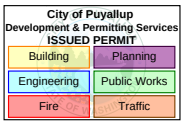
Reliable®




# Model G Series Standard-Response Sprinklers

## Features

- Standard coverage, standard-response sprinklers
- Upright, pendent, horizontal sidewall, and vertical sidewall deflectors
- Robust solder capsule thermal element
- Available in a wide variety of finishes

## Product Description

Reliable Model G Series sprinklers are standard-response standard spray automatic sprinklers using a solder capsule thermal element. The solder is captured in the cylinder of the capsule by a stainless steel ball. When the solder melts, the ball moves into the cylinder allowing the thermal element to fall away from the sprinkler. When this occurs, the compressed strut and lever spring free from the sprinkler. System pressure then clears the waterway of all operating parts allowing the deflector to evenly distribute water.

Pendent and horizontal sidewall sprinklers may be installed exposed or surface mounted using escutcheons such as the Reliable Models B, C, or HB (reference Technical Bulletin 204).

When installed recessed, the Model G Series sprinklers are specifically listed with and may only be installed with listed Reliable escutcheons. Refer to the technical information on the following pages for specific listings for recessed installations and Figures 6 and 7 for dimensional information.

**Important!** Reliable fire sprinklers must be handled, stored, and installed in accordance with the guidelines in Caution Sheet 310 and this bulletin. Failure to follow these instructions may result in unintended operation or nonoperation of the fire protection system.

Upright

Pendent

**Note:** Not all versions of the product are shown.

When fitted with an approved water shield, these sprinklers may considered intermediate sprinklers for use in racks, below grated walkways, and other areas where intermediate level sprinklers are required.

**Sprinkler Summary** — **Table A**

| Model | K-Factor gpm/psi$^{1/2}$ (lpm/bar$^{1/2}$) | Listings & Approvals | Threads | Sprinkler Identification Number (SIN) |
|---|---|---|---|---|
| G Upright | 2.8 (40) | UL, FM | 1/2" NPT, ISO 7-R1/2 | R1021 |
| | 4.2 (60) | UL | 1/2" NPT, ISO 7-R1/2 | R1023 |
| | 5.6 (80) | UL, FM, LPCB, EC, UKCA | 1/2" NPT, ISO 7-R1/2 | R1025 |
| | 8.0 (115) | UL, FM | 1/2" NPT, ISO 7-R1/2 | R1026 |
| | 8.0 (115) | UL, FM, LPCB, EC, UKCA | 3/4" NPT, ISO 7-R3/4 | R1027 |
| G Upright Intermediate | 5.6 (80) | UL, FM | 1/2" NPT, ISO 7-R1/2 | R1425 |
| | 8.0 (115) | UL, FM | 3/4" NPT, ISO 7-R3/4 | R1427 |
| G Pendent | 2.8 (40) | UL, FM | 1/2" NPT, ISO 7-R1/2 | R1011 |
| | 4.2 (60) | UL | 1/2" NPT, ISO 7-R1/2 | R1013 |
| | 5.6 (80) | UL, FM | 1/2" NPT, ISO 7-R1/2 | R1015 |
| | 8.0 (115) | UL, FM, LPCB, EC, UKCA | 3/4" NPT, ISO 7-R3/4 | R1017 |
| G Horizontal Sidewall | 2.8 (40) | UL | 1/2" NPT, ISO 7-R1/2 | R1231 |
| | 4.2 (60) | UL | 1/2" NPT, ISO 7-R1/2 | R1233 |
| | 5.6 (80) | UL, FM, LPCB | 1/2" NPT, ISO 7-R1/2 | R1235 |
| | 8.0 (115) | UL | 1/2" NPT, ISO 7-R1/2 | R1236 |
| | 8.0 (115) | UL | 3/4" NPT, ISO 7-R3/4 | R1237 |
| G Vertical Sidwall | 5.6 (80) | FM, LPCB, EC, UKCA | 1/2" NPT, ISO 7-R1/2 | R1285 |

## Model G Upright Sprinkler

**Technical Specifications**
- **Style:** Upright
- **Threads:** (see Table B)
- **Nominal K-Factor:** (See Table B)
- **Max. Working Pressure:** 175 psi (12 bar)

**Material Specifications**
- **Thermal Sensor:** Solder capsule
- **Sprinkler Frame:** Brass Alloy
- **Cap:** Bronze Alloy with PTFE
- **Load Screw:** Brass Alloy
- **Deflector:** Brass Alloy

