT DEPTH In. (mm)	ALLOWABLE SHEAR LOAD BASED ON CONCRETE STRENGTH		ALLOWABLE SHEAR LOAD BASED ON STEEL STRENGTH		
			2000 PSI (13.8 MPa) CONCRETE Lbs. (kN)	4000 PSI (27.6 MPa) CONCRETE Lbs. (kN)	ASTM A307 (SAE 1018) Lbs. (kN)	ASTM A193 GR. B7 (SAE 4140) Lbs. (kN)	ASTM F593 AISI 304 SS Lbs. (kN)
3/8 (9.5)	7/16 (11.1)	1-1/2 (38.1)	N/A	1,031 (4.6)	1,040 (4.6)	2,170 (9.7)	1,995 (8.9)
		3-3/8 (85.7)	1,305 (5.8)	1,305 (5.8)	1,040 (4.6)	2,170 (9.7)	1,995 (8.9)
1/2 (12.7)	9/16 (14.3)	2 (50.8)	N/A	2,005 (8.9)	1,870 (8.3)	3,895 (17.3)	3,585 (15.9)
		4-1/2 (114.3)	2,005 (8.9)	2,005 (8.9)	1,870 (8.3)	3,895 (17.3)	3,585 (15.9)
5/8 (15.9)	or 11/16 (17.5)	2-1/2 (63.5)	N/A	2,814 (12.5)	2,940 (13.1)	6,125 (27.2)	5,635 (25.1)
	or 3/4 (19.1)	5-5/8 (142.9)	3,990 (17.8)	3,990 (17.8)	2,940 (13.1)	6,125 (27.2)	5,635 (25.1)
3/4 (19.1)	or 13/16 (20.6)	3 (76.2)	N/A	5,030 (22.4)	4,250 (18.9)	8,855 (39.4)	7,440 (33.1)
	or 7/8 (22.2)	6-3/4 (171.5)	5,030 (22.4)	5,030 (22.4)	4,250 (18.9)	8,855 (39.4)	7,440 (33.1)
7/8 (22.2)	or 15/16 (23.8)	3-1/2 (88.9)	N/A	5,230 (23.3)	5,800 (25.8)	12,760 (56.8)	10,730 (47.7)
	or 1 (25.4)	7-7/8 (200.0)	7,465 (33.2)	7,465 (33.2)	5,800 (25.8)	12,760 (56.8)	10,730 (47.7)
1 (25.4)	or 1-1/16 (27.0)	4 (101.6)	N/A	8,288 (36.9)	7,590 (33.8)	15,810 (70.3)	13,285 (59.1)
	or 1-1/8 (28.6)	9 (228.6)	9,385 (41.7)	9,385 (41.7)	7,590 (33.8)	15,810 (70.3)	13,285 (59.1)
1-1/4 (31.8)	or 1-5/16 (33.3)	5 (127.0)	N/A	8,288 (36.9)	11,900 (52.9)	24,790 (100.3)	18,840 (83.8)
	or 1-3/8 (34.9)	11-1/4 (285.8)	14,600 (64.9)	14,600 (64.9)	11,900 (52.9)	24,790 (100.3)	18,840 (83.8)

1 Use lower value of either concrete or steel strength for allowable shear load.

PERFORMANCE TABLE

A7 Acrylic Adhesive — Average Ultimate Tension and Shear Loads[1,2] for Threaded Rod Installed in Grout Filled Concrete Block

THREADED ROD DIA. In. (mm)	DRILL HOLE DIAMETER In. (mm)	EMBEDMENT DEPTH In. (mm)	ANCHOR LOCATION	ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)
1/2 (12.7)	5/8 (15.9)	4-1/4 (108.0)	GROUTED CELL	5,170 (23.0)	8,500 (37.8)
5/8 (15.9)	3/4 (19.1)	5 (127.0)	GROUTED CELL	6,320 (28.1)	10,850 (48.3)
3/4 (19.1)	7/8 (22.2)	6-5/8 (168.3)	GROUTED CELL	10,910 (48.5)	17,075 (76.0)

1 Allowable working loads for the single installations should not exceed 25% (an industry standard) capacity or the allowable load of the anchor rod. Loads based upon testing with ASTM A193, Grade B7 rods.

2 The tabulated values are for anchors installed at minimum 12 inch edge distance and minimum 8 inch spacing.

PERFORMANCE TABLE

A7 Acrylic Adhesive — Average Ultimate Tension and Shear Loads[1] for Threaded Rod Installed in Grouted[2] Brick Masonry Constructed of Solid Red Brick Units

THREADED ROD DIA. In. (mm)	DRILL HOLE DIAMETER In. (mm)	EMBEDMENT DEPTH In. (mm)	ANCHOR LOCATION	ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)
1/4 (6.4)	3/8 (9.5)	3-1/2 (88.9)	CENTER OF BRICK FACE	2,130 (9.5)	1,165 (5.2)
		6 (152.4)		3,575 (15.9)	1,550 (6.9)
3/8 (9.5)	1/2 (12.7)	3-1/2 (88.9)	CENTER OF BRICK FACE	2,130 (9.5)	4,150 (18.5)
		6 (152.4)		8,875 (39.5)	6,950 (30.9)
1/2 (12.7)	5/8 (15.9)	3-1/2 (88.9)	CENTER OF BRICK FACE	2,130 (9.5)	3,090 (13.7)
		6 (152.4)		12,155 (54.1)	7,910 (35.2)

1 Allowable working loads for the single installations should not exceed 25% (an industry standard) capacity or the allowable load of the anchor rod. Loads based upon testing with ASTM A193, Grade B7 rods.

2 Void between brick wythes was grouted solid; therefore the use of screens was not necessary.

For hollow block, see page 43.

PERFORMANCE TABLE

DRILL HOLE DIAMETERS
PROVIDED ON PAGES 22, 24 AND 25

A7 Acrylic Adhesive

Average Ultimate Tension Loads[1,2,3] for Reinforcing Bar Installed in Solid Concrete

REINFORCING BAR DIA. In. (mm)	EMBEDMENT IN CONCRETE In. (mm)	2000 PSI (13.8 MPa) CONCRETE ULTIMATE TENSION Lbs. (kN)	4000 PSI (27.6 MPa) CONCRETE ULTIMATE TENSION Lbs. (kN)	ULTIMATE TENSILE AND YIELD STRENGTH GRADE 60 REBAR	
				MINIMUM YIELD STRENGTH Lbs. (kN)	MINIMUM ULTIMATE TENSILE STRENGTH Lbs. (kN)
# 3 (9.5)	3-3/8 (85.7)	6,180 (27.5)	8,324 (37.0)	6,600 (29.4)	9,900 (44.0)
	4-1/2 (114.3)	7,560 (33.6)	11,418 (50.8)	6,600 (29.4)	9,900 (44.0)
# 4 (12.7)	4-1/2 (114.3)	9,949 (44.3)	16,657 (74.1)	12,000 (53.4)	18,000 (80.1)
	6 (152.4)	15,038 (66.9)	17,828 (79.3)	12,000 (53.4)	18,000 (80.1)
# 5 (15.9)	5-5/8 (142.9)	14,012 (62.3)	20,896 (93.0)	18,600 (82.7)	27,900 (124.1)
	7-1/2 (190.5)	16,718 (74.4)	26,072 (116.0)	18,600 (82.7)	27,900 (124.1)
# 6 (19.1)	6-3/4 (171.5)	21,247 (94.5)	26,691 (118.7)	26,400 (117.4)	39,600 (176.2)
	9 (228.6)	33,325 (148.2)	37,425 (166.5)	26,400 (117.4)	39,600 (176.2)
# 7 (22.2)	7-7/8 (200.0)	N/A	40,374 (179.6)	36,000 (160.1)	54,000 (240.2)
	10-1/2 (266.7)	38,975 (173.4)	46,050 (204.8)	36,000 (160.1)	54,000 (240.2)
# 8 (25.4)	9 (228.6)	35,600 (158.4)	47,311 (210.5)	47,400 (210.9)	71,100 (316.3)
	12 (304.8)	41,010 (182.4)	66,140 (294.2)	47,400 (210.9)	71,100 (316.3)
# 9 (28.6)	10-1/8 (257.2)	N/A	57,221 (254.5)	60,000 (266.9)	90,000 (400.4)
	13-1/2 (342.9)	N/A	79,966 (355.7)	60,000 (266.9)	90,000 (400.4)
# 10 (31.8)	11-1/4 (285.8)	49,045 (218.2)	73,091 (325.1)	76,200 (339.0)	114,300 (508.5)
	15 (381.0)	69,079 (307.3)	83,295 (370.5)	76,200 (339.0)	114,300 (508.5)
# 11 (34.9)	12-3/8 (314.3)	63,397 (282.0)	75,047 (333.8)	93,600 (416.4)	140,400 (624.6)
	16-1/2 (419.1)	81,707 (363.5)	91,989 (409.2)	93,600 (416.4)	140,400 (624.6)

1 Allowable working loads for the single installations under static loading should not exceed 25% capacity or the allowable load of the anchor rod.

2 Ultimate load values in 2000 and 4000 psi stone aggregate concrete. Ultimate loads are indicated for the embedment shown in the Embedment in Concrete column. Performance values are based on the use of minimum Grade 60 reinforcing bar. The use of lower strength rods will result in lower ultimate tension loads.

3 SHEAR DATA: Provided the distance from the rebar to the edge of the concrete member exceeds 1.25 times the embedment depth of the rebar, calculate the ultimate shear load for the rebar anchorage as 60% of the ultimate tensile strength of the rebar.

PERFORMANCE TABLE

A7 Acrylic Adhesive

Recommended Edge Distance Requirements for Shear Loads Installed in Solid Concrete

ANCHOR DIAMETER In. (mm)	EMBEDMENT DEPTH In. (mm)	CRITICAL EDGE DISTANCE In. (mm) 100% LOAD CAPACITY)	INTERPOLATED EDGE DISTANCE In. (mm) (80% LOAD CAPACITY)	INTERPOLATED EDGE DISTANCE In. (mm) (50% LOAD CAPACITY)	MINIMUM EDGE DISTANCE In. (mm) (10% LOAD CAPACITY)
3/8 (9.5)	3-3/8 (85.7)	4-3/16 (106.4)	3-7/16 (87.3)	2-5/16 (58.7)	13/16 (20.6)
1/2 (12.7)	4-1/2 (114.3)	5-5/8 (142.9)	4-5/8 (117.5)	3-1/8 (79.4)	1-1/8 (28.6)
5/8 (15.9)	5-5/8 (142.9)	7 (177.8)	5-3/4 (146.1)	3-1/8 (79.4)	1-3/8 (34.9)
3/4 (19.1)	6-3/4 (171.5)	8-7/16 (214.2)	6-15/16 (176.2)	4-5/8 (117.5)	1-5/8 (41.3)
1 (25.4)	9 (228.6)	11-1/4 (285.8)	9-1/4 (235.0)	6-1/4 (158.8)	2-1/4 (57.2)
1-1/4 (31.8)	11-1/4 (285.8)	14-1/16 (357.2)	11-5/8 (295.3)	7-7/8 (200.0)	2-7/8 (73.0)

Combined Tension and Shear Loading—for A7 Adhesive Anchors

Allowable loads for anchors under tension and shear loading at the same time (combined loading) will be lower than the allowable loads for anchors subjected to 100% tension or 100% shear. Use the following equation to evaluate anchors in combined loading conditions:

$$\left(\frac{Na}{Ns}\right)^{5/3} + \left(\frac{Va}{Vs}\right)^{5/3} \leq 1$$

Na = Applied Service Tension Load

Ns = Allowable Tension Load

Va = Applied Service Shear Load

Vs = Allowable Shear Load

PERFORMANCE TABLE

A7 Acrylic Adhesive

Recommended Edge Distance Requirements for Tension Loads Installed in Solid Concrete

ANCHOR DIAMETER In. (mm)	EMBEDMENT DEPTH In. (mm)	CRITICAL EDGE DISTANCE In. (mm) (100% LOAD CAPACITY)	INTERPOLATED EDGE DISTANCE In. (mm) (90% LOAD CAPACITY)	INTERPOLATED EDGE DISTANCE In. (mm) (80% LOAD CAPACITY)	MINIMUM EDGE DISTANCE In. (mm) (70% LOAD CAPACITY)
3/8 (9.5)	3-3/8 (85.7) 4-1/2 (114.3)	2-1/2 (63.5) 3-3/8 (85.7)	1-15/16 (49.2) 2-5/8 (66.7)	1-3/8 (34.9) 1-7/8 (47.6)	13/16 (26.2) 1-1/8 (28.6)
1/2 (12.7)	4-1/2 (114.3) 6 (152.4)	3-3/8 (85.7) 4-1/2 (114.3)	2-5/8 (66.7) 3-1/2 (88.9)	1-7/8 (47.6) 2-1/2 (63.5)	1-1/8 (28.6) 1-1/2 (38.1)
5/8 (15.9)	5-5/8 (142.9) 7-1/2 (190.5)	4-3/16 (106.4) 5-5/8 (142.9)	3-1/4 (82.6) 4-3/8 (111.1)	2-5/16 (58.7) 3-1/8 (79.4)	1-3/8 (34.9) 1-7/8 (47.6)
3/4 (19.1)	6-3/4 (171.5) 9 (228.6)	5-1/16 (128.6) 6-3/4 (171.5)	3-15/16 (100.0) 5-1/4 (133.4)	2-13/16 (71.4) 3-3/4 (95.3)	1-5/8 (15.9) 2-1/4 (57.2)
1 (25.4)	9 (228.6) 12 (304.8)	6-3/4 (171.5) 9 (228.6)	5-1/4 (133.4) 7 (177.8)	3-3/4 (95.3) 5 (127.0)	2-1/4 (57.2) 3 (76.2)
1-1/4 (31.8)	11-1/4 (285.8) 15 (381.0)	8-7/16 (214.3) 11-1/4 (285.8)	6-9/16 (166.7) 8-3/4 (222.2)	4-3/4 (120.7) 6-1/4 158.8)	2-7/8 (73.0) 3-3/4 (95.3)

PERFORMANCE TABLE

A7 Acrylic Adhesive

Recommended Spacing Requirements for Tension Loads Installed in Concrete, Lightweight Concrete and Hollow Block

ANCHOR DIAMETER In. (mm)	EMBEDMENT DEPTH In. (mm)	CRITICAL SPACING In. (mm) (100% LOAD CAPACITY)	INTERPOLATED SPACING In. (mm) (90% LOAD CAPACITY)	MINIMUM SPACING In. (mm) (80% LOAD CAPACITY)
3/8 (9.5)	3-3/8 (85.7) 4-1/2 (114.3)	4-3/16 (106.4) 5-5/8 (142.9)	2-1/2 (63.5) 3-3/8 (85.7)	13/16 (20.6) 1-1/8 (28.6)
1/2 (12.7)	4-1/2 (114.3) 6 (152.4)	5-5/8 (142.9) 7-1/2 (190.5)	3-3/8 (85.7) 4-1/2 (114.3)	1-1/8 (28.6) 1-1/2 (38.1)
5/8 (15.9)	5-5/8 (142.9) 7-1/2 (190.5)	7 (177.8) 9-3/8 (238.1)	4-3/16 (106.4) 5-5/8 (142.9)	1-3/8 (34.9) 1-7/8 (47.6)
3/4 (19.1)	6-3/4 (171.5) 9 (228.6)	8-7/16 (214.3) 11-1/4 (285.8)	5 (127.0) 6-3/4 (171.5)	1-5/8 (41.3) 2-1/4 (57.2)
1 (25.4)	9 (228.6) 12 (304.8)	11-1/4 (285.8) 15 (381.0)	6-3/4 (171.5) 9 (228.6)	2-1/4 (57.2) 3 (76.2)
1-1/4 (31.8)	11-1/4 (285.8) 15 (381.0)	14-1/16 (357.2) 18-3/4 (476.3)	8-1/2 (215.9) 11-1/4 (285.8)	2-7/8 (73.0) 3-3/4 (95.5)

A7 Adhesive Edge/Spacing Distance Load Factor Summary for Installation of Threaded Rod and Reinforcing Bar [1, 2]

LOAD FACTOR	DISTANCE FROM EDGE OF CONCRETE
Critical Edge Distance—Tension	
100% Tension Load →	0.75 x Anchor Embedment
Minimum Edge Distance—Tension	
70% Tension Load →	0.25 x Anchor Embedment
Critical Edge Distance—Shear	
100% Shear Load →	1.25 x Anchor Embedment
Minimum Edge Distance—Shear	
10% Shear Load →	0.25 x Anchor Embedment

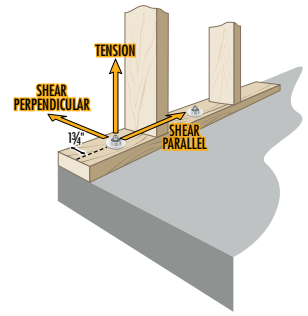
LOAD FACTOR	DISTANCE FROM ANOTHER ANCHOR
Critical Spacing—Tension	
100% Tension Load →	1.25 x Anchor Embedment
Minimum Spacing—Tension	
80% Tension Load →	0.25 x Anchor Embedment
Critical Spacing—Shear	
100% Shear Load →	1.25 x Anchor Embedment
Minimum Spacing—Shear	
25% Shear Load →	0.25 x Anchor Embedment

1 Use linear interpolation for load factors at edge distances or spacing distances between critical and minimum.

2 Anchors are affected by multiple combination of spacing and/or edge distance loading and direction of the loading. Use the product of tension and shear loading factors in design.

RED HEAD®
ADHESIVE ANCHORING SPECIALISTS

A7 Adhesive for Sill Plate Attachments



PERFORMANCE TABLE

A7 Acrylic Adhesive — Average Ultimate Tension and Shear[1,2,3] for Threaded Rods in Solid Concrete Floors and Stemwalls at 1-3/4" Edge Distance

ANCHOR DIAMETER	DRILL HOLE DIAMETER In. (mm)	EMBEDMENT In. (mm)	2000PSI (13.8 MPa) CONCRETE		
			SHEAR LOAD DIRECTION	ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)
1/2 (12.7)	9/16 (14.3)	4-1/2 (114.3)	Perpendicular	9,180 (40.8)	1,760 (7.8)
			Parallel	9,180 (40.8)	7,240 (32.2)
5/8 (15.9)	11/16 (17.5) or 3/4 (19.1)	5-5/8 (142.9)	Perpendicular	13,620 (60.6)	2,540 (11.3)
			Parallel	13,620 (60.6)	8,778 (39.0)
		10 (254.0)	Perpendicular	20,700 (92.1)	2,540 (11.3)
			Parallel	20,700 (92.1)	8,799 (39.1)
3/4 (19.1)	13/16 (20.6) or 7/8 (22.2)	6-3/4 (171.4)	Perpendicular	15,080 (67.1)	2,080 (9.2)
7/8 (22.2)	15/16 (23.8) or 1 (25.4)	15 (381.0)	Perpendicular	29,940 (133.2)	2,080 (9.2)
			Parallel	29,940 (133.2)	7,101 (31.6)

1 Allowable working loads for the single installations under static loading should not exceed 25% capacity or the allowable load of the anchor rod.
2 Ultimate load values in 2000 and 4000 psi stone aggregate concrete. Ultimate loads are indicated for the embedment shown in the Embedment in Concrete column. Performance values are based on the use of high strength threaded rod (ASTM A193 Gr. B7). The use of lower strength rods will result in lower ultimate tension and shear loads.
3 Linear interpolation may be used for intermediate spacing and edge distances (see pages 28-29).

A7 Acrylic Adhesive — Allowable Tension Loads[1] at 1-3/4" Edge Distance for Threaded Rods in Solid Concrete Floors and Stemwalls

ANCHOR DIAMETER In. (mm)	DRILL HOLE DIAMETER In. (mm)	EMBEDMENT DEPTH In. (mm)	ALLOWABLE TENSION LOAD BASED ON ADHESIVE BOND STRENGTH	ALLOWABLE TENSION LOAD BASED ON STEEL STRENGTH		
			2000 PSI (13.8 MPa) CONCRETE Lbs. (kN)	ASTM A307 (SAE 1018) Lbs. (kN)	ASTM A193 GR. B7 (SAE 4140) Lbs. (kN)	ASTM F593 AISI 304 SS Lbs. (kN)
1/2 (12.7)	9/16 (14.3)	4-1/2 (114.3)	2,295 (10.2)	3,730 (16.6)	7,780 (34.6)	7,155 (31.8)
5/8 (15.9)	11/16 (17.5) or 3/4 (19.1)	5-5/8 (142.9)	3,405 (10.7)	5,870 (26.1)	12,230 (54.4)	11,250 (50.0)
		10 (254.0)	5,175 (23.0)	5,870 (26.1)	12,230 (54.4)	11,250 (50.0)
3/4 (19.1)	13/16 (20.6) or 7/8 (22.2)	6-3/4 (171.4)	3,770 (16.8)	8,490 (37.8)	17,690 (78.7)	14,860 (66.1)
7/8 (22.2)	15/16 (23.8) or 1 (25.4)	15 (381.0)	7,485 (33.3)	11,600 (51.6)	25,510 (113.5)	20,835 (92.7)

1 Use lower value of either bond or steel strength for allowable tensile load.
2 Linear interpolation may be used for intermediate spacing and edge distances (see pages 28-29).

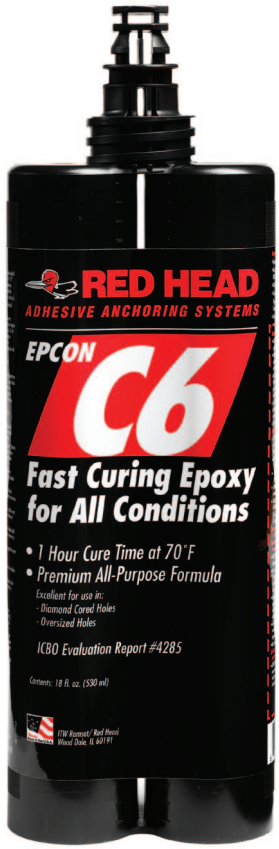
A7 Acrylic Adhesive — Allowable Shear Loads[1] at 1-3/4" Edge Distance for Threaded Rods in Solid Concrete Floors and Stemwalls

ANCHOR DIAMETER In. (mm)	DRILL HOLE DIAMETER In. (mm)	EMBEDMENT DEPTH In. (mm)	SHEAR LOAD DIRECTION	ALLOWABLE SHEAR LOADS BASED ON CONCRETE STRENGTH	ALLOWABLE SHEAR LOAD BASED ON STEEL STRENGTH		
				2000 PSI (13.8 MPa) CONCRETE Lbs. (kN)	ASTM A307 (SAE 1018) Lbs. (kN)	ASTM A193 GR. B7 (SAE 4140) Lbs. (kN)	ASTM F593 AISI 304 SS Lbs. (kN)
1/2 (12.7)	9/16 (14.3)	4-1/2 (114.3)	Perpendicular	440 (1.9)	1,870 (8.3)	3,895 (17.3)	3,585 (15.9)
			Parallel	1,810 (8.0)	1,870 (8.3)	3,895 (17.3)	3,585 (15.9)
5/8 (15.9)	11/16 (17.5) or 3/4 (19.1)	5-5/8 (142.9)	Perpendicular	635 (2.8)	2,940 (13.1)	6,125 (27.2)	5,635 (25.1)
			Parallel	2,195 (9.8)	2,940 (13.1)	6,125 (27.2)	5,635 (25.1)
		10 (254.0)	Perpendicular	635 (2.8)	2,940 (13.1)	6,125 (27.2)	5,635 (25.1)
			Parallel	2,200 (9.8)	2,940 (13.1)	6,125 (27.2)	5,635 (25.1)
3/4 (19.1)	13/16 (20.6) or 7/8 (22.2)	6-3/4 (171.4)	Perpendicular	600 (2.7)	4,250 (18.9)	8,855 (39.4)	7,440 (33.1)
7/8 (22.2)	15/16 (23.8) or 1 (25.4)	15 (381.0)	Perpendicular	520 (2.3)	5,800 (25.8)	12,760 (56.8)	10,730 (47.7)
			Parallel	1,775 (7.9)	5,800 (25.8)	12,760 (56.8)	10,730 (47.7)

1 Use lower value of either concrete or steel strength for allowable shear load.

C6

Reliable Performance—Even Under the Most Severe Installation Conditions



C6-18

NEW!
Base Material Temperature 15°F
(cartridge temperature must be ≥ 70°F)

DESCRIPTION/SUGGESTED SPECIFICATIONS*

*Suggested Specifications see page 34

Fast Curing Epoxy for All Conditions

The hardener and resin are completely mixed as they are dispensed from the dual cartridge through a static mixing nozzle. The pre-mixed adhesive is injected directly into the anchor hole. C6 can be used with threaded rod or rebar (for fastening to hollow base materials, see pages 43 and 46).

ADVANTAGES

- 1 hour cure time (see below)
- Works in damp holes and underwater applications
- Minimum shrinkage—can be used in oversized holes and diamond cored holes
- High heat deflection temperature: 139°F minimum
- One formula for both solid and hollow base materials
- NSF standard 61 certified for drinking water systems
- Extensively tested—earthquake, underwater, creep, freeze-thaw, radiation, fire, fatigue, electrical isolation, ozone and many more test programs have been conducted on C6
- Extensive use—C6 has been used on projects all over the world for almost 20 years

Easy to open, snap-off tip, no cutting required

Curing Times

MADE IN USA

BASE MATERIAL[1] (F°/C°)	WORKING TIME[2]	FULL CURE TIME
120°/ 49°	4 minutes	1 hour
110°/ 43°	4 minutes	1 hour
90°/ 32°	5 minutes	1 hour
80°/ 26°	6 minutes	1 hour
70°/ 21°	7 minutes	1 hour
60°/ 16°	7 minutes	2 hours
50°/ 10°	7 minutes	2 hours
40°/ 4°	7 minutes	24 hours
15°/ -9°	6 minutes	24 hours

[1] Cartridge must be ≥ 70°F.

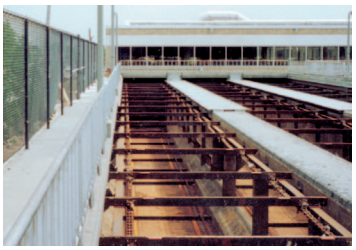
[2] Working time is max time from the end of mixing to when the insertion of the anchor into the adhesive shall be completed.

Gel Time per ASTM D2471 = 10 minutes at 72° F

APPLICATIONS

Tunnel Construction

Over 40,000 anchors were installed overhead in damp holes with water seeping through using C6 and our "dosage control" screens.



Water Treatment Plant

Skimmers and brackets with chain plates fastened with C6, which is **NSF approved** for potable drinking water systems.

Underwater Installations

C6 was used to install four 1-1/4" eye bolts underwater to lift this 37 ton block of concrete out of the ocean.

APPROVALS/LISTINGS

ICC Evaluation Service, Inc. – #ER4285

City of Los Angeles – RR#24975

City of Los Angeles – RR#24927

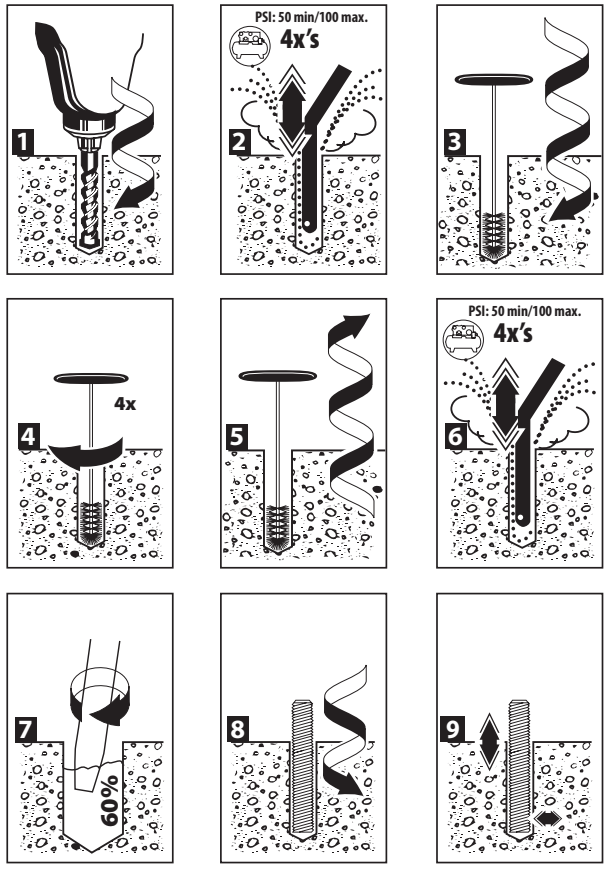
NSF Standard 61 Certified for Drinking Water Components

DOT Approvals

NSF Certified to ANSI/NSF 61

For the most current approvals/listings visit: www.itw-redhead.com

INSTALLATION STEPS



FEATURES

ANCHORAGE TO SOLID CONCRETE

Threaded Rod (Carbon or Stainless Steel) or Rebar supplied by contractor; rod does not need to be chisel pointed

C6 adhesive completely fills area between rod and hole creating a stress-free, high load anchorage

Pre-drilled hole in concrete; see performance tables for suggested hole sizes

E200 Dispenser

C6–18 fl. oz. Ordering Information

PART NUMBER	DESCRIPTION	BOX QTY
 C6-18	C6 Adhesive,18 Fl. Oz. Cartridge	6
 E24XL	Mixing Nozzle for C6-18 Cartridge Nozzle diameter fits 9/16" holes (overall length of nozzle 10-3/8")	24
 E102	Hand Dispenser for C6-18 Cartridges Dispenses both 18 oz. and 22 oz. Cartridges	1

PART NUMBER	DESCRIPTION	BOX QTY
 E200	Pneumatic Dispenser for C6-18 Cartridge	1

Refer to page 49 for ordering information on brushes , hole plugs, and extension tubing for deep holes.

ESTIMATING TABLE

C6 18 Fluid Ounce Cartridge

Number of Anchoring Installations Per Cartridge* Using Reinforcing Bar with C6 Adhesive in Solid Concrete

REBAR	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES (mm)														
		1 (25.4)	2 (50.8)	3 (76.2)	4 (101.6)	5 (127.0)	6 (152.4)	7 (177.8)	8 (203.2)	9 (228.6)	10 (254.0)	11 (279.4)	12 (304.8)	13 (330.2)	14 (355.6)	15 (381.0)
# 3	1/2	316.7	158.4	105.6	79.2	63.3	52.8	45.2	39.6	35.2	31.7	28.8	26.4	24.4	22.6	21.1
# 4	5/8	239.3	119.6	79.8	59.8	47.9	39.9	34.2	29.9	26.6	23.9	21.8	19.9	18.4	17.1	16.0
# 5	3/4	183.5	91.8	61.2	45.9	36.7	30.6	26.2	22.9	20.4	18.4	16.7	15.3	14.1	13.1	12.2
# 6	7/8	148.2	74.1	49.4	37.0	29.6	24.7	21.2	18.5	16.5	14.8	13.5	12.3	11.4	10.6	9.9
# 7	1-1/8	71.0	35.5	23.7	17.7	14.2	11.8	10.1	8.9	7.9	7.1	6.5	5.9	5.5	5.1	4.7
# 8	1-1/4	63.2	31.6	21.1	15.8	12.6	10.5	9.0	7.9	7.0	6.3	5.7	5.3	4.9	4.5	4.2
# 9	1-3/8	65.9	33.0	22.0	16.5	13.2	11.0	9.4	8.2	7.3	6.6	6.0	5.5	5.1	4.7	4.4
# 10	1-1/2	53.9	27.0	18.0	13.5	10.8	9.0	7.7	6.7	6.0	5.4	4.9	4.5	4.1	3.9	3.6
# 11	1-3/4	33.0	16.5	11.0	8.2	6.6	5.5	4.7	4.1	3.7	3.3	3.0	2.7	2.5	2.4	2.2

* The number of anchoring installations is based upon calculations of hole volumes using ANSI tolerance carbide tipped drill bits, the nominal areas of the reinforcing bars and the stress areas of the threaded rods. These estimates do not account for waste.
* Oversized holes acceptable but volume of adhesive will increase.

ESTIMATING TABLE

CLAMPING FORCE PROVIDED ON PAGE 34

C6 18 Fluid Ounce Cartridge

Number of Anchoring Installations Per Cartridge* Using Threaded Rod with C6 Adhesive in Solid Concrete

ROD In. (mm)	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES (mm)														
		1 (25.4)	2 (50.8)	3 (76.2)	4 (101.6)	5 (127.0)	6 (152.4)	7 (177.8)	8 (203.2)	9 (228.6)	10 (254.0)	11 (279.4)	12 (304.8)	13 (330.2)	14 (355.6)	15 (381.0)
1/4 (6.4)	5/16	587.3	293.7	195.8	146.8	117.5	97.9	83.9	73.4	65.3	58.7	53.4	48.9	45.2	42.0	39.2
3/8 (9.5)	7/16	340.0	170.0	113.3	85.0	68.0	56.7	48.6	42.5	37.8	34.0	30.9	28.3	26.2	24.3	22.7
1/2 (12.7)	9/16	244.7	122.4	81.6	61.2	48.9	40.8	35.0	30.6	27.2	24.5	22.2	20.4	18.8	17.5	16.3
5/8 (15.9)	3/4	125.2	62.6	41.7	31.3	25.0	20.9	17.9	15.7	13.9	12.5	11.4	10.4	9.6	8.9	8.3
3/4 (19.1)	7/8	99.1	49.5	33.0	24.8	19.8	16.5	14.2	12.4	11.0	9.9	9.0	8.3	7.6	7.1	6.6
7/8 (22.2)	1	82.0	41.0	27.4	20.5	16.4	13.7	11.7	10.3	9.1	8.2	7.5	6.8	6.3	5.9	5.5
1 (25.4)	1-1/8	67.6	33.8	22.5	16.9	13.5	11.3	9.7	8.4	7.5	6.8	6.1	5.6	5.2	4.8	4.5
1-1/4 (31.8)	1-3/8	51.2	25.6	17.0	12.8	10.2	8.5	7.3	6.4	5.7	5.1	4.6	4.3	3.9	3.7	3.4

* The number of anchoring installations is based upon calculations of hole volumes using ANSI tolerance carbide tipped drill bits, the nominal areas of the reinforcing bars and the stress areas of the threaded rods. These estimates do not account for waste.
* Oversized holes acceptable but volume of adhesive will increase.

PACKAGING

1. Disposable, self-contained cartridge system capable of dispensing both epoxy components in the proper mixing ratio
2. Epoxy components dispensed through a static mixing nozzle that thoroughly mixes the material, and places the epoxy at the base of the pre-drilled hole
3. Cartridge markings: Include manufacturer's name, batch number and best-used-by date, mix ratio by volume, ANSI hazard classification, and appropriate ANSI handling precautions

SUGGESTED SPECIFICATIONS

EPOXY ADHESIVE

High Strength EPOXY ADHESIVE: USA Made, ARRA Certified

1. Two component resin and hardener, 100% solids (containing no solvents or VOC's), non-sag paste, insensitive to moisture, grey in color, early working time and gel time appropriate for sever installation conditions, suitable for extreme temperature ranges, for all conditions or substrate materials.
2. Meets NSF Standard 61, certified for use in conjunction with drinking water systems.
3. Works in wet, damp, and submerged hole.
4. Heat deflection temperature: 139°F minimum.
5. Extended Shelf life: Best if used within 2 years.
6. Reliable performance in solid or hollow base materials.
7. Oversized and/or diamond cored holes permitted.
8. Suitable for Cold Base material installation using warmed cartridge.

PERFORMANCE TABLE

DRILL HOLE DIAMETERS PROVIDED ON PAGE 33

C6 Epoxy Adhesive — Average Ultimate Tension and Shear Loads[1,2,3] for Threaded Rod Installed in Solid Concrete

THREADED ROD DIA. In. (mm)	MAX. CLAMPING FORCE AFTER PROPER CURE Ft.-Lbs. (Nm)	EMBEDMENT IN CONCRETE In. (mm)	2000 PSI (13.8 MPa) CONCRETE		4000 PSI (27.6 MPa) CONCRETE		6000 PSI (41.4 MPa) CONCRETE	
			ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)	ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)	ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)
3/8 (9.5)	13 - 18 (17.6-24.4)	3-3/8 (85.7)	7,195 (32.0)	5,209 (23.2)	8,445 (37.6)	5,869 (26.1)	10,621 (47.2)	5,941 (26.4)
		4-1/2 (114.3)	8,317 (37.0)	5,209 (23.2)	10,021 (44.6)	5,869 (26.1)	10,603 (47.2)	5,941 (26.4)
1/2 (12.7)	22 - 25 (29.8-33.9)	4-1/2 (114.3)	13,271 (59.0)	11,427 (50.8)	17,684 (78.7)	12,585 (56.0)	17,684 (78.7)	12,585 (56.0)
		6 (152.4)	19,127 (85.1)	11,427 (50.8)	19,608 (87.2)	12,585 (56.0)	19,608 (87.2)	12,585 (56.0)
5/8 (15.9)	55 - 80 (74.6-108.5)	5-5/8 (142.9)	17,704 (78.8)	18,294 (81.4)	24,526 (109.1)	19,802 (88.1)	24,526 (109.1)	19,802 (88.1)
		7-1/2 (190.5)	22,642 (100.7)	18,294 (81.4)	28,766 (128.0)	19,802 (88.1)	29,456 (131.0)	19,802 (88.1)
3/4 (19.1)	106-160 (143.7-216.9)	6-3/4 (171.5)	28,779 (128.0)	25,723 (114.4)	31,521 (140.2)	25,723 (114.4)	33,759 (150.2)	25,723 (114.4)
		9 (228.6)	31,758 (141.3)	25,723 (114.4)	41,384 (184.0)	25,723 (114.4)	41,384 (184.0)	25,723 (114.4)
7/8 (22.2)	185-250 (250.8-338.9)	7-7/8 (200.0)	35,257 (156.8)	Consult Factory	37,714 (167.8)	30,295 (134.8)	41,023 (182.5)	32,573 (144.9)
		10-1/2 (266.7)	Consult Factory	Consult Factory	51,211 (227.8)	30,295 (134.8)	51,211 (227.8)	32,573 (144.9)
1 (25.4)	276-330 (374.2-447.4)	9 (228.6)	40,334 (179.4)	38,519 (171.3)	47,886 (213.0)	40,341 (179.5)	47,886 (213.0)	46,416 (206.5)
		12 (304.8)	48,719 (216.7)	38,519 (171.3)	62,194 (276.7)	40,341 (179.5)	63,053 (280.5)	46,416 (206.5)
1-1/4 (31.8)	370-660 (501.6-894.8)	11-1/4 (285.8)	55,654 (247.6)	65,085 (289.5)	56,981 (253.5)	65,085 (289.5)	Consult Factory	65,085 (289.5)
		15 (381.0)	65,728 (289.5)	65,085 (289.5)	79,726 (354.7)	65,085 (289.5)	Consult Factory	65,085 (289.5)

1 Allowable working loads for the single installations under static loading should not exceed 25% capacity or the allowable load of the anchor rod.
2 Ultimate load values in 2000, 4000, and 6000 psi stone aggregate concrete. Ultimate loads are indicated for the embedment shown in the Embedment in Concrete column. Performance values are based on the use of high strength threaded rod (ASTM A193 Gr. B7). The use of lower strength rods will result in lower ultimate tension and shear loads.
3 Linear interpolation may be used for intermediate spacing and edge distances (see page 35).

C6 Epoxy Adhesive — Average Ultimate Tension Loads[1,2,3] for Threaded Rod Installed in Solid Concrete, Shallow Embedment

ANCHOR DIAMETER In. (mm)	DRILL HOLE DIAMETER In. (mm)	EMBEDMENT IN CONCRETE In. (mm)	3500 PSI (24.2 MPa) ULTIMATE TENSION Lbs. (kN)
1/4 (6.4)	5/16 (7.9)	1 (25.4)	1,653 (7.4)
		2-1/4 (57.2)	2,818 (12.5)
		3 (76.2)	3,599 (16.0)
3/8 (9.5)	7/16 (11.1)	1-1/2 (38.1)	3,426 (15.2)
1/2 (12.7)	9/16 (14.3)	2 (50.8)	6,100 (27.1)
5/8 (15.9)	3/4 (19.1)	2-1/2 (63.5)	8,775 (39.0)
3/4 (19.1)	7/8 (22.2)	3 (76.2)	12,625 (56.2)
7/8 (22.2)	1 (25.4)	3-1/2 (88.9)	18,650 (83.0)
1 (25.4)	1-1/8 (28.6)	4 (101.6)	25,034 (111.4)
1-1/4 (31.8)	1-3/8 (34.9)	5 (127.0)	37,100 (165.0)

1 Allowable working loads for the single installations under static loading should not exceed 25% capacity or the allowable load of the anchor rod.
2 Ultimate load values in 2000, 4000, and 6000 psi stone aggregate concrete. Ultimate loads are indicated for the embedment shown in the Embedment in Concrete column. Performance values are based on the use of high strength threaded rod (ASTM A193 Gr. B7). The use of lower strength rods will result in lower ultimate tension and shear loads.
3 Linear interpolation may be used for intermediate spacing and edge distances (see page 35).

PERFORMANCE TABLE

C6 Epoxy Adhesive — Average Ultimate Tension and Shear Loads[1,2,3] for Threaded Rod Installed in Grout Filled Concrete Block

THREADED ROD DIA.	DRILL HOLE DIAMETER In. (mm)	EMBEDMENT DEPTH In. (mm)	ANCHOR LOCATION In. (mm)	ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)
3/8 (9.5)	7/16 (11.1)	3 (76.2)	GROUTED CELL	4,862 (21.6)	N/A
1/2 (12.7)	5/8 (15.9)	3 (76.2)	GROUTED CELL	4,953 (22.0)	N/A
1/2 (12.7)	5/8 (15.9)	6 (152.4)	GROUTED CELL	8,214 (36.5)	N/A
5/8 (15.9)	3/4 (19.1)	5 (127.0)	GROUTED CELL	7,355 (32.7)	N/A
3/4 (19.1)	7/8 (22.2)	6 (152.4)	Note 1	17,404 (77.4)	19,588 (87.1)
3/4 (19.1)	7/8 (22.2)	6 (152.4)	Note 2	17,404 (77.4)	8,668 (38.6)

1 Anchor can be located in grouted cell, "T" joint, or bed joint.
2 Anchor can be located in first grouted cell from edge.
3 Allowable working loads for the single installations under static loading should not exceed 25% (an industry standard) capacity or the allowable load of the anchor rod. Loads based upon testing with ASTM A193, Grade B7 rods.

PERFORMANCE TABLE

DRILL HOLE DIAMETERS PROVIDED ON PAGE 33

C6 Epoxy Adhesive — Allowable Tension Loads[1,2,3] for Threaded Rod Installed in Solid Concrete

THREADED ROD DIA. In. (mm)	EMBEDMENT DEPTH In. (mm)	ALLOWABLE TENSION LOAD BASED ON ADHESIVE BOND STRENGTH			ALLOWABLE TENSION LOAD BASED ON STEEL STRENGTH		
		2000 PSI (13.8 MPa) CONCRETE Lbs. (kN)	4000 PSI (27.6 MPa) CONCRETE Lbs. (kN)	6000 PSI (41.4 MPa) IN CONCRETE Lbs. (kN)	ASTM A307 (SAE 1018) Lbs. (kN)	ASTM A193 GR. B7 (SAE 4140) Lbs. (kN)	ASTM F593 AISI 304 SS Lbs. (kN)
3/8 (9.5)	3-3/8 (85.7)	1,800 (8.0)	2,110 (9.4)	2,655 (11.8)	2,080 (9.3)	4,340 (19.3)	3,995 (17.8)
	4-1/2 (114.3)	2,080 (9.2)	2,505 (11.1)	2,655 (11.8)	2,080 (9.3)	4,340 (19.3)	3,995 (17.8)
1/2 (12.7)	4-1/2 (114.3)	3,315 (14.8)	4,420 (19.7)	4,420 (19.7)	3,730 (16.6)	7,780 (34.6)	7,155 (31.8)
	6 (152.4)	4,780 (21.3)	4,900 (21.8)	4,900 (21.8)	3,730 (16.6)	7,780 (34.6)	7,155 (31.8)
5/8 (15.9)	5-5/8 (142.9)	4,425 (19.7)	6,130 (27.3)	6,130 (27.3)	5,870 (26.1)	12,230 (54.4)	11,250 (50.0)
	7-1/2 (190.5)	5,660 (25.2)	7,190 (32.0)	7,364 (32.8)	5,870 (26.1)	12,230 (54.4)	11,250 (50.0)
3/4 (19.1)	6-3/4 (171.5)	7,195 (32.0)	7,885 (35.1)	8,440 (37.5)	8,490 (37.8)	17,690 (78.7)	14,860 (66.1)
	9 (228.6)	7,940 (35.3)	10,345 (46.0)	10,345 (46.0)	8,490 (37.8)	17,690 (78.7)	14,860 (66.1)
7/8 (22.2)	7-7/8 (200.0)	8,810 (39.2)	9,430 (41.9)	10,260 (45.6)	11,600 (51.6)	25,510 (113.5)	20,835 (92.7)
	10-1/2 (266.7)	N/A	12,080 (57.0)	12,805 (57.0)	11,600 (51.6)	25,510 (113.5)	20,835 (92.7)
1 (25.4)	9 (228.6)	10,085 (44.9)	11,970 (53.3)	11,970 (53.0)	15,180 (67.5)	31,620 (140.7)	26,560 (118.1)
	12 (304.8)	12,180 (54.2)	15,545 (69.2)	15,760 (70.1)	15,180 (67.5)	31,620 (140.7)	26,560 (118.1)
1-1/4(31.8)	11-1/4 (285.8)	13,915 (61.9)	14,245 (63.4)	14,245 (63.4)	23,800 (105.9)	49,580 (220.6)	34,670 (154.2)
	15 (381.0)	16,340 (72.7)	19,930 (88.7)	19,930 (88.7)	23,800 (105.9)	49,580 (220.6)	34,670 (154.2)

1 Use lower value of either bond or steel strength for allowable tensile load.
2 Allowable loads taken from ICC Evaluation Report #4285 (formerly ICBO).
3 Linear interpolation may be used for intermediate spacing and edge distances (see below).