**Sprinkler Finishes**
(See Table F)

**Sensitivity**
Standard response

**Temperature Ratings**
135°F (57°C)
165°F (74°C)
212°F (100°C)
286°F (141°C)

**Guards & Shields**
D-1 Guard (UL)
C-1 Guard (FM)
C-3 Guard with Shield (UL, FM on R1025, R1026, and R1027 only)

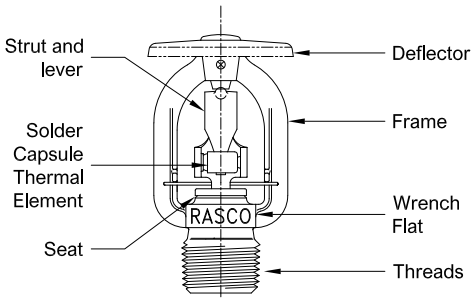
**Sprinkler Wrench**
Model W2

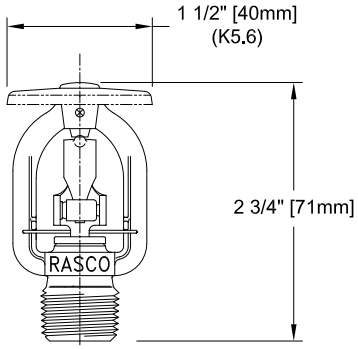
**Listings and Approvals**
(See Table B)

### Model G Upright Sprinkler Components and Dimensions

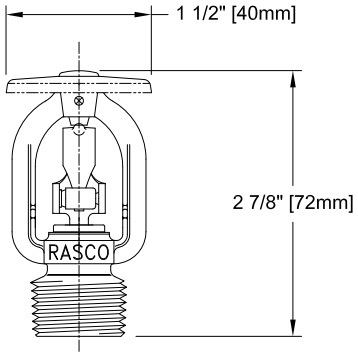
**Figure 1**

Note: Deflector on K2.8 and K4.2 Model G Upright is 1-1/4" (32 mm) diameter.




Shown with 1/2" Threads




Shown with 3/4" Threads

### Model G Upright Sprinklers

**Table B**

| SIN | K-factor (US) | K-factor (Metric) | Threads | Approvals |
|---|---|---|---|---|
| R1021 | 2.8 | 40 | 1/2” NPT, ISO 7-R1/2 | UL, FM |
| R1023 | 4.2 | 60 | 1/2” NPT, ISO 7-R1/2 | UL |
| R1025 | 5.6 | 80 | 1/2” NPT, ISO 7-R1/2 | UL, FM, LPCB, EC: 1438-CPR-0053 UKCA: 0832-UKCA-CPR-S5104 |
| R1026 | 8.0 | 115 | 1/2” NPT, ISO 7-R1/2 | UL, FM |
| R1027 | 8.0 | 115 | 3/4” NPT, ISO 7-R3/4 | UL, FM, LPCB, EC: 1438-CPR-0053 UKCA: 0832-UKCA-CPR-S5104 |

## Model G Intermediate Upright Sprinkler

**Technical Specifications**
- **Style:** Intermediate Upright
- **Threads:** (See Table C)
- **Nominal K-Factor:** (See Table C)
- **Max. Working Pressure:** 175 psi (12 bar)

**Material Specifications**
- **Thermal Sensor:** Solder Capsule
- **Sprinkler Frame:** Brass Alloy
- **Cap:** Bronze Alloy with PTFE
- **Load Screw:** Brass Alloy
- **Deflector:** Brass Alloy

**Sprinkler Finishes**
Bronze (Only)

**Sensitivity**
Standard response

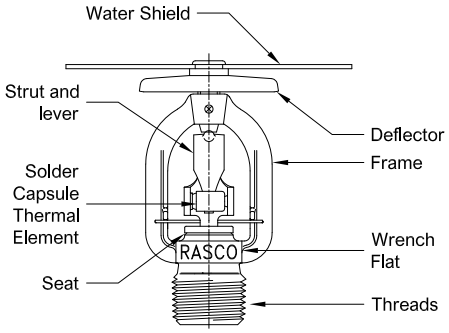
**Temperature Ratings**
135°F (57°C)
165°F (74°C)
212°F (100°C)
286°F (141°C)

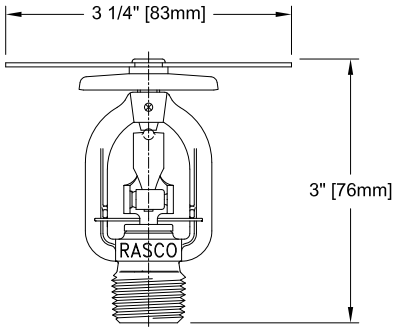
**Guards & Shields**
Factory Water Shield (cULus, FM)