C6 Adhesive Edge/Spacing Distance Load Factor Summary for Installation of Threaded Rod and Reinforcing Bar [1,2]

LOAD FACTOR	DISTANCE FROM EDGE OF CONCRETE
Critical Edge Distance—Tension 100% Tension Load	1.25 x Anchor Embedment (or greater)
Minimum Edge Distance—Tension 70% Tension Load	0.50 x Anchor Embedment
Critical Edge Distance—Shear 100% Shear Load	1.25 x Anchor Embedment (or greater)
Minimum Edge Distance—Shear 30% Shear Load	0.30 x Anchor Embedment

LOAD FACTOR	DISTANCE FROM ANOTHER ANCHOR
Critical Spacing—Tension 100% Tension Load	1.50 x Anchor Embedment (or greater)
Minimum Spacing—Tension 75% Tension Load	0.75 x Anchor Embedment
Critical Spacing—Shear 100% Shear Load	1.50 x Anchor Embedment (or greater)
Minimum Spacing—Shear 30% Shear Load	0.50 x Anchor Embedment

1 Use linear interpolation for load factors at edge distances or spacing distances between critical and minimum.
2 Anchors are affected by multiple combination of spacing and/or edge distance loading and direction of the loading. Use the product of tension and shear loading factors in design.

PERFORMANCE TABLE

DRILL HOLE DIAMETERS PROVIDED ON PAGE 33

C6 Epoxy Adhesive — Allowable Shear Loads[1,2,3] for Threaded Rod Installed in Solid Concrete

THREADED ROD DIA. In. (mm)	MINIMUM EMBEDMENT DEPTH In. (mm)	ALLOWABLE SHEAR LOAD BASED ON CONCRETE STRENGTH			ALLOWABLE SHEAR LOAD BASED ON STEEL STRENGTH		
		2000 PSI (13.8 MPa) CONCRETE Lbs. (kN)	4000 PSI (27.6 MPa) CONCRETE Lbs. (kN)	6000 PSI (41.4 MPa) CONCRETE Lbs. (kN)	ASTM A307 (SAE 1018) Lbs. (kN)	ASTM A193 GR. B7 (SAE 4140) Lbs. (kN)	ASTM F593 AISI 304 SS Lbs. (kN)
3/8 (9.5)	3-3/8 (85.7)	1,300 (5.8)	1,465 (6.5)	1,500 (6.7)	1,040 (4.6)	2,170 (9.7)	1,995 (8.9)
1/2 (12.7)	4-1/2 (114.3)	2,855 (12.7)	3,145 (14.0)	3,145 (14.0)	1,870 (8.3)	3,895 (17.3)	3,585 (15.9)
5/8 (15.9)	5-5/8 (142.9)	4,575 (20.3)	4,950 (22.0)	4,950 (22.0)	2,940 (13.1)	6,125 (27.2)	5,635 (25.1)
3/4 (19.1)	6-3/4 (171.5)	6,430 (28.6)	6,430 (28.6)	6,430 (28.6)	4,250 (18.9)	8,855 (39.4)	7,440 (33.1)
7/8 (22.2)	7-7/8 (200.0)	N/A	7,575 (33.7)	8,140 (36.2)	5,800 (25.8)	12,760 (56.8)	10,730 (47.7)
1 (25.4)	9 (228.6)	9,630 (42.8)	10,085 (44.9)	11,600 (51.6)	7,590 (33.8)	15,810 (70.3)	13,285 (59.1)
1-1/4 (31.8)	11-1/4 (285.8)	16,270 (72.4)	16,270 (72.4)	16,270 (72.4)	11,900 (52.9)	24,790 (110.3)	18,840 (83.8)

1 Use lower value of either concrete or steel strength for allowable shear load.
2 Allowable loads taken from ICC Evaluation Report #4285 (formerly ICBO).
3 Linear interpolation may be used for intermediate spacing and edge distances (see page 35).

PERFORMANCE TABLE

DRILL HOLE DIAMETERS PROVIDED ON PAGE 33

C6 Epoxy Adhesive — Average Ultimate Tension Loads[1,2,3] for Reinforcing Bar Installed in Solid Concrete

REINFORCING BAR In. (mm)	EMBEDMENT IN CONCRETE In. (mm)	2000 PSI (13.8 MPa) CONCRETE ULTIMATE TENSION Lbs. (kN)	4000 PSI (27.6 MPa) CONCRETE ULTIMATE TENSION Lbs. kN)	ULTIMATE TENSILE AND YIELD STRENGTH GRADE 60 REBAR	
				MINIMUM YIELD STRENGTH Lbs. (kN)	MINIMUM ULTIMATE TENSILE STRENGTH Lbs. (kN)
# 3 (9.5)	3-3/8 (85.7)	7,020 (31.2)	9,200 (40.9)	6,600 (29.4)	9,900 (44.0)
	4-1/2 (114.3)	9,000 (40.1)	11,540 (51.3)	6,600 (29.4)	9,900 (44.0)
# 4 (12.7)	4-1/2 (114.3)	11,940 (53.1)	15,140 (67.3)	12,000 (53.4)	18,000 (80.1)
	6 (152.4)	16,703 (74.3)	18,880 (84.0)	12,000 (53.4)	18,000 (80.1)
# 5 (15.9)	5-5/8 (142.9)	14,120 (62.8)	27,740 (123.4)	18,600 (82.7)	27,900 (124.1)
	7-1/2 (190.5)	20,040 (89.1)	30,727 (136.7)	18,600 (82.7)	27,900 (124.1)
# 6 (19.1)	6-3/4 (171.5)	17,940 (79.8)	29,200 (129.9)	26,400 (117.4)	39,600 (176.2)
	9 (228.6)	25,520 (113.5)	41,640 (185.2)	26,400 (117.4)	39,600 (176.2)
	10 (254.0)	N/A	45,000 (200.2)	26,400 (117.4)	39,600 (176.2)
# 7 (22.2)	7-7/8 (200.0)	N/A	45,850 (204.0)	36,000 (160.1)	54,000 (240.2)
	10-1/2 (266.7)	N/A	60,375 (268.6)	36,000 (160.1)	54,000 (240.2)
	13 (330.2)	N/A	65,300 (290.5)	36,000 (160.1)	54,000 (240.2)
# 8 (25.4)	9 (228.6)	30,960 (137.7)	54,180 (241.1)	47,400 (210.9)	71,100 (316.3)
	12 (304.8)	30,960 (137.7)	65,420 (291.0)	47,400 (210.9)	71,100 (316.3)
	16 (406.4)	N/A	86,700 (385.7)	47,400 (210.9)	71,100 (316.3)
# 9 (28.6)	10-1/8 (257.2)	N/A	61,530 (273.7)	60,000 (266.9)	90,000 (400.4)
	13-1/2 (342.9)	N/A	81,240 (361.4)	60,000 (266.9)	90,000 (400.4)
	19 (482.6)	N/A	108,000 (480.4)	60,000 (266.9)	90,000 (400.4)
# 10 (31.8)	11-1/4 (285.8)	44,600 (198.4)	76,500 (340.3)	76,200 (339.0)	114,300 (508.5)
	15 (381.0)	49,220 (218.9)	82,320 (366.2)	76,200 (339.0)	114,300 (508.5)
	19 (482.6)	N/A	120,000 (533.8)	76,200 (339.0)	114,300 (508.5)

1 Allowable working loads for the single installations under static loading should not exceed 25% ultimate capacity or the allowable load of the anchor rod.
2 Ultimate load values in 2000 and 4000 psi stone aggregate concrete. Ultimate loads are indicated for the embedment shown in the Embedment in Concrete column. Performance values are based on minimum Grade 60 reinforcing bar. The use of lower strength rods will result in lower ultimate tension and shear loads.
3 SHEAR DATA: Provided the distance from the rebar to the edge of the concrete member exceeds 1.25 times the embedment depth of the rebar, calculate the ultimate shear load for the rebar anchorage as 60% of the ultimate tensile strength of the rebar.

Combined Tension and Shear Loading—for Adhesive Anchors

Allowable loads for anchors under tension and shear loading at the same time (combined loading) will be lower than the allowable loads for anchors subjected to 100% tension or 100% shear. Use the following equation to evaluate anchors in combined loading conditions:

$$\left(\frac{Na}{Ns}\right)^{5/3} + \left(\frac{Va}{Vs}\right)^{5/3} \leq 1$$

Na = Applied Service Tension Load

Ns = Allowable Tension Load

Va = Applied Service Shear Load

Vs = Allowable Shear Load

RED HEAD®
ADHESIVE ANCHORING SPECIALISTS

G5

High Strength Epoxy tested in accordance with ICC-ES AC308

G5-22

DESCRIPTION/SUGGESTED SPECIFICATIONS*

*Suggested Specifications see pages 40

The epoxy resin and hardener are completely mixed as they are dispensed from the dual cartridge through a static mixing nozzle, directly into the anchor hole.

See Appendix A (see pages 98-101) for strength design performance values.

Compliant with 2009 IBC. Category 1 performance rating. For use in uncracked, cracked concrete and seismic applications.

ADVANTAGES

FORMULATED FOR HOT OR WARM WEATHER

- Fire rated: tested up to 4hrs FRP
- High strength Epoxy
- 15 minute nozzle life at 70° degrees F
- Provides the best edge and spacing distance in the market

RECOGNIZED WORLDWIDE
Fire Tested BS476 4 Hrs FRP

International Standard Fire Resistance Performance

Easy to open, snap-off tip, no cutting required

NON-OFFENSIVE ODOR

- Virtually odorless, can be used indoors

Curing Times

MADE IN USA

BASE MATERIAL (F°/C°)	WORKING TIME	FULL CURE TIME
110°/ 43°	9 minutes	24 hours
90°/ 32°	9 minutes	24 hours
70°/ 20°	15 minutes	24 hours

E102

APPLICATIONS

Anchoring a concrete traffic barrier wall to concrete bridge deck.

Steel column anchoring with threaded rod

APPROVALS/LISTINGS

ICC Evaluation Service, Inc.– No. ESR 1137

DOT Approvals

City of Los Angeles – RR-25270

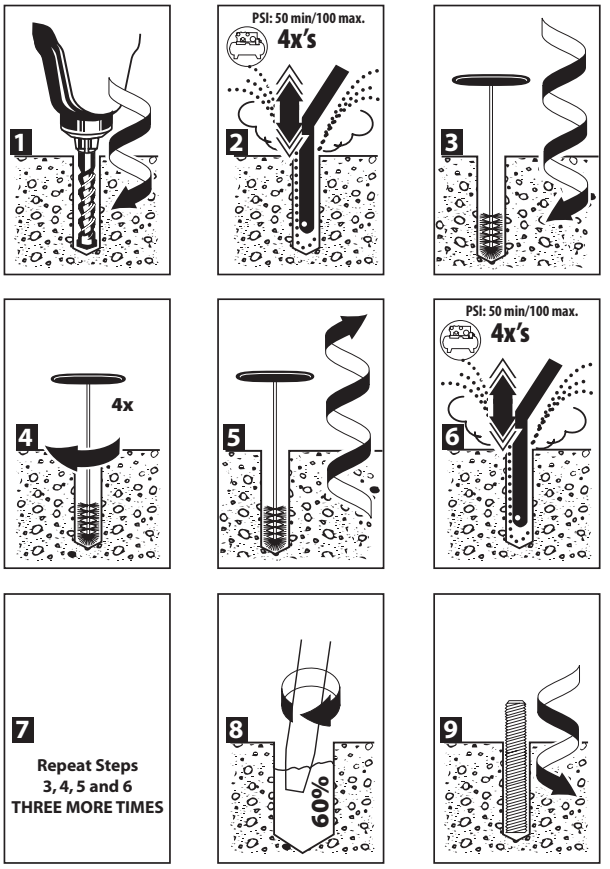
Florida Building Code Approved

NSF Standard 61 Certified for Drinking Water Components

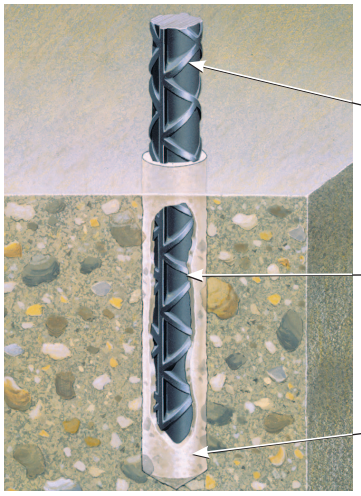
NSF Certified to ANSI/NSF 61

For the most current approvals/listings visit: www.itw-redhead.com

INSTALLATION STEPS



FEATURES

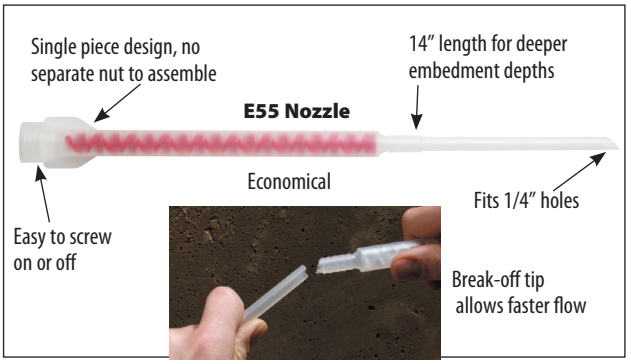


ANCHORAGE TO SOLID CONCRETE

Rebar (shown) or Threaded Rod (carbon or stainless steel) supplied by contractor

G5 adhesive completely fills area between rod and hole creating a stress-free, high load anchorage

Pre-drilled hole in concrete; see performance tables for suggested hole sizes



G5–22 fl. oz. Ordering Information

PART NUMBER	DESCRIPTION	BOX QTY
 G5-22	G5 Adhesive, 22 Fl. Oz. Cartridge	6
 E55	Mixing Nozzle for G5-22 Cartridge Nozzle diameter fits 3/8" to 5/8" holes (overall length of nozzle 14")	24
 E102	Hand Dispenser for G5-22 Cartridges Dispenses both 18 oz. and 22 oz. Cartridges	1

PART NUMBER	DESCRIPTION	BOX QTY
 E202	Pneumatic Tool for G5-22 Cartridge	1

Refer to page 49 for ordering information on brushes , hole plugs, and extension tubing for deep holes.

ESTIMATING TABLE

G5 22 Fluid Ounce Cartridge

Number of Anchoring Installations Per Cartridge* Using Reinforcing Bar with G5 Adhesive in Concrete

REBAR	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES (mm)														
		1 (25.4)	2 (50.8)	3 (76.2)	4 (101.6)	5 (127.0)	6 (152.4)	7 (177.8)	8 (203.2)	9 (228.6)	10 (254.0)	11 (279.4)	12 (304.8)	13 (330.2)	14 (355.6)	15 (381.0)
# 3	1/2	388.9	194.5	129.6	97.2	77.8	64.8	55.6	48.6	43.2	38.9	35.4	32.4	29.9	27.8	25.9
# 4	5/8	293.8	146.9	97.9	73.5	58.5	49.0	42.0	36.7	32.6	29.4	26.7	24.5	22.6	21.0	19.6
# 5	3/4	225.4	112.7	75.1	56.3	45.1	37.6	32.2	28.2	25.0	22.5	20.5	18.8	17.3	16.1	15.0
# 6	7/8	182.0	91.0	60.7	45.5	36.4	30.3	26.0	22.7	20.2	18.2	16.5	15.2	14.0	13.0	12.1
# 7	1-1/8	87.2	43.6	29.1	21.8	17.4	14.5	12.5	10.9	9.7	8.7	7.9	7.3	6.7	6.2	5.8
# 8	1-1/4	77.6	38.8	25.9	19.4	15.5	12.9	11.1	9.7	8.6	7.8	7.1	6.5	6.0	5.5	5.2
# 9	1-3/8	81.0	40.5	27.0	20.2	16.2	13.5	11.6	10.1	9.0	8.1	7.4	6.7	6.2	5.8	5.4
# 10	1-1/2	66.2	33.1	22.1	16.6	13.2	11.0	9.5	8.3	7.4	6.6	6.0	5.5	5.1	4.7	4.4
# 11	1-3/4	40.5	20.2	13.5	10.1	8.1	6.7	5.8	5.1	4.5	4.0	3.7	3.4	3.1	2.9	2.7

* The number of anchoring installations is based upon calculations of hole volumes using ANSI tolerance carbide tipped drill bits, the nominal areas of the reinforcing bars and the stress areas of the threaded rods. These estimates do not account for waste.
* Oversized holes acceptable but volume of adhesive will increase.

ESTIMATING TABLE

CLAMPING FORCE PROVIDED ON PAGE 40

G5 22 Fluid Ounce Cartridge

Number of Anchoring Installations Per Cartridge* Using Threaded Rod with G5 Adhesive in Concrete

ROD In. (mm)		DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES (mm)													
			1 (25.4)	2 (50.8)	3 (76.2)	4 (101.6)	5 (127.0)	6 (152.4)	7 (177.8)	8 (203.2)	9 (228.6)	10 (254.0)	11 (279.4)	12 (304.8)	13 (330.2)	14 (355.6)	15 (381.0)
1/4	(6.4)	5/16	721.2	360.6	240.4	180.3	144.2	120.2	103.0	90.2	80.1	72.1	65.6	60.1	55.5	51.5	48.1
3/8	(9.5)	7/16	417.6	208.8	139.2	104.4	83.5	69.6	59.7	52.2	46.4	41.8	38.0	34.8	32.1	29.8	27.8
1/2	(12.7)	9/16	300.5	150.3	100.2	75.1	60.1	50.1	42.9	37.6	33.4	30.1	27.3	25.0	23.1	21.5	20.0
5/8	(15.9)	3/4	153.8	76.9	51.3	38.4	30.8	25.6	22.0	19.2	17.1	15.4	14.0	12.8	11.8	11.0	10.3
3/4	(19.1)	7/8	121.7	60.8	40.6	30.4	24.3	20.3	17.4	15.2	13.5	12.2	11.1	10.1	9.4	8.7	8.1
7/8	(22.2)	1	100.9	50.5	33.6	25.2	20.2	16.8	14.4	12.6	11.2	10.1	9.2	8.4	7.8	7.2	6.7
1	(25.4)	1-1/8	83.0	41.5	27.7	20.7	16.6	13.8	11.9	10.4	9.2	8.3	7.5	6.9	6.4	5.9	5.5
1-1/4	(31.8)	1-3/8	62.8	31.4	20.9	15.7	12.6	10.5	9.0	7.8	7.0	6.3	5.7	5.2	4.8	4.5	4.2

* The number of anchoring installations is based upon calculations of hole volumes using ANSI tolerance carbide tipped drill bits, the nominal areas of the reinforcing bars and the stress areas of the threaded rods. These estimates do not account for waste.
* Oversized holes acceptable but volume of adhesive will increase.

PACKAGING

1. Disposable, self-contained 22 ounce cartridge system capable of dispensing both epoxy components in the proper mixing ratio
2. Epoxy components dispensed through a static mixing nozzle that thoroughly mixes the material and places the epoxy at the base of the pre-drilled hole
3. Cartridge markings: Include manufacturer's name, batch number and best-used-by date, mix ratio by volume, ANSI hazard classification, and appropriate ANSI handling precautions

SUGGESTED SPECIFICATIONS

EPOXY ADHESIVE:

High Strength EPOXY ADHESIVE: USA Made, ARRA Certified

1. Odorless, two component resin and hardener, 100% solids (containing no solvents or VOC's), non-sag paste, insensitive to moisture, grey in color, extended working time, medium gel time for warm concrete.
2. Works in wet, damp, or submerged holes.
3. Heat Deflection Temperature; 144°F minimum.
4. Shelf life: Best if used within 18 months.
5. Formulated for use in warmer concrete, solid grout-filled masonry, and solid brick.
6. Oversized and/or Core drilled holes permitted.
7. Fire-Resistance Performance of 4 Hours

PERFORMANCE TABLE

DRILL HOLE DIAMETERS PROVIDED ON PAGE 39

G5 Epoxy Adhesive

Average Ultimate Tension and Shear Loads[1,2,3] for Threaded Rod Installed in Solid Concrete

THREADED ROD DIA. In. (mm)	MAX. CLAMPING FORCE AFTER PROPER CURE Ft.-Lbs. (Nm)	EMBEDMENT CONCRETE In. (mm)	2000 PSI (13.8 MPa) CONCRETE		4000 PSI (27.6 MPa) CONCRETE	
			ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)	ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)
3/8 (9.5)	9 (12.2)	3-3/8 (85.7)	5,060 (22.5)	6,227 (27.7)	8,396 (37.3)	6,227 (27.7)
		4-1/2 (114.3)	6,465 (28.8)	6,227 (27.7)	10,490 (46.7)	6,227 (27.7)
1/2 (12.7)	16 (21.6)	4-1/2 (114.3)	10,484 (46.6)	12,016 (53.5)	13,476 (59.9)	12,016 (53.5)
		6 (152.4)	12,392 (55.1)	12,016 (53.5)	19,166 (85.3)	12,016 (53.5)
		7-1/2 (190.5)	N/A	12,016 (53.5)	20,572 (91.5)	12,016 (53.5)
5/8 (15.9)	47 (63.5)	5-5/8 (142.9)	14,634 (65.1)	17,547 (78.1)	20,880 (92.9)	17,547 (78.1)
		7-1/2 (190.5)	20,182 (89.8)	17,547 (78.1)	27,939 (124.3)	17,547 (78.1)
		9-3/8 (238.1)	N/A	17,547 (78.1)	32,249 (143.5)	17,547 (78.1)
3/4 (19.1)	90 (121.5)	6-3/4 (171.5)	18,966 (84.4)	24,918 (110.8)	29,019 (129.1)	24,918 (110.8)
		9 (228.6)	25,988 (115.6)	24,918 (110.8)	43,812 (194.9)	24,918 (110.8)
		11-1/4 (285.8)	N/A	24,918 (110.8)	47,927 (213.2)	24,918 (110.8)
1 (25.4)	276 (372.6)	9 (228.6)	43,804 (194.9)	43,648 (194.2)	53,531 (238.1)	43,648 (194.2)
		12 (304.8)	45,351 (201.6)	43,648 (194.2)	64,022 (284.8)	43,648 (194.2)
		15 (381.0)	N/A	43,648 (194.2)	82,547 (367.2)	43,648 (194.2)

1 Allowable working loads for the single installations under static loading should not exceed 25% (an industry standard) capacity or the allowable load of the anchor rod.

2 Ultimate load values in 2000 and 4000 psi stone aggregate concrete. Ultimate loads are indicated for the embedment shown in the Embedment in Concrete column. Performance values are based on the use of high strength threaded rod (ASTM A193 Gr. B7). The use of lower strength rods will result in lower ultimate tension and shear loads.

3 Linear interpolation may be used for intermediate spacing and edge distances. (See page 42)

PERFORMANCE TABLE

DRILL HOLE DIAMETERS PROVIDED ON PAGE 39

G5 Epoxy Adhesive — Allowable Tension Loads[1] for Threaded Rod Installed in Solid Concrete

THREADED ROD DIA. In. (mm)	MIN. EMBEDMENT DEPTH In. (mm)	ALLOWABLE TENSION LOAD BASED ON EPOXY BOND STRENGTH		ALLOWABLE TENSION LOAD BASED ON STEEL STRENGTH		
		2000 PSI (13.8 MPa) CONCRETE Lbs. (kN)	4000 PSI (27.6 MPa) CONCRETE Lbs. (kN)	ASTM A307 (SAE 1018) Lbs. (kN)	ASTM A193 GR. B7 (SAE 4140) Lbs. (kN)	ASTM F593 AISI 304 SS Lbs. (kN)
3/8 (9.5)	3-3/8 (85.7)	1,265 (5.6)	2,092 (9.3)	2,080 (9.3)	4,340 (19.3)	3,995 (17.8)
	4-1/2 (114.3)	1,616 (7.2)	2,622 (11.7)	2,080 (9.3)	4,340 (19.3)	3,995 (17.8)
1/2 (12.7)	4-1/2 (114.3)	3,004 (13.4)	3,369 (15.0)	3,730 (16.6)	7,780 (34.6)	7,155 (31.8)
	6 (152.4)	3,098 (13.8)	4,791 (21.3)	3,730 (16.6)	7,780 (34.6)	7,155 (31.8)
5/8 (15.9)	5-5/8 (142.9)	3,659 (16.3)	5,220 (23.2)	5,870 (26.1)	12,230 (54.4)	11,250 (50.0)
	7-1/2 (190.5)	5,046 (22.4)	6,985 (31.1)	5,870 (26.1)	12,230 (54.4)	11,250 (50.0)
3/4 (19.1)	6-3/4 (171.5)	4,742 (21.1)	7,255 (32.3)	8,490 (37.8)	17,690 (78.7)	14,860 (66.1)
	9 (228.6)	6,497 (28.9)	10,057 (44.7)	8,490 (37.8)	17,690 (78.7)	14,860 (66.1)
1 (25.4)	9 (228.6)	10,951 (48.7)	11,209 (49.9)	15,180 (67.5)	31,620 (140.6)	26,560 (118.1)
	12 (304.8)	11,338 (50.4)	15,923 (70.8)	15,180 (67.5)	31,620 (140.6)	26,560 (118.1)

1 Use lower value of either bond or steel strength for allowable tensile load.

2 Linear interpolation may be used for intermediate spacing and edge distances. (See page 42)

PERFORMANCE TABLE

DRILL HOLE DIAMETERS PROVIDED ON PAGE 39

G5 Epoxy Adhesive — Allowable Shear Loads[1,2] for Threaded Rod Installed in Solid Concrete

THREADED ROD DIA. In. (mm)	MIN. EMBEDMENT DEPTH In. (mm)	ALLOWABLE SHEAR LOAD BASED ON CONCRETE STRENGTH		ALLOWABLE SHEAR LOAD BASED ON STEEL STRENGTH		
		2000 PSI (13.8 MPa) CONCRETE Lbs. (kN)	4000 PSI (27.6 MPa) CONCRETE Lbs. (kN)	ASTM A307 (SAE 1018) Lbs. (kN)	ASTM A193 GR. B7 (SAE 4140) Lbs. (kN)	ASTM F593 AISI 304 SS Lbs. (kN)
3/8 (9.5)	3-3/8 (85.7)	1,557 (6.9)	1,557 (6.9)	1,040 (4.6)	2,170 (9.7)	1,995 (8.9)
1/2 (12.7)	4-1/2 (114.3)	3,004 (13.4)	3,004 (13.4)	1,870 (8.3)	3,895 (17.3)	3,585 (15.9)
5/8 (15.9)	5-5/8 (142.9)	4,387 (19.5)	4,387 (19.5)	2,940 (13.1)	6,125 (27.2)	5,635 (25.1)
3/4 (19.1)	6-3/4 (171.5)	6,230 (27.7)	6,230 (27.7)	4,250 (18.9)	8,855 (39.4)	7,440 (33.1)
1 (25.4)	9 (228.6)	10,912 (48.5)	10,912 (48.5)	7,590 (33.8)	15,810 (70.3)	13,285 (59.1)

1 Use lower value of either concrete or steel strength for allowable shear load.

2 Linear interpolation may be used for intermediate spacing and edge distances. (See page 42)

Combined Tension and Shear Loading—for G5 Adhesive Anchors

Allowable loads for anchors under tension and shear loading at the same time (combined loading) will be lower than the allowable loads for anchors subjected to 100% tension or 100% shear. Use the following equation to evaluate anchors in combined loading conditions:

$$\left(\frac{Na}{Ns}\right) + \left(\frac{Va}{Vs}\right) \leq 1$$

Na = Applied Service Tension Load

Ns = Allowable Tension Load

Va = Applied Service Shear Load

Vs = Allowable Shear Load

G5 Epoxy Adhesive — Average Ultimate Tension Loads[1,2,3] for Reinforcing Bar Installed in Solid Concrete

REINFORCING BAR In. (mm)	EMBEDMENT IN CONCRETE In. (mm)	2000 PSI (13.8 MPa) IN CONCRETE ULTIMATE TENSION Lbs. (kN)	4000 PSI (27.6 MPa) IN CONCRETE ULTIMATE TENSION Lbs. (kN)	ULTIMATE TENSILE AND YIELD STRENGTH GRADE 60 REBAR	
				MINIMUM YIELD STRENGTH Lbs. (kN)	MINIMUM ULTIMATE TENSILE STRENGTH Lbs. (kN)
# 3 (9.5)	3-3/8 (85.7)	7,480 (33.3)	8,090 (35.9)	6,600 (29.4)	9,900 (44.0)
	4-1/2 (114.3)	N/A	10,488 (46.6)	6,600 (29.4)	9,900 (44.0)
# 4 (12.7)	4-1/2 (114.3)	N/A	14,471 (64.4)	12,000 (53.4)	18,000 (80.1)
	6 (152.4)	11,235 (50.0)	20,396 (90.7)	12,000 (53.4)	18,000 (80.1)
# 5 (15.9)	5-5/8 (142.9)	N/A	21,273 (94.6)	18,600 (82.7)	27,900 (124.1)
	7-1/2 (190.5)	18,108 (80.6)	31,863 (141.7)	18,600 (82.7)	27,900 (124.1)
# 6 (19.1)	6-3/4 (171.5)	N/A	27,677 (123.1)	26,400 (117.4)	39,600 (176.2)
	9 (228.6)	29,338 (130.5)	47,879 (212.9)	26,400 (117.4)	39,600 (176.2)
# 7 (22.2)	7-7/8 (200.0)	N/A	43,905 (195.3)	36,000 (160.1)	54,000 (240.2)
	10-1/2 (266.7)	N/A	52,046 (231.5)	36,000 (160.1)	54,000 (240.2)
# 8 (25.4)	9 (228.6)	N/A	55,676 (247.7)	47,400 (210.9)	71,100 (316.3)
	12 (304.8)	48,000 (213.5)	77,358 (344.1)	47,400 (210.9)	71,100 (316.3)
# 9 (28.6)	10-1/8 (257.2)	N/A	62,443 (277.8)	60,000 (266.9)	90,000 (400.4)
	13-1/2 (342.9)	N/A	71,959 (320.1)	60,000 (266.9)	90,000 (400.4)
# 10 (31.8)	11-1/4 (285.8)	N/A	70,165 (312.1)	76,200 (339.0)	114,300 (508.5)
	15 (381.0)	N/A	78,545 (349.4)	76,200 (339.0)	114,300 (508.5)

1 Allowable working loads for the single installations under static loading should not exceed 25% ultimate capacity or the allowable load of the anchor rod.

2 Ultimate load values in 2000 and 4000 psi stone aggregate concrete. Ultimate loads are indicated for the embedment shown in the Embedment in Concrete column. Performance values are based on the use of minimum Grade 60 reinforcing bar. The use of lower strength rods will result in lower ultimate tension and shear loads.

3 SHEAR DATA: Provided the distance from the rebar to the edge of the concrete member exceeds 1.25 times the embedment depth of the rebar, calculate the ultimate shear load for the rebar anchorage as 60% of the ultimate tensile strength of the rebar.

G5 Epoxy Adhesive — Average Ultimate Tension Loads[1,2] for Threaded Rod Installed in Solid Concrete

THREADED ROD In. (mm)	HOLE DIAMETER In. (mm)	EMBEDMENT IN CONCRETE In. (mm)	≥ 3000 PSI (13.8 MPa) IN CONCRETE ULTIMATE TENSION Lbs. (kN)
1-1/2 (38.1)	1-3/4 (44.5)	13 (330.2)	100,250 (490.4)
		17 (431.8)	143,600 (638.8)
		19 (482.6)	150,000 (667.3)
2 (50.8)	2-1/4 (57.2)	16 (406.4)	150,000 (667.3)
		17 (431.8)	169,700 (754.9)

1 Allowable working loads for the single installations under static loading should not exceed 25% ultimate capacity or the allowable load of the anchor rod.

2 Ultimate load values are ≥ 3000 psi in stone aggregate concrete. Ultimate loads are indicated for the embedment shown in the Embedment in Concrete column. Performance values are based on the use of high strength threaded rod (ASTM A193 Gr. B7). The use of lower strength rods will result in lower ultimate tension loads. See chart below.

G5 Adhesive Edge/Spacing Distance Load Factor Summary for Installation of Threaded Rod and Reinforcing Bar [1, 2]

LOAD FACTOR	DISTANCE FROM EDGE OF CONCRETE
Critical Edge Distance—Tension	
100% Tension Load →	1.25 x Anchor Embedment
Minimum Edge Distance—Tension	
70% Tension Load →	0.50 x Anchor Embedment
Critical Edge Distance—Shear	
100% Shear Load →	1.25 x Anchor Embedment
Minimum Edge Distance—Shear	
30% Shear Load →	0.30 x Anchor Embedment

LOAD FACTOR	DISTANCE FROM ANOTHER ANCHOR
Critical Spacing—Tension	
100% Tension Load →	1.50 x Anchor Embedment
Minimum Spacing—Tension	
75% Tension Load →	0.75 x Anchor Embedment
Critical Spacing—Shear	
100% Shear Load →	1.50 x Anchor Embedment
Minimum Spacing—Shear	
30% Shear Load →	0.50 x Anchor Embedment

1 Use linear interpolation for load factors at edge distances or spacing distances between critical and minimum.

2 Anchors are affected by multiple combination of spacing and/or edge distance loading and direction of the loading. Use the product of tension and shear loading factors in design.

RED HEAD®
ADHESIVE ANCHORING SPECIALISTS

Umbrella Inserts and Stubby Screens

High Performance Adhesive Systems for Fastening to Hollow Base Materials

A7-28 C6-18

HB 14-2

HBU-38

HBU-FS

DESCRIPTION/ADVANTAGES

Hollow Block Fastening with A7 and C6 Adhesive

HBU-38

Umbrella Inserts—specially designed for fastening to the face of hollow concrete block, brick, clay tile or terra cotta. Accepts rods 1/4″, 3/8″ and 1/2″

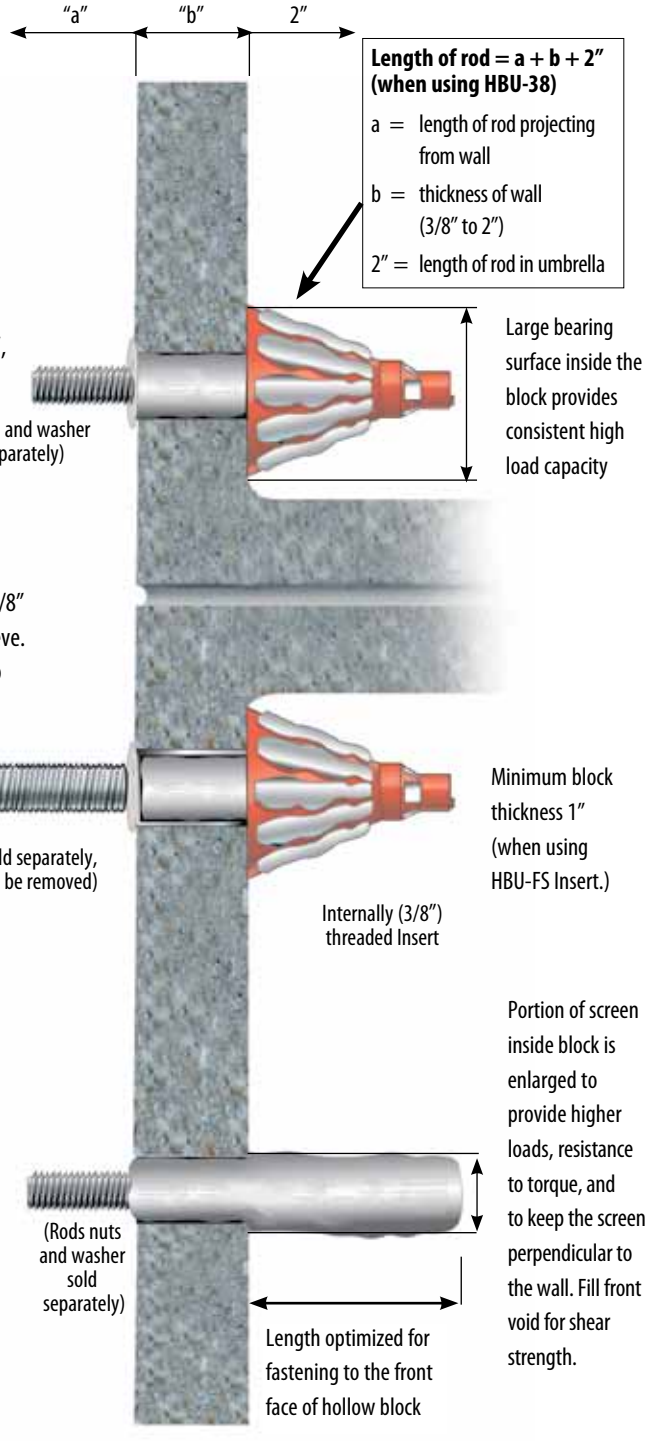
(Rods nuts and washer sold separately)

HBU-FS

Umbrella Inserts with 3/8″ internally threaded sleeve. Removable fastening to concrete block

STUBBY SCREENS

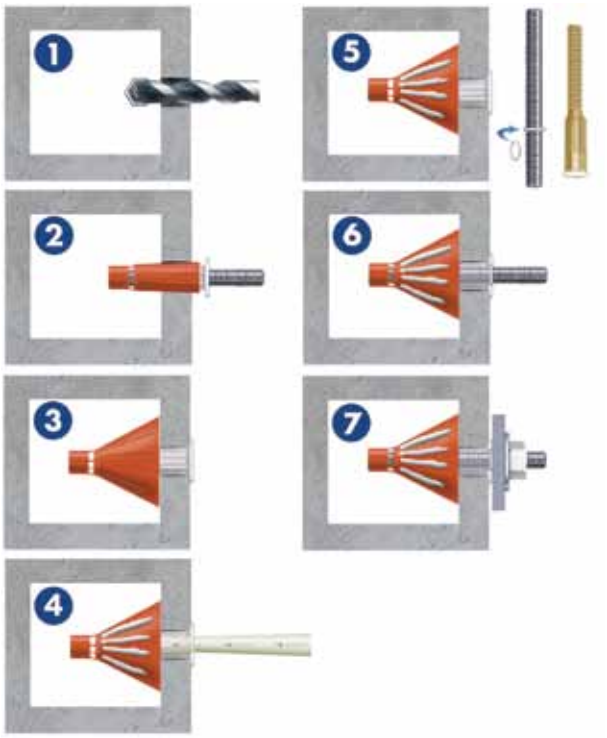
Specially designed stainless steel screens provide maximum performance for a screen in the front face of hollow concrete block. Screens available for rods 1/4″ to 5/8″



Section View—Concrete Block

Umbrella Inserts and Screens

INSTALLATION STEPS



1. Drill 3/4″ diameter hole, 3-3/4″ deep using rotation only drilling mode and carbide tipped drill bit. Clean out hole with forced air. Complete hole preparation with use of a brush and repeat cleaning with compressed air (leave no dust or slurry).
2. Place umbrella on piece of threaded rod, stretch umbrella over the rod by pulling the white collar back approximately 1″. Squeeze orange portion of umbrella and push umbrella into hole.
3. Push umbrella body through the hole and completely into void. Remove threaded rod. (Do not use in solid base materials. For anchoring into block web, ends and mortar joints, use screens.)
4. Dispense and discard a sufficient amount of adhesive from new cartridge until a uniform adhesive mix is achieved. Inject approximately 1-1/2 fl. oz. of adhesive into umbrella (7 to 8 pumps using manual dispenser) to completely fill umbrella.
5. 3/8″ rod uses a centering ring (supplied with inserts) to keep rod perpendicular to the wall.
6. Insert rod into the filled umbrella using a slow, soft twisting motion until it contacts the back of umbrella.
7. Wait for appropriate temperature/cure time before tightening fixture to the recommended torque of 10 ft./lbs.

Installation instructions for stubby screens provided on page 46.

SELECTION CHART

Umbrella Inserts

DESCRIPTION	PART NO.	BOX CONTENTS
Umbrella Anchor 	HBU-38	20 Umbrellas 20 Centering Rings
3/8″ Internally Threaded Insert with Umbrella 	HBU-FS	10 Umbrellas 10 Flush Sleeve Insert

SELECTION CHART

Stubby Screens

PART NO.	DESCRIPTION	QTY/BOX
HB 14-2	1/4″ x 2″ Stainless Screen	100
HB 38-312	3/8″ x 3-1/2″ Stainless Screen	100
HB 12-312	1/2″ x 3-1/2″ Stainless Screen	50
HB 58-412	5/8″ x 4-1/2″ Stainless Screen	50

ESTIMATING TABLE

Umbrella Inserts

Number of Anchoring Installations Per Cartridge Using Threaded Rod and Umbrella Inserts with A7 and C6 Adhesives in Hollow Base Material*

ROD In (mm)	DRILL HOLE DIA. INCHES	VOLUME OF CARTRIDGE		UMBRELLA INSERT WITH EMBEDMENT OF 3-3/4″
3/8 (9.5)	3/4	A7	5 fluid oz.	3
		A7	8 fluid oz.	5
		A7	10 fluid oz.	6
		A7	28 fluid oz.	17
		C6	18 fluid oz.	11

* These estimates do not account for waste.

ESTIMATING TABLE

Stubby Screens — Number of Anchoring Installations Per Cartridge* Using Threaded Rod and Stubby Screens with A7 and C6 Adhesives in Hollow Base Material

ROD In (mm)	DRILL HOLE DIA. INCHES	VOLUME OF CARTRIDGE	SCREEN LENGTH PLUS 1 DIAMETER (INCHES) 2″	3-1/2″	4-1/2″
1/4 (6.4)	3/8	A7 8 fluid oz.	39		
		A7 10 fluid oz.	48		
		A7 28 fluid oz.	135		
		C6 18 fluid oz.	87		
3/8 (9.5)	1/2	A7 8 fluid oz.		17	
		A7 10 fluid oz.		21	
		A7 28 fluid oz.		62	
		C6 18 fluid oz.		40	
1/2 (12.7)	5/8	A7 8 fluid oz.		12	
		A7 10 fluid oz.		15	
		A7 28 fluid oz.		43	
		C6 18 fluid oz.		28	
5/8 (15.9)	3/4	A7 8 fluid oz.			7
		A7 10 fluid oz.			11
		A7 28 fluid oz.			24
		C6 18 fluid oz.			16

* These estimates do not account for waste.