**Sprinkler Wrenches**
Model W2

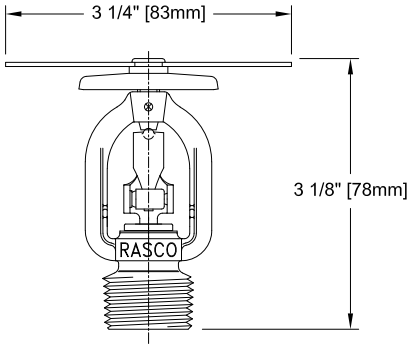
**Listings and Approvals**
(See Table C)

**Model G Intermediate Upright Sprinkler Components and Dimensions** — **Figure 2**




Shown with 1/2" Threads




Shown with 3/4" Threads

**Model G Intermediate Upright Sprinklers** — **Table C**

| SIN | K-factor (US) | K-factor (Metric) | Threads | Approvals |
|---|---|---|---|---|
| R1425 | 5.60 | 80 | 1/2” NPT, ISO 7-R1/2 | UL, FM |
| R1427 | 8.00 | 115 | 3/4” NPT, ISO 7-R3/4 | UL, FM |

## Model G Pendent Sprinkler

**Technical Specifications**
- **Style:**
  - Pendent
  - Recessed Pendent
- **Threads:** (See Table D)
- **Nominal K-Factor:** (See Table D)
- **Max. Working Pressure:**
  - 175 psi (12 bar)

**Material Specifications**
- **Thermal Sensor:** Solder Capsule
- **Sprinkler Frame:** Brass Alloy
- **Cap:** Bronze Alloy with PTFE
- **Load Screw:** Brass Alloy
- **Deflector:** Brass Alloy

**Sprinkler Finishes**
(See Table F)

**Sensitivity**
Standard response

**Temperature Ratings**
135°F (57°C)
165°F (74°C)
212°F (100°C)
286°F (141°C)[1]

**Recessed Escutcheons**
G (cULus, all SIN)
G (FM, SIN R1015 only)[2]
F1 (cULus, all SIN)
F1 (LPCB, SIN R1015 only)

**Guards & Shields[3]**
D-1 Guard (UL)
D-5 Guard and Shield (UL, R1015 and R1017)
C-1 Guard (FM)
C-5 Guard with Shield (FM on R1015 and R1017 only)
S-1 (1/2") Shield (cULus, FM, R1015 only)
S-2 (3/4") Shield (cULus, FM, R1017 only)

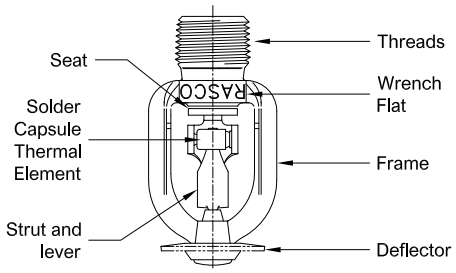
**Sprinkler Wrenches**
Model W2 (non-recessed pendent)
Model RC1 (recessed pendent)

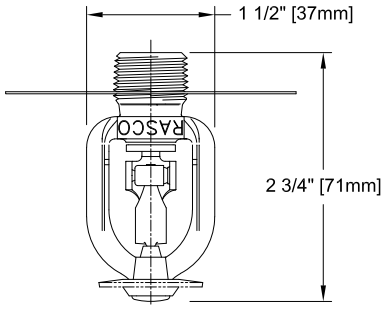
**Listings and Approvals**
(See Table D)

**Notes:**
1. 286°F (141°C) temperature rated sprinklers not approved for recessed installations.
2. FM Approval of Model G Recessed sprinkler for ordinary and extra hazard occupancies is limited to wet pipe systems only.
3. Not suitable for recessed installations.

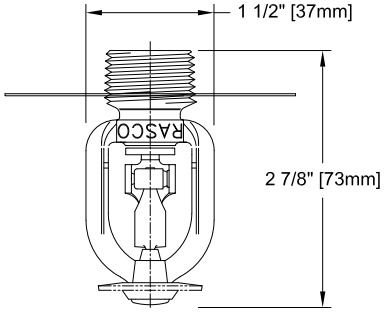
### Model G Pendent Sprinkler Components and Dimensions

**Figure 3**




Shown with 1/2" threads and optional 3-1/4" (83mm) diameter S1 Water Shield (order separately)




Shown with 3/4" threads and optional 3-1/4" (83mm) diameter S2 Water Shield (order separately)

### Model G Pendent Sprinklers

**Table D**

| SIN | K-factor (US) | K-factor (Metric) | Threads | Approvals |
|---|---|---|---|---|
| R1011 | 2.8 | 40 | 1/2" NPT, ISO 7-R1/2 | UL, FM |
| R1013 | 4.2 | 60 | 1/2" NPT, ISO 7-R1/2 | UL |
| R1015 | 5.6 | 80 | 1/2" NPT, ISO 7-R1/2 | UL, FM |
| R1017 | 8.0 | 115 | 3/4" NPT, ISO 7-R3/4 | UL, FM, LPCB, EC: 1438-CPR-0053 UKCA: 0832-UKCA-CPR-S5104 |

## Model G Horizontal Sidewall Sprinkler

**Technical Specifications**
**Style:** Horizontal Sidewall
**Threads:** (See Table E)
**Nominal K-Factor:** See Table E
**Max. Working Pressure:**
175 psi (12 bar)

**Material Specifications**
**Thermal Sensor:** Solder Capsule
**Sprinkler Frame:** Brass Alloy
**Cap:** Bronze Alloy with PTFE
**Load Screw:** Brass Alloy
**Deflector:** Brass Alloy

**Sprinkler Finishes**
(See Table F)

**Sensitivity**
Standard response

**Temperature Ratings**
135°F (57°C)
165°F (74°C)
212°F (100°C)
286°F (141°C)

**Recessed Escutcheons**[1][2]
F1 (UL)

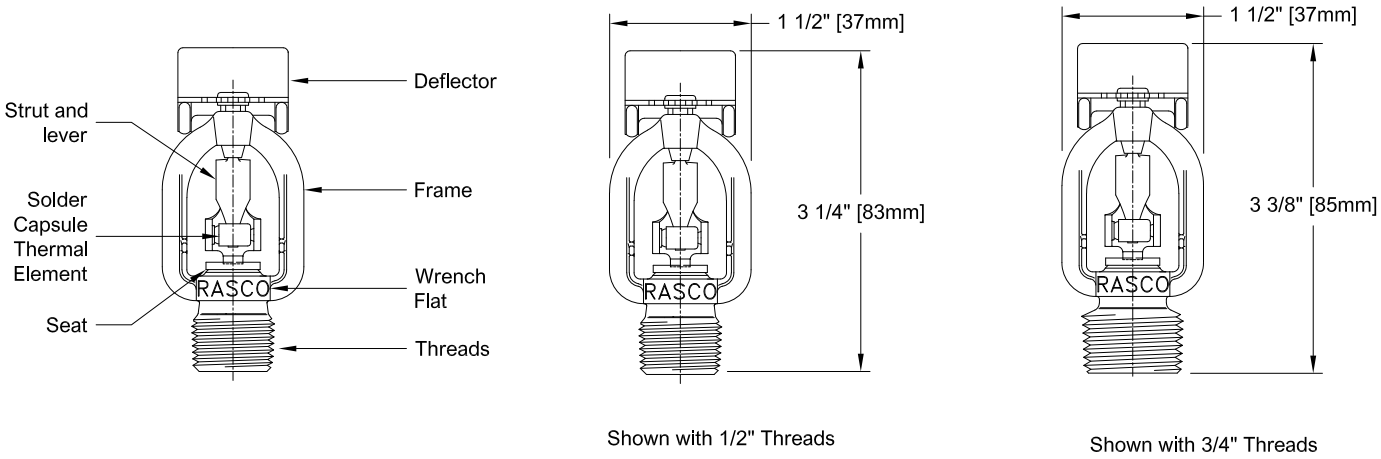
**Guards & Shields**[3]
D-1 Guard (UL, all SIN)
C-1 Guard (FM, SIN R1235 only)

**Sprinkler Wrenches**
Model W2 (non-recessed sidewall)
Model RC-1 (recessed sidewall)

**Listings and Approvals**[4]
(See Table E)

**Notes:**
1. Listed for use with 135°F (57°C) temperature rated sprinkler only.
2. Listed for Light Hazard ONLY when installed recessed.
3. Not suitable for recessed horizontal sidewall installations.
4. Listed for light hazard only, except for SIN R1235 is cULus Listed for ordinary hazard when exposed or surface mounted.