PERFORMANCE TABLE

Load Values[1, 2] Using A7 in Hollow Concrete Block

	ROD DIA. In. (mm)	MAX CLAMPING FORCE AFTER PROPER CURE Ft.-Lbs. (Nm)	DRILL HOLE DIA. In. (mm)	EMBEDMENT (SCREEN LENGTH) In. (mm)	ULTIMATE TENSION Lbs. (Kn)	ULTIMATE SHEAR Lbs. (Kn)
Umbrella	3/8 (9.5)	10 (13)	3/4 (19.1)	3-3/4 (95.3)	3,558 (15.8)	3,109 (13.8)
Stubby Screens	1/4 (6.4)	4 (5)	3/8 (9.5)	2 -1/4 (57.1)	1,550 (6.9)	1,900 (8.5)
	3/8 (9.5)	7 (9)	1/2 (12.7)	3-7/8 (98.4)	1,661 (7.4)	2,071 (9.2)
	1/2 (12.7)	10 (13)	5/8 (15.9)	4 (101.6)	2,458 (10.9)	4,467 (19.9)
	5/8 (15.9)	13 (17)	3/4 (19.1)	5-1/8 (130.2)	2,543 (10.9)	5,047 (22.4)

1 Allowable working loads should not exceed 25% ultimate capacity. Based upon testing using ASTM A193, Grade B7 rod.

2 The tabulated values are for anchors installed at a minimum 12 inch edge distance and minimum 8 inch spacing.

PERFORMANCE TABLE

Load Values[1, 2] Using C6 in Hollow Concrete Block

	ROD DIA. In. (mm)	MAX CLAMPING FORCE AFTER PROPER CURE Ft.-Lbs. (Nm)	DRILL HOLE DIA. In. (mm)	EMBEDMENT (SCREEN LENGTH) In. (mm)	ULTIMATE TENSION Lbs. (Kn)	ULTIMATE SHEAR Lbs. (Kn)
Umbrella	3/8 (9.5)	10 (13)	3/4 (19.1)	3-3/4 (95.3)	1,875 (8.3)	2,200 (9.8)
Stubby Screens	1/4 (6.4)	4 (5)	3/8 (9.5)	2 (50.8)	1,550 (6.9)	1,900 (8.5)
	3/8 (9.5)	7 (9)	1/2 (12.7)	3-1/2 (88.9)	1,661 (7.4)	2,071 (9.2)
	1/2 (12.7)	10 (13)	5/8 (15.9)	3-1/2 (88.9)	1,873 (8.3)	2,242 (10.0)
	5/8 (15.9)	13 (17)	3/4 (19.1)	4-1/2 (114.3)	1,970 (8.8)	3,554 (15.8)

1 Allowable working loads should not exceed 25% ultimate capacity. Based upon testing using ASTM A193, Grade B7 rod.

2 The tabulated values are for anchors installed at a minimum 12 inch edge distance and minimum 8 inch spacing.

Screen Tubes

Quality Adhesive Systems for Fastening Through Block and for Brick Pinning Applications

A7-28 C6-18

Nylon Screens

Stainless Screens

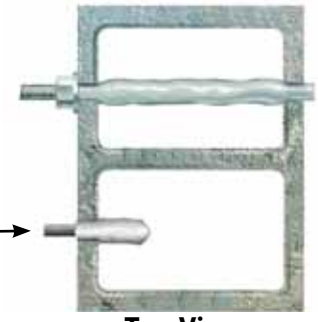
DESCRIPTION/SUGGESTED SPECIFICATIONS

Screens Used with A7 and C6

HOLLOW CONCRETE BLOCK

Maximum holding strength in concrete block can be obtained by fastening to both the front and back of the block using an adhesive screen tube and threaded rod.

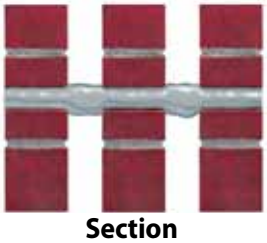
For attachments to single face of block, see page 43 for information on "umbrella anchors" and "stubby screens"



Top View

BRICK WALL

Systems designed for Seismic Retrofit, Brick Pinning or fastening to brick—various lengths and diameters available to accommodate site conditions.



Section

The no-drip feature of A7 adhesive makes it particularly well suited for brick pinning applications.

ADVANTAGES

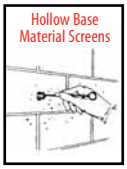
HBP SERIES—NYLON SCREENS

- 30%-50% savings from stainless steel screens
- Comparable performance values
- Easier to insert and span across voids
- Flexible material is less susceptible to damage from crushing

HB SERIES—STAINLESS SCREENS

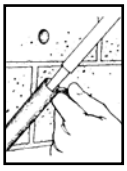
- Corrosion resistant
- Available in 1/4" to 3/4" diameters
- Special version, "dosage control" available for overhead and underwater installations

INSTALLATION STEPS



1. Drill hole to the length of the screen plus 1 diameter, using rotation-only drilling mode. Clean out hole with forced air. Complete hole preparation with use of a brush and repeat cleaning with forced air (leave no dust or slurry).

3. Insert the filled screen completely into the hole (subflush).



2. When starting new cartridge or new nozzle, dispense and discard enough adhesive until uniform adhesive mix is achieved. Insert the nozzle into the bottom of the screen and **fill screen completely full** (use extension tube if needed to reach bottom of screen).

4. While holding the tab of the screen against the wall, hand insert the selected rod slowly into the screen tube with a slow twisting motion. Pull screen flush to face and coat with adhesive. Wait for appropriate cure time before torquing fixture in place.

SELECTION CHART

Screen Tubes

HB Stainless Screen

HBP Nylon Screen

ROD DIA. In. (mm)	SCREEN LENGTH In. (mm)	STAINLESS STEEL SCREENS		NYLON SCREENS	
		PART NO.	QTY/BOX	PART NO.	QTY/BOX
1/4 (6.4)	6 (152.4)	HB 14-6	100	N/A	N/A
1/4 (6.4)	8 (203.2)	HB 14-8	100	N/A	N/A
1/4 (6.4)	10 (254.0)	HB 14-10	100	N/A	N/A
3/8 (9.5)	6 (152.4)	HB 38-6	50	HBP 38-6	50
3/8 (9.5)	8 (203.2)	HB 38-8	25	HBP 38-8	25
3/8 (9.5)	10 (254.0)	HB 38-10	25	HBP 38-10	25
1/2 (12.7)	6 (152.4)	HB 12-6	50	HBP 12-6	50
1/2 (12.7)	8 (203.2)	HB 12-8	25	HBP 12-8	25
1/2 (12.7)	10 (254.0)	HB 12-10	25	HBP 12-10	25
5/8 (15.9)	6 (152.4)	HB 58-6	25	HBP 58-6	40
5/8 (15.9)	8 (203.2)	HB 58-8	20	HBP 58-8	40
5/8 (15.9)	10 (254.0)	HB 58-10	20	HBP 58-10	40
3/4 (19.1)	8 (203.2)	HB 34-8	20	N/A	N/A
3/4 (19.1)	10 (254.0)	HB 34-10	10	HBP 34-10	20
3/4 (19.1)	13 (330.2)	HB 34-13	10	HBP 34-13	20

*Not available in standard strength nylon screens. Longer screens available through specials.

ESTIMATING TABLE

Screen Tubes

Number of Holes Per Cartridge* Using Threaded Rod and Screen Tubes with A7 and C6 Adhesives in Hollow Base Material

ROD In (mm)	DRILL HOLE DIA. INCHES	VOLUME OF CARTRIDGE	SCREEN LENGTH (INCHES)			
			6″	8″	10″	13″
1/4 (6.4)	3/8	A7 8 fluid oz.	13	10	8	
		A7 10 fluid oz.	16	12	10	
		A7 28 fluid oz.	45	35	28	
		C6 18 fluid oz.	29	22	18	
3/8 (9.5)	1/2	A7 8 fluid oz.	10	8	6	
		A7 10 fluid oz.	12	10	7.5	
		A7 28 fluid oz.	37	29	23	
		C6 18 fluid oz.	24	19	15	
1/2 (12.7)	5/8	A7 8 fluid oz.	7	5	4	
		A7 10 fluid oz.	9	6	5	
		A7 28 fluid oz.	26	18	14	
		C6 18 fluid oz.	17	12	9	
5/8 (15.9)	3/4	A7 8 fluid oz.	5	4	3	
		A7 10 fluid oz.	6	5	4	
		A7 28 fluid oz.	18	14	10	
		C6 18 fluid oz.	12	9	7	
3/4 (19.1)	7/8	A7 8 fluid oz.		2.5	2	1
		A7 10 fluid oz.		3	2.5	1.75
		A7 28 fluid oz.		9	6	5
		C6 18 fluid oz.		6	4	3

* These estimates do not account for waste.

Screen Tubes

PERFORMANCE TABLE

Load Values

Average Ultimate Loads for HBP (nylon) or HB (stainless) Screens Used with A7 in Hollow Concrete Block[1]

ROD DIA. In. (mm)	DRILL HOLE DIA. In. (mm)	MAX CLAMPING FORCE AFTER PROPER CURE Ft.-Lbs. (Nm)	SCREEN EMBEDMENT (LENGTH) In. (mm)	ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)
1/4 (6.4)	3/8 (9.5)	5 (6)	8 (203.2)	2,072 (9.2)	2,264 (10.1)
3/8 (9.5)	1/2 (12.7)	12 (16)	8 (203.2)	2,360 (10.5)	2,668 (11.9)
1/2 (12.7)	5/8 (15.9)	19 (25)	8 (203.2)	2,647 (11.8)	2,668 (11.9)
5/8 (15.9)	3/4 (19.1)	26 (35)	8 (203.2)	2,647 (11.8)	3,578 (15.9)
3/4 (19.1)	7/8 (22.2)	28 (37)	8 (203.2)	2,647 (11.8)	4,573 (20.3)

1 Allowable working loads should not exceed 25% of ultimate capacity. Loads based upon testing with ASTM A193, Grade B7 rods.

For grout filled, concrete block or solid red brick units, see page 27.

PERFORMANCE TABLE

Load Values

Average Ultimate Loads for HBP (nylon) or HB (stainless) Screens Used with C6 in Hollow Concrete Block[1]

ROD DIA. In. (mm)	DRILL HOLE DIA. In. (mm)	MAX CLAMPING FORCE AFTER PROPER CURE Ft.-Lbs. (Nm)	SCREEN EMBEDMENT (LENGTH) In. (mm)	ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)
1/4 (6.4)	3/8 (9.5)	5 (6)	8 (203.2)	2,072 (9.2)	2,264 (10.1)
3/8 (9.5)	1/2 (12.7)	12 (16)	8 (203.2)	2,800 (12.5)	2,466 (10.9)
1/2 (12.7)	5/8 (15.9)	19 (25)	8 (203.2)	3,487 (15.5)	2,668 (11.9)
5/8 (15.9)	3/4 (19.1)	26 (35)	8 (203.2)	3,487 (15.5)	3,578 (15.9)
3/4 (19.1)	7/8 (22.2)	28 (37)	8 (203.2)	3,487 (15.5)	4,573 (20.3)

1 Allowable working loads should not exceed 25% of ultimate capacity. Loads based upon testing with ASTM A193, Grade B7 rods.

PERFORMANCE TABLE

Load Values

Average Ultimate Loads for HBP (nylon) Screens Used with C6 in Brick and Concrete Block[1]

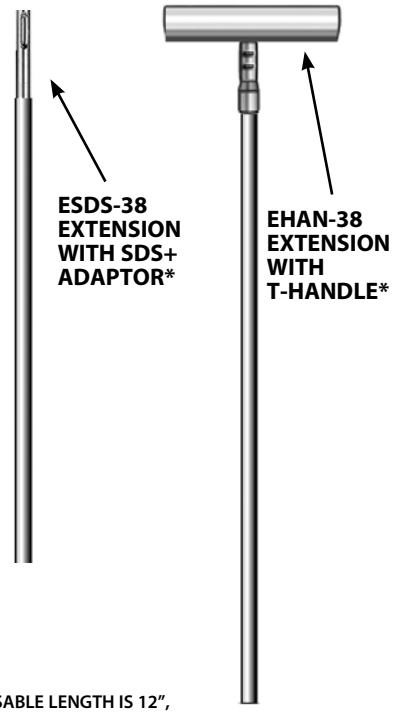
NYLON SCREEN PART NO.	DRILL HOLE DIA. In. (mm)	SINGLE BRICK		DOUBLE BRICK		BRICK AND HOLLOW BLOCK
		ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)	ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)	ULTIMATE TENSION Lbs. (kN)
HBP 38-6	1/2 (12.7)	2,150 (9.6)	N/A	4,675 (20.8)	1,917 (8.5)	3,659 (16.3)
HBP 38-8	1/2 (12.7)	2,200 (9.8)	1,143 (5.1)	6,175 (27.5)	1,743 (7.8)	3,659 (16.3)
HBP 38-10	1/2 (12.7)	2,000 (8.9)	950 (4.2)	3,272 (14.6)	2,498 (11.1)	2,498 (11.1)
HBP 12-6	5/8 (15.9)	3,800 (16.9)	N/A	6,369 (28.3)	2,498 (11.1)	5,595 (24.9)
HBP 12-8	5/8 (15.9)	1,750 (7.8)	N/A	7,530 (33.5)	2,305 (10.3)	3,500 (15.6)
HBP 12-10	5/8 (15.9)	2,618 (11.6)	N/A	2,885 (12.8)	2,305 (10.3)	2,498 (11.1)

1 Allowable working loads should not exceed 25% of ultimate capacity. Loads based upon testing with ASTM A193, Grade B7 rods.

RED HEAD®
ADHESIVE ANCHORING SPECIALISTS

Accessories

Wire Brush Extensions



* USABLE LENGTH IS 12",
GOOD FOR ALL HOLES EXCEPT 7/16" DIAMETER

DESCRIPTION/ADVANTAGES

Hole Plugs

Special plugs make overhead installations easier, centers rod in hole, and keeps adhesive off threads

ROD DIAMETER	HOLE DIAMETER	PART #	QTY
3/8"	7/16"	E038	25
1/2"	9/16"	E012	25
5/8"	3/4"	E058	20
3/4"	7/8"	E034	20
7/8"	1"	E078	10
1"	1-1/8"	E010	10
1-1/4"	1-3/8"	E114	10

Nylon Brushes

Proper hole cleaning using a brush is essential to achieve optimum performance

SIZE DIA.	DESCRIPTION	PART #	QTY
1/2"	Nylon Brush	B012	1
3/4"	Nylon Brush	B034	1
1"	Nylon Brush	B100	1
1-1/4"	Nylon Brush	B114	1
1-1/2"	Nylon Brush	B112	1

Wire Brushes

Proper hole cleaning using a brush is essential to achieve optimum performance

1/8" NPT
(National Pipe
Thread Taper)

PART #	ANCHOR DIA.	REBAR	DRILL BIT DIA.	BRUSH DIA.	QTY/BAG
SB038	3/8"	No. 3	7/16"	5/8"	4
SB012	1/2"	—	9/16"	3/4"	4
SB058	5/8"	No. 5	3/4"	1"	4
SB034	3/4"	No. 6	7/8"	1-1/4"	4
SB078	7/8"	—	1"	1-1/2"	4
SB010	1"	No. 7	1-1/8"	1-5/8"	4
SB125	1-1/4"	—	1-3/8"	1-3/4"	4
ESDS-38	Wire brush 12" usable extension with SDS+ adaptor				1
EHAN-38	Wire brush 12" usable extension with T-Handle				1

* Proper hole cleaning using a wire brush is essential to achieve optimum performance.
Brush may be used up to 50 holes depending on concrete strength.
Brushes required for installation of No. 4, No. 8 rebar and larger are available with lead time.

Plastic Extension Tubing

Attaches to Adhesive System nozzles for deep hole installations

DESCRIPTION	PART #	QTY
6-Foot Straight Tubing can cut to proper size (.39 in I.D. x .43 in. O.D.)	E25-6	6

Blow Pump

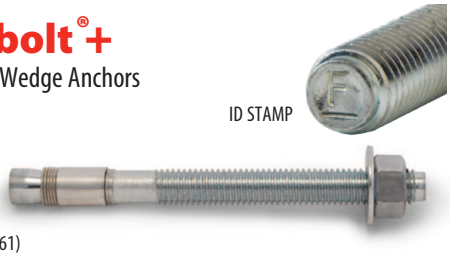
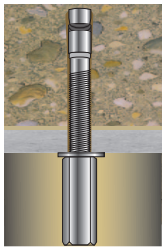
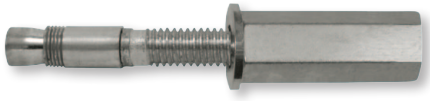
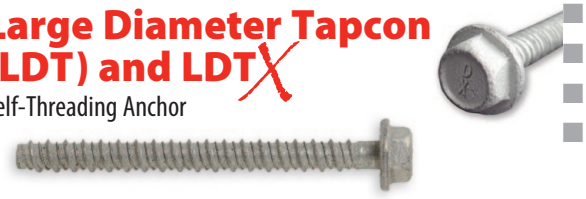
DESCRIPTION	PART #	QTY/BAG
Blow Pump	BP-10	1

Minimum hole 7/16".

RED HEAD®
CONCRETE ANCHORING SPECIALISTS

Anchors for Concrete Applications

Selection Guide

ANCHOR TYPE	KEY FEATURES	SIZE RANGE (Inches)
 **Trubolt®** Wedge Anchors  (see page 54)	■ 2006 IBC Compliant ■ Seismic zone (A-B) approved ■ Fully-threaded ■ Length ID head stamped ■ Stainless steel clip ■ Through-fixture fastening	**Diameter:** 1/4 – 1 **Length:** 1-3/4 – 12
 **Trubolt®+** Seismic Wedge Anchors  (see page 61)	■ 2006 IBC & 2009 IBC Compliant ■ All seismic zone (A-F) and cracked concrete approved ■ Fully-threaded ■ Length ID head stamped ■ Through-fixture fastening	**Diameter:** 3/8, 1/2, 5/8 & 3/4 **Length:** 3 – 8-1/2
 ***OVERHEAD* Trubolt+** Seismic Wedge Over Head Anchors  (see page 61)	■ 2006 IBC & 2009 IBC Compliant ■ All seismic zone (A-F) and cracked concrete approved ■ Fully-threaded ■ Through-fixture fastening	**Diameter:** 3/8 **Length:** 2-1/2
 **Large Diameter Tapcon (LDT) and LDTX** Self-Threading Anchor  (see page 62)	■ Anti-rotation serrated washer ■ Extra large hex washer head ■ Length ID head stamped ■ Through-fixture fastening	**LDT with Zinc Plating** **Diameter:** 3/8 – 3/4 **Length:** 1-3/4 – 6-1/4 **LDTX with EnvireX Coating** **Diameter:** 3/8 & 1/2 **Length:** 3 – 5
 **Multi-Set II®** Drop-In Anchors  (see page 67)	■ RM: Flanged body to keep anchor flush with surface of concrete ■ RL: Non-flanged body for recessed setting ■ RX: Designed for hollow core and post tension concrete ■ CL: Designed for one-sided forming, accepts coil rod	**Diameter:** 1/4 – 3/4 **Length:** 1 – 3-3/16 **Diameter:** 1/4 – 3/4 **Length:** 1 – 3-3/16 **Diameter:** 3/8 & 1/2 **Length:** 3/4 **Diameter:** 1/2 & 3/4 **Length:** 2 & 3-3/16
 **Dynabolt®** Masonry Sleeve Anchors  For both Hollow and Solid Concrete Applications (see page 71)	■ Concrete, block and brick ■ Many choices of head styles ■ Through-fixture fastening ■ Available in 304 stainless steel	**Diameter:** 1/4 – 3/4 **Length:** 5/8 – 6-1/4

	CORROSION RESISTANCE	PERFORMANCE	HEAD STYLES	APPROVALS/LISTINGS
Trubolt cont'd	■ Zinc-plated carbon steel to ASTM B633, SC1, Type III ■ Hot dipped galvanized to ASTM A-153 ■ Type 304 and 316 stainless steel	Ultimate Pullout Performance in 4000 psi Concrete up to 26,540 lbs. (1" diameter)	Hex nut Tie-Wire version	ICC Evaluation Service, Inc. # ESR-2251 (see page 55 for more details) Underwriters Laboratories Factory Mutual City of Los Angeles - #RR2748 California State Fire Marshall Caltrans Meets or exceeds U.S. Government G.S.A. Specification A-A-1923A Type 4 (formerly GSA: FF-S-325 Group II, Type 4, Class 1)
Trubolt+ cont'd	■ Zinc-plated carbon steel to ASTM B633, SC1, Type III	Pullout strength of 4,980 lbs in 2,500 psi Cracked Concrete (1/2" diameter).	Hex nut	ICC Evaluation Service, Inc. # ESR-2427 -Category 1 performance rating -2006 IBC and 2009 IBC compliant -Meets ACI 318 ductility requirements -Tested in accordance with ACI 355.2 and ICC-ES AC193 -Listed for use in seismic zones A, B, C, D, E, & F -3/8", 1/2", 5/8" and 3/4" diameter anchors listed in ESR-2427 City of Los Angeles - #RR25867 Florida Building Code FL#14419.2
OH Trubolt+ cont'd	■ Zinc-plated carbon steel to ASTM B633, SC1, Type III	Pullout strength of 4,980 lbs in 2,500 psi Cracked Concrete (1/2" diameter).	Hex nut	ICC Evaluation Service, Inc. # ESR-2427 -Category 1 performance rating -2006 IBC and 2009 IBC compliant -Meets ACI 318 ductility requirements -Tested in accordance with ACI 355.2 and ICC-ES AC193 -Listed for use in seismic zones A, B, C, D, E, & F -3/8", 1/2", 5/8" and 3/4" diameter anchors listed in ESR-2427 City of Los Angeles - #RR25867 Florida Building Code FL#14419.2
LDT cont'd	■ Zinc-plated carbon steel to ASTM B695 & B633 ■ Type 410 stainless steel	Ultimate Pullout Performance in 4,000 psi Concrete up to 23,266 lbs. (3/4" diameter)	Finished bolt style	
	■ Now with EnvireX™ coating Approved for use in ACQ and MCQ lumber* *Excessive content of copper in the ACQ and MCQ lumber may affect the anchor finish.			1,000 hours salt spray ASTM B117
Multi-Set II Drop-In cont'd	■ Zinc-plated carbon steel to ASTM B633, SC1, Type III ■ Type 18-8 and 316 stainless steel	Ultimate Pullout Performance in 4000 psi Concrete up to 9,480 lbs. (3/4" diameter)	RM: Flanged body RL: Non-flanged body Use any bolt or threaded rod	GSA: A-A-55614 Type 1 (Formerly GSA: FF-S-325 Group VIII) Underwriters Laboratories Factory Mutual California State Fire Marshal Caltrans
Dynabolt cont'd	■ Zinc-plated carbon steel to ASTM B633, SC1, Type III ■ Type 304 stainless steel	Ultimate Pullout Performance in 4000 psi Concrete up to 8,900 lbs. (3/4" diameter)	Flat head Hex nut Acorn nut Tie-Wire Round head Threshold flat head	GSA: A-A-1922A (Formerly GSA: FF-S-325 Group II, Type 3, Class 3) Factory Mutual California State Fire Marshal

continued on next page

Anchors for Concrete Applications

continued from pages 50-51

ANCHOR TYPE		KEY FEATURES	SIZE RANGE (Inches)
Stud Stud Anchors (see page 74)		■ Bottom bearing ■ Hammer-driven ■ Ideal for jacking or leveling ■ Easy installation	**Diameter:** 1/4 – 3/4 **Length:** 1-3/4 – 6-1/4
Redi-Drive® High performance Hammer-Drive Anchors (see page 76)		■ Simple installation ■ Small drill size ■ No torque required ■ Through-fixture fastening	**Diameter:** 1/4 **Length:** 3/4 – 3
Tapcon® Concrete Anchors with Advanced Threadform Technology™	 **Original** (see page 80)  **Maxi-Set** (see page 84)  **SCOTS** (see page 86)  **XL** (see page 88)  **StormGuard** (see page 90)		
SAMMYS Hurricane Protection Anchor (see page 92)		■ Original Tapcon 1/4″ dia. anchor with Blue Climaseal™ ■ Quick and easy secure shutter installations	**Diameter:** 1/4 **Length:** 1-1/4 – 6
Hammer-Set™ Nail-drive Anchors (see page 93)		■ Easy installation ■ Low profile head ■ Through-fixture fastening	**Diameter:** 3/16 & 1/4 **Length:** 7/8 – 2
E-Z Ancor™ **Drywall Anchors** **For Drywall Applications Only** (see page 94)		■ Fast, no pre-drilling ■ Easy to use, just use #2 phillips bit ■ Removable	**Accepts** #8 and #10 screws
Poly-Set® All-purpose plastic plug anchors (see page 95)	 **For Concrete, Hollow and Drywall Applications**	■ Unique twisting action ■ Resistant to moisture, chemicals and atmospheric conditions ■ Available in pre-packaged kits	**Diameter:** 3/16 – 1/4 **Length:** 1-1/4 – 1-7/16 **3/16″** uses #6 – 8 screw **1/4″** uses #10 – 12 screw
Boa™ Coil Expansion Anchors Replacement coil available for easy re-use (see page 96)		■ Heavy-Duty, Reusable Fastening ■ Easy installation ■ Removable ■ High shear strength	**Diameter:** 1/2 – 3/4 **Length:** 3 – 6

	CORROSION RESISTANCE	PERFORMANCE	HEAD STYLES	APPROVALS/LISTINGS
Stud cont'd	■ Zinc-plated carbon steel to ASTM B633, SC1, Type III	Ultimate Pullout Performance in 4000 psi Concrete up to 7,520 lbs.	Hex nut	GSA: A-A-55614 Type 2 (Formerly GSA: FF-S-325 Group VIII, Type 2) Factory Mutual Underwriters Laboratories California State Fire Marshal
Redi-Drive cont'd	■ Zinc-plated carbon steel	Ultimate Pullout Performance in 4000 psi Concrete up to 2,300 lbs.	Mushroom head Pipe version (1/4" & 3/8") Tie-Wire version Form-drive	FF-S-325 Group VI Factory Mutual (3/8" Pipe-Drive)
Tapcon cont'd	■ Patented Climaseal® coating ■ Type 410 stainless steel	Ultimate Pullout Performance in 4000 psi Concrete up to 2,380 lbs.	Hex head Phillips flat head	ICC Evaluation Service, Inc.– #ESR-1671 ICC Evaluation Service, Inc.– #ESR-2202 Miami-Dade County – # 11-0616.05 Florida Building Code FL#7556.1
	The above is for the Original and 410 SS Tapcon only. For data on other Tapcon products see their product pages as follows: Tapcon Maxi-Set on page 84, Tapcon SCOTS on page 86, Tapcon XL on page 88, and Tapcon StormGuard on page 90.			
SAMMYS Anchor cont'd	■ Blue Climaseal™	Ultimate Pullout Performance in 4000 psi Concrete at 3,100 lbs. (2-1/4" Embedment)	Nail	Miami Dade County # 11-6016.04
Hammer-Set cont'd	■ Zinc alloy	Ultimate Pullout Performance in 4000 psi Concrete up to 793 lbs.	Mushroom head	GSA: A-A-1925A Type 1 (zinc mushroom) (Formerly GSA: FF-S-325 Group V, Type 2, Class 3)
E-ZAncor cont'd	■ Zinc plated steel/ engineered plastic (accepts corrosion resistant screw of your choice)	Ultimate Pullout Performance in 5/8" Gypsum wallboard up to 75 lbs.	Accepts screw style of your choice	
Poly-Set cont'd	■ Polyethylene Anchor (accepts corrosion resistant screw of your choice)		Kit comes with phillips head screw (accepts screw style of your choice)	
Boa Coil cont'd	■ Zinc plated carbon steel to ASTM B633, SC1, Type III	Ultimate Pullout Performance in 4000 psi Concrete up to 38,500 lbs. (3/4" diameter)	Finished bolt style	

Trubolt® Wedge Anchors

Dependable, Heavy-Duty, Inspectable, Wedge Type Expansion Anchor

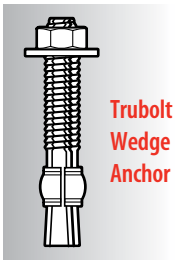
Trubolt®
Wedge Anchors

DESCRIPTION/SUGGESTED SPECIFICATIONS

Wedge Type Anchors—

SPECIFIED FOR ANCHORAGE INTO CONCRETE

Trubolt Wedge anchors feature a stainless steel expansion clip, threaded stud body, nut and washer. Anchor bodies are made of plated carbon steel, hot-dipped galvanized carbon steel, type 304 stainless steel or type 316 stainless steel as identified in the drawings or other notations.



Trubolt Wedge Anchor

The exposed end of the anchor is stamped to identify anchor length. Stampings should be preserved during installation for any subsequent embedment verification.

Use carbide tipped hammer drill bits made in accordance with ANSI B212.15-1994 to install anchors.

Anchors are tested to ACI 355.2 and ICC-ES AC193. Anchors are listed by the following agencies as required by the local building code: ICC-ES, UL, FM, City of Los Angeles, California State Fire Marshal and Caltrans.

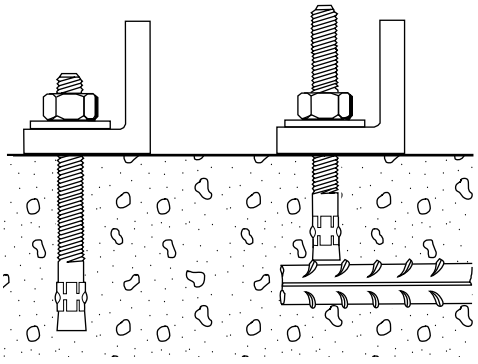
See Appendix B (pages 101-102) for performance values in accordance to 2006 IBC.

ADVANTAGES

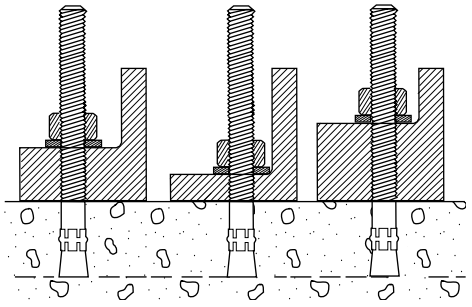
- 2006 International Building Code (IBC) Compliant
- Versatile fully threaded design is standard on sizes up to 3/4" diameter and 10" length
- Anchor diameter equals hole diameter
- Standard carbon and stainless steel anchors
- 360° contact with concrete assures full expansion for reliable working loads
- Non bottom-bearing, may be used in hole depth exceeding anchor length
- Can be installed through the work fixture, eliminating hole spotting
- Inspectable torque values, indicating proper installation

Fully Threaded Advantage

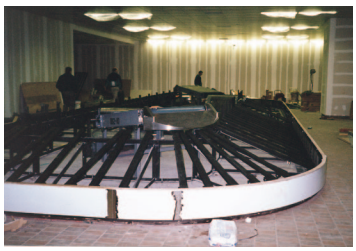
Trubolt's fully threaded feature eliminates subsurface obstruction problems.



Fully threaded design accommodates various material thicknesses at the same embedment. One anchor length saves time and money.



APPLICATIONS



Anchoring machinery and conveyors is a common wedge anchor application. The Trubolt is fully threaded to allow a large range of embedment and fixture thickness.

Seismic Wedge Anchor cracked concrete approval controls tension & shear simultaneously.

APPROVALS/LISTINGS

Trubolt®
Wedge Anchors

ICC Evaluation Service, Inc. # ESR-2251
- – Category 1 performance rating
- – 2006 IBC compliant
- – Meets ACI 318 ductility requirements
- – Tested in accordance with ACI 355.2 and ICC-ES AC193
- – For use in seismic zones A & B
- – 1/4", 3/8" & 1/2" diameter anchors listed in ESR-2251

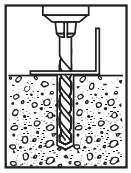
Underwriters Laboratories
Factory Mutual
City of Los Angeles - #RR2748
California State Fire Marshall
Caltrans
Meets or exceeds U.S. Government G.S.A. Specification A-A-1923A Type 4 (formerly GSA: FF-S-325 Group II, Type 4, Class 1)

LENGTH INDICATION CODE*

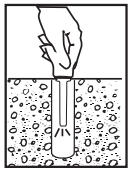
CODE	LENGTH OF ANCHOR	CODE	LENGTH OF ANCHOR
A	1-1/2 < 2 (38.1 < 50.8)	K	6-1/2 < 7 (165.1 < 177.8)
B	2 < 2-1/2 (50.8 < 63.5)	L	7 < 7-1/2 (177.8 < 190.5)
C	2-1/2 < 3 (63.5 < 76.2)	M	7-1/2 < 8 (190.5 < 203.2)
D	3 < 3-1/2 (76.2 < 88.9)	N	8 < 8-1/2 (203.2 < 215.9)
E	3-1/2 < 4 (88.9 < 101.6)	O	8-1/2 < 9 (215.9 < 228.6)
F	4 < 4-1/2 (101.6 < 114.3)	P	9 < 9-1/2 (228.6 < 241.3)
G	4-1/2 < 5 (114.3 < 127.0)	Q	9-1/2 < 10 (241.3 < 254.0)
H	5 < 5-1/2 (127.0 < 139.7)	R	10 < 11 (254.0 < 279.4)
I	5-1/2 < 6 (139.7 < 152.4)	S	11 < 12 (279.4 < 304.8)
J	6 < 6-1/2 (152.4 < 165.1)	T	12 < 13 (304.8 < 330.2)

*Located on top of anchor for easy inspection.

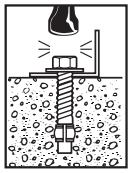
INSTALLATION STEPS



1. Select a carbide drill bit with a diameter equal to the anchor diameter. Drill hole to any depth exceeding the desired embedment. See chart for minimum recommended embedment.



2. Clean hole or continue drilling additional depth to accommodate drill fines.



3. Assemble washer and nut, leaving nut flush with end of anchor to protect threads. Drive anchor through material to be fastened until washer is flush to surface of material.

4. Expand anchor by tightening nut 3-5 turns past the hand tight position, or to the specified torque requirement.

**** ONLY FOR USE IN CONCRETE****

FEATURES

Length ID Head Stamp—provides for embedment inspection after installation

Fully Threaded Design

Cold-Formed—manufacturing process adds strength

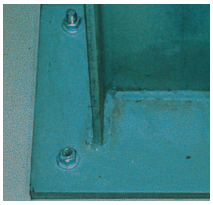
Stainless steel split expansion ring

Anchor Body—available in zinc-plated steel, hot-dipped galvanized steel, 304 stainless steel and 316 stainless steel

TRUBOLT® WEDGE ANCHOR

Trubolt Carbon Steel with Zinc Plating

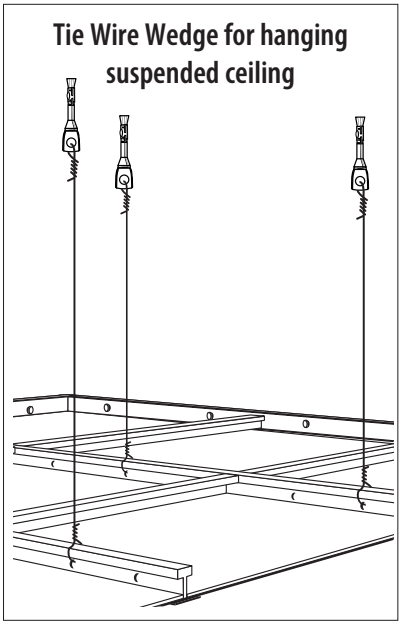
Meets ASTM B633 SC1, Type III specifications for electroplating of 5um = .0002" thickness. This material is well suited for non-corrosive environments.



Typical Applications—Structural Columns, Machinery, Equipment, etc.

Environment—Interior (non-corrosive)

Level of Corrosion—Low



PART NUMBER	THREAD LENGTH In. (mm)	ANCHOR DIA. & DRILL BIT SIZE (THREADS) PER INCH	OVERALL LENGTH In. (mm)	MAX. THICKNESS OF MATERIAL TO BE FASTENED In. (mm)	QTY/WT PER BOX lbs.	QTY/WT PER MASTER CARTON lbs.
WS-1416	3/4 (19.1)	1/4" - 20	1-3/4 (44.5)	3/8 (9.5)	100/ 3.1	1000/ 32
WS-1422	1-1/4 (31.8)		2-1/4 (57.2)	7/8 (22.2)	100/ 3.6	1000/ 37
WS-1432	2-1/4 (57.2)		3-1/4 (82.6)	1-7/8 (47.6)	100/ 4.7	800/ 39
WS-3822	1-1/8 (28.6)	3/8" - 16	2-1/4 (57.2)	3/8 (9.5)	50/ 4.1	500/ 41
WS-3826	1-5/8 (41.3)		2-3/4 (69.9)	7/8 (22.2)	50/ 4.7	400/ 39
WS-3830	1-3/4 (44.5)		3 (76.2)	1-1/8 (28.6)	50/ 5.0	400/ 41
WS-3836	2-1/2 (63.5)		3-3/4 (95.3)	1-7/8 (47.6)	50/ 5.9	300/ 36
WS-3850	3-3/4 (95.2)		5 (127.0)	3-1/8 (79.4)	50/ 7.4	250/ 38
WS-3870	3-7/8 (98.4)		7 (177.8)	5-1/8 (130.2)	50/ 10.4	250/ 53
WS-1226	1-1/4 (31.8)	1/2" - 13	2-3/4 (69.9)	1/8 (3.2)	25/ 4.6	200/ 38
WS-1236	2-1/4 (57.2)		3-3/4 (95.3)	1 (25.4)	25/ 5.7	150/ 35
WS-1242	2-3/4 (69.9)		4-1/4 (108.0)	1-1/2 (38.1)	25/ 6.2	150/ 38
WS-1244	3 (76.2)		4-1/2 (114.3)	1-3/4 (44.5)	25/ 6.5	150/ 39
WS-1254	4 (101.6)		5-1/2 (139.7)	2-3/4 (69.9)	25/ 7.7	150/ 47
WS-1270	5-1/2 (139.7)		7 (177.8)	4-1/4 (108.0)	25/ 9.3	150/ 57
WS-5834	1-3/4 (44.5)	5/8" - 11	3-1/2 (88.9)	1/8 (3.2)	10/ 3.6	100/ 37
WS-5842	2-1/2 (63.5)		4-1/4 (108.0)	7/8 (22.2)	10/ 4.1	100/ 42
WS-5850	3-1/4 (82.6)		5 (127.0)	1-5/8 (41.3)	10/ 4.7	100/ 48
WS-5860	4-1/4 (107.9)		6 (152.4)	2-5/8 (66.7)	10/ 5.4	50/ 28
WS-5870	5-1/4 (133.4)		7 (177.8)	3-5/8 (92.1)	10/ 6.2	30/ 19
WS-5884	5-3/4 (146.0)		8-1/2 (215.9)	5-1/8 (130.2)	10/ 8.0	30/ 25
WS-58100	5-3/4 (146.0)		10 (254.0)	6-5/8 (168.3)	10/ 9.4	30/ 29
WS-3442	2-3/8 (60.3)	3/4" - 10	4-1/4 (108.0)	1/4 (31.8)	10/ 6.8	60/ 42
WS-3446	2-7/8 (73.0)		4-3/4 (120.7)	3/4 (19.1)	10/ 7.4	60/ 45
WS-3454	3-5/8 (92.1)		5-1/2 (139.7)	1-1/2 (38.1)	10/ 8.1	50/ 41
WS-3462	4-3/8 (111.1)		6-1/4 (158.8)	2-1/4 (57.2)	10/ 9.1	30/ 28
WS-3470	5-1/8 (130.2)		7 (177.8)	3 (76.2)	10/ 9.7	30/ 30
WS-3484	5-3/4 (146.0)		8-1/2 (215.9)	4-1/2 (114.3)	10/ 12.3	30/ 38
WS-34100	5-3/4 (146.0)		10 (254.0)	6 (152.4)	10/ 14.0	30/ 43
WS-34120	1-3/4 (44.5)		12 (304.8)	8 (203.2)	10/ 16.6	30/ 51
WS-7860	2-1/2 (63.5)	7/8" - 9	6 (152.4)	1-3/8 (34.9)	5/ 6.3	25/ 32
WS-7880	2-1/2 (63.5)		8 (203.2)	3-3/8 (85.7)	5/ 8.1	15/ 25
WS-78100	2-1/2 (63.5)		10 (254.0)	5-3/8 (136.5)	5/ 9.8	15/ 30
WS-10060	2-1/2 (63.5)	1" - 8	6 (152.4)	1/2 (12.7)	5/ 8.3	25/ 43
WS-10090	2-1/2 (63.5)		9 (228.6)	3-1/2 (88.9)	5/ 11.6	15/ 36
WS-100120	2-1/2 (63.5)		12 (304.8)	6-1/2 (165.1)	5/ 15.0	15/ 46
TIE WIRE						
TW-1400	N/A	1/4"	2-1/8 (54.0)	9/32-hole (7.1)	100/ 3.6	1000/ 36
TW-1400 K	N/A		2-1/8 (54.0)	9/32-hole (7.1)	BULK	1500/ 73

Trubolt Carbon Steel with Hot-Dipped Galvanizing

Meets ASTM A153 Class specifications for hot-dipped galvanizing > 45um = .002". It is highly recommended for damp, humid environments near coastal regions. Hot-dipped galvanized Trubolts have a coating thickness of zinc that is almost 10 times as thick as electroplating. This creates greater corrosion resistance at a minimal cost.

Typical Applications—Railings, Signage, Awnings, etc.

Environment—Rural/ Suburban (exterior environment— essentially unpolluted areas)

Level of Corrosion—Low to Medium

PART NUMBER	THREAD LENGTH In. (mm)	ANCHOR DIA. & DRILL BIT SIZE (THREADS) PER INCH	OVERALL LENGTH In. (mm)	MAX. THICKNESS OF MATERIAL TO BE FASTENED In. (mm)	QTY/WT PER BOX lbs.	QTY/WT PER MASTER CARTON lbs.
WS-1226G	1-1/4 (31.8)	1/2" - 13	2-3/4 (69.9)	1/8 (3.2)	25/ 4.8	200/ 39
WS-1242G	2-3/4 (69.9)		4-1/4 (108.0)	1-1/2 (38.1)	25/ 6.7	150/ 41
WS-1254G	4 (101.6)		5-1/2 (139.7)	2-3/4 (69.9)	25/ 8.0	150/ 49
WS-1270G	5-1/2 (139.7)		7 (177.8)	4-1/4 (108.0)	25/ 9.7	150/ 59
WS-5834G	1-3/4 (44.5)	5/8" - 11	3-1/2 (88.9)	1/8 (3.2)	10/ 3.7	100/ 38
WS-5860G	4-1/4 (107.9)		6 (152.4)	2-5/8 (66.7)	10/ 5.6	50/ 29
WS-3446G	2-7/8 (73.0)	3/4" - 10	4-3/4 (120.7)	3/4 (19.1)	10/ 7.5	60/ 46
WS-3454G	3-5/8 (92.1)		5-1/2 (139.7)	1-1/2 (38.1)	10/ 8.4	50/ 42
WS-3484G	5-3/4 (146.0)		8-1/2 (215.9)	4-1/2 (114.3)	10/ 12.5	30/ 38

Trubolt Type 304 Stainless Steel

Serves many applications well. It withstands rusting in architectural and food processing environments and resists organic chemicals, dye stuffs and many inorganic chemicals.

Typical Applications—Cladding, Stadium Seating, etc.