**Model G Horizontal Sidewall Sprinkler Components and Dimensions** — **Figure 4**




**Note:** Please refer to Figure 7 for recessed installation.

**Model G Horizontal Sidewall Sprinklers** — **Table E**

| SIN | K-factor (US) | K-factor (Metric) | Threads | Approvals |
|---|---|---|---|---|
| R1231 | 2.8 | 40 | 1/2” NPT, ISO 7-R1/2 | UL |
| R1233 | 4.2 | 60 | 1/2” NPT, ISO 7-R1/2 | UL |
| R1235 | 5.6 | 80 | 1/2” NPT, ISO 7-R1/2 | UL, FM, LPCB |
| R1236 | 8.0 | 115 | 1/2” NPT, ISO 7-R1/2 | UL |
| R1237 | 8.0 | 115 | 3/4” NPT, ISO 7-R3/4 | UL |

## Model G Vertical Sidewall Sprinkler — SIN R1285

**Technical Specifications**
- **Style:**
  - Upright Vertical Sidewall
  - Pendent Vertical Sidewall
- **Threads:** 1/2" NPT or ISO 7-R1/2
- **Nominal K-Factor:** 5.6 (80 metric)
- **Max. Working Pressure:** 175 psi (12 bar)

**Material Specifications**
- **Thermal Sensor:** Solder Capsule
- **Sprinkler Frame:** Brass Alloy
- **Cap:** Bronze Alloy with PTFE
- **Load Screw:** Brass Alloy
- **Deflector:** Brass Alloy

**Sprinkler Finishes**
(See Table F)

**Sensitivity**
Standard response

**Temperature Ratings**
135°F (57°C)
165°F (74°C)
212°F (100°C)
286°F (141°C)

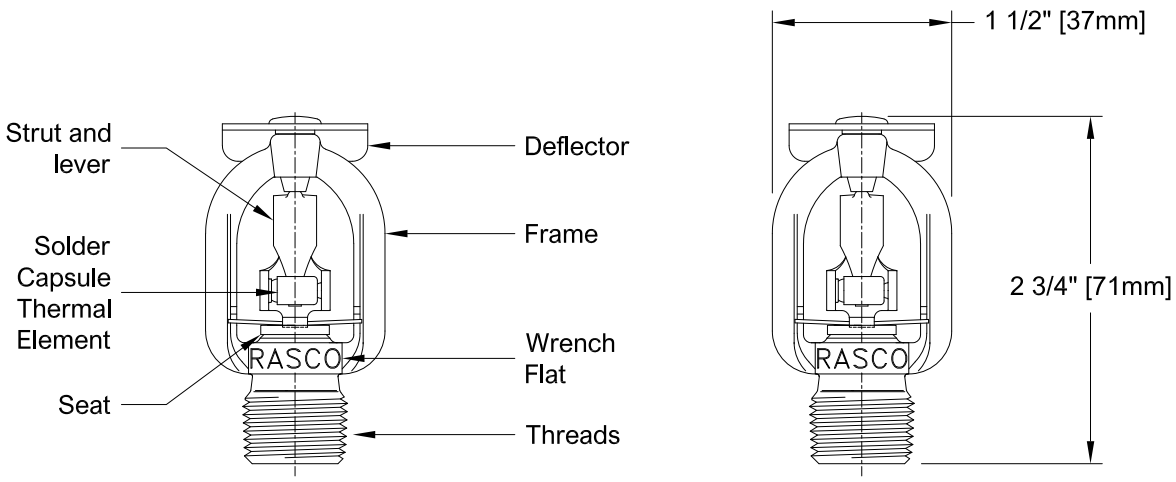
**Guards & Shields**
C-1 Guard (FM)