Environment—Urban (slight to moderate degree of pollution)

Level of Corrosion—Medium

PART NUMBER	THREAD LENGTH In. (mm)	ANCHOR DIA. & DRILL BIT SIZE (THREADS) PER INCH	OVERALL LENGTH In. (mm)	MAX. THICKNESS OF MATERIAL TO BE FASTENED In. (mm)	QTY/WT PER BOX lbs.	QTY/WT PER MASTER CARTON lbs.
WW-1416	3/4 (19.1)	1/4" - 20	1-3/4 (44.5)	3/8 (9.5)	100/ 3.2	1000/ 32
WW-1422	1-1/4 (31.8)		2-1/4 (57.2)	7/8 (22.2)	100/ 3.7	1000/ 37
WW-1432	2-1/4 (57.2)		3-1/4 (82.6)	1-7/8 (47.6)	100/ 4.8	800/ 39
WW-3822	1-1/8 (28.6)	3/8" - 16	2-1/4 (57.2)	3/8 (9.5)	50/ 4.1	500/ 41
WW-3826	1-5/8 (41.3)		2-3/4 (69.9)	7/8 (22.2)	50/ 4.8	400/ 39
WW-3830	1-3/4 (44.5)		3 (76.2)	1-1/8 (28.6)	50/ 5.1	400/ 42
WW-3836	2-1/2 (63.5)		3-3/4 (95.3)	1-7/8 (47.6)	50/ 6.0	300/ 37
WW-3850	3-3/4 (95.3)		5 (127.0)	3-1/8 (79.4)	50/ 7.5	250/ 39
WW-1226	1-1/4 (31.8)	1/2" - 13	2-3/4 (69.9)	1/8 (3.2)	25/ 4.7	200/ 38
WW-1236	2-1/4 (57.2)		3-3/4 (95.3)	1 (25.4)	25/ 5.8	150/ 36
WW-1242	2-3/4 (69.9)		4-1/4 (108.0)	1-1/2 (38.1)	25/ 6.3	150/ 39
WW-1254	3 (76.2)		5-1/2 (139.7)	2-3/4 (69.9)	25/ 7.7	150/ 47
WW-1270	3-1/2 (88.9)		7 (177.8)	4-1/4 (108.0)	25/ 9.4	150/ 57
WW-5834	1-3/4 (44.5)	5/8" - 11	3-1/2 (88.9)	1/8 (3.2)	10/ 3.6	100/ 37
WW-5842	2-1/2 (63.5)		4-1/4 (108.0)	7/8 (22.2)	10/ 4.2	100/ 43
WW-5850	3-1/4 (82.6)		5 (127.0)	1-5/8 (41.3)	10/ 4.8	100/ 49
WW-5860	4-1/4 (107.9)		6 (152.4)	2-5/8 (66.7)	10/ 5.5	50/ 28
WW-5870	3-1/2 (88.9)		7 (177.8)	3-5/8 (92.1)	10/ 6.2	30/ 20
WW-5884	3-1/2 (88.9)		8-1/2 (215.9)	5-1/8 (130.2)	10/ 8.0	30/ 25
WW-3442	2-3/8 (60.3)	3/4" - 10	4-1/4 (108.0)	1/4 (1.6)	10/ 6.8	60/ 42
WW-3446	2-7/8 (73.0)		4-3/4 (120.7)	3/4 (19.1)	10/ 6.7	60/ 41
WW-3454	3-5/8 (92.1)		5-1/2 (139.7)	1-1/2 (38.1)	10/ 7.5	50/ 38
WW-3470	3-1/2 (88.9)		7 (177.8)	3 (76.2)	10/ 9.2	30/ 28
WW-3484	3-1/2 (88.9)		8-1/2 (215.9)	4-1/2 (114.3)	10/ 12.3	30/ 38
WW-34100	1-3/4 (44.5)		10 (254.0)	6 (152.4)	10/ 13.5	30/ 42
WW-10060	2-1/2 (63.5)	1" - 8	6 (152.4)	1/2 (12.7)	5/ 8.3	25/ 43
WW-10090	2-1/2 (63.5)		9 (228.6)	3-1/2 (88.9)	5/ 11.4	15/ 35

* For continuous extreme low temperature applications, use stainless steel.

SELECTION CHARTS

Trubolt Type 316 Stainless Steel

Contains more nickel and chromium than Type 304, and 2%-3% molybdenum, which gives it better corrosion resistance. It is especially more effective in chloride environments that tend to cause pitting.

Typical Applications—Pumps, Diffusers, Gates, Weir Plates, etc.

Environment—Industrial (moderate to heavy atmospheric pollution)

Level of Corrosion—Medium to High

Typical Applications—Tunnels, Dams, Tiles, Lighting Fixtures, etc.

Environment—Marine (heavy atmospheric pollution)

Level of Corrosion—High

PART NUMBER	THREAD LENGTH In. (mm)	ANCHOR DIA. & DRILL BIT SIZE (THREADS) PER INCH	OVERALL LENGTH In. (mm)	MAX. THICKNESS OF MATERIAL TO BE FASTENED In. (mm)	QTY/WT PER BOX lbs.	QTY/WT PER MASTER CARTON lbs.
SWW-1422	1-1/4 (31.8)	1/4" - 20	2-1/4 (57.2)	7/8 (22.2)	100/ 3.7	1000/ 37
SWW-1432	2-1/4 (57.2)		3-1/4 (82.6)	1-1/8 (28.6)	100/ 4.8	1000/ 39
SWW-3822	1-1/8 (28.6)	3/8" - 16	2-1/4 (57.2)	3/8 (9.5)	50/ 4.1	500/ 41
SWW-3826	1-5/8 (41.3)		2-3/4 (69.9)	7/8 (22.2)	50/ 4.8	400/ 39
SWW-3830	1-3/4 (44.5)		3 (76.2)	1-1/8 (28.6)	50/ 5.2	400/ 42
SWW-3836	2-1/2 (63.5)		3-3/4 (95.5)	1-7/8 (47.6)	50/ 6.0	300/ 37
SWW-3850	3-3/4 (95.3)		5 (127.0)	3-1/8 (79.4)	50/ 7.5	250/ 39
SWW-1226	1-1/4 (31.8)	1/2" - 13	2-3/4 (69.9)	1/8 (3.2)	25/ 4.7	200/ 39
SWW-1236	2-1/4 (57.2)		3-3/4 (95.3)	1 (25.4)	25/ 5.8	150/ 36
SWW-1242	2-3/4 (69.9)		4-1/4 (108.0)	1-1/2 (38.1)	25/ 6.5	150/ 40
SWW-1254	3 (76.2)		5-1/2 (139.7)	2-3/4 (69.9)	25/ 7.8	150/ 48
SWW-5842	2-1/2 (63.5)	5/8" - 11	4-1/4 (108.0)	7/8 (22.2)	10/ 4.2	100/ 43
SWW-5850	3-1/4 (82.6)		5 (127.0)	1-5/8 (41.3)	10/ 4.8	100/ 49
SWW-5870	3-1/2 (88.9)		7 (177.8)	3-5/8 (92.1)	10/ 6.7	30/ 21
SWW-3446	2-1/4 (57.2)	3/4" - 10	4-3/4 (120.7)	3/4 (19.1)	10/ 6.8	60/ 41
SWW-3454	3 (76.2)		5-1/2 (139.7)	1-1/2 (38.1)	10/ 8.1	50/ 41

* For continuous extreme low temperature applications, use stainless steel.

PERFORMANCE TABLE

Trubolt Wedge Anchors

Ultimate Tension and Shear Values (Lbs/kN) in Concrete*

ANCHOR DIA. In. (mm)	INSTALLATION TORQUE Ft. Lbs. (Nm)	EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE	f'c = 2000 PSI (13.8 MPa)		f'c = 4000 PSI (27.6 MPa)		f'c = 6000 PSI (41.4 MPa)	
				TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
1/4 (6.4)	4 (5.4)	1-1/8 (28.6)	WS-Carbon or WS-G Hot-Dipped Galvanized or WW-304 S.S. or SWW-316 S.S.	1,180 (5.2)	1,400 (6.2)	1,780 (7.9)	1,400 (6.2)	1,900 (8.5)	1,400 (6.2)
		1-15/16 (49.2)		2,100 (9.3)	1,680 (7.5)	3,300 (14.7)	1,680 (7.5)	3,300 (14.7)	1,680 (7.5)
		2-1/8 (54.0)		2,260 (10.1)	1,680 (7.5)	3,300 (14.7)	1,680 (7.5)	3,300 (14.7)	1,680 (7.5)
3/8 (9.5)	25 (33.9)	1-1/2 (38.1)		1,680 (7.5)	2,320 (10.3)	2,240 (10.0)	2,620 (11.7)	2,840 (12.6)	3,160 (14.1)
		3 (76.2)		3,480 (15.5)	4,000 (17.8)	5,940 (26.4)	4,140 (18.4)	6,120 (27.2)	4,500 (20.0)
		4 (101.6)		4,800 (21.4)	4,000 (17.8)	5,940 (26.4)	4,140 (18.4)	6,120 (27.2)	4,500 (20.0)
1/2 (12.7)	55 (74.6)	2-1/4 (57.2)		4,660 (20.7)	4,760 (21.2)	5,100 (22.7)	4,760 (21.2)	7,040 (31.3)	7,040 (31.3)
		4-1/8 (104.8)		4,660 (20.7)	7,240 (32.2)	9,640 (42.9)	7,240 (32.2)	10,820 (48.1)	8,160 (36.3)
		6 (152.4)		5,340 (23.8)	7,240 (32.2)	9,640 (42.9)	7,240 (32.2)	10,820 (48.1)	8,160 (36.3)
5/8 (15.9)	90 (122.0)	2-3/4 (69.9)		6,580 (29.3)	7,120 (31.7)	7,180 (31.9)	7,120 (31.7)	9,720 (43.2)	9,616 (42.8
		5-1/8 (130.2)		6,580 (29.3)	9,600 (42.7)	14,920 (66.4)	11,900 (52.9)	16,380 (72.9)	12,520 (55.7)
		7-1/2 (190.5)		7,060 (31.4)	9,600 (42.7)	15,020 (66.8)	11,900 (52.9)	16,380 (72.9)	12,520 (55.7)
3/4 (19.1)	110 (149.2)	3-1/4 (82.6)		7,120 (31.7)	10,120 (45.0)	10,840 (48.2)	13,720 (61.0)	13,300 (59.2)	15,980 (71.1)
		6-5/8 (168.3)		10,980 (48.8)	20,320 (90.4)	17,700 (78.7)	23,740 (105.6)	20,260 (90.1)	23,740 (105.6)
		10 (254.0)		10,980 (48.8)	20,320 (90.4)	17,880 (79.5)	23,740 (105.6)	23,580 (104.9)	23,740 (105.6)
7/8 (22.2)	250 (339.0)	3-3/4 (95.3)		9,520 (42.3)	13,160 (58.5)	14,740 (65.6)	16,580 (73.8)	17,420 (77.5)	19,160 (85.2)
		6-1/4 (158.8)		14,660 (65.2)	20,880 (92.9)	20,940 (93.1)	28,800 (128.1)	24,360 (108.4)	28,800 (128.1)
		8 (203.2)		14,660 (65.2)	20,880 (92.9)	20,940 (93.1)	28,800 (128.1)	24,360 (108.4)	28,800 (128.1)
1 (25.4)	300 (406.7)	4-1/2 (114.3)		13,940 (62.0)	16,080 (71.5)	20,180 (89.8)	22,820 (101.5)	21,180 (94.2)	24,480 (108.9)
		7-3/8 (187.3)		14,600 (64.9)	28,680 (127.6)	23,980 (106.7)	37,940 (168.8)	33,260 (148.0)	38,080 (169.4)
		9-1/2 (241.3)		18,700 (83.2)	28,680 (127.6)	26,540 (118.1)	37,940 (168.8)	33,260 (148.0)	38,080 (169.4)

* Allowable values are based upon a 4 to 1 safety factor. Divide by 4 for allowable load values.

* For Tie-Wire Wedge Anchor, TW-1400, use tension data from 1/4" diameter with 1-1/8" embedment.

* For continuous extreme low temperature applications, use stainless steel.

PERFORMANCE TABLE

Trubolt Wedge Anchors

Ultimate Tension and Shear Values (Lbs/kN) in Lightweight Concrete*

ANCHOR DIA. In. (mm)	INSTALLATION TORQUE Ft. Lbs. (Nm)	EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE	LIGHTWEIGHT CONCRETE f'c = 3000 PSI (20.7 MPa)		LOWER FLUTE OF STEEL DECK WITH LIGHTWEIGHT CONCRETE FILL f'c = 3000 PSI (20.7 MPa)	
				TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
3/8 (9.5)	25 (33.9)	1-1/2 (38.1)	WS-Carbon or WS-G Hot-Dipped Galvanized or WW-304 S.S. or SWW-316 S.S.	1,175 (5.2)	1,480 (6.6)	1,900 (8.5)	3,160 (14.1)
		3 (76.2)		2,825 (12.6)	2,440 (10.9)	2,840 (12.6)	4,000 (17.8)
1/2 (12.7)	55 (74.6)	2-1/4 (57.2)		2,925 (13.0)	2,855 (12.7)	3,400 (15.1)	5,380 (23.9)
		3 (76.2)		3,470 (15.4)	3,450 (15.3)	4,480 (19.9)	6,620 (29.4)
		4 (101.6)		4,290 (19.1)	3,450 (15.3)	4,800 (21.4)	6,440 (28.6)
5/8 (15.9)	90 (122.0)	3 (76.2)		4,375 (19.5)	4,360 (19.4)	4,720 (21.0)	5,500 (24.5)
		5 (127.0)		6,350 (28.2)	6,335 (28.2)	6,580 (29.3)	9,140 (40.7)
3/4 (19.1)	110 (149.2)	3-1/4 (82.6)		5,390 (24.0)	7,150 (31.8)	5,840 (26.0)	8,880 (39.5)
		5-1/4 (133.4)		7,295 (32.5)	10,750 (47.8)	7,040 (31.3)	N/A

* Allowable values are based upon a 4 to 1 safety factor. Divide by 4 for allowable load values.

PERFORMANCE TABLE

Trubolt Wedge Anchors

Recommended Edge and Spacing Distance Requirements for Shear Loads*

ANCHOR DIA. In. (mm)	EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE	EDGE DISTANCE REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	MIN. EDGE DISTANCE AT WHICH THE LOAD FACTOR APPLIED = .60 In. (mm)	MIN. EDGE DISTANCE AT WHICH THE LOAD FACTOR APPLIED = .20 In. (mm)	SPACING REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	MIN. ALLOWABLE SPACING BETWEEN ANCHORS In. (mm) LOAD FACTOR APPLIED = .40
1/4 (6.4)	1-1/8 (28.6) 1-15/16 (49.2)	WS-Carbon or WS-G Hot-Dipped Galvanized or WW-304 S.S. or SWW-316 S.S.	2 (50.8) 1-15/16 (49.2)	1-5/16 (33.3) 1 (25.4)	N/A N/A	3-15/16 (100.0) 3-7/8 (98.4)	2 (50.8) 1-15/16 (49.2)
3/8 (9.5)	1-1/2 (38.1) 3 (76.2)		2-5/8 (66.7) 3-3/4 (95.3)	1-3/4 (44.5) 3 (76.2)	N/A 1-1/2 (38.1)	5-1/4 (133.4) 6 (152.4)	2-5/8 (66.7) 3 (76.2)
1/2 (12.7)	2-1/4 (57.2) 4-1/8 (104.8)		3-15/16 (100.0) 5-3/16 (131.8)	2-9/16 (65.1) 3-1/8 (79.4)	N/A 1-9/16 (39.7)	7-7/8 (200.0) 6-3/16 (157.2)	3-15/16 (100.0) 3-1/8 (79.4)
5/8 (15.9)	2-3/4 (69.9) 5-1/8 (130.2)		4-13/16 (122.2) 6-7/16 (163.5)	3-1/8 (79.4) 3-7/8 (98.4)	N/A 1-15/16 (49.2)	9-5/8 (244.5) 7-11/16 (195.3)	4-13/16 (122.2) 3-7/8 (98.4)
3/4 (19.1)	3-1/4 (82.6) 6-5/8 (168.3)		5-11/16 (144.5) 6-5/16 (160.3)	3-3/4 (95.3) 5 (127.0)	N/A 2-1/2 (63.5)	11-3/8 (288.9) 9-15/16 (252.4)	5-11/16 (144.5) 5 (127.0)
7/8 (22.2)	3-3/4 (95.3) 6-1/4 (158.8)		6-9/16 (166.7) 8-1/2 (215.9)	4-5/16 (109.5) 6-1/4 (158.8)	N/A 3-1/8 (79.4)	13-1/8 (333.4) 12-1/2 (317.5)	6-9/16 (166.7) 6-1/4 (158.8)
1 (25.4)	4-1/4 (108.0) 7-3/8 (187.3)		7-7/8 (200.0) 10-1/16 (255.6)	5-1/8 (130.2) 7-3/8 (187.3)	N/A 3-11/16 (93.7)	15-3/4 (400.1) 14-3/4 (374.7)	7-7/8 (200.0) 7-3/8 (187.3)

* Spacing and edge distances shall be divided by 0.75 when anchors are placed in structural lightweight concrete. Linear interpolation may be used for intermediate spacing and edge distances.

PERFORMANCE TABLE

Trubolt Wedge Anchors

Recommended Edge and Spacing Distance Requirements for Tension Loads*

ANCHOR DIA. In. (mm)	EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE	EDGE DISTANCE REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	MIN. ALLOWABLE EDGE DISTANCE AT WHICH THE LOAD FACTOR APPLIED = .65 In. (mm)	SPACING REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	MIN. ALLOWABLE SPACING AT WHICH THE LOAD FACTOR APPLIED = .70 In. (mm)
1/4 (6.4)	1-1/8 (28.6) 1-15/16 (49.2) 2-1/8 (54.0)	WS-Carbon or WS-G Hot-Dipped Galvanized or WW-304 S.S. or SWW-316 S.S.	2 (50.8) 1-15/16 (49.2) 1-5/8 (41.3)	1 (25.4) 1 (25.4) 13/16 (20.6)	3-15/16 (100.0) 3-7/8 (98.4) 3-3/16 (81.0)	2 (50.8) 1-15/16 (49.2) 1-5/8 (41.3)
3/8 (9.5)	1-1/2 (38.1) 3 (76.2) 4 (101.6)		2-5/8 (66.7) 3 (76.2) 3 (76.2)	1-5/16 (33.3) 1-1/2 (38.1) 1-1/2 (38.1)	5-1/4 (133.4) 6 (152.4) 6 (152.4)	2-5/8 (66.7) 3 (76.2) 3 (76.2)
1/2 (12.7)	2-1/4 (57.2) 4-1/8 (104.8) 6 (152.4)		3-15/16 (100.0) 3-1/8 (79.4) 4-1/2 (114.3)	2 (50.8) 1-9/16 (39.7) 2-1/4 (57.2)	7-7/8 (200.0) 6-3/16 (157.2) 9 (228.6)	3-15/16 (100.0) 3-1/8 (79.4) 4-1/2 (114.3)
5/8 (15.9)	2-3/4 (69.9) 5-1/8 (130.2) 7-1/2 (190.5)		4-13/16 (122.2) 3-7/8 (98.4) 5-5/8 (142.9)	2-7/16 (61.9) 1-15/16 (49.2) 2-13/16 (71.4)	9-5/8 (244.5) 7-1/16 (195.3) 11-1/4 (285.8)	4-13/16 (122.2) 3-7/8 (98.4) 5-5/8 (142.9)
3/4 (19.1)	3-1/4 (82.6) 6-5/8 (168.3) 10 (254.0)		5-11/16 (144.5) 5 (127.0) 7-1/2 (190.5)	2-7/8 (73.0) 2-1/2 (63.5) 3-3/4 (95.3)	11-3/8 (288.9) 9-15/16 (252.4) 15 (381.0)	5-11/16 (144.5) 5 (127.0) 7-1/2 (190.5)
7/8 (22.2)	3-3/4 (95.3) 6-1/4 (158.8) 8 (203.2)		6-9/16 (166.7) 6-1/4 (158.8) 6 (152.4)	3-5/16 (84.1) 3-1/8 (79.4) 3 (76.2)	13-1/8 (333.4) 12-1/2 (317.5) 12 (304.8)	6-9/16 (166.7) 6-1/4 (158.8) 6 (152.4)
1 (25.4)	4-1/2 (114.3) 7-3/8 (187.3) 9-1/2 (241.3)		7-7/8 (200.0) 7-3/8 (187.3) 7-1/8 (181.0)	3-15/16 (100.0) 3-11/16 (93.7) 3-9/16 (90.5)	15-3/4 (400.1) 14-3/4 (374.7) 14-1/4 (362.0)	7-7/8 (200.0) 7-3/8 (187.3) 7-1/8 (181.0)

* Spacing and edge distances shall be divided by 0.75 when anchors are placed in structural lightweight concrete. Linear interpolation may be used for intermediate spacing and edge distances.

Combined Tension and Shear Loading—for Trubolt Anchors

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

$$(Ps/Pt)^{5/3} + (Vs/Vt)^{5/3} \leq 1$$

Ps = Applied tension load Vs = Applied shear load Pt = Allowable tension load Vt = Allowable shear load

RED HEAD®
CONCRETE ANCHORING SPECIALISTS

Trubolt®+ Seismic Wedge Anchors

2009 IBC Compliant

DESCRIPTION/SUGGESTED SPECIFICATIONS

Seismic Wedge Type Anchors—

Trubolt+ Wedge anchors consist of a high-strength threaded stud body, expansion clip, nut and washer. Anchor bodies are made of plated carbon steel. The expansion clip consists of a split cylindrical ring with undercutting grooves.

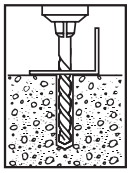
The exposed end of the anchor is stamped to identify anchor length. Stampings should be preserved during installation for any subsequent embedment verification.

Use carbide tipped hammer drill bits made in accordance with ANSI B212.15-1994 to install anchors.

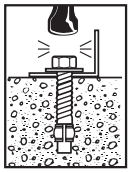
Anchors are tested to ACI 355.2 and ICC-ES AC193. Anchors are listed by the following agencies as required by the local building code: ICC-ES, and City of Los Angeles.

See Appendix C (pages 103-104) for performance values in accordance to 2006 and 2009 IBC.

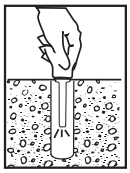
INSTALLATION STEPS



1. Select a carbide drill bit with a diameter equal to the anchor diameter. Drill hole to any depth exceeding the desired embedment. See chart for minimum recommended embedment.



3. Assemble washer and nut, leaving nut flush with end of anchor to protect threads. Drive anchor through material to be fastened until washer is flush to surface of material.



2. Clean hole or continue drilling additional depth to accommodate drill fines.

4. Expand anchor by tightening nut 3-5 turns past the hand tight position, or to the specified torque requirement.

APPROVALS/LISTINGS

ICC Evaluation Service, Inc. # ESR-2427
- -Category 1 performance rating
- -2006 IBC and 2009 IBC compliant
- -Meets ACI 318 ductility requirements
- -Tested in accordance with ACI 355.2 and ICC-ES AC193
- -Listed for use in seismic zones A, B, C, D, E, & F
- -3/8", 1/2", 5/8" and 3/4" diameter anchors listed in ESR-2427

City of Los Angeles - #RR25867
Florida Building Code FL#14419.2
Patents US 7,811,037 B2 and US 7,744,320 B2

LENGTH INDICATION CODE*

CODE	LENGTH OF ANCHOR	CODE	LENGTH OF ANCHOR
A	1-1/2 < 2 (38.1 < 50.8)	K	6-1/2 < 7 (165.1 < 177.8)
B	2 < 2-1/2 (50.8 < 63.5)	L	7 < 7-1/2 (177.8 < 190.5)
C	2-1/2 < 3 (63.5 < 76.2)	M	7-1/2 < 8 (190.5 < 203.2)
D	3 < 3-1/2 (76.2 < 88.9)	N	8 < 8-1/2 (203.2 < 215.9)
E	3-1/2 < 4 (88.9 < 101.6)	O	8-1/2 < 9 (215.9 < 228.6)
F	4 < 4-1/2 (101.6 < 114.3)	P	9 < 9-1/2 (228.6 < 241.3)
G	4-1/2 < 5 (114.3 < 127.0)	Q	9-1/2 < 10 (241.3 < 254.0)
H	5 < 5-1/2 (127.0 < 139.7)	R	10 < 11 (254.0 < 279.4)
I	5-1/2 < 6 (139.7 < 152.4)	S	11 < 12 (279.4 < 304.8)
J	6 < 6-1/2 (152.4 < 165.1)	T	12 < 13 (304.8 < 330.2)

*Located on top of anchor for easy inspection.

SELECTION CHART

Trubolt®+ Seismic Wedge Anchors
Carbon Steel with Zinc Plating

Meets ASTM B633 SC1, Type III specifications for electroplating of 5um = .0002" thickness. This coating is well suited for non-corrosive environments.

PART NUMBER	THREAD LENGTH In. (mm)	ANCHOR DIA. & DRILL BIT SIZE (THREADS) PER INCH	OVERALL LENGTH In. (mm)	MAX. THICKNESS OF MATERIAL TO BE FASTENED In. (mm)	QTY/WT PER BOX lbs.	QTY/WT PER MASTER CARTON lbs.
CWS-3830	1-5/8 (41.3)	3/8" - 16	3 (76.2)	5/8 (15.9)	50/ 5.3	400/ 42
CWS-3836	2-3/8 (60.3)	3/8" - 16	3-3/4 (95.3)	1-3/8 (34.9)	50/ 5.9	300/ 35
CWS-3850	3-5/8 (92.1)	3/8" - 16	5 (127.0)	2-5/8 (66.7)	50/ 7.3	250/ 37
CWS-1236	2-1/8 (54.0)	1/2" - 13	3-3/4 (95.3)	3/4 (19.1)	25/ 5.7	150/ 34
CWS-1244	2-7/8 (73.0)	1/2" - 13	4-1/2 (114.3)	1-1/2 (38.1)	25/ 7.0	150/ 40
CWS-1254	3-7/8 (98.4)	1/2" - 13	5-1/2 (139.7)	2-1/2 (63.5)	25/ 8.0	150/ 49
CWS-1270	5-3/8 (136.5)	1/2" - 13	7 (177.8)	4 (101.6)	25/ 9.2	150/ 55
CWS-5850	3-3/16 (81.0)	5/8" - 11	5 (127.0)	1-1/8 (28.6)	10/ 4.7	100/ 48
CWS-5860	4-3/16 (106.4)	5/8" - 11	6 (152.4)	2-1/8 (54.0)	10/ 5.4	50/ 28
CWS-5870	5-3/16 (131.8)	5/8" - 11	7 (177.8)	3-1/8 (79.4)	10/ 6.2	30/ 19
CWS-5884	5-3/4 (146.0)	5/8" - 11	8-1/2 (215.9)	4-5/8 (117.5)	10/ 8.0	30/ 25
CWS-3454	3-5/8 (92.1)	3/4" - 10	5-1/2 (139.7)	1-1/2 (38.1)	50/ 7.6	30/ 38
CWS-3462	4-3/8 (111.1)	3/4" - 10	6-1/4 (158.8)	2-1/4 (57.2)	10/ 8.5	30/ 26
CWS-3470	5-1/8 (130.2)	3/4" - 10	7 (177.8)	3 (76.2)	10/ 9.0	30/ 27
CWS-3484	5-3/4 (146.0)	3/4" - 10	8-1/2 (215.9)	4-1/2 (114.3)	10/ 10.5	30/ 32
CWS-34100	5-3/4 (146.0)	3/4" - 10	10 (254.0)	6 (152.4)	10/ 11.9	30/ 36

RED HEAD®
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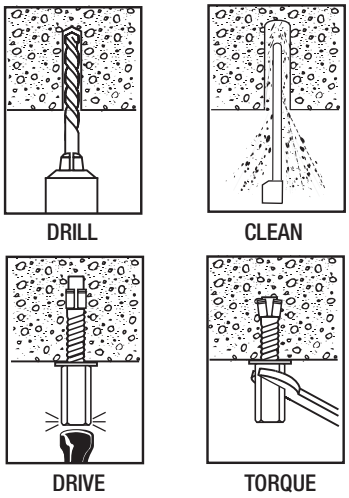
OVERHEAD Trubolt®+ Seismic Wedge Anchors

2009 IBC Compliant

Trubolt+ Patents
US 7,811,037 B2 and US 7,744,320 B2

INSTALLATION STEPS



DESCRIPTION/SUGGESTED SPECIFICATIONS

Seismic Wedge Type Anchors—

OVERHEAD Trubolt+ Wedge anchors consist of a high-strength threaded stud body, expansion clip, coupling nut and washer. Anchor bodies are made of plated carbon steel. The expansion clip consists of a split cylindrical ring with undercutting grooves.

The exposed end of the anchor is stamped to identify anchor length. Stampings should be preserved during installation for any subsequent embedment verification.

Use carbide tipped hammer drill bits made in accordance with ANSI B212.15-1994 to install anchors.

Anchors are tested to ACI 355.2 and ICC-ES AC193. Anchors are listed by the following agencies as required by the local building code: ICC-ES, and City of Los Angeles.

See Appendix C (pages 103-104) for performance values in accordance to 2006 and 2009 IBC.

ADVANTAGES

- 2006 and 2009 International Building Code (IBC) Compliant
- Approved for Cracked Concrete/Seismic Applications in Concrete and Metal Deck
- Fast Installation — Drive Anchor Assembly and Torque Coupling Nut
- Overhead Anchor Assembly Includes: Anchor, Coupling Nut and Washer — NO Additional Components Required
- High Performance Achieved Using Shallow Embedment
- ICC-ES ESR-2427

APPLICATIONS

- Metal Deck 3/8" Threaded Rod Applications
- Pipes/Plumbing
- Heavy Electrical Lighting & Fixtures
- HVAC Equipment & Fixtures

SELECTION CHART

OVERHEAD Trubolt®+ Seismic Wedge Anchors
Carbon Steel with Zinc Plating

Meets ASTM B633 SC1, Type III specifications for electroplating of 5um = .0002" thickness. This coating is well suited for non-corrosive environments.

PART NUMBER	ANCHOR DIAMETER / LENGTH	DRILL BIT SIZE In. (mm)	EMBEDMENT DEPTH In. (mm)	COUPLING NUT	SETTING TORQUE*	QTY/WT PER BOX lbs.	QTY/WT PER MASTER lbs.
CWS-38CN	3/8" - 16 Thread 2-1/2" Length	3/8 (9.5)	2 (50.8)	3/8" - 16 Thread	30 ft-lbs. 1-3/4" Length	40/ 7.6	320 / 45.4

* Setting torque only applies at the time of installation.

RED HEAD®
CONCRETE ANCHORING SPECIALISTS

Large Diameter Tapcon (LDT) Anchors

Finished head, Removable Anchor

LDT

(3/8" & 1/2") **(5/8" & 3/4")**
Sawtooth™

3/8" and 1/2" are available with *Envire*X™ coating

Uses standard drill bits—no special drill bits to purchase or lose!

DESCRIPTION/SUGGESTED SPECIFICATIONS

Self-threading Anchors—

SPECIFIED FOR ANCHORAGE INTO CONCRETE

LDT Self-threading Anchor

The LDT anchor is a high performance anchor that cuts its own threads into concrete.

Anchor bodies are made of hardened carbon steel and zinc plated, **Grade 5.**

The anchors shall have a finished hex washer head with anti-rotation serrations to prevent anchor back-out. The head of the anchor is stamped with a length identification code for easy inspection.

The anchor shall be installed with carbide tipped hammer drill bits made in accordance to ANSI B212.15-1994.

ADVANTAGES

SAVE TIME

EASILY INSTALLED

- Installs in less than half the time of wedge anchors or adhesive anchors
- Simply drill a pilot hole and drive the LDT anchor by hand or impact

EASILY REMOVED

- No torching or grinding required to remove anchors

SAVE MONEY

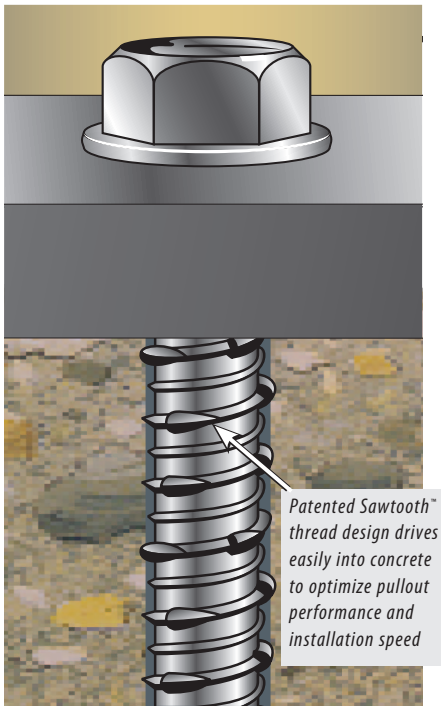
LOWER DRILL BIT COSTS

- Use standard ANSI bits instead of proprietary bits
- Single piece design, no nut and washer to assemble

USE STANDARD ANSI BITS

- No special proprietary bits to purchase or lose
- Reduce chances for anchor failure due to incorrect bit usage

Sawtooth Threads™, now available on 5/8" and 3/4"



Patented Sawtooth™ thread design drives easily into concrete to optimize pullout performance and installation speed

IMPROVED PERFORMANCE IN LARGE DIAMETER HOLES

- Superior performance to wedge anchor
- Higher loads in shallow embedments
- Closer edge/spacing distance than mechanical anchors
- More threads for better thread engagement and higher pullout resistance
- Durable induction-hardened tip

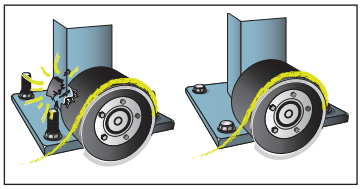
EASY INSTALLATION

- Easy 2-step installation, simply drill a pilot hole and drive
- Installs in less than half the time of a wedge anchor
- Efficient thread cutting
- Use standard drill bit sizes
- Single piece design—no nut and washer assembly
- Easily removed

APPLICATIONS

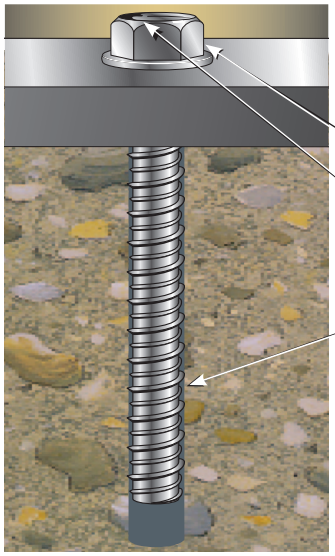
Racking, shelving and conveyors are just a few high volume applications ideal for Large Diameter Tapcon (LDT™). The ease and speed of installation of the LDT can reduce installation time to less than half the time of typical systems used today.

For installation speed, high performance and easy removability, LDT is the anchor of choice.



The LDT's finished head and lack of exposed threads virtually eliminates tire damage on fork lift trucks.

FEATURES



Easy Installation
Installs into concrete by hand or impact wrench

Anti-rotation Serrated Washer
— Prevents anchor back-out

Extra Large Hex Washer Head
— With increased bearing surface

Length Identification Head Stamp
— For embedment inspection after installation

Hi-Lo Threads
— Cuts its own threads into concrete for greater pull-out resistance

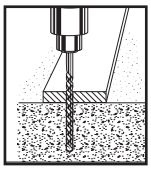
LDT 3/8" and 1/2" are available with *Envire*X™ coating

1,000 hours salt spray ASTM B117. Approved for use in ACQ and MCQ lumber*

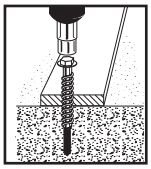
*Excessive content of copper in the ACQ and MCQ lumber may affect the anchor finish.

INSTALLATION STEPS

Installation Steps for Concrete, Lightweight Concrete and Metal Deck



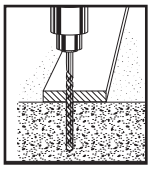
1. Using the proper size carbide bit (see chart) drill "a pilot hole at least 1" deeper than anchor embedment. ""



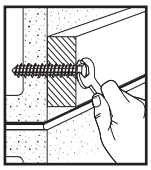
2. Using an **electric impact wrench**, or socket wrench (hand install) insert anchor into hole and tighten anchor until fully seated. (see chart for socket size) (do not over tighten).

Installation Steps for Hollow or Grout-Filled CMU

(3/8" and 1/2" diameter)



1. Using a 5/16" (for 3/8" LDT) or 7/16" (for 1/2" LDT) carbide tipped bit, drill a pilot hole at least 1" deeper than anchor embedment. ""



2. Using a socket wrench insert anchor into hole and hand tighten anchor until fully seated. (9/16" socket for 3/8" and 3/4" socket for 1/2") (do not over tighten).

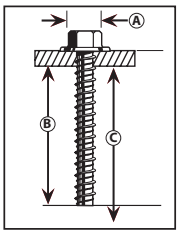
LDT's can be installed by hand or with an impact wrench

Installation by hand—is easy, simply using a socket wrench

Installation by impact wrench—is recommended for faster installations or for high volume projects. Installation with impact wrench—is ***not*** recommended for hollow block.

Selection Chart

LDT Size	ANSI Standard Drill Bit Diameter	Ⓐ Anchor Head (Socket Size) Diameter	Washer Diameter	Ⓑ Minimum Embedment	Ⓒ Hole Depth	USE IN		
						Concrete	CMU Hollow	CMU Grout-filled
LDT 3/8"	5/16"	9/16"	13/16"	1-1/2"	2-1/2"	YES	YES	YES
LDT 1/2"	7/16"	3/4"	1"	2-1/2"	3-1/2"	YES	NO	YES
LDT 5/8"	1/2"	13/16"	1-3/16"	2-3/4"	3-3/4"	YES	NO	YES
LDT 3/4"	5/8"	15/16"	1-5/16"	3-1/4"	4-1/4"	YES	NO	YES



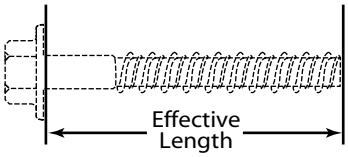
See catalog for effective lengths and length indication code.

SELECTION CHART

LDT Carbon and Stainless Steel

Carbon Steel with Zinc Plating: Meets ASTM B695 and B633 specifications for zinc plating of 5um = .0002" thickness. This coating is well suited for non-corrosive interior environments.

Carbon Steel with EnvireX Coating: Provides additional corrosion protection for outdoor applications.



PART NUMBER CARBON STEEL ZINC PLATED	PART NUMBER CARBON STEEL EnvireX COATING	PART NUMBER FOR 410 STAINLESS STEEL	ANCHOR DIA. In. (mm)	DRILL BIT DIA. In. (mm)	EFFECTIVE LENGTH In. (mm) (see detail on left)	MAX. THICKNESS OF MATERIAL TO BE FASTENED In. (mm)	QTY/WT PER BOX lbs.	QTY/WT PER MASTER CARTON lbs.
LDT-3816	——	SLDT-3816	3/8 (9.5)	5/16 (7.9)	1-3/4 (44.5)	1/4 (6.4)	50/ 3.0	400/ 24.0
LDT-3824	——	SLDT-3824	3/8 (9.5)	5/16 (7.9)	2-1/2 (63.5)	1 (25.4)	50/ 4.5	400/ 34.0
LDT-3830	LDT-3830X	SLDT-3830	3/8 (9.5)	5/16 (7.9)	3 (76.2)	1-1/2 (38.1)	50/ 5.0	400/ 40.0
LDT-3840	LDT-3840X	SLDT-3840	3/8 (9.5)	5/16 (7.9)	4 (101.6)	2-1/2 (63.5)	50/ 6.5	400/ 52.0
LDT-3850	LDT-3850X	SLDT-3850	3/8 (9.5)	5/16 (7.9)	5 (127.0)	3-1/2 (89.0)	40/ 7.5	320/ 60.0
LDT-1230	LDT-1230X	SLDT-1230	1/2 (12.7)	7/16 (11.1)	3 (76.2)	1/2 (12.7)	25/ 4.5	150/ 27.0
LDT-1240	LDT-1240X	SLDT-1240	1/2 (12.7)	7/16 (11.1)	4 (101.6)	1-1/2 (38.1)	25/ 6.0	150/ 36.6
LDT-1250	LDT-1250X	SLDT-1250	1/2 (12.7)	7/16 (11.1)	5 (127.0)	2-1/2 (63.5)	25/ 7.6	150/ 45.6
LDT-1260	——	——	1/2 (12.7)	7/16 (11.1)	6 (152.4)	4 (101.6)	20/ 9.0	120/ 54.0
LDT-5830	——	——	5/8 (15.9)	1/2 (12.7)	3 (76.2)	1/4 (6.4)	10 / 3.5	100 / 35.0
LDT-5840	——	——	5/8 (15.9)	1/2 (12.7)	4 (101.6)	1-1/4 (31.8)	10 / 4.0	100 / 40.0
LDT-5850	——	——	5/8 (15.9)	1/2 (12.7)	5 (127.0)	2-1/4 (57.1)	10 / 4.7	100 / 47.0
LDT-5860	——	——	5/8 (15.9)	1/2 (12.7)	6 (152.4)	3-1/4 (82.6)	10 / 5.4	50 / 27.0
LDT-3444	——	——	3/4 (19.1)	5/8 (15.9)	4-1/2 (114.3)	1-1/4 (31.8)	10 / 7.4	50 / 37.0
LDT-3454	——	——	3/4 (19.1)	5/8 (15.9)	5-1/2 (139.7)	2-1/4 (57.1)	10 / 8.1	50 / 40.5
LDT-3462	——	——	3/4 (19.1)	5/8 (15.9)	6-1/4 (158.8)	3 (76.2)	10 / 9.1	30 / 27.3

* The stainless steel LDT's will be gold in color in order to differentiate them from the carbon steel anchors.

DESIGN GUIDE

For proper selection of anchor diameters based upon predrilled holes in base plates and fixtures.

HOLE DIAMETER IN FIXTURE In. (mm)	SUGGESTED LDT DIAMETER In. (mm)
7/16 (11.1)	3/8 (9.5)
1/2 (12.7)	3/8 (9.5)
9/16 (14.3)	1/2 (12.7)
5/8 (15.9)	1/2 (12.7)
3/4 (19.1)	5/8 (15.9)
7/8 (22.2)	3/4 (19.1)

LENGTH INDICATION CODE*

X denotes available with EnvireX coating

CODE	LENGTH OF ANCHOR In. (mm)
A	1-1/2 < 2 (38.1 < 50.8)
B	2 < 2-1/2 (50.8 < 63.5)
C	2-1/2 < 3 (63.5 < 76.2)
D	3 < 3-1/2 (76.2 < 88.9)
E	3-1/2 < 4 (88.9 < 101.6)
F	4 < 4-1/2 (101.6 < 114.3)
G	4-1/2 < 5 (114.3 < 127.0)
H	5 < 5-1/2 (127.0 < 139.7)
I	5-1/2 < 6 (139.7 < 152.4)
J	6 < 6-1/2 (152.4 < 165.1)

* Located on top of anchor for easy inspection.

PERFORMANCE TABLE

LDT Anchors

Ultimate Tension and Shear Values (Lbs/kN) in Concrete

ANCHOR DIA. In. (mm)	EMBEDMENT DEPTH In. (mm)	f'c = 2000 PSI (13.8 MPa) TENSION Lbs. (kN)	f'c = 2000 PSI (13.8 MPa) SHEAR Lbs. (kN)	f'c = 3000 PSI (20.7 MPa) TENSION Lbs. (kN)	f'c = 3000 PSI (20.7 MPa) SHEAR Lbs. (kN)	f'c = 4000 PSI (27.6 MPa) TENSION Lbs. (kN)	f'c = 4000 PSI (27.6 MPa) SHEAR Lbs. (kN)
3/8 (9.5)	1-1/2 (38.1)	1,336 (5.9)	2,108 (9.4)	1,652 (7.3)	2,764 (12.3)	1,968 (8.8)	3,416 (15.2)
	2 (50.8)	1,492 (6.6)	3,036 (13.5)	2,024 (9.0)	3,228 (14.4)	2,552 (11.4)	3,420 (15.2)
	2-1/2 (63.5)	3,732 (16.6)	3,312 (14.7)	3,748 (16.7)	3,364 (15.0)	3,760 (16.7)	3,424 (15.2)
	3-1/2 (88.9)	5,396 (24.0)	3,312 (14.7)	6,624 (29.5)	3,368 (15.0)	7,852 (34.9)	3,428 (15.2)
1/2 (12.7)	2 (50.8)	3,580 (15.9)	5,644 (25.1)	3,908 (17.4)	6,512 (29.0)	4,236 (18.8)	7,380 (32.8)
	3-1/2 (88.9)	7,252 (32.3)	6,436 (28.6)	8,044 (35.8)	7,288 (32.4)	8,836 (39.3)	8,140 (36.2)
	4-1/2 (114.3)	10,176 (45.3)	7,384 (32.8)	10,332 (46.0)	7,968 (35.4)	10,488 (46.7)	8,552 (38.0)
5/8 (15.9)	2-3/4 (69.9)	5,276 (23.5)	8,656 (38.5)	6,560 (29.2)	11,064 (49.2)	7,844 (34.8)	13,476 (59.9)
	3-1/2 (88.9)	7,972 (35.5)	10,224 (45.5)	9,848 (43.8)	12,144 (54.0)	11,724 (52.2)	14,060 (62.5)
	4-1/2 (114.3)	11,568 (51.5)	12,316 (54.8)	13,432 (59.8)	13,580 (60.4)	16,892 (75.1)	14,840 (66.0)
3/4 (19.1)	3-1/4 (82.6)	6,876 (30.6)	7,140 (31.8)	9,756 (43.4)	10,728 (47.7)	12,636 (56.2)	14,316 (63.6)
	4-1/2 (114.3)	10,304 (45.8)	13,120 (58.4)	14,424 (64.2)	16,868 (75.0)	18,540 (82.5)	20,612 (91.7)
	5-1/2 (139.7)	13,048 (58.0)	17,908 (79.7)	18,156 (80.8)	21,718 (96.9)	23,268 (130.5)	25,652 (114.1)

PERFORMANCE TABLE

LDT Anchors

Allowable Tension and Shear Values* (Lbs/kN) in Concrete Carbon and Stainless Steel

ANCHOR DIA. In. (mm)	EMBEDMENT DEPTH In. (mm)	f'c = 2000 PSI (13.8 MPa)		f'c = 3000 PSI (20.7 MPa)		f'c = 4000 PSI (27.6 MPa)	
		TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
3/8 (9.5)	1-1/2 (38.1)	334 (1.5)	527 (2.3)	413 (1.8)	691 (3.1)	492 (2.1)	854 (3.8)
	2 (50.8)	373 (1.7)	759 (3.4)	506 (2.2)	807 (3.6)	638 (2.8)	855 (3.8)
	2-1/2 (63.5)	933 (4.2)	828 (3.7)	937 (4.2)	841 (3.7)	940 (4.2)	856 (3.8)
	3-1/2 (88.9)	1,349 (6.0)	828 (3.7)	1,656 (7.4)	842 (3.7)	1,963 (8.7)	857 (3.8)
1/2 (12.7)	2 (50.8)	895 (4.0)	1,411 (6.3)	977 (4.3)	1,628 (7.2)	1,059 (4.7)	1,845 (8.2)
	3-1/2 (88.9)	1,813 (8.0)	1,609 (7.2)	2,011 (8.9)	1,822 (8.1)	2,209 (9.8)	2,035 (9.0)
	4-1/2 (114.3)	2,544 (11.3)	1,846 (8.2)	2,583 (11.5)	1,992 (8.9)	2,622 (11.7)	2,138 (9.5)
5/8 (15.9)	2-3/4 (69.9)	1,319 (5.9)	2,164 (9.7)	1,640 (7.3)	2,766 (12.3)	1,961 (8.7)	3,369 (15.0)
	3-1/2 (88.9)	1,993 (8.9)	2,556 (11.4)	2,462 (10.9)	3,036 (13.5)	2,931 (13.0)	3,515 (15.6)
	4-1/2 (114.3)	2,892 (12.9)	3,079 (13.7)	3,358 (14.9)	3,395 (15.1)	4,223 (18.8)	3,710 (16.5)
3/4 (19.1)	3-1/4 (82.6)	1,719 (7.6)	1,785 (7.9)	2,439 (10.8)	2,682 (11.9)	3,159 (14.0)	3,579 (15.9)
	4-1/2 (114.3)	2,576 (11.5)	3,280 (14.6)	3,606 (16.0)	4,217 (18.7)	4,635 (20.6)	5,153 (22.9)
	5-1/2 (139.7)	3,262 (14.5)	4,477 (19.9)	4,539 (20.2)	5,445 (24.2)	5,817 (25.9)	6,413 (28.5)

* Allowable values are based upon a 4 to 1 safety factor. (Ultimate/4)

PERFORMANCE TABLE

LDT Anchors

Recommended Edge & Spacing Requirements for Tension Loads* Carbon and Stainless Steel

ANCHOR DIA. In. (mm)	EMBEDMENT DEPTH In. (mm)	EDGE DISTANCE REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	LOAD FACTOR APPLIED AT MIN. EDGE DISTANCE 1-3/4 Inches (44mm)	SPACING DISTANCE REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	LOAD FACTOR APPLIED AT MIN. SPACING DISTANCE 3 Inches (76mm)
3/8 (9.5)	1-1/2 (38.1)	2 (50.8)	70%	6 (152.4)	44%
	2 (50.8)	2 (50.8)	70%	6 (152.4)	44%
	2-1/2 (63.5)	3 (76.2)	70%	6 (152.4)	44%
	3-1/2 (88.9)	4 (101.6)	70%	6 (152.4)	44%
1/2 (12.7)	2 (50.8)	2-1/4 (57.2)	65%	8 (203.2)	27%
	3-1/2 (88.9)	3 (76.2)	65%	8 (203.2)	27%
	4-1/2 (114.3)	4 (101.6)	65%	8 (203.2)	27%

* Edge and spacing distance shall be divided by .75 when anchors are placed in structural lightweight concrete. Linear interpolation may be used for intermediate spacing and edge distances.

For 5/8" and 3/4" LDT Anchors, the critical edge distance for these anchors is 10 times the anchor diameter. The edge distance of these anchors may be reduced to 1-3/4" provided a 0.65 load factor is used for tension loads, a 0.15 load factor is used for shear loads applied perpendicular to the edge, or a 0.60 load factor is used for shear loads applied parallel to the edge. Linear interpolation may be used for intermediate edge distances.

PERFORMANCE TABLE

LDT Anchors

Recommended Edge & Spacing Requirements for Shear Loads* Carbon and Stainless Steel

ANCHOR DIA. In. (mm)	EMBEDMENT DEPTH In. (mm)	EDGE DISTANCE REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	LOAD FACTOR APPLIED AT MIN. EDGE DISTANCE 1-3/4 Inches (44mm)	SPACING DISTANCE REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	LOAD FACTOR APPLIED AT MIN. SPACING DISTANCE 3 Inches (76mm)
3/8 (9.5)	1-1/2 (38.1)	3 (76.2)	25%	6 (152.4)	57%
	2 (50.8)	4 (101.6)	25%	6 (152.4)	57%
	2-1/2 (63.5)	5 (127.0)	25%	6 (152.4)	57%
	3-1/2 (88.9)	5 (127.0)	25%	6 (152.4)	57%
1/2 (12.7)	2 (50.8)	5 (127.0)	25%	8 (203.2)	60%
	3-1/2 (88.9)	5 (127.0)	25%	8 (203.2)	60%
	4-1/2 (114.3)	5-1/2 (139.7)	25%	8 (203.2)	60%

* Edge and spacing distances shall be divided by .75 when anchors are placed in structural lightweight concrete. Linear interpolation may be used for intermediate spacing and edge distances.

PERFORMANCE TABLES

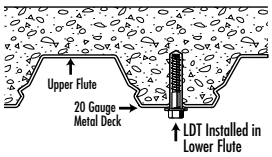
LDT Anchors — Ultimate Tension Load (Lbs/kN) in Concrete Block
(anchors should be installed by hand in hollow block)

ANCHOR DIA. In. (mm)	EMBEDMENT DEPTH In. (mm)	HOLLOW CONCRETE BLOCK		GROUT FILLED CONCRETE BLOCK	
		TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
3/8 (9.5)	1-1/2 (38.1)	916 (4.1)	3,176 (14.1)	1,592 (7.1)	3,900 (17.3)
1/2 (12.7)	2-1/2 (63.5)	N/A	N/A	5,924 (26.4)	6,680 (29.7)

LDT Anchors — Allowable Tension and Shear* (Lbs/kN) in Concrete Block
(anchors should be installed by hand in hollow block)

ANCHOR DIA. In. (mm)	EMBEDMENT DEPTH In. (mm)	HOLLOW CONCRETE BLOCK		GROUT FILLED CONCRETE BLOCK	
		TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
3/8 (9.5)	1-1/2 (38.1)	229 (1.0)	794 (3.5)	398 (1.8)	975 (4.3)
1/2 (12.7)	2-1/2 (63.5)	N/A	N/A	1,481 (6.6)	1,670 (7.4)

* Allowable values are based upon a 4 to 1 safety factor. (Ultimate/4)

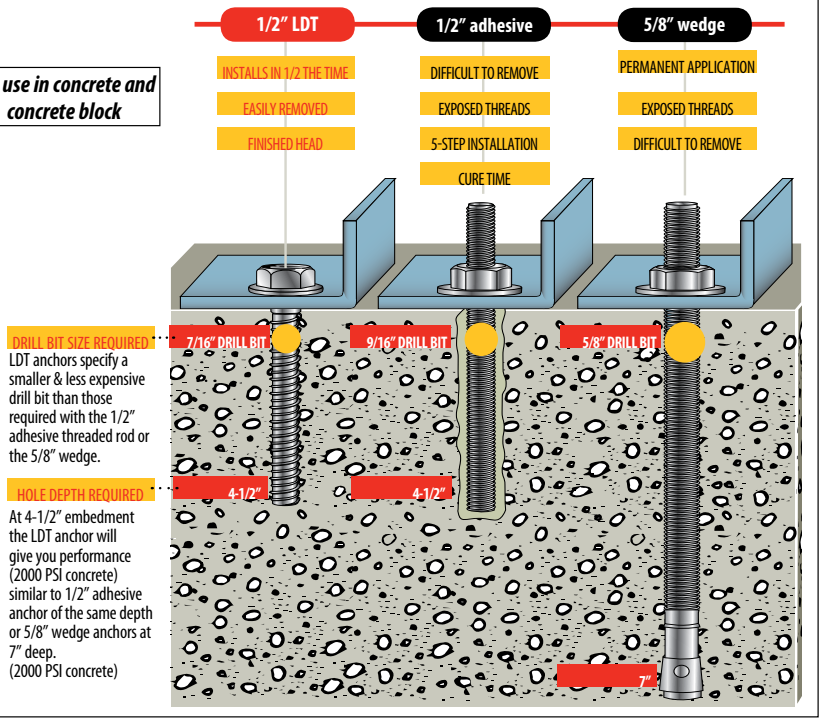


LDT Anchors — Anchoring Overhead in 3000 PSI Lightweight Concrete On Metal Deck

ANCHOR	DRILL HOLE DIAMETER In. (mm)	EMBEDMENT In. (mm)	3000PSI (20.7 MPa) CONCRETE		
			ULTIMATE TENSION LOAD Lbs. (kN)		ALLOWABLE WORKING LOAD Lbs. (kN)
3/8" LDT	5/16 (7.9)	1-1/2 (38.1)	Upper Flute	2,889 (12.9)	722 (3.2)
			Lower Flute	1,862 (8.3)	465 (2.1)

The Easy, Fast, High Performing, Removable Tapcon Anchor, Now Available in 3/8" and 1/2" Diameter

For use in concrete and concrete block



DRILL BIT SIZE REQUIRED
LDT anchors specify a smaller & less expensive drill bit than those required with the 1/2" adhesive threaded rod or the 5/8" wedge.

HOLE DEPTH REQUIRED
At 4-1/2" embedment the LDT anchor will give you performance (2000 PSI concrete) similar to 1/2" adhesive anchor of the same depth or 5/8" wedge anchors at 7" deep. (2000 PSI concrete)

RED HEAD®
CONCRETE ANCHORING SPECIALISTS

Multi-Set II® Drop-In Anchors

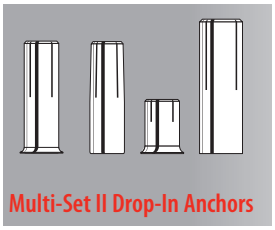
Internally Threaded Heavy-Duty Anchoring Systems

DESCRIPTION/SUGGESTED SPECIFICATIONS

Drop-In, Shell-Type Anchors—

SPECIFIED FOR ANCHORAGE INTO CONCRETE

Drop-In, shell-type anchors feature an internally threaded, all-steel shell with expansion cone insert and flush embedment lip. Anchors are manufactured from zinc-plated carbon steel, 18-8 stainless steel and 316 stainless steel.



Multi-Set II Drop-In Anchors

Anchors should be installed with carbide tipped hammer drill bits made in accordance to ANSI B212.15-1994 specifications.

Anchors should be tested to ASTM E488 criteria and listed by ICC-ES. Anchors should also be listed by the following agencies as required by the local building code: UL, FM, City of Los Angeles, California State Fire Marshal and Caltrans.

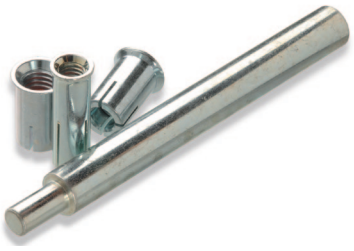
ADVANTAGES

Depth Charge Stop Drill and RX Drop-In Anchors

Ideal for Hollow-Core, Pre-Cast Plank and Post Tension Slabs

DepthCharge™ Stop Drill

- Optimized for use in hollow-core, pre-cast plank and post-tension slabs
- Lip keeps anchor flush during installation
- Shallow drilling—fast installation



RX Drop-In Anchor

See page 69 for kits

RM Drop-In Anchor

- Lipped anchor body keeps anchor flush
- Easy installation
- Keeps all rods same length
- Easy inspection
- Available in carbon steel, 18-8 and 316 stainless steel

RL Drop-In Anchor

- Below surface setting for easy patch work

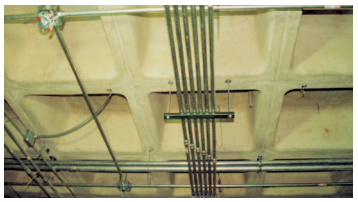
Coil Thread Anchor

- Quick thread attachment—ideal for 1 sided forming
- Use coil rod on job
- 2 diameters (1/2" and 3/4")

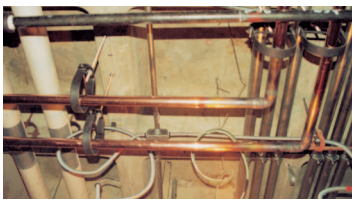
Multi-Set II Anchors

APPLICATIONS

Pumps and heavy piping are common applications for larger diameter Multi-Set Drop-In Anchors.

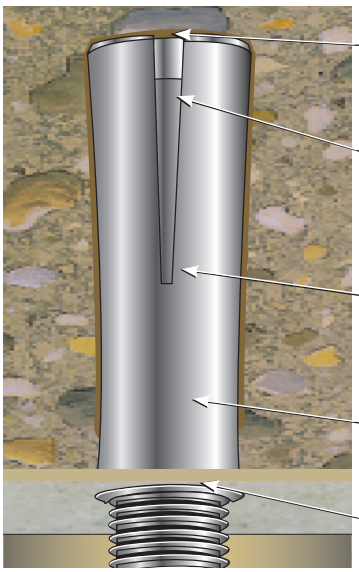


Cable tray and strut suspended from concrete ceilings are ideal Multi-Set applications. In post-tension or hollow-core slabs use the RX-38.



The Multi-Set Anchor is the standard for pipe-hanging. The RM version has a retainer lip to keep all anchors flush at the surface, keeping all your threaded rod the same length.

FEATURES



Expander Slots—allow for easy setting and superior performance

Cone Insert—that expands the anchor when driven with setting tool and hammer

Body—available in zinc-plated steel, 18-8 stainless steel, and 316 stainless steel

Easy Depth Inspection—keeps threaded rod drop lengths consistent

Retainer Lip—to keep anchor flush with surface

For use with threaded rods or headed bolts (supplied by contractor)

APPROVALS/LISTINGS

Meets or exceeds U.S. Government G.S.A. Specification A-A-55614 Type 1 (Formerly GSA: FF-S-325 Group VIII)

Underwriters Laboratories

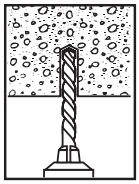
Factory Mutual

California State Fire Marshal

Caltrans

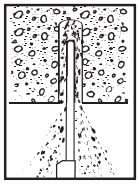
For the most current approvals/listings visit: www.itw-redhead.com

INSTALLATION STEPS



To set anchor flush with surface:

1. Drill hole to required embedment (see Table on page 69).



2. Clean hole with pressurized air.

3. Drive anchor flush with surface of concrete.

4. Expand anchor with setting tool provided (see chart on page 69). Anchor is properly expanded when shoulder of setting tool is flush with top of anchor.

To set anchor below surface:

Drill hole deeper than anchor length. Thread bolt into anchor. Hammer anchor into hole until bolt head is at desired depth. Remove bolt and set anchor with setting tool.

SELECTION CHART

Multi-Set II Depth Charge Bits

PART NUMBER	DESCRIPTION FEATURE BENEFITS	DRILLING DEPTH
DCX-138	3/8" Depth Charge Stop Drill	3/4"
DCX-112	1/2" Depth Charge Stop Drill	1"

DepthCharge™ Stop Drill

- Shoulder prevents over drilling
- Less likely to hit reinforcing steel or post-tension cable in concrete
- No lost time or energy drilling farther than necessary
- Anchor is set at a specified depth, does not drop too far into hole

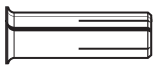
SELECTION CHARTS

Multi-Set II
Drop-In Anchors

PART NUMBER RT-138
1 setting tool per master carton
(See above for part numbers.)

PART NUMBER RTX-138
For use with RX-38 only.

PART NUMBER RTX-112
For use with RX-12 only.

USER TYPE / APPLICATION	BASE MATERIAL	CORROSION RESISTANCE LEVEL	DROP-IN ANCHOR TYPE	PART NUMBER	SETTING TOOL PART NUMBER*	BOLT SIZE-THREADS PER INCH	DRILL BIT DIA. In. (mm)	THREAD DEPTH In. (mm)	EMBEDMENT MIN. HOLE DEPTH In. (mm)	QTY/WT PER BOX lbs.	QTY/WT PER MASTER CTN lbs. *
HVAC/Fire Sprinkler Plumber (Pipe-fitter)	Solid concrete/ lightweight fill deck	Low	RM 	RM-14 RM-38 RM-12 RM-58 RM-34	RT-114 RT-138 RT-112 RT-158 RT-134	1/4" - 20 3/8" - 16 1/2" - 13 5/8" - 11 3/4" - 10	3/8 (9.5) 1/2 (12.7) 5/8 (15.9) 7/8 (22.2) 1 (25.4)	3/8 (9.5) 1/2 (12.7) 3/4 (19.1) 1 (25.4) 1-1/4 (31.8)	1 (25.4) 1-5/8 (41.3) 2 (50.8) 2-1/2 (63.5) 3-3/16 (81.0)	100/ 2.6 50/ 3.4 50/ 5.8 25/ 7.8 25/11.9	1000/ 28 500/ 36 400/ 49 125/ 41 100/ 49
	Hollow-core pre-cast or Post-tension	Low	RX 	RX-38 RX-12	RTX-138 RTX-112	3/8" - 16 1/2" - 13	1/2 (12.7) 5/8 (15.9)	3/8 (9.5) 1/2 (12.7)	3/4 (19.1) 1 (25.4)	100/ 3.5 50/ 3.0	1000/ 36 500/ 31
	Solid concrete/ lightweight fill deck	Medium	SRM** 18-8 S.S. 	SRM-14 SRM-38 SRM-12 SRM-58 SRM-34	RT-114 RT-138 RT-112 RT-158 RT-134	1/4" - 20 3/8" - 16 1/2" - 13 5/8" - 11 3/4" - 10	3/8 (9.5) 1/2 (12.7) 5/8 (15.9) 7/8 (22.2) 1 (25.4)	3/8 (9.5) 1/2 (12.7) 3/4 (19.1) 1 (25.4) 1-1/4 (31.8)	1 (25.4) 1-5/8 (41.3) 2 (50.8) 2-1/2 (63.5) 3-3/16 (81.0)	100/ 2.7 50/ 3.4 50/ 6.0 25/ 7.9 25/12.0	1000/ 28 500/ 36 400/ 50 125/ 42 100/ 50
	Solid concrete	High	SSRM** 316 S.S.	SSRM-38 SSRM-12	RT-138 RT-112	3/8" - 16 1/2" - 13	1/2 (12.7) 5/8 (15.9)	1/2 (12.7) 3/4 (19.1)	1-5/8 (41.3) 2 (50.8)	50/ 3.4 50/ 6.0	500/ 36 400/ 50
Concrete Contractor, General Contractor, Highway	Solid concrete	Low	CL-Coil Threaded 	CL-12 CL-34	RT-112 RT-134	1/2" - 6 3/4" - 4.5	5/8 (15.9) 1 (25.4)	3/4 (19.1) 1-1/4 (31.8)	2 (50.8) 3-3/16 (81.0)	50/ 5.7 25/11.9	400/ 47 100/ 49
Concrete Cutting/ Sawing Contractor/ Misc. Metal	Solid concrete/ lightweight fill deck	Low	RL (w/o lip) 	RL-14 RL-38 RL-12 RL-58 RL-34	RT-114 RT-138 RT-112 RT-158 RT-134	1/4" - 20 3/8" - 16 1/2" - 13 5/8" - 11 3/4" - 10	3/8 (9.5) 1/2 (12.7) 5/8 (15.9) 7/8 (22.2) 1 (25.4)	3/8 (9.5) 1/2 (12.7) 3/4 (19.1) 1 (25.4) 1-1/4 (31.8)	1 (25.4) 1-5/8 (41.3) 2 (50.8) 2-1/2 (63.5) 3-3/16 (81.0)	100/ 2.6 50/ 3.4 50/ 5.8 25/ 7.8 25/11.9	1000/ 28 500/ 36 400/ 49 125/ 41 100/ 49

* 1 setting tool per master carton. ** For continuous extreme low temperature, use stainless steel.

Multi-Set II
RX Drop-In Kits

Part No.	Description
RX-38	3/8" drop-in using 1/2" drill bit
RTX-138	Setting Tool
DCX-138	Depth Charge Stop Drill
RX-38KIT	Contains: 1,000 RX-38 Anchors, 5 RTX-138 Setting Tools and 2 DCX-138 Depth Charge Stop Drills

Part No.	Description
RX-12	1/2" drop-in using 5/8" drill bit
RTX-112	Setting Tool
DCX-112	Depth Charge Stop Drill
RX-12KIT	Contains: 500 RX-12 Anchors, 3 RTX-112 Setting Tools and 1 DCX-112 Depth Charge Stop Drill

PERFORMANCE TABLE

Multi-Set II
Drop-In Anchors

Ultimate Tension and Shear Values (Lbs/kN) in Concrete*

BOLT DIA. In. (mm)	ANCHOR DIA. In. (mm)	MIN. EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE	TENSION Lbs. (kN)			SHEAR Lbs. (kN)
				f'c = 2000 PSI (13.8 MPa)	f'c = 4000 PSI (27.6 MPa)	f'c = 6000 PSI (41.4 MPa)	f'c ≥2000 PSI (13.8 MPa)
1/4 (6.4)	3/8 (9.5)	1 (25.4)	RM, RL or CL-Carbon or SRM-18-8 S.S. or SSRM-316 S.S.	1,680 (7.5)	2,360 (10.5)	2,980 (13.3)	1,080 (4.8)
3/8 (9.5)	1/2 (12.7)	1-5/8 (41.3)		2,980 (13.3)	3,800 (16.9)	6,240 (27.8)	3,160 (14.1)
1/2 (12.7)	5/8 (15.9)	2 (50.8)		3,300 (14.7)	5,840 (26.0)	8,300 (36.9)	4,580 (20.4)
5/8 (15.9)	7/8 (22.2)	2-1/2 (63.5)		5,500 (24.5)	8,640 (38.4)	11,020 (49.0)	7,440 (33.1)
3/4 (19.1)	1 (25.4)	3-3/16 (81.0)		8,280 (36.8)	9,480 (42.2)	12,260 (54.5)	10,480 (46.6)

* Allowable values are based upon a 4 to 1 safety factor. Divide by 4 for allowable load values.

* For continuous extreme low temperature applications, use stainless steel.

Multi-Set II Drop-In Anchors — Ultimate Tension and Shear Values (Lbs/kN) in Lightweight Concrete*

BOLT DIA. In. (mm)	ANCHOR DIA. In. (mm)	MINIMUM EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE	LIGHTWEIGHT CONCRETE f'c = 3000 PSI (20.7 MPa)		LOWER FLUTE OF STEEL DECK WITH LIGHTWEIGHT CONCRETE FILL f'c = 3000 PSI (20.7 MPa)	
				TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
3/8 (9.5)	1/2 (12.7)	1-5/8 (39.7)	RM, RL or CL-Carbon or SRM-18-8 S.S. or SSRM-316 S.S.	2,035 (9.1)	1,895 (8.4)	3,340 (14.9)	4,420 (19.6)
1/2 (12.7)	5/8 (15.9)	2 (50.8)		2,740 (12.2)	2,750 (12.2)	3,200 (14.2)	4,940 (22.0)
5/8 (15.9)	7/8 (22.2)	2-1/2 (63.5)		4,240 (18.9)	4,465 (19.9)	5,960 (26.5)	5,840 (26.0)
3/4 (19.1)	1 (25.4)	3-3/16 (81.0)		5,330 (23.7)	6,290 (28.0)	8,180 (36.4)	9,120 (40.6)

* Allowable values are based upon a 4 to 1 safety factor. Divide by 4 for allowable load values.

Multi-Set II Drop-In Anchors — Recommended Edge and Spacing Distance Requirements*

BOLT DIA. In. (mm)	DRILL BIT SIZE In. (mm)	EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE	EDGE DISTANCE REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	MIN. EDGE DISTANCE AT WHICH LOAD FACTOR APPLIED =.80 FOR TENSION =.70 FOR SHEAR In. (mm)	SPACING REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	MIN. ALLOWABLE SPACING BETWEEN ANCHORS LOAD FACTOR APPLIED =.80 FOR TENSION =.55 FOR SHEAR In. (mm)
1/4 (6.4)	3/8 (9.5)	1 (25.4)	RM, RL or CL-Carbon or SRM-18-8 S.S. or SSRM-316 S.S.	1-3/4 (44.5)	7/8 (22.2)	3-1/2 (88.9)	1-3/4 (44.5)
3/8 (9.5)	1/2 (12.7)	1-5/8 (41.3)		2-7/8 (73.0)	1-7/16 (36.5)	5-11/16 (144.5)	2-7/8 (73.0)
1/2 (12.7)	5/8 (15.9)	2 (50.8)		3-1/2 (88.9)	1-3/4 (44.5)	7 (177.8)	3-1/2 (88.9)
5/8 (15.9)	7/8 (22.2)	2-1/2 (63.5)		4-3/8 (111.1)	2-3/16 (55.6)	8-3/4 (222.3)	4-3/8 (111.1)
3/4 (19.1)	1 (25.4)	3-3/16 (81.0)		5-5/8 (142.9)	2-13/16 (71.4)	11-3/16 (284.2)	5-5/8 (142.9)

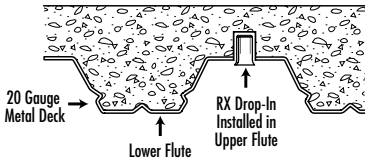
* Spacing and edge distances shall be divided by 0.75 when anchors are placed in structural lightweight concrete. Linear interpolation may be used for intermediate spacing and edge distances.

Multi-Set II Drop-In Anchors — Ultimate Tension and Shear Values (Lbs/kN) for RX-series (3/4" and 1" Embedment)*

BOLT DIA. In. (mm)	DRILL BIT SIZE In. (mm)	EMBEDMENT In. (mm)	2500 PSI (17.2 MPa) CONCRETE		4000 PSI (27.6 MPa) CONCRETE		HOLLOW CORE	
			TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
3/8 (9.5)	1/2 (12.7)	3/4 (19.1)	1,571 (7.0)	2,295 (10.2)	1,987 (8.8)	2,903 (12.9)	1,908 (8.5)	2,401 (10.7)
1/2 (12.7)	5/8 (15.9)	1 (25.4)	2,113 (9.4)	2,585 (11.5)	2,673 (11.9)	3,270 (14.5)	2,462 (11.0)	2,401 (10.7)

* The tabulated values are for RX anchors installed at a minimum of 12 diameters on center and minimum edge distance of 6 diameters for 100 percent anchor efficiency. Spacing and edge distance may be reduced to 6 diameters spacing and 3 diameter edge distance provided the values are reduced 50 percent. Linear Interpolation may be used for intermediate spacings and edge margins.

* Allowable values are based upon a 4 to 1 safety factor. Divide by 4 for allowable load values.



Multi-Set II Drop-In Anchors — Anchoring Overhead in 3000 PSI Lightweight Concrete On Metal Deck

ANCHOR	DRILL HOLE DIAMETER In. (mm)	EMBEDMENT In. (mm)	3000PSI (20.7 MPa) CONCRETE		
				ULTIMATE TENSION LOAD Lbs. (kN)	ALLOWABLE WORKING LOAD Lbs. (kN)
RX-38 Drop-In	1/2 (12.7)	3/4 (19.1)	Upper Flute	1,410 (6.3)	353 (1.6)
			Lower Flute	1,206 (5.4)	301 (1.3)

* Allowable values are based upon a 4 to 1 safety factor. Divide by 4 for allowable load values.

Combined Tension and Shear Loading—for Multi-Set Anchors

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

$$(Ps/Pt)^{5/3} + (Vs/Vt)^{5/3} \leq 1$$

Ps = Applied tension load **Vs = Applied shear load** **Pt = Allowable tension load** **Vt = Allowable shear load**

RED HEAD®
CONCRETE ANCHORING SPECIALISTS

Dynabolt® Sleeve Anchors

Versatile, Medium-Duty Sleeve Anchor

Dynabolt
Hex Nut Sleeve Anchor

DESCRIPTION/SUGGESTED SPECIFICATIONS

Sleeve Type Anchors—

SPECIFIED FOR ANCHORAGE INTO CONCRETE, GROUT-FILLED CONCRETE BLOCK, HOLLOW CONCRETE BLOCK AND BRICK

Dynabolt Masonry Sleeve Anchor

Sleeve type anchors feature a split expansion sleeve over a threaded stud bolt body and integral expander, nut and washer.

Anchors are made of Plated Carbon Steel, or Type 18-8 Stainless Steel.

Anchors should be installed with carbide tipped hammer drill bits made in accordance to ANSI B212.15-1994.

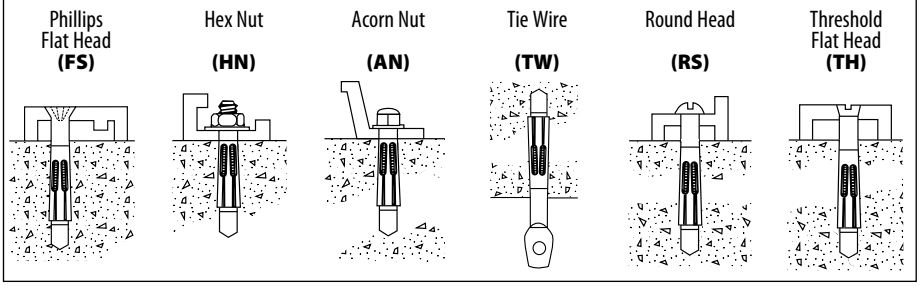
Anchors are tested to ASTM E488 criteria.

ADVANTAGES

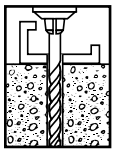
- Anchor diameter equals hole diameter
- Available in hex head and six other head styles
- Available 1/4 - 3/4" diameter up to 6-1/4" length
- Zinc plated carbon steel and 304 stainless steel
- Provides full 360° hole contact over large area and reduces concrete stress
- Heavy-loading capacity
- Preassembled for faster, easier installations
- Dynabolt can be installed through object to be fastened
- Sleeve design improves holding power
- No pre-spotting of holes necessary

Available Head Styles

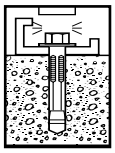
Full range of head style, corrosion protection, and sizes makes the Dynabolt Sleeve the right product for almost any application.



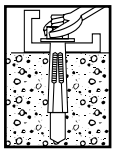
INSTALLATION STEPS



1. Use a bit with a diameter equal to the anchor. See selection chart to determine proper size bit for anchor used. Drill hole to any depth exceeding minimum embedment. Clean hole.



2. Insert assembled anchor into hole, so that washer or head is flush with materials to be fastened.



3. Expand anchor by tightening nut or head 2 to 3 turns.

APPROVALS/LISTINGS

Meets or exceeds U.S. Government G.S.A. Specification A-A-1922A (Formerly GSA: FF-S-325 Group II, Type 3, Class 3)

Factory Mutual

California State Fire Marshal

APPLICATIONS

Electrical junction boxes are common applications for the Dynabolt Sleeve anchor because it works well in solid concrete, concrete block, and brick. It is also available in several finished head styles.

The Dynabolt Sleeve anchor works well in hollow materials like brick and block. It is available in zinc-plated carbon steel and 304 stainless steel.

Door and window frames are commonly attached to the structure with Dynabolt Sleeve anchors because of their finished & threshold head styles and performance in block & brick.

SELECTION CHART

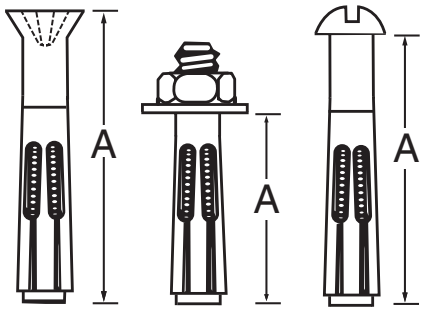
Dynabolt
Carbon Steel with Zinc Plating

Typical Applications—Shelf ledgers, electrical boxes, conduit

Environment—Interior (non-corrosive)

Level of Corrosion—Low

*** Effective Anchor Length**



HEAD STYLE	PART NUMBER	ANCHOR DIA. & DRILL BIT SIZE	EFFECTIVE ANCHOR LENGTH* In. (mm)	BOLT DIA./ THREADS PER INCH	MIN. EMBEDMENT In. (mm)	MAX. THICKNESS OF MATERIAL TO BE FASTENED In. (mm)	QTY/WT PER BOX lbs.	QTY/WT PER MASTER CARTON lbs.
ACORN NUT	AN-1405	1/4″	5/8 (15.9)	3/16″ /24	1/2 (12.7)	1/8 (3.2)	100/ 1.9	1000/ 20
	AN-1413		1-3/8 (34.9)	3/16″ /24	1-1/8 (28.6)	1/4 (6.4)	100/ 2.6	1000/ 27
	AN-1422		2-1/4 (57.2)	3/16″ /24	1-1/8 (28.6)	1-1/8 (28.6)	100/ 3.7	1000/ 38
HEX NUT	HN-1413	1/4″	1-3/8 (34.9)	3/16″ /24	1-1/8 (28.6)	1/4 (6.4)	100/ 2.3	1000/ 24
	HN-1422		2-1/4 (57.2)	3/16″ /24	1-1/8 (28.6)	1-1/8 (28.6)	100/ 3.4	1000/ 35
	HN-1614	5/16″	1-1/2 (38.1)	1/4″ /20	1-1/4 (31.8)	1/4 (6.4)	100/ 4.0	1000/ 41
	HN-1624		2-1/2 (63.5)	1/4″ /20	1-1/4 (31.8)	1-1/4 (31.8)	100/ 5.9	800/ 47
	HN-3817	3/8″	1-7/8 (47.6)	5/16″ /18	1-1/2 (38.1)	3/8 (9.5)	50/ 3.5	500/ 36
	HN-3830		3 (76.2)	5/16″ /18	1-1/2 (38.1)	1-1/2 (38.1)	50/ 4.9	400/ 40
	HN-1222	1/2″	2-1/4 (57.2)	3/8″ /16	1-7/8 (47.6)	3/8 (9.5)	25/ 3.3	250/ 34
	HN-1230		3 (76.2)	3/8″ /16	1-7/8 (47.6)	1-1/8 (28.6)	25/ 4.0	200/ 33
	HN-1240		4 (101.6)	3/8″ /16	1-7/8 (47.6)	2-1/8 (54.0)	25/ 5.3	200/ 44
	HN-5822	5/8″	2-1/4 (57.2)	1/2″ /13	2 (50.8)	1/4 (6.4)	25/ 6.3	150/ 38
	HN-5830		3 (76.2)	1/2″ /13	2 (50.8)	1 (25.4)	25/ 7.0	150/ 46
	HN-5842		4-1/4 (108.0)	1/2″ /13	2 (50.8)	2-1/4 (57.2)	10/ 3.9	100/ 41
	HN-5860		6 (152.4)	1/2″ /13	2 (50.8)	4 (101.6)	10/ 4.9	50/ 25
	HN-3424	3/4″	2-1/2 (63.5)	5/8″ /11	2-1/4 (57.2)	1/4 (6.4)	10/ 4.7	50/ 25
	HN-3440		4 (101.6)	5/8″ /11	2-1/4 (57.2)	1-3/4 (44.5)	5/ 3.2	50/ 33
	HN-3462		6-1/4 (158.8)	5/8″ /11	2-1/4 (57.2)	4 (101.6)	5/ 4.3	50/ 44
PHILLIPS FLAT HEAD*	FS-1411	1/4″ (head dia. .477)	1-1/2 (38.1)	3/16″ /24	1-1/8 (28.6)	3/8 (9.5)	100/ 1.9	1000/ 21
	FS-1420		2-1/4 (57.2)	3/16″ /24	1-1/8 (28.6)	1-1/8 (28.6)	100/ 2.7	1000/ 28
	FS-1430		3-1/8 (79.4)	3/16″ /24	1-1/8 (28.6)	2 (50.8)	100/ 3.8	1000/ 38
	FS-1440		4 (101.6)	3/16″ /24	1-1/8 (28.6)	2-7/8 (73.0)	100/ 4.7	1000/ 48
	FS-3826	3/8″ (head dia. .722)	2-7/8 (73.0)	5/16″ /18	1-1/2 (38.1)	1-3/8 (34.9)	50/ 3.8	500/ 40
	FS-3840		4 (101.6)	5/16″ /18	1-1/2 (38.1)	2-1/2 (63.5)	50/ 5.3	400/ 44
	FS-3850		5 (127.0)	5/16″ /18	1-1/2 (38.1)	3-1/2 (88.9)	50/ 5.6	300/ 40
	FS-3860		6 (152.4)	5/16″ /18	1-1/2 (38.1)	4-1/2 (114.3)	50/ 8.0	300/ 48
THRESHOLD FLAT HEAD	TH-1420	1/4″ (head dia. .385)	2-1/4 (57.2)	3/16″ /24	1-1/8 (28.6)	1-1/8 (28.6)	100/ 2.5	1000/ 25
ROUND HEAD	RS-1426	1/4″	2-7/8 (73.0)	3/16″ /24	1-1/8 (28.6)	1-3/4 (44.5)	100/ 3.7	1000/ 38
TIE WIRE	TW-1614	5/16″	1-1/2 (38.1)	1/4″ /20	1-1/2 (38.1)	9/32 hole (7.1)	100/ 4.9	1000/ 50

* Phillips flat head uses a standard 80° – 82° counter sink.

SELECTION CHART

Dynabolt
Type 304 Stainless Steel

Typical Applications—Cladding and Brick Ties

Environment—Slight to moderate degree of pollution

Level of Corrosion—Medium

HEAD STYLE	PART NUMBER	ANCHOR DIA. & DRILL BIT SIZE	EFFECTIVE ANCHOR LENGTH* In. (mm)	BOLT DIA./ THREADS PER INCH	MIN. EMBEDMENT In. (mm)	MAX. THICKNESS OF MATERIAL TO BE FASTENED In. (mm)	QTY/WT PER BOX lbs.	QTY/WT PER MASTER CARTON lbs.
HEX NUT	SHN-1413	1/4″	1-3/8 (34.9)	3/16″ /24	1-1/8 (28.6)	1/4 (6.4)	100/ 2.3	1000/ 24
	SHN-3817	3/8″	1-7/8 (47.6)	5/16″ /18	1-1/2 (38.1)	3/8 (9.5)	50/ 3.5	500/ 36
	SHN-3830		3 (76.2)	5/16″ /18	1-1/2 (38.1)	1-1/2 (38.1)	50/ 4.9	400/ 40
	SHN-1222	1/2″	2-1/4 (57.2)	3/8″ /16	1-7/8 (47.6)	3/8 (9.5)	25/ 3.3	250/ 34
	SHN-1230		3 (76.2)	3/8″ /16	1-7/8 (47.6)	1-1/8 (28.6)	25/ 4.0	200/ 33
	SHN-1240		4 (101.6)	3/8″ /16	1-7/8 (47.6)	2-1/8 (54.0)	25/ 5.3	200/ 44
	SHN-5842	5/8″	4-1/4 (108.0)	1/2″ /13	2 (50.8)	2-1/4 (57.2)	10/ 3.9	100/ 41
PHILLIPS FLAT HEAD*	SFS-1420	1/4″	2-1/4 (57.2)	3/16″ /24	1-1/8 (28.6)	1-1/8 (28.6)	100/ 2.7	1000/ 28
	SFS-1430		3-1/8 (79.4)	3/16″ /24	1-1/8 (28.6)	2 (50.8)	100/ 3.8	1000/ 38
	SFS-3826	3/8″	2-7/8 (73.0)	5/16″ /18	1-1/2 (38.1)	1-3/8 (34.9)	50/ 3.8	500/ 40
	SFS-3840		4 (101.6)	5/16″ /18	1-1/2 (38.1)	2-1/2 (63.5)	50/ 5.3	400/ 44
ROUND HEAD	SRS-1420	1/4″	2 (50.8)	3/16″ /24	1-1/8 (28.6)	7/8 (22.2)	100/ 2.7	1000/ 28

* Flat head uses a standard 80° – 82° counter sink.
For continuous extreme low temperature applications, use stainless steel.

Dynabolt Sleeve Anchors — Ultimate Tension and Shear Values in Concrete (Lbs/kN)*

ANCHOR DIA. In. (mm)	INSTALLATION TORQUE Ft. Lbs. (Nm)	BOLT DIA. In. (mm)	MINIMUM EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE (STEEL)	f'c = 2000 PSI (13.8 MPa) TENSION Lbs. (kN)	f'c = 2000 PSI (13.8 MPa) SHEAR Lbs. (kN)	f'c = 3000 PSI (20.7 MPa) TENSION Lbs. (kN)	f'c = 3000 PSI (20.7 MPa) SHEAR Lbs. (kN)	f'c = 4000 PSI (27.6 MPa) TENSION Lbs. (kN)	f'c = 4000 PSI (27.6 MPa) SHEAR Lbs. (kN)
1/4 (6.4)	3.5 (4.7)	3/16 (4.8)	1-1/8 (28.6)	Carbon or Stainless	1,200 (5.3)	1,215 (5.4)	1,325 (5.9)	1,215 (5.4)	1,450 (6.4)	1,215 (5.4)
5/16 (7.9)	8 (10.8)	1/4 (6.4)	1-1/4 (31.8)		1,400 (6.2)	2,040 (9.1)	1,920 (8.5)	2,220 (9.9)	2,600 (11.6)	2,400 (10.7)
3/8 (9.5)	14 (19.0)	5/16 (7.9)	1-1/2 (38.1)		1,620 (7.2)	2,560 (11.4)	2,240 (10.0)	2,800 (12.5)	3,100 (13.8)	3,040 (13.5)
1/2 (12.7)	20 (27.1)	3/8 (9.5)	1-7/8 (47.6)		2,220 (9.9)	3,250 (14.5)	3,140 (14.0)	4,000 (17.8)	4,400 (19.6)	4,500 (20.0)
5/8 (15.9)	48 (65.1)	1/2 (12.7)	2 (50.8)		3,080 (13.7)	6,440 (28.6)	4,400 (19.6)	7,240 (32.2)	6,120 (27.2)	8,080 (35.9)
3/4 (19.1)	90 (122.0)	5/8 (15.9)	2-1/4 (57.2)		4,200 (18.7)	10,200 (45.4)	6,060 (27.0)	11,600 (51.6)	8,900 (39.6)	13,100 (58.3)

* For continuous extreme low temperature applications, use stainless steel.
For AN-1405, Ultimate Pullout: 500 lbs. & Ultimate Shear: 1751 lbs. based on 4,000 psi.