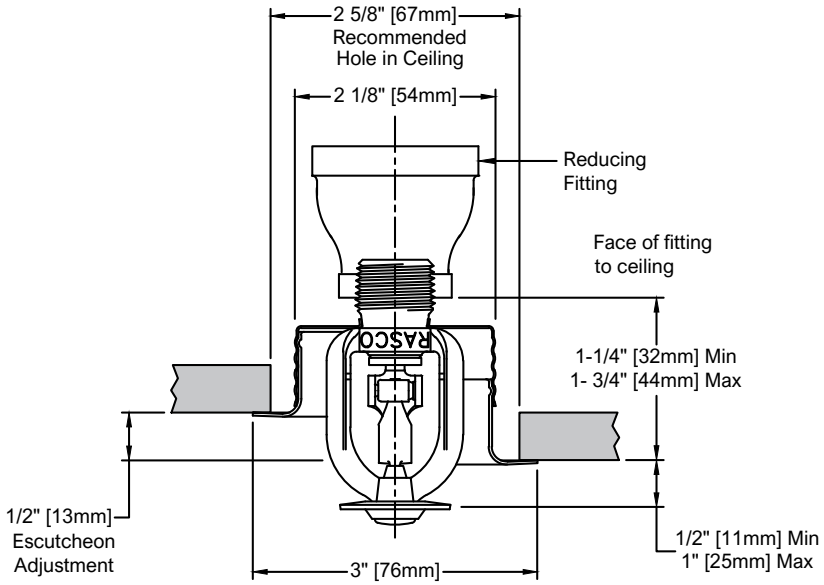
**Sprinkler Wrenches**
Model W2

**Listings and Approvals**[1]
FM Approved
LPCB
EC (1438-CP-0055)
UKCA: 0832-UKCA-CPR-S5104

**Notes:**
1. Listed and approved for Light Hazard ONLY.

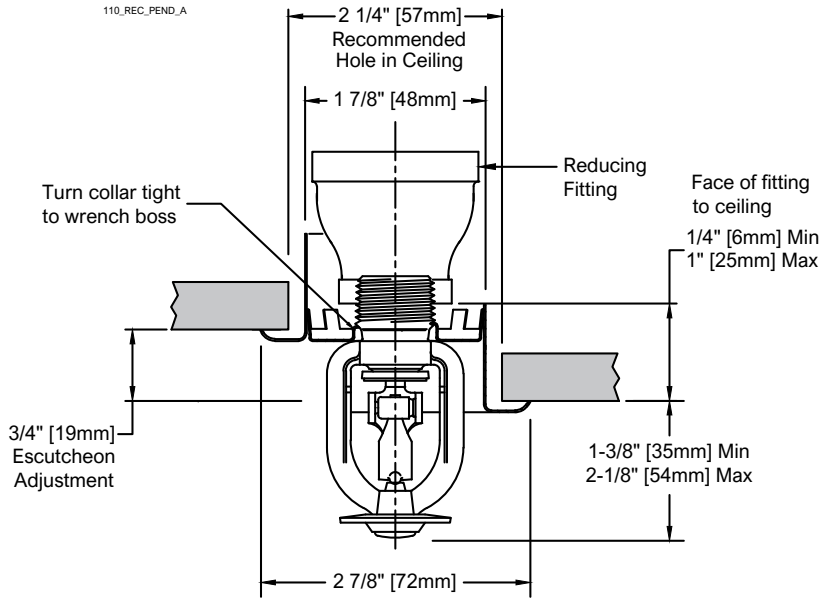
### Model G Vertical Sprinkler Components and Dimensions — Figure 5