Dynabolt Sleeve Anchors — Ultimate Tension and Shear Values in Lightweight Concrete (Lbs/kN)*

ANCHOR DIA. In. (mm)	INSTALLATION TORQUE Ft. Lbs. (Nm)	BOLT DIA. In. (mm)	MINIMUM EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE (STEEL)	f'c = 4000 PSI (27.6 MPa) TENSION Lbs. (kN)	f'c = 4000 PSI (27.6 MPa) SHEAR Lbs. (kN)	f'c = 6000 PSI (41.4 MPa) TENSION Lbs. (kN)	f'c = 6000 PSI (41.4 MPa) SHEAR Lbs. (kN)
1/4 (6.4)	3.5 (4.7)	3/16 (4.8)	1-1/8 (28.6)	Carbon or Stainless	870 (3.9)	730 (3.2)	1,066 (4.7)	894 (4.0)
5/16 (7.9)	8 (10.8)	1/4 (6.4)	1-1/4 (31.8)		1,260 (5.6)	1,680 (7.5)	1,440 (6.4)	2,220 (9.9)
3/8 (9.5)	14 (19.0)	5/16 (7.9)	1-1/2 (38.1)		1,620 (7.2)	2,300 (10.2)	2,240 (10.0)	2,800 (12.5)
1/2 (12.7)	25 (33.9)	3/8 (9.5)	1-7/8 (47.6)		2,600 (11.6)	2,400 (10.7)	3,160 (14.1)	2,400 (10.7)
5/8 (15.9)	48 (65.1)	1/2 (12.7)	2 (50.8)		3,240 (14.4)	5,600 (24.9)	4,300 (19.1)	7,840 (34.9)
3/4 (19.1)	90 (122.0)	5/8 (15.9)	2-1/4 (57.2)		3,640 (16.2)	8,640 (38.4)	5,800 (25.8)	12,480 (55.5)

Dynabolt Sleeve Anchors — Ultimate Tension and Shear Values in Concrete Masonry Units (Lbs/kN)*

ANCHOR DIA. In. (mm)	INSTALLATION TORQUE Ft. Lbs. (Nm)	BOLT DIA. In. (mm)	MINIMUM EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE (STEEL)	LIGHTWEIGHT HOLLOW CORE TENSION Lbs. (kN)	LIGHTWEIGHT HOLLOW CORE SHEAR Lbs. (kN)	LIGHTWEIGHT GROUT FILLED TENSION Lbs. (kN)	LIGHTWEIGHT GROUT FILLED SHEAR Lbs. (kN)	MEDIUM WEIGHT HOLLOW CORE TENSION Lbs. (kN)	MEDIUM WEIGHT HOLLOW CORE SHEAR Lbs. (kN)	MEDIUM WEIGHT GROUT FILLED TENSION Lbs. (kN)	MEDIUM WEIGHT GROUT FILLED SHEAR Lbs. (kN)
1/4 (6.4)	3.5 (4.7)	3/16 (4.8)	1-1/8 (28.6)	Carbon	1,120 (5.0)	1,215 (5.4)	1,120 (5.0)	1,215 (5.4)	1,120 (5.0)	1,215 (5.4)	1,120 (5.0)	1,215 (5.4)
				Stainless	640 (2.8)	1,620 (7.2)	640 (2.8)	1,620 (7.2)	640 (2.8)	1,620 (7.2)	640 (2.8)	1,620 (7.2)
3/8 (9.5)	15 (20.3)	5/16 (7.9)	1-1/2 (38.1)	Carbon	1,360 (6.0)	2,560 (11.4)	1,360 (6.0)	2,560 (11.4)	1,360 (6.0)	2,560 (11.4)	1,360 (6.0)	2,560 (11.4)
				Stainless	1,160 (5.2)	2,560 (11.4)	1,160 (5.2)	2,560 (11.4)	1,160 (5.2)	2,560 (11.4)	1,160 (5.2)	2,560 (11.4)
1/2 (12.7)	25 (33.9)	3/8 (9.5)	1-7/8 (47.6)	Carbon	N/A	N/A	2,220 (9.9)	3,500 (15.6)	N/A	N/A	2,220 (9.9)	3,500 (15.6)
				Stainless	N/A	N/A	2,100 (9.3)	3,500 (15.6)	N/A	N/A	2,100 (9.3)	3,500 (15.6)
5/8 (15.9)	55 (74.6)	1/2 (12.7)	2 (50.8)	Carbon	N/A	N/A	3,080 (13.7)	6,440 (28.6)	N/A	N/A	3,080 (13.7)	6,440 (28.6)
				Stainless	N/A	N/A	3,080 (13.7)	6,440 (28.6)	N/A	N/A	2,820 (12.5)	6,440 (28.6)
3/4 (19.1)	90 (122.0)	5/8 (15.9)	2-1/2 (63.5)	Carbon	N/A	N/A	4,200 (18.7)	10,200 (45.4)	N/A	N/A	4,200 (18.7)	10,200 (45.4)

* Allowable values are based upon a 4 to 1 safety factor. Divide by 4 for allowable load values. **The tabulated values are for anchors installed in a minimum of 12 diameters on center and a minimum edge distance of 6 diameters for 100 percent anchor efficiency. Spacing and edge distance may be reduced to 6 diameter spacing and 3 diameter edge distance, provided the values are reduced 50 percent. Linear interpolation may be used for intermediate spacings and edge distances.**

Combined Tension and Shear Loading—for Dynabolt Anchors

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

$$(Ps/Pt) + (Vs/Vt) \leq 1$$

Ps = Applied tension load Vs = Applied shear load Pt = Allowable tension load Vt = Allowable shear load

Stud Anchors

Bottom-Bearing, Hammer-Driven Anchors

DESCRIPTION/SUGGESTED SPECIFICATIONS

Stud Type Anchors—

SPECIFIED FOR ANCHORAGE INTO CONCRETE

Stud Anchors feature a bolt body and pre-assembled expander plug. Anchors should be installed with carbide tipped hammer drill bits made in accordance to ANSI B212.15-1994.

Anchors are tested to ASTM E488 criteria. Anchors are listed by the following agencies as required: UL and FM.

ADVANTAGES

- Fast and easy to install
- Same drill size as anchor size
- Bottom-bearing design is ideal for jacking and leveling applications
- Install anchor directly through fixture
- Hammer-driven expansion design eliminates torque requirements, for dependable holding capacity

APPLICATIONS

Stud Anchors are commonly used to anchor equipment to concrete slabs. The external studs make for easy jacking and leveling for easy cleanup in industrial settings.

FEATURES

External Threads for easy equipment setting

Stamped part number on body

Pre-assembled expander plug—easy anchor to set—drill and hammer in—anchor is bottom bearing

APPROVALS/LISTINGS

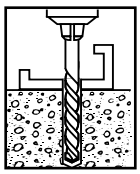
Meets or exceeds U.S. Government G.S.A. specification A-A-55614 Type 2 (Formerly GSA: FF-S-325 Group VIII, Type 2)

Factory Mutual

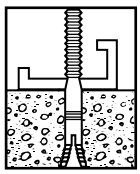
California State Fire Marshal

Underwriters Laboratories

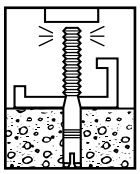
INSTALLATION STEPS



1. Drill hole same diameter as anchor to embedment specified in chart. Clean hole.



2. Drive anchor with expander plug in bottom, through material to be fastened.



3. Expand anchor by driving anchor over plug with hammer.

Note: Recommended thickness of concrete for bottom-bearing anchors = embedment depth + three times anchor diameter

SELECTION CHART

Stud Anchors

PART NUMBER	HOLE OR BIT SIZE (THREADS) PER INCH	OVERALL LENGTH In. (mm)	STUD LENGTH In. (mm)	THREAD LENGTH In. (mm)	MIN. EMBEDMENT In. (mm)	QTY/WT PER BOX lbs.	QTY/WT PER MASTER CARTON lbs.
JS-14C	1/4" - 20	1-3/4 (44.5)	3/4 (19.1)	5/8 (15.9)	1-3/8 (34.9)	100/2.6	1000/ 26
JS-14H		2-1/4 (57.2)	1-1/8 (28.6)	7/8 (22.2)	1-3/8 (34.9)	100/3.1	1000/ 31
JS-14M		3-1/4 (82.6)	2-1/8 (54.0)	7/8 (22.2)	1-3/8 (34.9)	100/4.5	1000/ 45
JS-38C	3/8" - 16	2-1/4 (57.2)	1 (25.4)	3/4 (19.1)	1-5/8 (41.3)	50/3.6	500/ 36
JS-38H		3 (76.2)	1-5/8 (41.3)	1-1/4 (31.8)	1-5/8 (41.3)	50/4.5	500/ 45
JS-38M		3-3/4 (95.3)	2-1/4 (57.2)	1-1/4 (31.8)	1-5/8 (41.3)	50/5.7	500/ 57
JS-12C	1/2" - 13	2-3/4 (69.9)	1-1/8 (28.6)	7/8 (22.2)	1-7/8 (47.6)	25/3.9	250/ 39
JS-12H		4-1/4 (108.0)	2-1/2 (63.5)	2 (50.8)	1-7/8 (47.6)	25/5.6	250/ 56
JS-12M		5-1/4 (133.4)	3-5/8 (92.1)	2 (50.8)	1-7/8 (47.6)	25/7.0	250/ 70
JS-58H	5/8" - 11	5 (127.0)	3 (76.2)	2-1/4 (57.2)	2-3/8 (60.3)	10/4.1	100/ 42
JS-34H	3/4" - 10	6-1/4 (158.8)	3-3/4 (95.3)	2-1/2 (63.5)	2-7/8 (73.0)	10/7.6	50/ 59

PERFORMANCE TABLE

Stud Anchors — Ultimate Tension and Shear Values in Concrete (Lbs/kN)

ANCHOR DIA. In. (mm)	MINIMUM EMBEDMENT DEPTH In. (mm)	f'c = 2000 PSI (13.8 MPa)		f'c = 4000 PSI (27.6 MPa)	
		TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
1/4 (6.4)	1-3/8 (34.9)	1,120 (5.0)	580 (2.6)	1,500 (6.7)	1,640 (7.3)
3/8 (9.5)	1-5/8 (41.3)	1,740 (7.7)	2,280 (10.1)	3,160 (14.1)	3,360 (14.9)
1/2 (12.7)	1-7/8 (47.6)	2,680 (11.9)	5,320 (23.7)	4,020 (17.9)	5,100 (22.7)
5/8 (15.9)	2-3/8 (60.3)	3,200 (14.2)	5,460 (24.3)	5,520 (24.6)	6,820 (30.3)
3/4 (19.1)	2-7/8 (73.0)	4,020 (17.9)	8,100 (36.0)	7,520 (33.5)	8,560 (38.1)

Allowable loads are based upon a 4 to 1 safety factor. Divide by 4 for allowable load values.

PERFORMANCE TABLE

Stud Anchors — Recommended Edge and Spacing Distance Requirements*

ANCHOR DIA. In. (mm)	MINIMUM EMBEDMENT DEPTH In. (mm)	EDGE DISTANCE REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	MIN. EDGE DISTANCE AT WHICH LOAD FACTOR APPLIED = .90 FOR TENSION = .65 FOR SHEAR In. (mm)	SPACING REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	MIN. ALLOWABLE SPACING BETWEEN ANCHORS LOAD FACTOR APPLIED = .90 FOR TENSION = .50 FOR SHEAR In. (mm)
1/4 (6.4)	1-3/8 (34.9)	2-7/16 (61.9)	1-1/4 (31.8)	4-13/16 (122.2)	2-7/16 (61.9)
3/8 (9.5)	1-5/8 (41.3)	2-7/8 (73.0)	1-7/16 (36.5)	5-11/16 (144.5)	2-7/8 (73.0)
1/2 (12.7)	1-7/8 (47.6)	3-5/16 (84.1)	1-11/16 (42.9)	6-9/16 (166.7)	3-5/16 (84.1)
5/8 (15.9)	2-3/8 (60.3)	4-3/16 (106.4)	2-1/8 (54.0)	8-5/16 (211.1)	4-3/16 (106.4)
3/4 (19.1)	2-7/8 (73.0)	5-1/16 (128.6)	2-9/16 (65.1)	10-1/16 (255.6)	5-1/16 (128.6)

* Linear interpolation may be used for intermediate spacing and edge distances.

Combined Tension and Shear Loading—for Stud Anchors

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

$$(Ps/Pt)^{5/3} + (Vs/Vt)^{5/3} \leq 1$$

Ps = Applied tension load Vs = Applied shear load Pt = Allowable tension load Vt = Allowable shear load

Redi-Drive® Anchors

Redi-Drive Anchors—High Performance Without Torquing

DESCRIPTION/SUGGESTED SPECIFICATIONS

Light-Duty Hammer-Drive Masonry Anchors—

SPECIFIED FOR ANCHORAGE INTO CONCRETE, BLOCK AND BRICK

The Redi-Drive is a high performance small diameter one-piece hammer-drive anchor. The anchor holds based on a friction principle—the shank diameter is larger than the drill hole size. Anchors shall be installed with carbide-tipped hammer drill bits made in accordance to ANSI B212.15-1994.

Redi-Drive High Performance Hammer-Drive Anchor

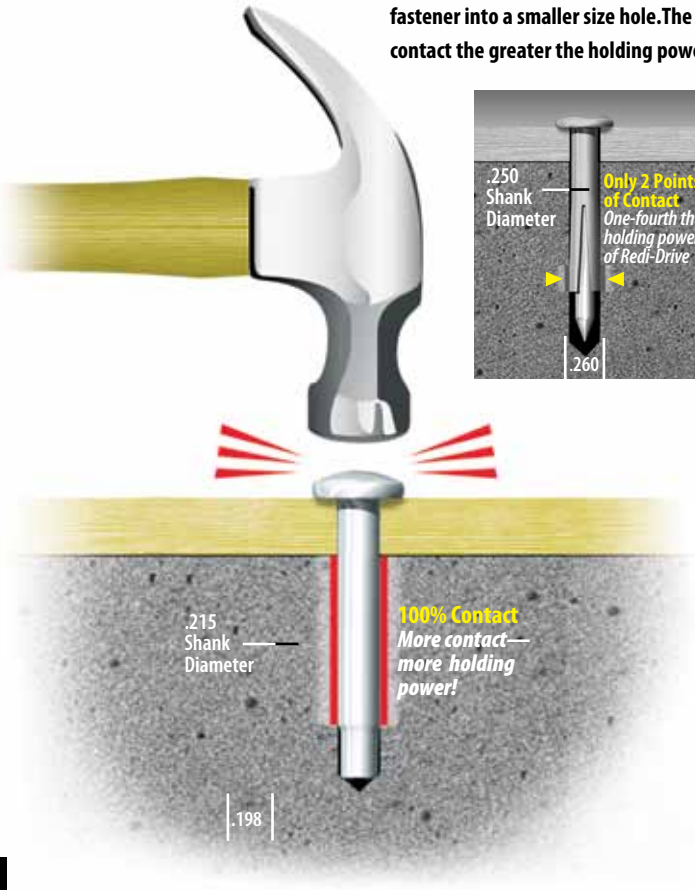
The Redi-Drive is available in four types. . .mushroom head, pipe-hanging (1/4" & 3/8") FM approved (on 3/8"), Tie-Wire, and double-head forming versions. Anchor performance in solid concrete at one inch embedment shall exceed 400 lbs. allowable tension load and 750 lbs. allowable shear load.

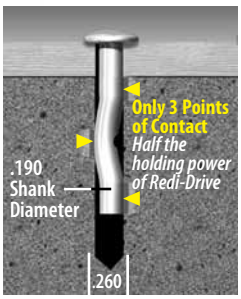
ADVANTAGES

- High performance provides superior holding values in concrete and other masonry materials
- Fire resistant
- Tamper resistant
- Standard 3/16" drill hole size—cheaper bit and faster installation
- Available in 3/4", 1-1/8", 1-5/8", 2", 2-1/2", and 3" lengths
- Most economical steel anchor available
- Provides fast, high performance drive-type fastening without torquing or need for special setting equipment

As simple as using a nail—

drive into predrilled holes for tremendous holding strength in concrete. **Compressive strength is created by forcing a larger diameter fastener into a smaller size hole.The greater the degree of contact the greater the holding power.**





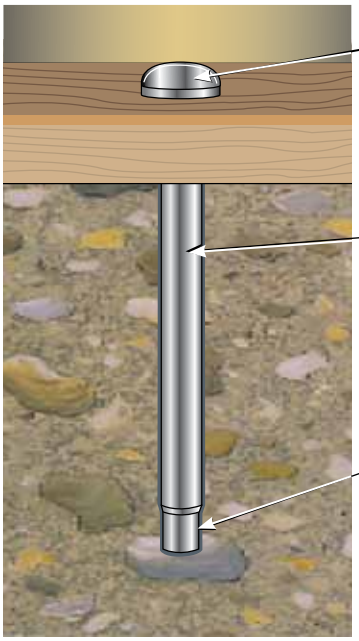
APPLICATIONS

Signage and other light duty metal products are common applications for the Redi-Drive. It has superior performance in block, brick and solid concrete, and is tamper-proof.

Wood attachments to concrete are common Redi-Drive applications, whether permanent or temporary.

Electrical boxes and conduit clips that need permanent attachment are ideal applications for the Redi-Drive. It works well in all base materials and is fast and economical.

FEATURES



Tamper-Proof—mushroom head

100% Hole Contact—.215 shank in .198 hole

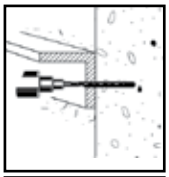
Dog-Point—for easy insertion and installation

APPROVALS/LISTINGS

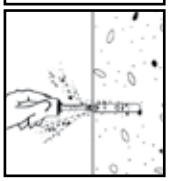
Meets or exceeds U.S. Government G.S.A. Specification FF-S-325 Group VI

Factory Mutual (3/8" pipe-drive)

INSTALLATION STEPS FOR REDI-DRIVE & FORMING ANCHORS

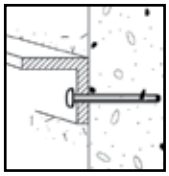


1. Drill a proper-sized diameter hole at a minimum depth (see chart on page 84, ANSI B212.15–1994).

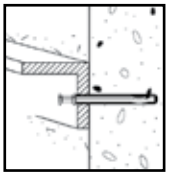


2. Clean hole.
Please note hole is 3/16" but diameter of Redi -Drive is 1/4" (except for PD8-134 and FD8-234)

3. Insert anchor through material to be fastened (insert tie-wire or pipe version Redi-Drive anchors into drilled holes) and drive anchor with a 3-lb. hammer until the head is flush with surface or desired embedment.



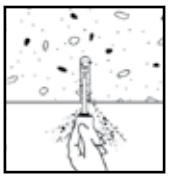
Anchor is now set for Redi-Drive Anchor.



Anchor is now set for Forming Anchor.

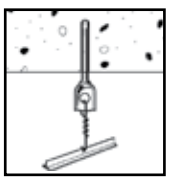
INSTALLATION STEPS FOR REDI-DRIVE TIE-WIRE ANCHORS

1. Drill a proper-sized diameter hole at a minimum depth (see chart on page 78, ANSI B212.15–1994).



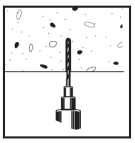
2. Clean hole.
Please note hole is 3/16" but diameter of Redi -Drive is 1/4" (except for PD8-134 and FD8-234)

3. Insert anchor through material to be fastened (insert tie-wire or pipe version Redi-Drive anchors into drilled holes) and drive anchor with a 3-lb. hammer until the head is flush with surface or desired embedment.



Anchor is now set.

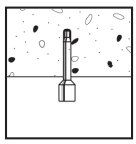
INSTALLATION STEPS FOR REDI-PIPE-DRIVE ANCHORS



1. Drill a proper-sized diameter hole at a minimum depth (see chart on page 84, ANSI B212.15–1994).

2. Clean hole.

3. Insert anchor through material to be fastened (insert tie-wire or pipe version Redi-Drive anchors into drilled holes) and drive anchor with a 3-lb. hammer until the head is flush with surface or desired embedment.



Anchor is now set.

SELECTION CHART

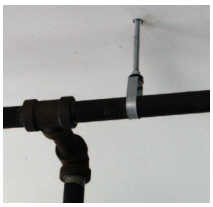
Redi-Drive Anchors

Typical Applications—Electrical boxes, conduit clips, and duct work

PART NUMBER	HEAD DIA. In. (mm)	DRILL BIT SIZE In. (mm)	TOTAL LENGTH In. (mm)	MIN. EMBEDMENT In. (mm)	MAX. FIXTURE THICKNESS In. (mm)	CLEARANCE HOLE SIZE In. (mm)	QTY/WT PER BX lbs.	QTY/WT PER MASTER CARTON lbs.
RD4-034	7/16 (11.1)	3/16 (4.8)	3/4 (19.1)	11/16 (17.5)	1/16 (1.6)	1/4 (6.4)	100/ 1.4	1000/ 15
RD4-118	7/16 (11.1)	3/16 (4.8)	1-1/8 (28.6)	3/4 (19.1)	3/8 (9.5)	1/4 (6.4)	100/ 1.6	1000/ 17
RD4-158	7/16 (11.1)	3/16 (4.8)	1-5/8 (41.3)	3/4 (19.1)	7/8 (22.2)	1/4 (6.4)	100/ 2.2	1000/ 23
RD4-200	7/16 (11.1)	3/16 (4.8)	2 (50.8)	3/4 (19.1)	1-1/4 (31.8)	1/4 (6.4)	100/ 2.6	1000/ 26
RD4-212	7/16 (11.1)	3/16 (4.8)	2-1/2 (63.5)	3/4 (19.1)	1-3/4 (44.5)	1/4 (6.4)	100/ 3.2	1000/ 33
RD4-300	7/16 (11.1)	3/16 (4.8)	3 (76.2)	3/4 (19.1)	2-1/4 (57.2)	1/4 (6.4)	100/ 3.7	1000/ 37

Tie Wire Typical Applications—Acoustical ceilings, suspended electrical fixture, pencil rod

PART NUMBER	HEAD SIZE O.D. In. (mm)	DRILL BIT SIZE In. (mm)	TOTAL LENGTH In. (mm)	MIN. EMBEDMENT In. (mm)	HEAD HEIGHT In. (mm)	HEAD SIZE I.D.	QTY/WT PER BX lbs.	QTY/WT PER MASTER CARTON lbs.
TD4-112	3/16 (4.8)	3/16 (4.8)	2-1/8 (54.0)	1-1/4 (31.8)	5/8 (15.9)	9/32" hole	100/ 3.5	1000/ 35



Pipe Hanging Typical Applications—Fire sprinkler, water lines, steam/gas, cable tray, electrical conduits

PART NUMBER	INTERNAL THREAD SIZE I.D.	DRILL BIT SIZE In. (mm)	TOTAL LENGTH In. (mm)	MIN. EMBEDMENT In. (mm)	HEAD HEIGHT In. (mm)	OUTSIDE HEAD DIAMETER O.D. In. (mm)	QTY/WT PER BX lbs.	QTY/WT PER MASTER CARTON lbs.
PD4-112	1/4 - 20"	3/16 (4.8)	2-1/8 (54.0)	1-1/4 (31.8)	5/8 (15.9)	13/32 (10.3)	100/ 3.0	1000/ 30
PD8-134	3/8 - 16"	1/4 (6.4)	2-1/2 (63.5)	1-3/4 (44.5)	3/4 (19.1)	9/16 (14.3)	100/ 6.0	1000/ 61

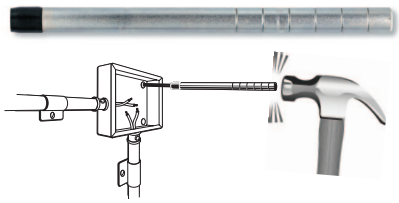
Forming
Wood attachments to concrete are common Redi-Drive applications, whether permanent or temporary

PART NUMBER	HEAD SIZE O.D. In. (mm)	DRILL BIT SIZE In. (mm)	TOTAL LENGTH In. (mm)	MIN. EMBEDMENT In. (mm)	HEAD HEIGHT In. (mm)	HEAD SIZE I.D.	QTY/WT PER BX lbs.	QTY/WT PER MASTER CARTON lbs.
FD4-234	7/16 (11.1)	3/16 (4.8)	2-3/4 (69.9)	3/4 (19.0)	N/A	N/A	100/ 3.1	1000/ 31
FD6-234	3/8 (9.5)	3/16 (4.8)	2-3/4 (69.9)	1-1/4 (31.8)	N/A	N/A	100/ 3.1	1000/ 31
FD8-234	7/16 (11.1)	1/4 (6.4)	2-3/4 (69.9)	1-1/4 (31.8)	N/A	N/A	100/ 5.6	1000/ 56

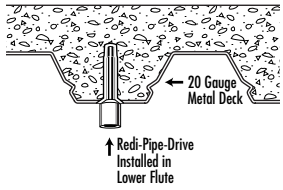
ACCESSORIES

Redi-Drive Setting Tool

Installs Redi-Drive anchors in tight and hard to access areas—easily and quickly. Just place anchor in rubber "holding cap," place against work surface and hammer in anchors.



PART NUMBER	DESCRIPTION	QTY/WT PER BOX	QTY/WT PER MASTER CARTON
RDST	Redi-Drive Setting Tool	1/1	1/1



Redi-Drive Anchors — Anchoring Overhead in 3000 PSI Lightweight Concrete On Metal Deck

ANCHOR	DRILL HOLE DIAMETER In. (mm)	EMBEDMENT In. (mm)	3000 PSI (20.7 MPa) CONCRETE		
			ULTIMATE TENSION LOAD Lbs. (kN)		ALLOWABLE WORKING LOAD Lbs. (kN)
3/8" Pipe Drive	1/4 (6.4)	1-1/2 (38.1)	Upper Flute	1,099 (4.9)	275 (1.2)
			Lower Flute	994 (4.4)	249 (1.1)

Safe working loads for single installations under static loading conditions should not exceed 25% of the ultimate capacity.

Redi-Drive Forming Anchors — Ultimate Tension and Shear Values (Lbs/kN) in Concrete

ANCHOR	DRILL HOLE DIAMETER In. (mm)	EMBEDMENT In. (mm)	4000 PSI (27.6 MPa) CONCRETE	
			ULTIMATE TENSION LOAD Lbs. (kN)	ALLOWABLE WORKING LOAD Lbs.(kN)
FD6-234	3/16 (4.8)	1-1/4 (31.8)	1,140 (5.1)	2,320 (10.3)
FD8-234	1/4 (6.4)	1-1/4 (31.8)	1,550 (6.9)	3,700 (16.5)

Safe working loads for single installations under static loading conditions should not exceed 25% of the ultimate capacity.

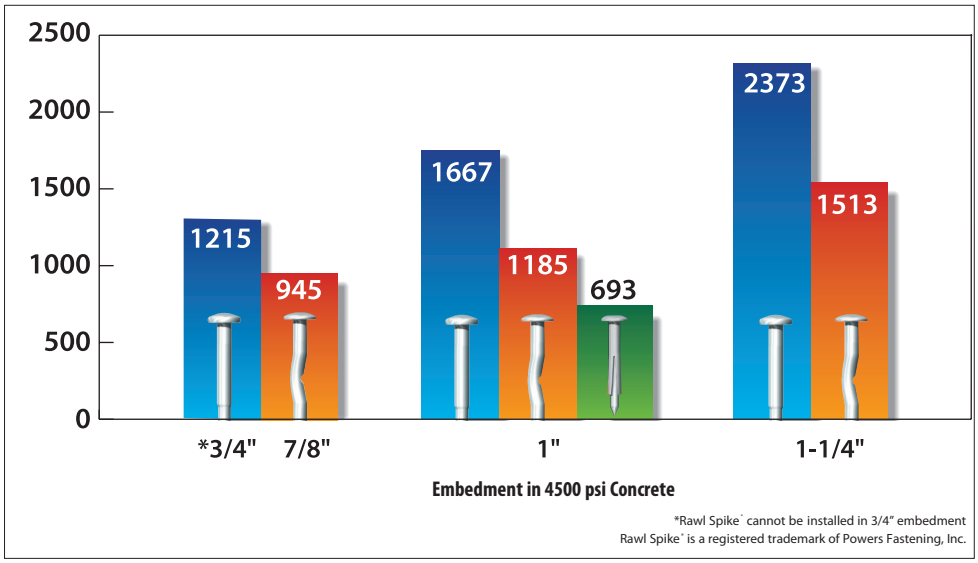
Redi-Drive Anchors — Ultimate Tension and Shear Values (Lbs/kN) in Concrete, Hollow Block and Grout Filled

SHANK DIA. ANCHOR	EMBEDMENT In. (mm)	4500 PSI (31.0 MPa)		CMU (HOLLOW BLOCK) PSI (MPa)		CMU (GROUT FILLED) PSI (MPa)	
		TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
Redi-Drive	3/4 (19.1)	1,215 (5.4)	1,857 (8.3)	382 (1.7)	683 (3.0)	731 (3.3)	1,614 (7.2)
	1 (25.4)	1,667 (7.4)	3,112 (13.8)	392 (1.7)	987 (4.4)	870 (3.9)	1,766 (7.9)
	1-1/4 (31.8)	2,373 (10.6)	3,355 (14.9)	398 (1.8)	1,381 (6.1)	1,543 (6.9)	2,778 (12.4)
Tie-Drive or 1/4" Pipe-Drive	1-1/4 (31.8)	2,372 (10.6)	N/A	N/A	N/A	N/A	N/A
3/8" Pipe-Drive	1-1/2 (38.1)	2,090 (9.3)	N/A	N/A	N/A	N/A	N/A

Safe working loads for single installations under static loading conditions should not exceed 25% of the ultimate capacity.

The tabulated values are for anchors installed in a minimum of 12 diameters on center and a minimum edge distance of 10 diameters for 100 percent anchor efficiency.
Space and edge distance may be reduced to six diameters spacing and five diameter edge distance provided values are reduced 50%. Linear interpolation may be used for intermediate spacing and edge margins.

The Redi-Drive is the most versatile of all of these products. It can be used at all these embedment depths and is superior in pull-out performance to these competitive anchors.



*Rawl Spike® cannot be installed in 3/4" embedment
Rawl Spike® is a registered trademark of Powers Fastening, Inc.

Tapcon® Concrete and Masonry Anchors

THE ORIGINAL Tapcon®

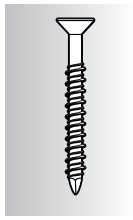
Advanced Threadform Technology™ Easier to install–less torque required!

Blue Climaseal™ 410 Stainless Steel

DESCRIPTION/SUGGESTED SPECIFICATIONS

Tapcon Anchors—

SPECIFIED FOR ANCHORAGE INTO CONCRETE, BRICK OR BLOCK

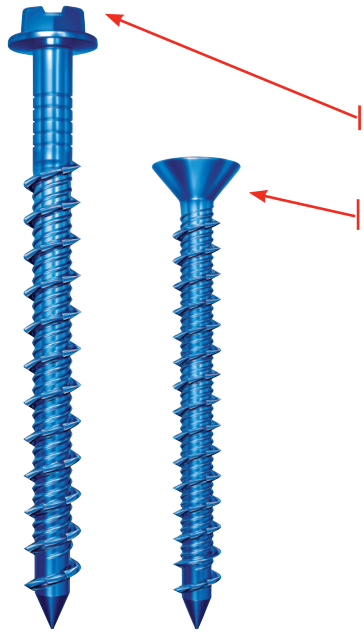


The "original masonry" anchor that cuts its own threads into concrete, brick, or block. Maximum performance is achieved because the Tapcon Anchor, the Condrive Installation Tool, and the carbide-tipped Tapcon Drill Bits are designed to work as a system. It is essential to use the Condrive tool and the correct drill bit to assure consistent anchor performance.

ADVANTAGES

- Works in all masonry base materials.
- Fast and easy—3 anchors per minute.
- No hole spotting or inserts required.
- Removable.
- Slotted hex and phillips flat head styles.
- Extended corrosion protection—Blue Climaseal™.
- Available in 410 Stainless Steel.

Tapcon Anchors



Blue Climaseal™ provides extended corrosion protection

Available in 410 Stainless Steel (see photo on left)

Hex Head style on Tapcon Anchors is available for majority of fixture anchoring needs

Phillips Flat Head style is available when flush seating is necessary in countersink applications

Advanced Threadform cuts into concrete and masonry for reduced installation torque and increased pullout performance

Lengths of Tapcon Anchors range from 1-1/4" to 4" in 3/16" and up to 6" in 1/4" diameters.

Nail-Type Point guides the anchor into the pre-drilled hole. Excellent for wood to concrete applications

CORROSION RESISTANCE

Kesternich Results (DIN 40018 2.0L)

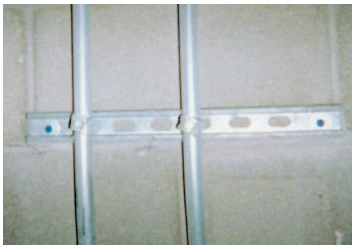
30 Cycles - 10% or less rust

Salt Spray Results (ASTM B117)

720 Hrs - 10% or less rust

APPLICATIONS

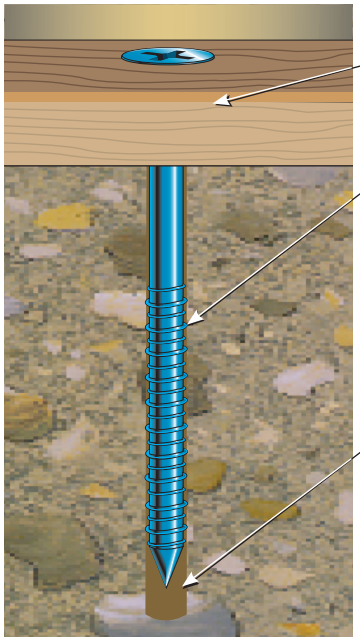
The Tapcon Anchor is especially well suited for window and door frames because it performs well in block, is available in a flat head style, and is fast to install.



Many horizontal or "wall" applications are attached with Tapcon Anchor because it is removable and works well in block and brick.

The picture shows the Condrive 1000 Installation Kit in action. The kit makes for fast and easy change over from drill bit to driver and controls the driving torque to prevent thread stripping and head snapping in hard base materials.

FEATURES



Fixture Thickness—determine the fixture thickness to be anchored

Anchor Embedment—with a minimum recommended embedment of 1", the correct Tapcon anchor choice can be made. Hole depth must be a minimum **1/4" deeper** than the anchor embedment to allow for displaced material

Hole Diameter—proper hole diameter is very important to insure consistent performance and maximum pullout strength. **3/16" anchors require 5/32" diameter bits, and 1/4" anchors require 3/16" diameter bits**

APPROVAL/LISTINGS

Blue Climaseal™

ICC Evaluation Service, Inc. – #ESR-1671
ICC Evaluation Service, Inc. – #ESR-2202
Miami-Dade County – #11-0616.05
Florida Building Code FL#7556.1

410 Stainless Steel

Miami-Dade County – #11-0616.05
Florida Building Code FL#7556.1

For the most current approvals/listings visit: www.itw-redhead.com

INSTALLATION STEPS

Read installation instructions before using!

WARNING: If there are any questions concerning proper installation, applications or appropriate use of this product, please call our Technical Services Department at 1-800-899-7890. Failure to follow these instructions can result in serious personal injury.

1. **Select proper fastener – diameter / head style / length.**
   a) **Use selection chart to choose proper length.**
2. **Drill Hole – use selection chart to determine drill bit length and depth of hole.**
   a) **Choose appropriate drill of Tapcon Anchor.**
   b) **Drill hole minimum ¼" deeper than Tapcon Anchor to be embedded.**
   Minimum anchor embedment: 1"
   Maximum anchor embedment: 1-3/4"
3. **Drive Anchor.**

WARNING: Failure to wear safety glasses with side shields can result in serious personal injury. Always wear ANSI compliant eye protection (ANSI Z87.1-2003).

WARNING: Using the wrong size drill bit will affect performance values and may cause failure.

Head Styles

3/16" diameter has a 1/4" slotted hex washer head (HWH)
1/4" diameter has a 5/16" slotted hex washer head (HWH)

3/16" diameter uses a #2 phillips flat head (PFH)
1/4" diameter uses a #3 phillips flat head (PFH)

SELECTION CHARTS

Tapcon® Anchors with Blue Climaseal™

Diameter.....3/16″ and 1/4″
Point Type.....Nail
Thread Form.....Advanced Threadform Technology™
Finish.....Blue Climaseal™
All boxes of ITW Tapcon come packaged with matching carbide-tipped bit. Tapcon is packaged 100 pieces per box and 500 pieces per master carton except HW4-600 and PF4-600 (400 in master carton).

FIXTURE THICKNESS INCHES	RECOMMENDED TAPCON LENGTH In. (mm)	PART NO. 3/16″ HEX HEAD	PART NO. 1/4″ HEX HEAD	PART NO. 3/16″ FLAT HEAD	PART NO. 1/4″ FLAT HEAD	BIT LENGTH In. (mm)	STRAIGHT SHANK BITS FOR 3/16″ TAPCON PART NO.	STRAIGHT SHANK BITS FOR 1/4″ TAPCON PART NO.
0″ – 1/4″	1-1/4 (31.8)	HW3-114	HW4-114	PF3-114	PF4-114	3-1/2 (88.9)	7900814	7901014
1/4″ – 3/4″	1-3/4 (44.5)	HW3-134	HW4-134	PF3-134	PF4-134	3-1/2 (88.9)	7900814	7901014
3/4″ – 1-1/4″	2-1/4 (57.2)	HW3-214	HW4-214	PF3-214	PF4-214	4-1/2 (114.3)	7900818	7901018
1-1/4 ″ – 1-3/4″	2-3/4 (69.9)	HW3-234	HW4-234	PF3-234	PF4-234	4-1/2 (114.3)	7900818	7901018
1-3/4″ – 2-1/4″	3-1/4 (82.6)	HW3-314	HW4-314	PF3-314	PF4-314	5-1/2 (139.7)	7900822	7901022
2-1/4″ – 2-3/4″	3-3/4 (95.3)	HW3-334	HW4-334	PF3-334	PF4-334	5-1/2 (139.7)	7900822	7901022
2-1/2″ – 3″	4 (101.6)	HW3-400	HW4-400	PF3-400	PF4-400	5-1/2 (139.7)	7900822	7901022
3-1/2″ – 4″	5 (127.0)	N/A	HW4-500	N/A	PF4-500	6-1/2 (165.1)	N/A	7901026
4-1/2″ – 5″	6 (152.4)	N/A	HW4-600	N/A	PF4-600	7-1/2 (190.5)	N/A	7901030

Additional Tapcon bits are available 10 per tube.

Tapcon® 410 SS Anchor

Diameter.....3/16″ and 1/4″
Point Type.....Nail
Thread Form.....Original Notched Hi-Lo™
Finish.....410 Stainless Steel with Silver Climaseal™
All boxes of ITW Tapcon come packaged with matching carbide-tipped bit. Tapcon is packaged 100 pieces per box and 500 pieces per master carton except 3461907 (400 in master carton).

FIXTURE THICKNESS INCHES	RECOMMENDED TAPCON LENGTH In. (mm)	PART NO. 1/4″ HEX HEAD	PART NO. 3/16″ FLAT HEAD	PART NO. 1/4″ FLAT HEAD	BIT LENGTH In. (mm)	STRAIGHT SHANK BITS FOR 3/16″ TAPCON PART NO.	STRAIGHT SHANK BITS FOR 1/4″ TAPCON PART NO.
0″ – 1/4″	1-1/4 (31.8)	SHW4-114	3434907	SPF4-114	3-1/2 (88.9)	7900814	7901014
1/4″ – 3/4″	1-3/4 (44.5)	SHW4-134	3418907	SPF4-134	3-1/2 (88.9)	7900814	7901014
3/4″ – 1-1/4″	2-1/4 (57.2)	SHW4-214	3419907	SPF4-214	4-1/2 (114.3)	7900818	7901018
1-1/4 – 1-3/4″	2-3/4 (69.9)	SHW4-234	3420907	SPF4-234	4-1/2 (114.3)	7900818	7901018
1-3/4″ – 2-1/4″	3-1/4 (82.6)	SHW4-314	3421907	SPF4-314	5-1/2 (139.7)	7900822	7901022
2-1/4″ – 2-3/4″	3-3/4 (95.3)	SHW4-334	3322907	SPF4-334	5-1/2 (139.7)	7900822	7901022
2-1/2″ – 3″	4 (101.6)	3459907	N/A	N/A	5-1/2 (139.7)	N/A	3100910
3-1/2″ – 4″	5 (127.0)	3460907	N/A	N/A	6-1/2 (165.1)	N/A	3102910
4-1/2″ – 5″	6 (152.4)	3461907	N/A	N/A	7-1/2 (190.5)	N/A	3461907

Tapcon® SDS Bits

PART NUMBER	DESCRIPTION
790059	7″ (SDS Rotohammer Bits for use with 3/16″ Tapcon)
7901060	5″ (SDS Rotohammer Bits for use with 1/4″ Tapcon)
7901059	7″ (SDS Rotohammer Bits for use with 1/4″ Tapcon)

All SDS bits are sold individually.

PERFORMANCE TABLE

Tapcon® Anchors

Ultimate Tension and Shear Values (Lbs/kN) in Concrete

ANCHOR DIA. In. (mm)	MIN. DEPTH OF EMBEDMENT In. (mm)	f′c = 2000 PSI (13.8 MPa)		f′c = 3000 PSI (20.7 MPa)		f′c = 4000 PSI (27.6 MPa)		f′c = 5000 PSI (34.5 MPa)	
		TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
3/16 (4.8)	1 (25.4)	600 (2.7)	720 (3.2)	625 (2.8)	720 (3.2)	650 (2.9)	720 (3.2)	800 (3.6)	860 (3.8)
	1-1/4 (31.8)	845 (3.7)	720 (3.2)	858 (3.8)	720 (3.2)	870 (3.9)	720 (3.2)	1,010 (4.5)	860 (3.8)
	1-1/2 (38.1)	1,090 (4.8)	860 (3.8)	1,090 (4.8)	860 (3.8)	1,090 (4.8)	860 (3.8)	1,220 (5.4)	860 (3.8)
	1-3/4 (44.5)	1,450 (6.5)	870 (3.9)	1,455 (6.5)	870 (3.9)	1,460 (6.5)	990 (4.4)	1,730 (7.7)	990 (4.4)
1/4 (6.4)	1 (25.4)	750 (3.3)	900 (4.0)	775 (3.4)	900 (4.0)	800 (3.6)	1,360 (6.1)	950 (4.2)	1,440 (6.4)
	1-1/4 (31.8)	1,050 (4.7)	900 (4.0)	1,160 (5.2)	900 (4.0)	1,270 (5.6)	1,360 (6.1)	1,515 (6.7)	1,440 (6.4)
	1-1/2 (38.1)	1,380 (6.1)	1,200 (5.3)	1,600 (7.2)	1,200 (5.3)	1,820 (8.1)	1,380 (6.1)	2,170 (9.7)	1,670 (7.4)
	1-3/4 (44.5)	2,020 (9.0)	1,670 (7.4)	2,200 (9.8)	1,670 (7.4)	2,380 (10.6)	1,670 (7.4)	2,770 (12.3)	1,670 (7.4)

Safe working loads for single installation under static loading should not exceed 25% of the ultimate load capacity.

Tapcon® Anchors — Ultimate Tension and Shear Values (Lbs/kN) in Hollow Block

ANCHOR DIA. In. (mm)	ANCHOR EMBEDMENT In. (mm)	LIGHTWEIGHT BLOCK		MEDIUM WEIGHT BLOCK	
		TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
3/16 (4.8)	1 (25.4)	220 (1.0)	400 (1.8)	340 (1.5)	730 (3.2)
1/4 (6.4)	1 (25.4)	250 (1.1)	620 (2.8)	500 (2.2)	1,000 (4.4)

Safe working loads for single installation under static loading should not exceed 25% of the ultimate load capacity.

NOTE: 3/16" Tapcon requires 5/32" bit, 1/4" Tapcon requires 3/16" bit.

Tapcon® Anchors — Allowable Edge and Spacing Distances

PARAMETER	ANCHOR DIA. In. (mm)	NORMAL WEIGHT CONCRETE			CONCRETE MASONRY UNITS (CMU)		
		FULL CAPACITY (Critical Distance Inches)	REDUCED CAPACITY (Minimal Distance Inches)	LOAD REDUCTION FACTOR	FULL CAPACITY (Critical Distance Inches)	REDUCED CAPACITY (Minimal Distance Inches)	LOAD REDUCTION FACTOR
Spacing Between Anchors - Tension	3/16	3	1-1/2	0.73	3	1-1/2	1.00
	1/4	4	2	0.66	4	2	0.84
Spacing Between Anchors - Shear	3/16	3	1-1/2	0.83	3	1-1/2	1.00
	1/4	4	2	0.82	4	2	0.81
Edge Distance - Tension	3/16	1-7/8	1	0.83	4	2	0.91
	1/4	2-1/2	1-1/4	0.82	4	2	0.88
Edge Distance -Shear	3/16	2-1/4	1-1/8	0.70	4	2	0.93
	1/4	3	1-1/2	0.59	4	2	0.80

For SI: 1 inch = 25.4 mm

Tapcon® Condrive 1000 Tool Kit

DESCRIPTION/SUGGESTED SPECIFICATIONS

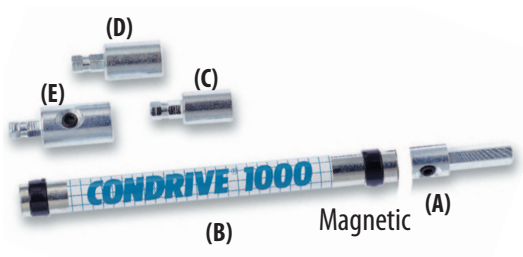
Condrive 1000 Installation Tool—

SPECIFIED FOR ANCHORAGE INTO CONCRETE, BRICK OR BLOCK

The key to Tapcon's fast and easy installation is the multi-purpose Condrive Installation Tool. The drive sleeve, along with the hex head and phillips sockets provide the installer with the flexibility necessary for the complete variety of Tapcon applications (tool does not include drill bit).

Condrive® 1000 - A multi-purpose tool designed for installation of Tapcon hex head and Phillips flat head anchors up to 3-3/4" long. If driving hex head Tapcon, driver will automatically disengage. The Condrive 1000 has a reusable plastic case.

Condrive Tools are designed to specifically install Tapcon Anchors and to fit standard hammer drills.



Part No. C1000
(Does not include drill bit)

APPLICATIONS

The picture shows the Condrive 1000 Installation Kit in action. The kit makes for fast and easy change over from drill bit to driver and controls the driving torque to prevent thread stripping and head snapping in hard base materials.

ADVANTAGES

- Fast change from drilling to driving
- Eliminates need to change out chucks and bits
- Eliminates need for two tools
- Special nut driver is recessed for torque control to reduce head breakage

Condrive 1000 Spare Parts

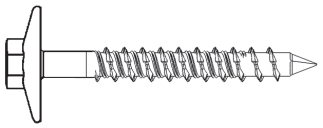
PART NO.	DESCRIPTION	QTY/WT
(A) 7901001	Drill Adapter	1/.06
(B) 7901002	Sleeve	1/.01
(C) 7901006	3/16" Socket	1/.04
(D) 7901007	1/4" Socket	1/.05
(E) 7901010	Phillips Socket	1/.44

Tapcon®
Maxi-Set Anchors

UltraShield **White UltraShield**

DESCRIPTION/SUGGESTED SPECIFICATIONS

FOR TAPCON APPLICATIONS THAT REQUIRE MORE ANCHOR BEARING SURFACE.



ADVANTAGES

- Same reliable performance and speed of installation as regular Tapcon.
- Large 5/8″ diameter flange provides more bearing surface and increases pullover resistance. High 5/16″ hex head adds driving stability.
- Compatible with DrivTru™ socket system. Improves installation. Protects paint finish.
- UltraShield™ and White UltraShield™ long-life finish deliver excellent corrosion resistance.

CORROSION RESISTANCE

Salt Spray Test (ASTM B117)	UltraShield	White UltraShield
	1100 Hrs 10% or less rust	1500 Hrs NO RED RUST

APPROVAL/LISTINGS

ICC Evaluation Service, Inc. – #ESR-1671

Miami-Dade County – #11-0616.05

Florida Building Code – #7556.1

For the most current approvals/listings visit: www.itw-redhead.com

INSTALLATION STEPS

Read installation instructions before using!

WARNING: If there are any questions concerning proper installation, applications or appropriate use of this product, please call our Technical Services Department at 1-800-899-7890. Failure to follow these instructions can result in serious personal injury.

1. **Select proper fastener – diameter / head style / length.**
   a) **Use selection chart to choose proper length.**
2. **Drill Hole – use selection chart to determine drill bit length and depth of hole.**
   a) **Choose appropriate drill of Tapcon Anchor.**
   b) **Drill hole minimum ¼″ deeper than Tapcon Anchor to be embedded.**
   Minimum anchor embedment: 1″
   Maximum anchor embedment: 1-3/4″
3. **Drive anchor using DrivTru HWH Socket.**

DrivTru PART#	DESCRIPTION	APPLICATIONS
1513910	DrivTru Socket	All 5/16″ across flats HWH fasteners

WARNING: Failure to wear safety glasses with side shields can result in serious personal injury. Always wear ANSI compliant eye protection (ANSI Z87.1-2003).

WARNING: Using the wrong size drill bit will affect performance values and may cause failure.

APPLICATIONS

Shutters - protective and decorative

Screened porch and pool enclosures.

Various sheet metal flashings.

Decorative wrought iron.

Wood nailers and plywood attachment.

SELECTION CHART

Tapcon® Maxi-Set Anchors

Diameter.....1/4" Thread Form..... Advanced Threadform Technology™
Point Type.....Nail Finish.....UltraShield™ or *White UltraShield™
Head Style.....5/16" across flats hex with 5/8" diameter flange.

RECOMMENDED TAPCON LENGTH In. (mm)	PART NO. 1/4" HEX HEAD	FINISH	BIT LENGTH In. (mm)	STRAIGHT SHANK BITS FOR 1/4" TAPCON PART NO.
1-3/4 (44.5)	3294000	Ultra Shield	3-1/2 (88.9)	7901014
2-1/4 (57.2)	3295000	Ultra Shield	4-1/2 (114.3)	7901018
1-3/4 (44.5)	3383100*	White Ultra Shield	3-1/2 (88.9)	7901014*
2-1/4 (57.2)	3384100*	White Ultra Shield	4-1/2 (114.3)	7901018*
2-3/4 (69.9)	3408100*	White Ultra Shield	4-1/2 (114.3)	7901018*
3-1/4 (82.6)	3409100*	White Ultra Shield	5-1/2 (139.7)	7901022*

*Available with bronze painted head over White UltraShield™ NOTE: 2-3/4" and 3-1/4" lengths are special orders. Contact customer service for lead-times.
Maxi-Sets are packed 1,000 pieces per master carton except 3409100 is packed 750 pieces.

Tapcon® SDS Bits

PART NUMBER	DESCRIPTION
790059	7" (SDS Rotohammer Bits for use with 3/16" Tapcon)
7901060	5" (SDS Rotohammer Bits for use with 1/4" Tapcon)
7901059	7" (SDS Rotohammer Bits for use with 1/4" Tapcon)

PERFORMANCE TABLES

Tapcon® Anchors — Ultimate Tension and Shear Values (Lbs/kN) in Concrete

ANCHOR DIA. In. (mm)	MIN. DEPTH OF EMBEDMENT In. (mm)	f'c = 2000 PSI (13.8 MPa)		f'c = 3000 PSI (20.7 MPa)		f'c = 4000 PSI (27.6 MPa)		f'c = 5000 PSI (34.5 MPa)	
		TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
1/4 (6.4)	1 (25.4)	750 (3.3)	900 (4.0)	775 (3.4)	900 (4.0)	800 (3.6)	1,360 (6.1)	950 (4.2)	1,440 (6.4)
	1-1/4 (31.8)	1,050 (4.7)	900 (4.0)	1,160 (5.2)	900 (4.0)	1,270 (5.6)	1,360 (6.1)	1,515 (6.7)	1,440 (6.4)
	1-1/2 (38.1)	1,380 (6.1)	1,200 (5.3)	1,600 (7.2)	1,200 (5.3)	1,820 (8.1)	1,380 (6.1)	2,170 (9.7)	1,670 (7.4)
	1-3/4 (44.5)	2,020 (9.0)	1,670 (7.4)	2,200 (9.8)	1,670 (7.4)	2,380 (10.6)	1,670 (7.4)	2,770 (12.3)	1,670 (7.4)

Safe working loads for single installation under static loading should not exceed 25% of the ultimate load capacity.

Tapcon® Anchors — Ultimate Tension and Shear Values (Lbs/kN) in Hollow Block

ANCHOR DIA. In. (mm)	ANCHOR EMBEDMENT In. (mm)	LIGHTWEIGHT BLOCK		MEDIUM WEIGHT BLOCK	
		TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
1/4 (6.4)	1 (25.4)	250 (1.1)	620 (2.8)	500 (2.2)	1,000 (4.4)

Safe working loads for single installation under static loading should not exceed 25% of the ultimate load capacity.

NOTE: 3/16" Tapcon requires 5/32" bit, 1/4" Tapcon requires 3/16" bit.

Tapcon® Anchors — Allowable Edge and Spacing Distances

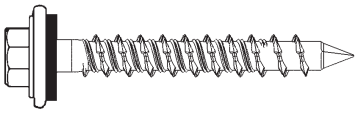
PARAMETER	ANCHOR DIA. In. (mm)	NORMAL WEIGHT CONCRETE			CONCRETE MASONRY UNITS (CMU)		
		FULL CAPACITY (Critical Distance Inches)	REDUCED CAPACITY (Minimal Distance Inches)	LOAD REDUCTION FACTOR	FULL CAPACITY (Critical Distance Inches)	REDUCED CAPACITY (Minimal Distance Inches)	LOAD REDUCTION FACTOR
Spacing Between Anchors - Tension	1/4	4	2	0.66	4	2	0.84
Spacing Between Anchors - Shear	1/4	4	2	0.82	4	2	0.81
Edge Distance - Tension	1/4	2-1/2	1-1/4	0.82	4	2	0.88
Edge Distance -Shear	1/4	3	1-1/2	0.59	4	2	0.80

For SI: 1 inch = 25.4 mm

Tapcon® SCOTS Anchors

DESCRIPTION/SUGGESTED SPECIFICATIONS

PREMIUM CONCRETE ANCHOR THAT COMBINES THE CORROSION PROTECTION OF STAINLESS STEEL WITH THE PERFORMANCE OF TAPCON ANCHORS.



ADVANTAGES

- **300 Series Stainless Steel head and Carbon Steel body.**
- Integral washer design provides more bearing surface.
- Rubber EPDM sealing washer "locks-out" moisture from building interior.
- Head paint available in white or bronze (extra charge).
- Delivers the same holding performance as Tapcon anchors with Blue Climaseal™.
- Reduces replacement of "weathered" fasteners.

CORROSION RESISTANCE

Kesternich Results (DIN 50018, 2.0L)

Climaseal™	30 Cycles - 10% or less red rust

APPROVAL/LISTINGS

ICC Evaluation Service, Inc. – #ESR-1671

Miami-Dade County – #11-0616.05

Florida Building Code – #7556.1

For the most current approvals/listings visit: www.itw-redhead.com

INSTALLATION STEPS

Read installation instructions before using!

WARNING: If there are any questions concerning proper installation, applications or appropriate use of this product, please call our Technical Services Department at 1-800-899-7890. Failure to follow these instructions can result in serious personal injury.

1. **Select proper fastener – diameter / head style / length.**
   a) **Use selection chart to choose proper length.**
2. **Drill Hole – use selection chart to determine drill bit length and depth of hole.**
   a) **Choose appropriate drill of Tapcon Anchor.**
   b) **Drill hole minimum 1/4" deeper than Tapcon Anchor to be embedded**
   Minimum anchor embedment: 1"
   Maximum anchor embedment: 1-3/4"
3. **Drive anchor using DrivTru HWH Socket.**

DrivTru PART#	DESCRIPTION	APPLICATIONS
1513910	DrivTru Socket	All 5/16" across flats HWH fasteners

WARNING: Failure to wear safety glasses with side shields can result in serious personal injury. Always wear ANSI compliant eye protection (ANSI Z87.1-2003).

WARNING: Using the wrong size drill bit will affect performance values and may cause failure.

APPLICATIONS

- Shutters - protective and decorative
- Screened porch and pool enclosures
- Aluminum fixtures
- Railings
- Metal roofing
- Flexible flashings

SELECTION CHART

Tapcon® SCOTS Anchors

Diameter.....1/4" Thread Form..... Advanced Threadform Technology™
Point Type.....Nail Finish.....Silver Climaseal™
Head Style.....5/16" HWH (300 Series Stainless)

RECOMMENDED TAPCON LENGTH In. (mm)	PART NO. 1/4" HEX HEAD	BIT LENGTH In. (mm)	STRAIGHT SHANK BITS FOR 1/4" TAPCON PART NO.
1-3/4 (44.5)	3358407	3-1/2 (88.9)	7901014
2-1/4 (57.2)	3359407	4-1/2 (114.3)	7901018

*Available with bronze painted head over White UltraShield™ NOTE: 2-3/4" and 3-1/4" lengths are special orders. Contact customer service for lead-times.
SCOTS are packed 1,000 pieces per master, 100 pieces per inner.

Tapcon® SDS Bits

PART NUMBER	DESCRIPTION
790059	7" (SDS Rotohammer Bits for use with 3/16" Tapcon)
7901060	5" (SDS Rotohammer Bits for use with 1/4" Tapcon)
7901059	7" (SDS Rotohammer Bits for use with 1/4" Tapcon)

PERFORMANCE TABLES

Tapcon® Anchors — Ultimate Tension and Shear Values (Lbs/kN) in Concrete

ANCHOR DIA. In. (mm)	MIN. DEPTH OF EMBEDMENT In. (mm)	f'c = 2000 PSI (13.8 MPa)		f'c = 3000 PSI (20.7 MPa)		f'c = 4000 PSI (27.6 MPa)		f'c = 5000 PSI (34.5 MPa)	
		TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
1/4 (6.4)	1 (25.4)	750 (3.3)	900 (4.0)	775 (3.4)	900 (4.0)	800 (3.6)	1,360 (6.1)	950 (4.2)	1,440 (6.4)
	1-1/4 (31.8)	1,050 (4.7)	900 (4.0)	1,160 (5.2)	900 (4.0)	1,270 (5.6)	1,360 (6.1)	1,515 (6.7)	1,440 (6.4)
	1-1/2 (38.1)	1,380 (6.1)	1,200 (5.3)	1,600 (7.2)	1,200 (5.3)	1,820 (8.1)	1,380 (6.1)	2,170 (9.7)	1,670 (7.4)
	1-3/4 (44.5)	2,020 (9.0)	1,670 (7.4)	2,200 (9.8)	1,670 (7.4)	2,380 (10.6)	1,670 (7.4)	2,770 (12.3)	1,670 (7.4)

Safe working loads for single installation under static loading should not exceed 25% of the ultimate load capacity.

Tapcon® Anchors — Ultimate Tension and Shear Values (Lbs/kN) in Hollow Block

ANCHOR DIA. In. (mm)	ANCHOR EMBEDMENT In. (mm)	LIGHTWEIGHT BLOCK		MEDIUM WEIGHT BLOCK	
		TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
1/4 (6.4)	1 (25.4)	250 (1.1)	620 (2.8)	500 (2.2)	1,000 (4.4)

Safe working loads for single installation under static loading should not exceed 25% of the ultimate load capacity.
NOTE: 3/16" Tapcon requires 5/32" bit, 1/4" Tapcon requires 3/16" bit.

Tapcon® Anchors — Allowable Edge and Spacing Distances

PARAMETER	ANCHOR DIA. In. (mm)	NORMAL WEIGHT CONCRETE			CONCRETE MASONRY UNITS (CMU)		
		FULL CAPACITY (Critical Distance Inches)	REDUCED CAPACITY (Minimal Distance Inches)	LOAD REDUCTION FACTOR	FULL CAPACITY (Critical Distance Inches)	REDUCED CAPACITY (Minimal Distance Inches)	LOAD REDUCTION FACTOR
Spacing Between Anchors - Tension	1/4	4	2	0.66	4	2	0.84
Spacing Between Anchors - Shear	1/4	4	2	0.82	4	2	0.81
Edge Distance - Tension	1/4	2-1/2	1-1/4	0.82	4	2	0.88
Edge Distance -Shear	1/4	3	1-1/2	0.59	4	2	0.80

For SI: 1 inch = 25.4 mm

RED HEAD®
CONCRETE ANCHORING SPECIALISTS

Tapcon® XL Anchors

UltraShield White UltraShield

APPLICATIONS

Shutters - protective and decorative

Screened porch and pool enclosures.

Railings

Mounted electrical equipment

Sill plates

DESCRIPTION/SUGGESTED SPECIFICATIONS

EXTRA LARGE TAPCON FOR EXTRA LARGE CHALLENGES!

ADVANTAGES

- Internal TORX® T-40 drive assures easy installation.
- High button head resists cam-out during installation.
- Corrosion protection of UltraShield™ and White UltraShield™ to combat aggressive environments.
- Available in silver or white to complement standard fixtures.
- Delivers over 3,000 lbs. holding power in concrete.
- Alternative to sleeve anchors.
- 1/4" SDS Tapcon drill bit for added convenience.
- Condrive® XL with MegaGrip™ bit holder for rapid one-tool installation.

CORROSION RESISTANCE

Salt Spray Test (ASTM B117)	UltraShield	White UltraShield
	1120 Hrs 10% or less rust	1500 Hrs 10% or less rust

APPROVAL/LISTINGS

Miami-Dade County – #11-0616.05

Florida Building Code – #13328.1

For the most current approvals/listings visit: www.itw-redhead.com

INSTALLATION STEPS

Read installation instructions before using!

WARNING: If there are any questions concerning proper installation, applications or appropriate use of this product, please call our Technical Services Department at 1-800-899-7890. Failure to follow these instructions can result in serious personal injury.

1. **Select proper fastener – diameter / head style / length.**
   a) **Use selection chart to choose proper length.**
2. **Drill Hole – use selection chart to determine drill bit length and depth of hole.**
   a) **Choose appropriate drill of Tapcon Anchor.**
   b) **Drill hole minimum ¼" deeper than Tapcon Anchor to be embedded.**
   Minimum anchor embedment: 1"
   Maximum anchor embedment: 1-3/4"
3. **Insert the adjustable MegaGrip bit tip holder in the small opening of sleeve. Slide the open end of the Condrive XL Installation Tool sleeve over the drill bit and snap in place.**
4. **Drive anchor using MegaGrip adjustable magnetic bit holder with TORX T-40 bit tip**

MegaGrip PART#	DESCRIPTION
3400910	MegaGrip Bit Holder

WARNING: Failure to wear safety glasses with side shields can result in serious personal injury. Always wear ANSI compliant eye protection (ANSI Z87.1-2003).

WARNING: Using the wrong size drill bit will affect performance values and may cause failure.

SELECTION CHART

Tapcon® XL Anchors

Diameter.....5/16″ Thread Form..... Reverse Hi-Lo®
Point Type.....Nail Finish.....UltraShield™ or *White UltraShield™
Head Style.....High button with TORX T-40 Drive

RECOMMENDED TAPCON LENGTH In. (mm)	PART NO.	FINISH	BIT LENGTH In. (mm)	1/4″ DRILL BITS FOR TAPCON XL PART NO.
2-1/4 (57.2)	3395902	Ultra Shield	6-3/4″ SDS drill bit with hex	3394910
2-1/4 (57.2)	3397902	*White Ultra Shield	6-3/4″ SDS drill bit with hex	3394910
2-3/4 (69.9)	3398902	*White Ultra Shield	6-3/4″ SDS drill bit with hex	3394910

XLs are packed 100 pieces per master carton.

*** HEAD PAINT AVAILABLE**

PART NO.	DESCRIPTION	CARTON QTY
3401910	Condrive® XL Installation Tool with MegaGrip™ Bit Holder with TORX® T-40 Bit Tip	10 per master carton
3400910	MegaGrip™ Magnetized Bit Holder with TORX T-40 Bit Tip	10 per bag
3394910	1/4″ x 6-3/4″ SDS Tapcon Drill Bit with Hex	1 piece per tube

Tapcon XL Anchors must be installed using all Red Head system components (Tapcon XL Anchors, Condrive XL Installation Tool and Tapcon Drill Bits) in order to qualify for ITW Red Head system support.

PERFORMANCE TABLES

Tapcon® XL Anchors

Ultimate Tension and Shear Values (Lbs/kN) in Concrete

ANCHOR DIA. In. (mm)	MIN. DEPTH OF EMBEDMENT In. (mm)	EDGE DISTANCE	f′c = 3000 PSI (20.7 MPa)	
			TENSION Lbs. (kN)	SHEAR Lbs. (kN)
5/16 (7.9)	1-1/4 (31.8)	1-9/16 (39.7)	1,050 (4.7)	1,330 (5.9)
		2-3/16 (55.6)	1,205 (5.4)	1,725 (7.7)
	1-3/4 (44.5)	1-9/16 (39.7)	2,020 (9.0)	1,530 (6.8)
		2-3/16 (55.6)	2,250 (10.0)	2,505 (11.1)
	2-1/4 (57.2)	1-9/16 (39.7)	2,850 (12.7)	1,955 (8.9)
		2-3/16 (55.6)	3,120 (13.9)	3,250 (14.4)

Safe working loads for single installation under static loading should not exceed 25% of the ultimate load capacity.

1. Pilot hole diameter shall be 0.263″ and drilled 1/4″ longer than the necessary embedment.
2. Allowable loads are based oultimate test load divide by 4.
3. Recommended center to center distance of 3-3/4″ is required for 100% efficiency and 1-7/8″ for 50% efficiency.
4. Embedment is through 1-1/4″ face shell of hollow block.

Tapcon® XL Anchors

Ultimate Tension & Shear Values in Concrete Masonry Units

ANCHOR DIA. In. (mm)	MINIMUM DEPTH OF EMBEDMENT In. (mm)	EDGE DISTANCE (Inches)	HOLLOW CORE[1]		GROUT-FILLED[2]	
			TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
5/16 (7.9)	1-1/4 (31.8)	4	1,045 (4.6)	2,280 (10.1)	1,045 (4.6)	2,280 (10.1)
	1-3/4 (44.5)	4	NOT RECOMMENDED	NOT RECOMMENDED	1,950 (8.7)	2,825 (12.6)
	2-1/4 (57.2)	4	NOT RECOMMENDED	NOT RECOMMENDED	3,770 (16.8)	3,140 (14.0)

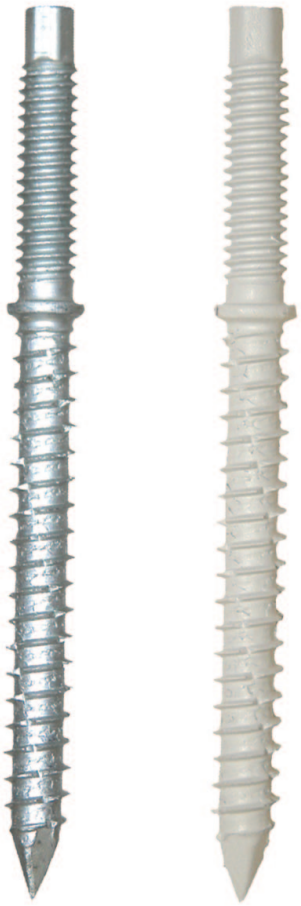
Safe working loads for single installation under static loading should not exceed 25% of the ultimate load capacity.

1 CMU = 1,600 PSI minimum compressive strength.

2 CMU = 1,600 PSI minimum compressive strength with 2,000 PSI grout.

RED HEAD®
CONCRETE ANCHORING SPECIALISTS

Tapcon® Storm Guard Anchors



DESCRIPTION/SUGGESTED SPECIFICATIONS

DIRECT MOUNT PERMANENT ANCHORS FOR QUICK AND EASY INSTALLATIONS OF METAL AND PLYWOOD PANELS TO CONCRETE AND BLOCK.

ADVANTAGES

- Available in UltraShield™ or White UltraShield™ for corrosion protection in coastal environments.
- Available in 2-1/4" and 3-1/4" lengths.
- Both lengths have 1/4-20 x 7/8" external thread above collar.
- No caulking required.
- Threaded chamfered safety collar prevents overdriving.
- 3/16" Hex Drive.
- Use with ANSI standard 3/16" carbide-tipped drill bit. (bit not included)

CORROSION RESISTANCE

Salt Spray Test (ASTM B117)	White UltraShield	Silver UltraShield
	1500 Hrs 10% or less red rust	1100 Hrs 10% or less rust

APPROVAL/LISTINGS

Miami-Dade County – #11-0616.04

For the most current approvals/listings visit: www.itw-redhead.com

INSTALLATION STEPS

Read installation instructions before using!

CAUTION: **DO NOT BEND DRILL BIT.**
DO NOT FORCE THE DRILL BIT INTO BASE MATERIAL.

3/16" Nut Driver Installation Tool (Part # 3426910)

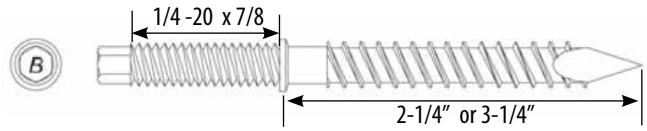
WARNING: Failure to wear safety glasses with side shields can result in serious personal injury. Always wear ANSI compliant eye protection (ANSI Z87.1-2003).

WARNING: Using the wrong size drill bit will affect performance values and may cause failure.

APPLICATIONS

Direct mount permanent anchors for quick and easy installations for metal and plywood panels to wood, hollow block and concrete.

SELECTION CHART



Tapcon®
Storm Guard Anchors

Diameter.....1/4" Thread Form..... Original Notched Hi-Lo™
Point Type.....Nail Finish.....UltraShield™ or *White UltraShield™

PART NO.	DESCRIPTION	COATING	BOX QTY
3424000	1/4" dia. x 2-1/4"	UltraShield	1,000
3424100	1/4" dia. x 2-1/4"	White UltraShield	1,000
3425000	1/4" dia. x 3-1/4"	UltraShield	500
3425100	1/4" dia. x 3-1/4"	White UltraShield	500
3426910	3/16" Nut Driver	---	1
7900814	3/16" x 3-1/2" Carbide-tipped Drill Bit	---	1

PERFORMANCE TABLES

Tapcon®
Storm Guard Anchors

Ultimate Tension and Shear Values (Lbs/kN) in Concrete

ANCHOR DIA. In. (mm)	MIN. DEPTH OF EMBEDMENT In. (mm)	EDGE DISTANCE	f'c = 3000 PSI (20.7 MPa)	
			TENSION Lbs. (kN)	SHEAR Lbs. (kN)
1/4 (6.4)	1 (25.4)	1-1/4 (31.8)	1,230 (5.5)	1,339 (6.0)
	1 (25.4)	2-1/2 (63.5)	1,701 (7.6)	2,333 (10.4)
	1-3/4 (44.5)	1-1/4 (31.8)	2,704 (12.0)	1,375 (6.1)
	1-3/4 (44.5)	2-1/2 (63.5)	2,844 (12.6)	2,618 (11.6)

Safe working loads for single installation under static loading should not exceed 25% of the ultimate load capacity.

Tapcon®
Storm Guard Anchors

Ultimate Tension and Shear Values (Lbs/kN) in Hollow Block

ANCHOR DIA. In. (mm)	MIN. DEPTH OF EMBEDMENT In. (mm)	EDGE DISTANCE	f'c = 1500 PSI (10.4 MPa)	
			TENSION Lbs. (kN)	SHEAR Lbs. (kN)
1/4 (6.4)	1-1/4 (31.8)	1-1/4 (31.8)	1,955 (8.7)	536 (2.4)
	1-1/4 (31.8)	2-1/2 (63.5)	1,940 (8.6)	1,088 (4.8)

Tapcon®
Storm Guard Anchors

Ultimate Tension and Shear Values (Lbs/kN) in Grout-Filled (CMU)

ANCHOR DIA. In. (mm)	MIN. DEPTH OF EMBEDMENT In. (mm)	EDGE DISTANCE	GROUT-FILLED (CMU) f'c = 2000 PSI (13.8 MPa)	
			TENSION Lbs. (kN)	SHEAR Lbs. (kN)
1/4 (6.4)	1-3/4 (44.5)	1-1/4 (31.8)	3,335 (14.8)	1,207 (5.4)
	1-3/4 (44.5)	2-1/2 (63.5)	3,779 (16.8)	2,061 (9.2)

RED HEAD®
CONCRETE ANCHORING SPECIALISTS

SAMMYS®
SSC Hurricane Protection Anchors

APPROVAL/LISTINGS

Miami Dade County # 11-0616.04

For the most current approvals/listings visit: www.itw-redhead.com

APPLICATIONS

Direct mount permanent anchors for quick and easy installations for metal and plywood panels to hollow block and concrete.

DESCRIPTION/SUGGESTED SPECIFICATIONS

SPECIFIED FOR SECURING SHUTTERS

Low profile permanent anchors for quick and easy secure shutter installations.

ADVANTAGES

- Thread: 1/4-20 internal thread
- Thread Depth: 5/8"
- Head Diameter: 1/2"
- Head Length: 3/4"
- Cap made of 304 stainless steel will never rust.
- "Original" Tapcon® 1/4 dia. anchor with Blue Climaseal™.
- T25 torx® driver for fast and easy installations.

SELECTION CHART

SAMMYS Hurricane Protection Anchors

Diameter.....1/4" Thread Form.... Original Notched Hi-Lo™
Point Type....Nail Finish.....Blue Climaseal™

PART NO.	ANCHOR LENGTH	BOX QTY
8103957	1-1/4"	125
8169957	1-3/4"	125
8164957	2-1/4"	125
8165957	2-3/4"	125
8167957	3-1/4"	125

PART NO.	ANCHOR LENGTH	BOX QTY
8166957	3-3/4"	125
8162957	4"	125
8168957	5"	125
8155957	6"	125
8182910	Installation Tool	1

PERFORMANCE TABLES

SAMMYS Hurricane Protection Anchors

Ultimate Tension and Shear Values (Lbs/kN) in Concrete

ANCHOR DIA. In. (mm)	MIN. DEPTH OF EMBEDMENT In. (mm)	EDGE DISTANCE	f'c = 3295 PSI (22.7 MPa)	
			TENSION Lbs. (kN)	SHEAR Lbs. (kN)
1/4 (6.4)	1 (25.4)	1-1/4 (31.8)	1,533 (6.8)	1,166 (5.2)
	1 (25.4)	2-1/2 (63.5)	2,024 (9.1)	1,264 (5.6)
	2-1/4 (57.2)	1-1/4 (31.8)	2,972 (13.2)	1,342 (6.0)
	2-1/4 (57.2)	2-1/2 (63.5)	3,099 (13.8)	1,906 (8.5)

Safe working loads for single installation under static loading should not exceed 25% of the ultimate load capacity.

SAMMYS Hurricane Protection Anchors

Ultimate Tension and Shear Values (Lbs/kN) in Hollow Block

ANCHOR DIA. In. (mm)	MIN. DEPTH OF EMBEDMENT In. (mm)	EDGE DISTANCE	f'c = 1500 PSI (10.4 MPa)	
			TENSION Lbs. (kN)	SHEAR Lbs. (kN)
1/4 (6.4)	1-1/4 (31.8)	1-1/4 (31.8)	1,388 (6.2)	526 (2.3)
	1-1/4 (31.8)	2-1/2 (63.5)	1,427 (6.3)	1,056 (4.7)

SAMMYS Hurricane Protection Anchors

Ultimate Tension and Shear Values (Lbs/kN) in Grout-Filled (CMU)

ANCHOR DIA. In. (mm)	MIN. DEPTH OF EMBEDMENT In. (mm)	EDGE DISTANCE	Hollow Block f'c = 2000 PSI (13.8 MPa)	
			TENSION Lbs. (kN)	SHEAR Lbs. (kN)
1/4 (6.4)	2-1/2 (63.5)	1-1/4 (31.8)	3,011 (13.4)	1,086 (4.8)
	2-1/2 (63.5)	2-1/2 (63.5)	3,332 (14.8)	1,317 (5.9)

RED HEAD®
CONCRETE ANCHORING SPECIALISTS

Hammer-Set™ Anchors

Nail-Drive Anchors

APPLICATIONS

*For overhead applications refer to page 79 for Redi-Drive information and performance data

NOT FOR USE IN OVERHEAD APPLICATIONS*

- Electrical boxes
- Conduit clips
- Drywall track
- Roof flashing

DESCRIPTION/SUGGESTED SPECIFICATIONS

Hammer-Set Nail Drive Anchors—

SPECIFIED FOR ANCHORAGE INTO CONCRETE

Hammer-Set Nail-Drive Anchor

The Hammer-Set one-piece zinc plated steel anchor consists of an expansion body and expander drive pin. Anchors meet or exceed GSA specification A-A-1925A Type 1. (Formerly GSA: FF-S-325 Group V, Type 2, Class 3)

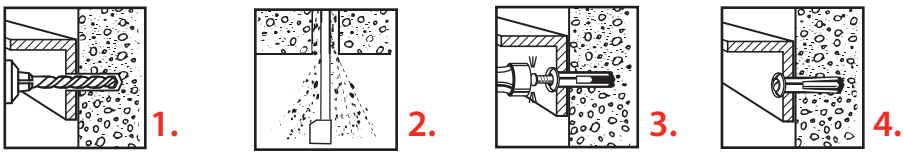
ADVANTAGES

- Fast, easy installation
- Works in concrete, block and brick
- Install through material to be fastened
- Low profile mushroom head style

APPROVALS/LISTINGS

Meets or exceeds GSA specification A-A-1925A Type 1 (Formerly GSA: FF-S-325 Group V, Type 2, Class 3)

INSTALLATION STEPS



1. Drill proper size hole through material to be fastened into base material. (See Chart for bit size).
2. Clean hole.
3. Insert Hammer-Set into hole until head of anchor body is flush with material to be fastened. Tap the nail until flush with head of anchor. Ensure minimum embedment is 1/4" deeper than anchor embedment. Be sure head is firmly against fixture
4. Anchor is now set. ** NOT RECOMMENDED FOR OVERHEAD **

SELECTION CHART

Hammer-Set

Bulk Packaging Available

PART NUMBER	DESCRIPTION In. (mm)	DRILL SIZE In. (mm)	MAX. FIXTURE THICKNESS In. (mm)	MIN. EMBEDMENT In. (mm)	MIN. HOLE DEPTH In. (mm)	QTY/WT PER BOX lbs.	QTY/WT PER MASTER CTN - lbs.
HS-1607	3/16 x 7/8 (4.8 x 22.2)	3/16 (4.8)	1/4 (6.4)	5/8 (15.9)	1-1/8 (28.6)	100/ 2.0	1000/ 20
HS-1406	1/4 x 3/4 (6.4 x 19.1)	1/4 (6.4)	1/8 (3.2)	5/8 (15.9)	1 (25.4)	100/ 2.2	1000/ 22
HS-1410	1/4 x 1 (6.4 x 25.4)	1/4 (6.4)	1/4 (6.4)	3/4 (19.1)	1-1/4 (31.8)	100/ 2.4	1000/ 24
HS-1412	1/4 x 1-1/4 (6.4 x 31.8)	1/4 (6.4)	1/2 (12.7)	3/4 (19.1)	1-1/2 (38.1)	100/ 2.6	1000/ 26
HS-1414	1/4 x 1-1/2 (6.4 x 38.1)	1/4 (6.4)	3/4 (19.1)	3/4 (19.1)	1-3/4 (44.5)	100/ 2.8	1000/ 28
HS-1420	1/4 x 2 (6.4 x 50.8)	1/4 (6.4)	1-1/4 (31.8)	3/4 (19.1)	2-1/4 (57.2)	100/ 3.5	1000/ 35

PERFORMANCE TABLE

Hammer-Set

Ultimate Tension and Shear Values in Concrete (Lbs/kN)*

ANCHOR DIA. In. (mm)	MIN. DEPTH OF EMBEDMENT In. (mm)	4000 PSI (27.6 MPa)	
		TENSION Lbs. (kN)	SHEAR Lbs. (kN)
3/16" (4.8)	5/8" (15.9)	640 (2.8)	595 (2.6)
1/4" (6.4)	3/4" (19.1)	880 (3.9)	970 (4.3)
1/4" (6.4)	1" (25.4)	950 (4.2)	970 (4.3)
1/4" (6.4)	1-1/4" (31.8)	1,025 (4.6)	970 (4.3)

Safe working loads for single installations under static loading conditions should not exceed 25% of the ultimate capacity.

RED HEAD®
CONCRETE ANCHORING SPECIALISTS

E-Z Ancor™

The Original Self-Drilling Drywall Anchor

EZ100 Zinc | EZPPL100 Plastic | EZT50 Toggle

DESCRIPTION/SUGGESTED SPECIFICATIONS

SPECIFIED FOR ANCHORAGE INTO GYPSUM WALLBOARD

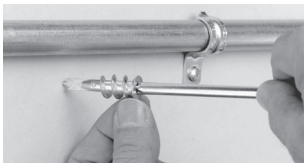
E-Z Ancor Self-Drilling Anchor

The E-Z Ancor is a one-piece self-drilling anchor designed for optimal holding performance in gypsum wallboard. Available in zinc or high strength engineered plastic (non-conductive). Ideal anchor for 3/8", 1/2" and 5/8" gypsum wallboard.

ADVANTAGES

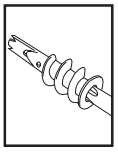
- Fast—no pre-drilling
- Easy—just use #2 phillips bit
- Clean and neat—tri-cut point drills a small hole and seats flush
- Corrosion resistance
- Removable—easily backed out of wallboard
- Breakaway point for easy usage when cavity is shallow

APPLICATIONS

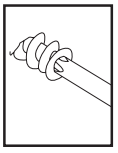


- Electrical fixtures
- HVAC fixtures
- Bathroom accessories
- Shelving
- Closet organizers
- Curtain rods
- Signage

INSTALLATION STEPS



1. Place #2 phillips screwdriver or cordless screwdriver (#2 phillips bit) into recess of E-Z Ancor.



2. Press into Gypsum wallboard while turning the anchor clockwise until seated flush.

3. Place fixture in position over installed E-Z Ancor. Insert screw (#8A or AB screws are recommended). Tighten fixture into place.

SELECTION CHART

E-Z Ancor

* Not for overhead

PART NUMBER	DESCRIPTION	QTY/WT PER BOX lbs.	QTY/WT PER MASTER CARTON lbs.
EZ100	Zinc E-Z Ancor	100/ 1.6	1000/17.0
EZPPL100	Plastic E-Z Ancor	100/ 0.1	1000/ 4.2
EZP25	25 Plastic Anchors/25 Screws (#8 - 1-1/4" sheet metal screws)	1/ 0.9	10/ 3.0
EZ25	25 Zinc Anchors/25 Screws (#8 – 1-1/4" sheet metal screw)	1/ 0.9	10/ 10
EZT50	EZ TOGGLE/50 #2 Phillips screws	50/ 2.4	250/ 12

PERFORMANCE TABLE

E-Z Ancor

MAXIMUM FIXTURE THICKNESS	ULTIMATE PULLOUT LBS. GYPSUM BOARD THICKNESS			ULTIMATE SHEAR LBS. GYPSUM BOARD THICKNESS		
	3/8"	1/2"	5/8"	3/8"	1/2"	5/8"
3/4"	40	50	75	135	150	200

Divide by 4 for allowable load values.

E-Z Ancor Kits

Starter Kit
Part Number: EZ25
Kit Contains:
25 Zinc Anchors
25 Screws

Starter Kit
Part Number: EZP25
Kit Contains:
25 Plastic Anchors
25 Screws

RED HEAD®
CONCRETE ANCHORING SPECIALISTS

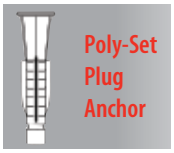
Poly-Set® Anchors

The Truly Versatile Plug Anchor

PS-0608SP PS-1012SP

DESCRIPTION/SUGGESTED SPECIFICATIONS

Plug Anchors — SPECIFIED FOR ANCHORAGE INTO ALL BASE MATERIALS



The Poly-Set is a polyethylene expansion anchor designed for fastening into drywall, hollow block, brick and solid concrete.

ADVANTAGES

- Unique twisting action provides superior holding over standard plug anchors
- Resistant to moisture, chemicals or atmospheric conditions—can be used anywhere
- Pre-packaged in kits with matching screws and carbide-tipped drill bit
- Works well in *all* base materials

INSTALLATION STEPS

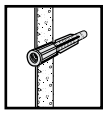
For Solid Concrete

1. Drill hole at least 1/4" deeper than anchor length and insert anchor until flange is flush.

2. Fasten fixture by inserting sheet metal screw through fixture and into anchor.

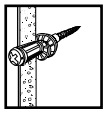
3. Tighten screw.

For Hollow Material



1. Drill hole and insert anchor until flange is flush.

2. Fasten fixture by inserting sheet metal screw through fixture and into anchor.



3. Expand anchor after screw head is against fixture, tighten screw the number of additional turns indicated on the chart below.

DRYWALL THICKNESS	PS-0608S	PS-1012S
3/8"	7 - 9 Turns	– – – – –
1/2"	5 - 7 Turns	8 - 9 Turns
5/8"	3 - 4 Turns	6 - 7 Turns
3/4"	1 - 2 Turns	4 - 5 Turns

Approximate number of additional turns after screw head is against fixture for indicated thickness of hollow wall.

SELECTION CHART

Poly-Set Anchors

PART NUMBER	DRILL BIT SIZE	ANCHOR LENGTH	SCREW SIZE	GRIP RANGE	QTY/WT PER BOX (lbs.)	QTY/WT PER MASTER CTN (lbs.)
PS-0608SP	3/16	1-1/4	#6 - 8	3/8 - 3/4	100/ 0.9	1000/ 2
PS-1012SP	9/32	1-7/16	#10 - 12	1/2 - 1	100/ 1.8	1000/ 4

PERFORMANCE TABLES

Average Ultimate Tension Load in Various Base Materials

PART NUMBER	DRYWALL (1/2")	CONCRETE (2000 PSI)	CONCRETE (4000 PSI)	HOLLOW BLOCK (CMU)
PS-0608SP	110 lbs.	225 lbs.	265 lbs.	235 lbs
PS-1012SP	145 lbs.	355 lbs.	390 lbs.	385 lbs

Allowable load values are based upon a 4 to 1 safety factor. Divide by 4 for allowable load values.

Poly-Set Kits

PART NUMBER	DRILL BIT SIZE	KIT CONTAINS	GRIP RANGE	QTY/WT PER BOX (lbs.)	QTY/WT PER MASTER CTN (lbs.)
PS-0608SKP	3/16	100 1-1/4" anchors/100 #8 screws	3/8 - 3/4	1/ 1.0	10/ 11
PS-1012SKP	9/32	50 1-7/16" anchors/50 #12 screws	1/2 - 1	1/ 1.2	10/ 12

RED HEAD®
CONCRETE ANCHORING SPECIALISTS

Boa™ Coil Expansion Anchors

DESCRIPTION/SUGGESTED SPECIFICATIONS

SPECIFIED FOR ANCHORAGE INTO CONCRETE

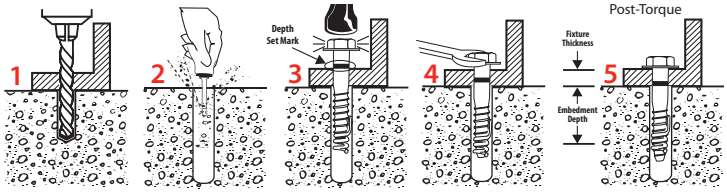
The Boa™ Coil is a high performance expansion anchor providing through fixture fastening and easy removal to keep the job moving. It's reusable with the coil replacement anchors making this anchor a low cost solution.

Ideal combination of value, performance and reusability make the Boa Coil the choice for Forming and tilt-wall contractors.

ADVANTAGES: Easy installation, removable, reusable, high shear strength, **Grade 5 bolt**.

APPLICATIONS: Concrete formwork, load bearing angles, beams and columns, machinery holddown, Jersey barrier, glare screens, light rail/commuter work.

INSTALLATION STEPS



NOTE: To achieve maximum loads the installation process needs to be carried out as follows:

1. Using the fixture as a template, drill the correct diameter and depth hole.
2. Remove debris with vacuum or hand pump.
3. Insert the assembled Boa Coil anchor. (The coil anchor tab points up the anchor.) Tap anchor down to depth set mark and stop.
4. Tighten until washer is firmly held to the fixture and stop. Number of turns to set anchor: 1/2" 3-4 turns, 5/8" and 3/4" 4-5 turns. Ensure washer is tight and snug fit.
5. The anchor is ready to take load. (The bolt can be removed leaving the coil in the hole.)

The Boa coil anchor can be reused up to 3 times in new holes.

SELECTION CHART

Boa Coil Anchors

PART NO.	ANCHOR DIA In. (mm)	SOCKET SIZE In.	DRILL BIT DIA. In. (mm)	HOLE DEPTH In. (mm)	FIXTURE THICKNESS AT MINIMUM EMBEDMENT TO BE FASTENED In. (mm)	QTY/WT PER BOX Lbs.	QTY/WT PER MASTER CTN Lbs.
RHCA-1230	1/2 (12.7)	3/4	1/2 (12.7)	3-1/2 (88.9)	3/8 (9.5)	25 / 4.5	150 / 27.2
RHCA-1240	1/2 (12.7)	3/4	1/2 (12.7)	4-1/2 (114.3)	1-3/8 (35.0)	25 / 5.9	150 / 35.6
RHCA-1254	1/2 (12.7)	3/4	1/2 (12.7)	6 (152.4)	2-7/8 (73.0)	25 / 7.8	150 / 46.9
RHCA-5834	5/8 (15.9)	15/16	5/8 (15.9)	4 (101.6)	3/8 (9.5)	20 / 8.8	120 / 52.5
RHCA-5850	5/8 (15.9)	15/16	5/8 (15.9)	5-1/2 (139.7)	1-7/8 (47.6)	15 / 8.5	90 / 51.0
RHCA-3444	3/4 (19.1)	1-1/8	3/4 (19.1)	5 (127.00)	1/4 (6.4)	10 / 6.4	60 / 38.3
RHCA-3460	3/4 (19.1)	1-1/8	3/4 (19.1)	6-1/2 (165.1)	1-3/4 (44.5)	10 / 8.2	60 / 49.1

Replacement coil available for easy re-use with Red Head Boa Coil Anchors only.