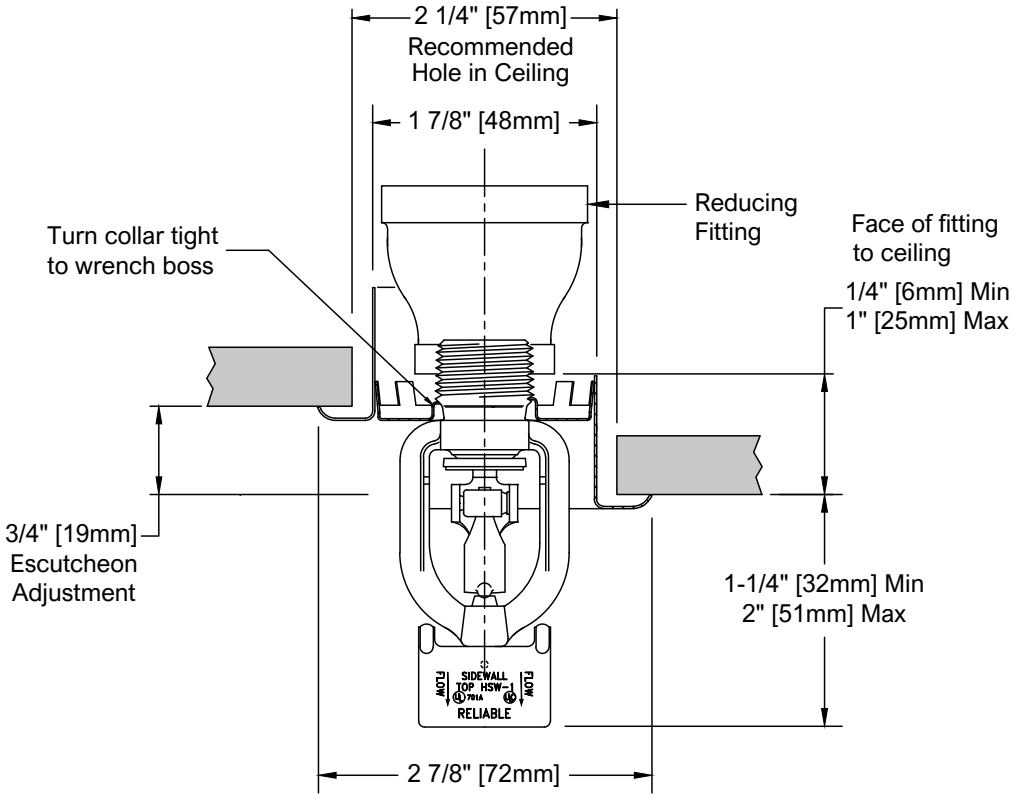



MODEL G RECESSED SPRINKLER

Note: Model G Recessed sprinklers utilizing vented cups may not be used where the pressure in the space above the ceiling is positive with respect to the protected area. Ensure that the openings around the sprinkler cup are unobstructed following installation.




MODEL G PENDENT SPRINKLER
WITH MODEL F1 RECESSED ESCUTCHEON




MODEL G HORIZONTAL SIDEWALL SPRINKLER
WITH MODEL F1 RECESSED ESCUTCHEON
(TOP VIEW)
110RECHSW

G Escutcheon

F1 Recessed

## Wrenches


Model W2 (upright, pendent, sidewall)


Model RC1 (recessed)

**Finishes[1][2]** **Table F**

| Standard Finishes | | Special Application Finishes | |
|---|---|---|---|
| **Sprinkler** | **G and F1 Recessed Escutcheons** | **Sprinkler** | **G and F1 Recessed Escutcheons** |
| Bronze | Brass | Bright Brass[5] | Bright Brass |
| Chrome | Chrome | Satin Chrome | Satin Chrome |
| White Polyester[3][4] | White Polyester | Custom Color Polyester[3][4] | Custom Color Polyester |
| | | Lead Plated[6][7][9] | |
| | | Wax Coated[6][7][8] | |
| | | Wax Over Lead[6][7][8][9] | |

**Notes:**
1. Other finishes and colors are available on special order. Consult your Reliable sales representative for details.
2. Paint or any other coating applied over the factory finish will void all approvals and warranties.
3. The Model G Recessed assembly consists of a sprinkler mounted in a galvanized steel cup with a finished trim ring.
4. Only frame and deflector are coated, operating parts are chrome plated.
5. For 212°F (100°C) maximum temperature rated sprinklers only.
6. Not suitable for use with recessed installations.
7. cULus Listed as corrosion resistant.
8. Clear wax used on ordinary temperature rated sprinklers; brown wax used on intermediate temperature rated sprinklers. Brown wax may be used on high temperature rated sprinklers where the ambient temperature does not exceed 150°F (66°C).
9. Not suitable for use on the 5.6K pendent (R1015).

## Maintenance

Reliable Model G series sprinklers should be inspected and the sprinkler system maintained in accordance with NFPA 25, as well as the requirements of any authorities having jurisdiction.

Prior to installation, sprinklers should remain in the original cartons and packaging until used. This will minimize the potential for damage to sprinklers that could cause improper operation or non-operation.

Do not clean sprinklers with soap and water, ammonia liquid or any other cleaning fluids. Remove dust by gentle vacuuming without touching the sprinkler.

Replace any sprinkler which has been painted (other than factory applied). A stock of spare sprinklers should be maintained to allow quick replacement of damaged or operated sprinklers. Failure to properly maintain sprinklers may result in inadvertent operation or non-operation during a fire event.

## Application

Model G Series standard spray upright and pendent sprinklers having K-factors of 5.6 (80) and higher are permitted to be used in all occupancy classifications and building construction types unless otherwise noted.

Model G Series standard spray upright and pendent sprinklers having K-factors less than 5.6 (80) are limited to light hazard occupancies.

Model G Series sidewall sprinklers shall only be installed in light hazard occupancies with smooth, horizontal or sloped, flat ceilings unless otherwise noted.