COIL REPLACEMENT PART NO.	QTY/WT PER BOX Lbs.	QTY/WT PER MASTER CTN Lbs.
RHC-12 (1/2")	100 / 2.8	600/16.9
RHC-58 (5/8")	100 / 2.2	600/13.1
RHC-34 (3/4")	100 / 1.3	600/7.5

PERFORMANCE TABLES

Boa Coil Anchors — Ultimate concrete/steel capacity in concrete (1)

ANCHOR DIAMETER In. (mm)	HOLE DIA. In. (mm)	EFFECTIVE EMBEDMENT DEPTH In. (mm)	FIXTURE HOLE DIA. In. (mm)	TURNS TO SET ANCHOR	ULTIMATE CONCRETE CAPACITY (2) (3)						ULTIMATE STEEL STRENGTH (4) LBS. (kN)	
					2,000 PSI (13.8 MPa)		4,000 PSI (27.6 MPa)		6,000 PSI (41.4 MPa)			
					TENSION (5) Lbs. (kN)	SHEAR Lbs. (kN)	TENSION (5) Lbs. (kN)	SHEAR Lbs. (kN)	TENSION (5) Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
1/2 (12.7)	1/2 (12.7)	2 (50.8)	9/16 (14.3)	3-4	4,039 (17.9)	6,070 (27.0)	5,715 (25.4)	8,590 (38.2)	6,994 (31.1)	10,516 (46.8)	19,384 (86.2)	14,456 (64.3)
		3 (76.2)	9/16 (14.3)	3-4	7,403 (32.9)	12,082 (53.7)	10,471 (46.6)	17,089 (76.0)	12,822 (57.0)	20,937 (93.1)		
5/8 (15.9)	5/8 (15.9)	2-3/8 (60.3)	11/16 (17.5)	4-5	5,291 (23.5)	8,800 (39.1)	7,483 (33.3)	12,445 (55.4)	9,162 (40.8)	15,242 (67.8)	30,152 (134.1)	21,937 (97.6)
		3-7/8 (98.4)	11/16 (17.5)	4-5	10,855 (48.3)	19,999 (89.0)	15,355 (68.3)	28,285 (125.8)	18,802 (83.6)	34,636 (154.0)		
3/4 (19.1)	3/4 (19.1)	3-1/4 (82.6)	13/16 (20.6)	4-5	8,479 (37.7)	16,567 (73.7)	11,991 (53.3)	23,427 (104.2)	14,682 (65.3)	28,690 (127.6)	43,360 (192.9)	32,031 (142.5)
		4-1/2 (114.3)	13/16 (20.6)	4-5	13,555 (60.3)	27,239 (121.2)	19,171 (85.3)	38,518 (171.3)	23,478 (104.4)	47,173 (209.8)		

(1) Use lower value of either concrete or steel (2) Concrete capacity based on Concrete Capacity Design method and verified by test data (3) Influence factors must be applied to concrete strength values
(4) Steel strength based on .57 Fu Ag for shear and 0.75 Fu Ag for tension (5) Test results when reused four times; maximum 20% reduction in tensile capacity; no reduction in shear

Boa Coil Anchors — Allowable concrete/steel capacity in concrete (1)

ANCHOR DIAMETER In. (mm)	HOLE DIA. In. (mm)	EFFECTIVE EMBEDMENT DEPTH In. (mm)	FIXTURE HOLE DIA. In. (mm)	TURNS TO SET ANCHOR	RECOMMENDED WORKING LOADS IN CONCRETE (2) (3)						ALLOWABLE STEEL STRENGTH (4) LBS. (kN)	
					2,000 PSI (13.8 MPa)		4,000 PSI (27.6 MPa)		6,000 PSI (41.4 MPa)			
					TENSION (5) Lbs. (kN)	SHEAR Lbs. (kN)	TENSION (5) Lbs. (kN)	SHEAR Lbs. (kN)	TENSION (5) Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
1/2 (12.7)	1/2 (12.7)	2 (50.8)	9/16 (14.3)	3-4	1,011 (4.5)	1,517 (6.7)	1,430 (6.4)	2,147 (9.5)	1,751 (7.8)	2,629 (11.7)	8,529 (37.9)	5,579 (24.8)
		3 (76.2)	9/16 (14.3)	3-4	1,852 (8.2)	3,020 (13.4)	2,619 (11.6)	4,272 (19.0)	3,208 (14.3)	5,234 (23.3)		
5/8 (15.9)	5/8 (15.9)	2-3/8 (60.3)	11/16 (17.5)	4-5	1,324 (5.9)	2,200 (9.8)	1,872 (8.3)	3,111 (13.8)	2,293 (10.2)	3,810 (16.9)	13,266 (59.0)	8,466 (37.7)
		3-7/8 (98.4)	11/16 (17.5)	4-5	2,715 (12.1)	5,000 (22.2)	3,840 (17.1)	7,071 (31.5)	4,703 (20.9)	8,660 (38.5)		
3/4 (19.1)	3/4 (19.1)	3-1/4 (82.6)	13/16 (20.6)	4-5	2,121 (9.4)	4,141 (18.4)	2,999 (13.3)	5,556 (24.7)	3,673 (16.3)	7,172 (31.9)	19,078 (84.9)	12,362 (55.0)
		4-1/2 (114.3)	13/16 (20.6)	4-5	3,390 (15.1)	6,810 (30.3)	4,794 (21.3)	9,630 (42.8)	5,872 (26.2)	11,793 (52.4)		

(1) Use lower value of either concrete or steel (2) Safety factor 4 (3) Influence factors must be applied to concrete strength values (4) Steel strength based on .22 Fu Ag for shear and 0.33 Fu Ag for tension
(5) Test results when reused four times; maximum 20% reduction in tensile capacity; no reduction in shear

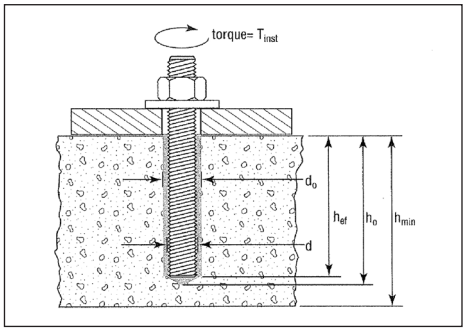
APPENDIX A: Strength Design Performance Values

SPECIFICATIONS AND DETAILS FOR INSTALLATION OF ANCHORS IN CONCRETE WITH EPCON G5 ADHESIVE

Characteristic	Symbol	Units	Threaded Rod Diameter (d)						
			3/8″	1/2″	5/8″	3/4″	7/8″	1″	1-1/4″
Nominal carbide bit diameter	d_o	in.	7/16	9/16	3/4	7/8	1	1-1/8	1-3/8
Anchor embedment depth – minimum	$h_{ef,\,min}$	in.	2-3/8	2-3/4	3-1/8	3-1/2	3-1/2	4	5
Anchor embedment depth – maximum	$h_{ef,\,max}$	in.	3-3/8	4-1/2	5-5/8	6-3/4	7-7/8	9	11-1/4
Minimum spacing	s_{min}	in.	15/16	1	2-1/2	6	3-1/2	4	5
Minimum edge distance	c_{min}	in.	15/16	1	2-1/2	6	3-1/2	4	5
Minimum concrete thickness	h_{min}	in.	$h_{ef} + 1\text{-}1/4$		$h_{ef} + 2d_o$				
Maximum tightening torque for pretension clamping	T_{inst}	ft lb	9	16	47	90	145	170	370

For SI: 1 inch= 25.4mm, 1 lbf = 4.45N, 1ft-lbf = 1.356N-m, 1psi = .006895MPa

ANCHOR INSTALLATION



BRUSH SPECIFICATIONS

Brush color	Part #	(d) Anchor diameter (in.)	(d_r) Rebar	(d_o) Drill bit diameter (in.)	Minimum brush diameter (in.)
Grey	SB038	3/8	# 3	7/16	0.563
Brown	SB012	1/2	◆	9/16	0.675
Green	SB058	5/8	# 5	3/4	0.900
Yellow	SB034	3/4	# 6	7/8	1.125
Red	SB078	7/8	◆	1	1.350
Purple	SB010	1	# 7	1-1/8	1.463
Blue	SB125	1-1/4	◆	1-3/8	1.575

For SI: 1 inch= 25.4mm ◆ Available with lead time.

WORKING TIMES AND CURE TIME FOR EPCON G5 ADHESIVE

Concrete Temp. (°F) [1,2]	Working Time (minutes) [3]	Cure Time (hours) [4]
70	15	24
90	9	24
110	9	24

For SI: t°(°F-32) X .555 = °C.

1 Adhesives must be installed in base material temperatures of 70°F to 110°F or artificially maintained.
2 Cartridge temperature should not differ significantly from the temperature of the base material.
3 Working time is the maximum time from the end of mixing to when the insertion of the anchor into the adhesive shall be completed.
4 Cure time is the minimum time from the end of working time to when the anchor may be torqued or loaded. Anchors are to be undisturbed during the cure time.

APPENDIX A: Strength Design Performance Values

TABLE 1: EPCON G5 ADHESIVE STEEL DESIGN INFORMATION FOR THREADED ROD

Characteristic		Symbol	Units	Anchor nominal diameter (d)						
				3/8″	1/2″	5/8″	3/4″	7/8″	1″	1-1/4″
Threaded rod effective cross-sectional area		A_{se}	inch^2	0.078	0.142	0.226	0.335	0.462	0.606	0.969
Carbon Steel A36	Nominal steel strength in tension	N_{sa}	lb	4,500	8,230	13,110	19,400	26,780	35,130	56,210
	Nominal steel strength in shear	V_{sa}	lb	2,250	4,940	7,870	11,640	16,070	21,080	33,730
	Strength reduction factor for tension, steel failure mode[1]	Φ	–	0.75	0.75	0.75	0.75	0.75	0.75	0.75
	Strength reduction factor for shear, steel failure mode[1]	Φ	–	0.65	0.65	0.65	0.65	0.65	0.65	0.65
	Reduction factor for seismic shear	$\alpha_{v,seis}$	–	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Carbon Steel A193 B7	Nominal steel strength in tension	N_{sa}	lb	9,690	17,740	28,250	41,810	57,710	75,710	121,140
	Nominal steel strength in shear	V_{sa}	lb	4,845	10,640	16,950	25,090	34,630	45,430	72,680
	Strength reduction factor for tension, steel failure mode[1]	Φ	–	0.75	0.75	0.75	0.75	0.75	0.75	0.75
	Strength reduction factor for shear, steel failure mode[1]	Φ	–	0.65	0.65	0.65	0.65	0.65	0.65	0.65
	Reduction factor for seismic shear	$\alpha_{v,seis}$	–	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Stainless Steel F593	Nominal steel strength in tension	N_{sa}	lb	5,810	10,640	16,950	25,090	34,630	45,430	72,680
	Nominal steel strength in shear	V_{sa}	lb	2,905	6,390	10,170	15,050	20,780	27,260	43,610
	Strength reduction factor for tension, steel failure mode[1]	Φ	–	0.65	0.65	0.65	0.65	0.65	0.65	0.65
	Strength reduction factor for shear, steel failure mode[1]	Φ	–	0.60	0.60	0.60	0.60	0.60	0.60	0.60
	Reduction factor for seismic shear	$\alpha_{v,seis}$	–	0.70	0.70	0.70	0.70	0.70	0.70	0.70

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

1 The tabulated value of Φ applies when the load combinations of Section 1605.2.1 of the IBC, Section 1612.2.1 of the UBC, or ACI 318 Section 9.2 are used as set forth in ACI 318 D.4.4. If the load combinations of Section 1909.2 of the UBC or ACI 318 Appendix C are used, the appropriate value of Φ must be determined in accordance with ACI 318 D.4.5.

TABLE 2: EPCON G5 ADHESIVE CONCRETE BREAKOUT DESIGN INFORMATION

Characteristic	Symbol	Units	Nominal rod diameter, d (inch)						
			3/8″	1/2″	5/8″	3/4″	7/8″	1″	1-1/4″
Effectiveness factor for uncracked concrete	$k_{c,uncr}$	–	24	24	24	24	24	24	24
Effectiveness factor for cracked concrete	$k_{c,cr}$	–	17	17	17	17	17	17	17
Minimum concrete thickness[2]	h_{min}	in.	h_{ef} + 1-1/4		$h_{ef} + 2d_o$				
Anchor embedment depth - minimum	$h_{ef,min}$	in.	2-3/8	2-3/4	3-1/8	3-1/2	3-1/2	4	5
Anchor embedment depth - maximum	$h_{ef,max}$	in.	3-3/8	4-1/2	5-5/8	6-3/4	7-7/8	9	11-1/4
Minimum spacing	s_{min}	in.	15/16	1	2-1/2	6	3-1/2	4	5
Minimum edge distance	c_{min}	in.	15/16	1	2-1/2	6	3-1/2	4	5
Critical edge distance	c_{ac}	in.	See Section 4.1.10 of the ESR-1137 Report						
Strength reduction factor for tension, concrete failure mode[1]	Φ	Cond B	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Strength reduction factor for shear, concrete failure mode[1]	Φ	Cond B.	0.70	0.70	0.70	0.70	0.70	0.70	0.70

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

1 The tabulated value of Φ applies when the load combinations of Section 1605.2.1 of the IBC, Section 1612.2.1 of the UBC, or ACI 318 Section 9.2 are used and the requirements of ACI 318 D.4.4(c) for Condition B are met. If the load combinations of Section 1909.2 of the UBC or ACI 318 Appendix C are used, the appropriate value of Φ must be determined in accordance with ACI 318 D.4.5 for Condition B.

2 d_o represents the nominal drill hole diameter.

TABLE 3: EPCON G5 ADHESIVE ANCHOR BOND STRENGTH DESIGN INFORMATION[1]

Characteristic		Symbol	Units	Nominal rod diameter (inch)						
				3/8″	1/2″	5/8″	3/4″	7/8″	1″	1-1/4″
Anchor embedment depth - minimum		$h_{ef,min}$	in.	2-3/8	2-3/4	3-1/8	3-1/2	3-1/2	4	5
Anchor embedment depth - maximum		$h_{ef,max}$	in.	3-3/8	4-1/2	5-5/8	6-3/4	7-7/8	9	11-1/4
Temperature Range A[2,4,5]	Characteristic Bond Strength for Uncracked Concrete	$\tau_{K,uncr}$	psi	1,620	1,620	1,620	1,620	1,620	1,620	1,620
	Characteristic Bond Strength for Cracked Concrete[6]	$\tau_{K,cr}$	psi	665	785	785	785	785	785	785
Temperature Range B[3,4,5]	Characteristic Bond Strength for Uncracked Concrete	$\tau_{K,uncr}$	psi	1,245	1,245	1,245	1,245	1,245	1,245	1,245
	Characteristic Bond Strength for Cracked Concrete[6]	$\tau_{K,cr}$	psi	510	605	605	605	605	605	605
Continuous Inspection	Strength Reduction Factor - Dry Concrete	$\Phi_{dry, ci}$	–	0.65	0.65	0.65	0.65	0.55	0.55	0.55
	Strength Reduction Factor - Saturated Concrete	$\Phi_{sat, ci}$	–	0.65	0.65	0.65	0.65	0.55	0.55	0.55
	Strength Reduction Factor - Water-Filled Holes	$\Phi_{wf, ci}$	–	0.65	0.65	0.65	0.65	0.55	0.55	0.55
	Strength Reduction Factor - Submerged Concrete	$\Phi_{sub, ci}$	–	0.65	0.65	0.65	0.65	0.55	0.55	0.55
Periodic Inspection	Strength Reduction Factor - Dry Concrete	$\Phi_{dry, ci}$	–	0.55	0.55	0.55	0.55	0.45	0.45	0.45
	Strength Reduction Factor - Saturated Concrete	$\Phi_{sat, ci}$	–	0.55	0.55	0.55	0.55	0.45	0.45	0.45
	Strength Reduction Factor - Water-Filled Holes	$\Phi_{wf, ci}$	–	0.55	0.55	0.55	0.55	0.45	0.45	0.45
	Strength Reduction Factor - Submerged Concrete	$\Phi_{sub, ci}$	–	0.55	0.55	0.55	0.55	0.45	0.45	0.45
Reduction factor for seismic tension		$\Phi_{N, seis}$	–	0.80						

For SI: 1 inch = 25.4mm, 1 lbf = 4.45N, 1ft-lbf= 1.356 N-m, 1 psi=0.006895 MPa.

1 Bond strength values correspond to concrete compressive strength range 2,500 psi to 8,500 psi.

2 Temperature range A: Maximum short term temperature of 110 degrees F and maximum long term temperature of 70 degrees F.

3 Temperature range B: Maximum short term temperature of 110 degrees F and maximum long term temperature of 110 degrees F.

4 Short term elevated concrete temperatures are those that occur over brief interval, e.g., as a result of diurnal cycling. Long term concrete temperatures are roughly constant over significant periods of time.

5 For load combinations consisting of only short-term loads, such as wind or seismic loads, bond strengths may be increased by 5% for Temperature Range A and by 36% for Temperature Range B.

6 For structures assigned to IBC or IRC Seismic Design Category C, D, E, or F, or UBC Seismic Zone 2b, 3, or 4, bond strength values must be multiplied by $\alpha_{N,seis}$.

SEE TABLE ON ALLOWABLE STRESS DESIGN, ASD, USING LOW STRENGTH CARBON STEEL (A36) THREADED ROD ON NEXT PAGE.

APPENDIX A: Strength Design Performance Values

TABLE 4: STRENGTH DESIGN USING LOW STRENGTH CARBON STEEL (A36) THREADED ROD ◆ INSTALLED IN f'c = 2,500 PSI – 8,000 PSI UNCRACKED CONCRETE WITH EPCON G5 ADHESIVE

Anchor Diameter (d)	Embedment Depth, hef (in) (min./max)	* Characteristic Bond Strength τ_K, uncr (psi)	Allowable Tension Load LBS				
			2,500 PSI (Controlling Mode)	3,000 PSI (Controlling Mode)	4,000 PSI (Controlling Mode)	6,000 PSI (Controlling Mode)	8,000 PSI (Controlling Mode)
3/8	2-3/8	1,620	2,493 (BOND)	2,493 (BOND)	2,493 (BOND)	2,493 (BOND)	2,493 (BOND)
	3-3/8	1,620	3,375 (STEEL)	3,375 (STEEL)	3,375 (STEEL)	3,375 (STEEL)	3,375 (STEEL)
1/2	2-3/4	1,620	3,557 (CONCRETE)	3,849 (CONCRETE)	3,849 (BOND)	3,849 (BOND)	3,849 (BOND)
	4-1/2	1,620	6,173 (STEEL)	6,173 (STEEL)	6,173 (STEEL)	6,173 (STEEL)	6,173 (STEEL)
5/8	3-1/8	1,620	4,309 (CONCRETE)	4,720 (CONCRETE)	5,450 (CONCRETE)	5,467 (BOND)	5,467 (BOND)
	5-5/8	1,620	9,833 (STEEL)	9,833 (STEEL)	9,833 (STEEL)	9,833 (BOND)	9,833 (STEEL)
3/4	3-1/2	1,620	5,107 (CONCRETE)	5,595 (CONCRETE)	6,460 (CONCRETE)	7,348 (BOND)	7,348 (BOND)
	6-3/4	1,620	13,679 (CONCRETE)	14,171 (BOND)	14,171 (BOND)	14,171 (BOND)	14,171 (BOND)
7/8	3-1/2	1,620	5,107 (CONCRETE)	5,595 (CONCRETE)	6,460 (CONCRETE)	7,014 (BOND)	7,014 (BOND)
	7-7/8	1,620	15,781 (BOND)	15,781 (BOND)	15,781 (BOND)	15,781 (BOND)	15,781 (BOND)
1	4	1,620	6,240 (CONCRETE)	6,836 (CONCRETE)	7,893 (CONCRETE)	9,161 (BOND)	9,161 (BOND)
	9	1,620	20,612 (BOND)	20,612 (BOND)	20,612 (BOND)	20,612 (BOND)	20,612 (BOND)
1-1/4	5	1,620	8,721 (CONCRETE)	9,553 (CONCRETE)	11,031 (CONCRETE)	13,510 (CONCRETE)	14,314 (BOND)
	11-1/4	1,620	29,432 (CONCRETE)	32,206 (BOND)	32,206 (BOND)	32,206 (BOND)	32,206 (BOND)

For SI: 1 inch= 25.4mm, 1 lbf = 4.45N, 1ft-lbf= 1.356 N-M, 1 psi=0.006895 MPa

1. Refer to Tables 1, 2 and 3 for steel, concrete and bond strength design information.
2. Bond strength reduction factors based on periodic inspection and dry, saturated, water-filled or submerged concrete conditions.

◆ Call 800-899-7890 for controlling modes and loads using stainless steel or higher strength threaded rod.

Procedure to calculate tension load for strength design – SD

Example: 1/2" diameter anchor with embedment depth of 4-1/2" installed in 4,000 psi concrete

1. Calculate steel strength – tension (per ACI 318 D.5.1.2)
   $\Phi N_{sa} = 0.75 * 8,230 =$ 6,173 lbs
2. Calculate concrete breakout strength – tension
   $\Phi k_{uncr}\sqrt{2,500\text{ psi}}\ h_{ef}^{1.5} = 0.65 * 24 * \sqrt{2,500} * 4\text{-}1/2^{1.5}$
   = 7,446 lbs per ACI 318 D.5.2
   Normalize load for 4,000 psi concrete $= 7,446\sqrt{\frac{4,000}{2,500}} =$ 9,418 lbs
3. Calculate bond strength – tension
   $\Phi * d * \pi * h_{ef} * \tau_{k,uncr} = 0.55 * 1/2 * 3.1415 * 4\text{-}1/2 * 1,620 =$ 6,298 lbs (per equations D-16a, and D-16f of ESR-1137)
4. Controlling strength is 6,173 lbs (steel) – lowest load value amongst bond, concrete and steel controlling modes

Strength Design Load = 6,173 lbs

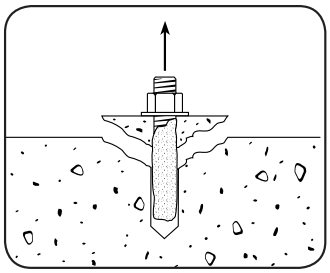
Procedure to calculate tension load for allowable stress design – ASD

1. Determine load combination and conversion factor.
   – Assume 30% dead load and 70% live load using load combination = 1.2D + 1.6L = 1.2 (0.3) + 1.6 (0.7) = 1.48 (per ACI318 Sect. 9.2)
2. Divide controlling strength (see strength design procedure - step 4) 6,173 lbs by the conversion factor of 1.48 = 6,173/1.48 = 4,171 lbs (steel)

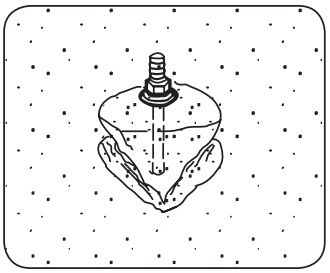
Allowable Strength Design Load = 4,171 lbs

Controlling Modes

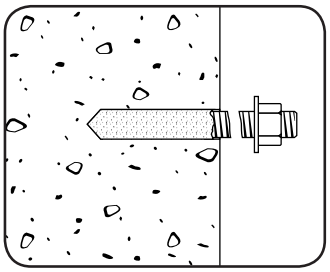
Bond



Concrete



Steel



APPENDIX B: Strength Design Performance values in accordance to 2006 IBC

ITW RED HEAD TRUBOLT WEDGE ANCHOR
DESIGN INFORMATION TESTED TO ICC-ES AC193 AND ACI 355.2, IN ACCORDANCE WITH 2006 IBC

Trubolt® Wedge Anchors

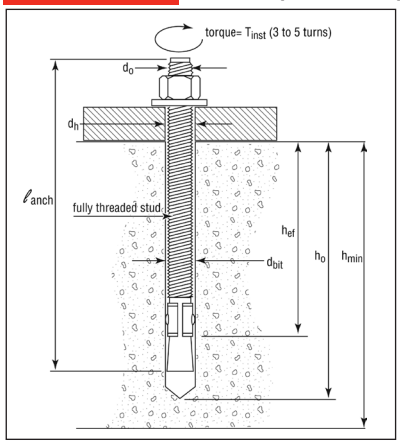
TRUBOLT WEDGE ANCHOR DESIGN INFORMATION[1,2,3]

DESIGN INFORMATION	Symbol	Units	Nominal Anchor Diameter									
			1/4		3/8		1/2		5/8		3/4	
Anchor O.D.	d_o	in	0.250		0.375		0.500		0.625		0.750	
Effective embedment	h_{ef}	in	1-1/2	2	1-3/4	2-5/8	1-7/8	3-3/8	2-1/2	4	3-1/2	4-3/4
Minimum member thickness	h_{min}	in	4	4	4	5	5	6	5	8	6	8
Critical edge distance	c_{ac}	in	2-5/8	3	2-5/8	5-1/4	3-3/4	6-3/4	5	8	7	9
Minimum edge distance	c_{min}	in	1-3/4	1-1/2	2-1/4	2	3-3/4	3-3/4	4-1/4	3-1/4	3-3/4	3-1/2
Minimum anchor spacing	s_{min}	in	1-3/4	1-1/2	2-1/4	2	3-3/4	3-3/4	4-1/4	3-1/4	3-3/4	3-1/2
Min. Specified Yield Strength	f_y	lb/in^2	55,000									
Min. Specified Ultimate Strength	f_{uta}	lb/in^2	75,000									
Effective tensile stress area	A_{se}	in^2	0.032		0.078		0.142		0.226		0.334	
Steel strength in tension	N_s	lb	2,385		5,815		10,645		16,950		25,050	
Steel strength in shear	V_s	lb	1,430		2,975	3,490	4,450	6,385	6,045	10,170	10,990	15,030
Pullout strength, uncracked concrete	$N_{p,uncr}$	lb	1,392	1,706	2,198	3,469	2,400	4,168	4,155	6,638	8,031	10,561
Anchor Category (All anchors are ductile)			1									
Effectiveness factor k_{uncr} uncracked concrete			24									
Axial stiffness in service load range	β	lb/in	14,651	9,385	17,515	26,424	32,483	26,136	42,899	21,749	43,576	28,697
Coefficient for variation for axial stiffness in service load range			34	47	28	45	17	33	55	22	63	28
Strength reduction factor ϕ for tension, steel failure modes			0.75									
Strength reduction factor ϕ for shear, steel failure modes			0.65									
Strength reduction factor ϕ for tension, concrete failure modes, Condition B			0.65									
Strength reduction factor ϕ for shear, concrete failure modes, Condition B			0.70									

[1] Trubolt+ Anchor Design Strengths must be determined in accordance with ACI 318-05 Appendix D and this table
[2] The Trubolt+ Wedge Anchor is a ductile steel element as defined by ACI 318 D.1
[3] 1/4", 3/8", & 1/2" diameter data is listed in ICC-ES ESR-2251.

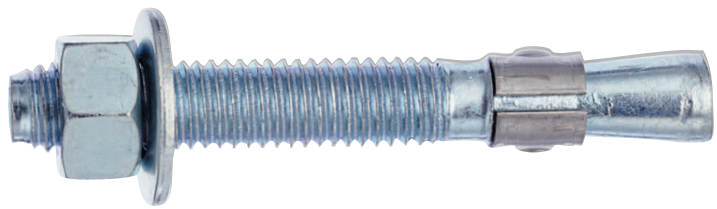
Trubolt® Wedge Anchors

TRUBOLT WEDGE ANCHOR (INSTALLED)



TRUBOLT WEDGE INSTALLATION INFORMATION

	Symbol	Units	Nominal Anchor Diameter (in.)									
			1/4		3/8		1/2		5/8		3/4	
Anchor outer diameter	d_o	in	0.25		0.375		0.5		0.625		0.750	
Nominal carbide bit diameter	d_{bit}	in	1/4		3/8		1/2		5/8		3/4	
Effective embedment depth	h_{ef}	in	1-1/2	2	1-3/4	2-5/8	1-7/8	3-3/8	2-1/2	4	3-1/2	4-3/4
Min hole depth	h_o	in	2	2-1/2	2-1/2	3-3/8	2-3/4	4-1/4	3-3/4	5-1/4	4-3/4	6
Min slab thickness	h_{min}	in	4		4	5	5	6	5	8	6	8
Installation torque	T_{inst}	ft-lb	4		25		55		90		110	
Min hole diameter in fixture	d_h	in	5/16		7/16		9/16		11/16		13/16	



APPENDIX B: Strength Design Performance values in accordance to 2006 IBC

Trubolt®
Wedge Anchors

TRUBOLT WEDGE PULLOUT STRENGTH ($N_{p, unc}$) (POUNDS) [1]

Nominal Anchor Diameter (in.)	Effective Embedment Depth (in.)	Concrete Compressive Strength			
		f'c = 2,500 psi	f'c = 3,000 psi	f'c = 4,000 psi	f'c = 6,500 psi
1/4	1-1/2	1,392	1,525	1,610	1,822
	2	1,706	1,869	1,947	2,151
3/8	1-3/4	2,198	2,408	2,621	3,153
	2-5/8	3,469	3,800	3,936	4,275
1/2	1-7/8	2,400	2,629	3,172	4,520
	3-3/8	4,168	4,520	4,520	4,520
5/8	2-1/2	4,155	4,155	4,376	5,578
	4	6,638	6,900	7,968	10,157
3/4	3-1/2	8,031	8,322	9,610	12,251
	4-3/4	10,561	10,561	10,561	12,251

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 0.006895 Mpa
1 Values are for single anchors with no edge distance or spacing reduction.

TRUBOLT WEDGE ANCHOR ALLOWABLE STATIC TENSION (ASD), NORMAL-WEIGHT UNCRACKED CONCRETE [1-6]

Nominal Anchor Diameter (in.)	Effective Embedment Depth (in.)	Concrete Compressive Strength			
		f'c = 2,500 psi	f'c = 3,000 psi	f'c = 4,000 psi	f'c = 6,500 psi
1/4	1-1/2	611	670	707	800
	2	749	821	855	945
3/8	1-3/4	965	1,058	1,151	1,385
	2-5/8	1,524	1,669	1,729	1,878
1/2	1-7/8	1,054	1,155	1,393	1,985
	3-3/8	1,831	1,985	1,985	1,985
5/8	2-1/2	1,825	1,825	1,922	2,450
	4	2,915	3,030	3,499	4,461
3/4	3-1/2	3,527	3,655	4,221	5,381
	4-3/4	4,638	4,638	4,638	5,381

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 0.006895 Mpa
Design Assumptions:
1 Single anchor with static tension load only.
2 Concrete determined to remain uncracked for the life of the anchorage.
3 Load combinations from 2006 IBC, Sections 1605.2.1 and 1605.3.1 (no seismic loading).
4 Thirty percent dead load and 70 percent live load, controlling load combination 1.2D + 1.6L
5 Calculation of weighted average: 1.2D + 1.6L = 1.2 (0.3) + 1.6 (0.7) = 1.48
6 Values do not include edge distance or spacing reductions.

2006 IBC Compliant

TRUBOLT WEDGE ANCHOR ALLOWABLE STATIC SHEAR (ASD), STEEL (POUNDS)[1-5]

Nominal Anchor Diameter (in.)	Effective Embedment Depth (in.)	Allowable Steel Capacity, Static Shear
1/4	1-1/2	628
	2	
3/8	1-3/4	1,307
	2-5/8	1,533
1/2	1-7/8	1,954
	3-3/8	2,804
5/8	2-1/2	2,655
	4	4,467
3/4	3-1/2	4,827
	4-3/4	6,601

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 0.006895 Mpa
Design Assumptions:
1 Single anchor with static shear load only.
3 Load combinations from 2006 IBC, Sections 1605.2.1 and 1605.3.1 (no seismic loading).
3 Thirty percent dead load and 70 percent live load, controlling load combination 1.2D + 1.6L
4 Calculation of weighted average: 1.2D + 1.6L = 1.2 (0.3) + 1.6 (0.7) = 1.48
5 Values do not include edge distance or spacing reductions.

APPENDIX C: Strength Design Performance values in accordance to 2006 and 2009 IBC

ITW RED HEAD TRUBOLT+ and OVERHEAD TRUBOLT+ EDGE ANCHOR DESIGN INFORMATION TESTED TO ICC-ES AC 193 AND ACI 355.2, IN ACCORDANCE WITH 2006 and 2009 IBC

TRUBOLT+ AND OVERHEAD TRUBOLT+ WEDGE ANCHOR DESIGN INFORMATION[1]

Characteristic	Symbol	Units	Nominal Anchor Diameter (inch)[4]									
			3/8"		1/2"				5/8"		3/4"	
Anchor category	1, 2 or 3	—	1		1				1		1	
Minimum effective embedment depth	h_{ef}	in	1-5/8		2		3-1/4		2-3/4	4-1/4	3-3/4	
Minimum concrete member thickness	h_{min}	in	4	5	4	6	6	8	6	6-1/4	7	8
Critical edge distance	c_{ac}	in	5	3	6	6	7-1/2	6	7-1/2	6-1/2	12	10
Data for Steel Strengths – Tension and Shear												
Minimum specified yield strength	f_y	psi	60,000		55,000				55,000		55,000	
Minimum specified ultimate strength	f_{uta}	psi	75,000		75,000				75,000		75,000	
Effective tensile stress area (neck)	A_{se}	in^2	0.056		0.119				0.183		0.266	
Effective tensile stress area (thread)	A_{se}	in^2	0.075		0.142				0.217		0.332	
Steel strength in tension	N_{sa}	lbf	4,200		8,925				13,725		19,950	
Steel strength in shear, uncracked or cracked concrete [6]	V_{sa}	lbf	1,830		5,175				8,955		14,970	
Steel strength in shear – seismic loads	V_{eq}	lbf	1,545		5,175				8,955		11,775	
Strength reduction factor f for tension, steel failure modes [2]			0.75		0.75				0.75		0.75	
Strength reduction factor f for shear, steel failure modes [2]			0.60		0.65				0.65		0.65	
Data for Concrete Breakout Concrete Pryout Strengths in Tension and Shear												
Effectiveness factor – uncracked concrete	k_{uncr}	—	24		24				24		24	
Effectiveness factor – cracked concrete	k_{cr}	—	17		17				17		17	
Modification factor for cracked and uncracked concrete [3]	$\Psi_{c,N}$	—	1.0		1.0				1.0		1.0	
Coefficient for pryout strength	k_{cp}	—	1.0		1.0		2.0		2.0		2.0	
Load-bearing length of anchor	l_e	in	1.625		2.0		3.25		2.75	4.25	3.75	
Strength reduction factor ϕ for tension, concrete failure modes, Condition B [2]			0.65		0.65				0.65		0.65	
Strength reduction factor ϕ for shear, concrete failure modes, Condition B [2]			0.70		0.70				0.70		0.70	
Data for Pullout Strengths												
Pullout strength, uncracked concrete	$N_{p,uncr}$	lbf	See Footnote [5]		See Footnote [5]		6,540		5,430	8,900	See Footnote [5]	
Pullout strength, cracked concrete	$N_{p,cr}$	lbf	See Footnote [5]		See Footnote [5]				See Footnote [5]		See Footnote [5]	
Pullout strength for seismic loads	N_{eq}	lbf	See Footnote [5]		See Footnote [5]				See Footnote [5]	6,715	See Footnote [5]	
Strength reduction factor f for tension, pullout failure modes, Condition B [2]			See Footnote [5]		0.65				0.65		See Footnote [5]	
Additional Anchor Data												
Axial stiffness in service load range in uncracked concrete	b_{uncr}	lbf/in	100,000		250,000				250,000		250,000	
Axial stiffness in service load range in cracked concrete	b_{cr}	lbf/in	40,000		20,000				20,000		20,000	

For SI: 1 inch = 25.4 mm, 1 in2 = 645.16mm2, 1 lbf = 4.45 N, 1 psi = 0.006895 MPa, 1 lbf • 102/in - 17,500 N/m.

[1] The 1/2", 5/8" and 3/4" diameter Trubolt+ Wedge Anchors are ductile steel elements as defined by ACI 318 D.1. The 3/8" diameter Trubolt+ is considered ductile under tension loading and brittle under shear loading.

[2] All values of ϕ apply to the load combinations of IBC Section 1605.2, ACI 318 Section 9.2 or UBC Section 1612.2. If the load combinations of Appendix C or UBC Section 1909.2 are used, the appropriate value of ϕ must be determined in accordance with ACI 318 D.4.5. For installations where reinforcement that complies with ACI 318 Appendix D requirements for Condition A is present, the appropriate ϕ factor must be determined in accordance with ACI 318 D.4.4.

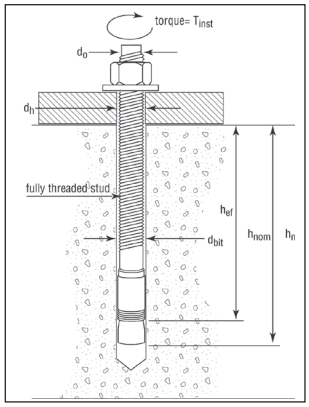
[3] For all design cases $\Psi_{c,N} = 1.0$. The appropriate effectiveness factor for cracked concrete (k_{cr}) or uncracked concrete (k_{uncr}) must be used.

[4] The actual diameter for the 3/8" diameter anchor is 0.361" for the 5/8" diameter anchor is 0.615" and the 3/4" diameter anchor is 0.7482".

[5] Anchor pullout strength does not control anchor design. Determine steel and concrete capacity only.

[6] Steel strength in shear values are based on test results per ACI 355.2, Section 9.4 and must be used for design.

TRUBOLT+ WEDGE ANCHOR (INSTALLED)



TRUBOLT+ AND OVERHEAD TRUBOLT+ WEDGE INSTALLATION INFORMATION

Parameter	Notation	Units	Nominal Achor Diameter (inch)									
			3/8		1/2				5/8		3/4	
Anchor outer diameter	d_o	inches	0.361		0.5				0.615		0.7482	
Nominal carbide bit diameter	d_{bit}	inches	3/8		1/2				5/8		3/4	
Effective embedment depth	h_{ef}	inches	1-5/8		2		3-1/4		2-3/4	4-1/4	3-3/4	
Minimum anchor embedment depth	h_{nom}	inches	2		2-1/2		3-3/4		3-1/4	4-3/4	4-3/8	
Minimum hole depth[1]	h_o	inches	2-1/4		2-3/4		4		3-1/2	5	4-5/8	
Minimum concrete member thickness[1]	h_{min}	inches	4	5	4	6	6	8	6	6-1/4	7	8
Critical edge distance[1]	c_{ac}	In.	5	3	6	6	7-1/2	6	7-1/2	6-1/2	12	10
Minimum anchor spacing[1]	s_{min}	In.	3-1/2	2-1/2	6	5-3/4	4	5-3/4	8	6	6	6
Minimum edge distance[1]	c_{min}	In.	3		6				7-1/2	5	7-1/2	7-1/2
Minimum overall anchor length	l	inches	2-1/2		3-3/4		4-1/2		4-1/4	6	5-1/2	
Installation torque	T_{inst}	ft-lb	30		45				90		110	
Minimum diameter of hole in fastened part	d_h	inches	1/2		5/8				3/4		7/8	

For SI: 1 inch = 25.4 mm, 1 ft-lb = 1.356 N-m.

APPENDIX C: Strength Design Performance values in accordance to 2006 and 2009 IBC

TRUBOLT+ AND *OVERHEAD* TRUBOLT+ WEDGE ANCHOR ALLOWABLE STRESS DESIGN (ASD) VALUES FOR ILLUSTRATIVE PURPOSES

Anchor Notation	Anchor Embedment Depth	Effective Embedment Depth	Allowable Tension Load
	(inches), h_{nom}	(inches), h_{ef}	(lbs)
3/8	2	1-5/8	1,090
1/2	2-1/2	2	1,490
	3-3/4	3-1/4	2,870
5/8	3-1/4	2-3/4	2,385
	4-3/4	4-1/4	3,910
3/4	4-3/8	3-3/4	3,825

For SI: 1 inch = 25.4 mm, 1 ft-lb = 4.45N.
Design Assumptions:
1 Single anchor with static shear load only.
[2] Load combinations from 2006 IBC, Sections 1605.2.1 and 1605.3.1 (no seismic loading).
[3] Thirty percent dead load and 70 percent live load, controlling load combination 1.2D + 1.6L
[4] Calculation of weighted average: 1.2D + 1.6L = 1.2 (0.3) + 1.6 (0.7) = 1.48
[5] Values do not include edge distance or spacing reductions.

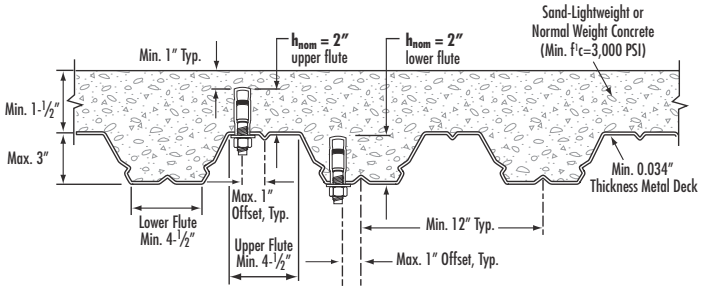
ITW RED HEAD TRUBOLT+ and *OVERHEAD* TRUBOLT+ WEDGE ANCHOR DESIGN INFORMATION FOR INSTALLATION IN THE SOFFIT OF CONCRETE FILL ON METAL DECK FLOOR AND ROOF ASSEMBLIES

TRUBOLT+ AND *OVERHEAD* TRUBOLT+ WEDGE ANCHOR DESIGN INFORMATION

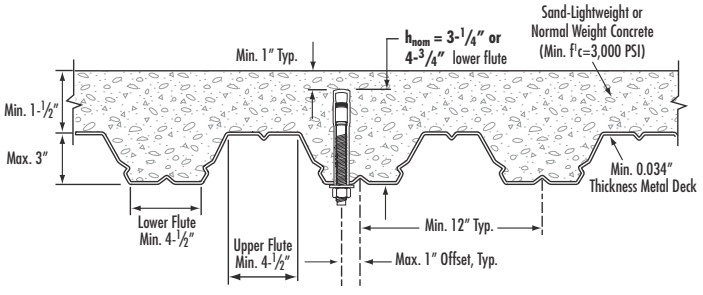
Characteristic	Symbol	Units	Nominal Anchor Diameter				
			3/8"	1/2"		5/8"	
			Upper /Lower	Upper /Lower	Lower Only	Lower Only	Lower Only
			h_{ef} = 1-5/8"	h_{ef} = 2"	h_{ef} = 3-1/4"	h_{ef} = 2-3/4"	h_{ef} = 4-1/4"
Pullout strength, uncracked concrete over metal deck	$N_{p, deck, uncr}$	lbf	2,170	2,515	5,285	3,365	6,005
Pullout strength, cracked concrete over metal deck	$N_{p, deck, cr}$	lbf	1,650	1,780	4,025	2,405	5,025
Reduction factor for pullout strength in tension, Condition B	ϕ	––	0.65				
Shear strength, uncracked concrete over metal deck	$V_{p, deck, uncr}$	lbf	1,640	2,200	3,790	2,890	6,560
Reduction factor for steel strength in shear	ϕ	––	0.60	0.65			
Anchor embedment depth	h_{nom}	in	2.0	2.5	3.75	3.25	4.75

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

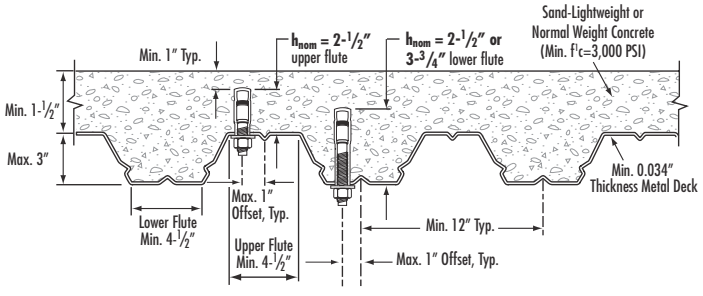
Nominal Anchor Diameter = 3/8″



Nominal Anchor Diameter = 5/8″



Nominal Anchor Diameter = 1/2″



ITW Red Head®

National Headquarters
2171 Executive Drive, Suite 100
Addison, IL 60101
Phone: 630-350-0370
Fax: 630-495-6158
www.itwredhead.com

Technical Support
Phone: 800-899-7890
Fax: 630-495-6204

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