## Installation

Model G Series sprinklers must be installed in accordance with NFPA 13 and the requirements of all applicable authorities having jurisdiction

Model G Series sprinklers must be installed with the Reliable sprinkler installation wrench identified in this Bulletin. Any other wrench may damage the sprinkler. A leak tight sprinkler joint can be obtained with a torque of 8 to 18 lb-ft (11 - 24 N·m) for 1/2" sprinklers and a torque of 14-20 lb-ft (19 - 27 N·m) for 3/4" sprinklers after applying appropriate thread sealant.

Do not tighten sprinklers over the maximum recommended installation torque. Exceeding the maximum recommended installation torque may cause leakage or impairment of the sprinkler.

## Guarantee

For the guarantee, terms, and conditions, visit www.reliablesprinkler.com.

## Ordering Information

**Specify the following when ordering:**

**Model**
- G

**Deflector/Orientation**
- Upright
- Upright Intermediate
- Pendent
- G Recessed
- Horizontal Sidewall
- Vertical Sidewall

**Temperature Rating**
- See sprinkler technical specifications

**Sprinkler Finish**
- See Table F

**Recessed Escutcheon***
- G
- F1

**Escutcheon Finish**
- See Table F

**Sprinkler Wrench**
- Model W2 (upright, non-recessed pendent, and sidewall)
- Model RC1 (recessed)

**Guards and Shields**
- See sprinkler technical specifications

***Note:** 286°F (141°C) sprinklers are not listed to be used recessed.

P/N 9999970005

ANVIL®
INTERNATIONAL

# FLEXHEAD®

## FLEXIBLE FIRE SPRINKLER CONNECTIONS


ANVIL® INTERNATIONAL
*Building Connections That Last*

# The Flexhead® Advantage

## QUALITY

- **BEST CORROSION RESISTANCE**
  Made from 100% 304 stainless steel
- **EXCELLENT FRICTION LOSS VALUES**
  One-inch true-bore ID reducing the need to upsize mains and branch lines, 1¼" ID available
- **PRESSURE SURGE PROTECTION**
  Fully braided connection improves pressure capability and prevents hose damage
- **HIGHEST MAXIMUM WORKING PRESSURE**
  Available up to 300 PSI
- **NO O-RINGS OR GASKETS**
  Welded connections reduce potential leak points at the inlet and outlet fitting
- **TIGHTEST THREAD TOLERANCES**
  Outlet fitting threads are machined from solid bar stock reducing potential leaks at the sprinkler head fit-up
- **EXTRA STABILITY BRACKET**
  A full 6-inch base to stabilize the sprinkler head during installation, pressurization or activation

## FEATURES

- Is seismically qualified, eliminating the need for an oversized ring around the sprinkler head in seismic areas
- Has the same product design that is dual listed by both UL and FM
- Can be produced to meet all your project requirements
- Hoses have serial identification with complete audit tracking of finished goods
- Hose has comprehensive limited warranty backed by an A++ insurance company
- Offers a variety of flexible fire sprinkler connections, suspended ceilings, gypsum board ceilings, freezer, coolers, institutional applications, cleanroom and duct applications
- Offers 1.25" FlexHead® hose for superior friction loss numbers
- The 3" Tall MPT Bracket allows the sprinkler to install the FlexHead® system without touching the ceiling tile

FLEXHEAD®

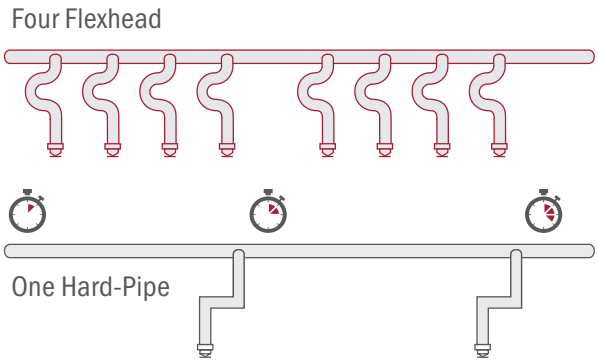
# Connect sprinkler heads to sub-mains at least four times faster.

FlexHead systems connect sprinkler heads to sprinkler sub-mains in about a quarter of the time it takes to install hard pipe. Expect even greater savings in retrofits, where FlexHead installs six to seven times faster than hard pipe.

Increase productivity with the ease of installation, no need to install hangers and there is no on-site assembly required. Every sprinkler connection is a finished, pre-constructed assembly, from the 1" pipe connector to the sprinkler head outlet. In addition, FlexHead provides seismic protection to sprinkler heads allowing for deflection during a seismic event.

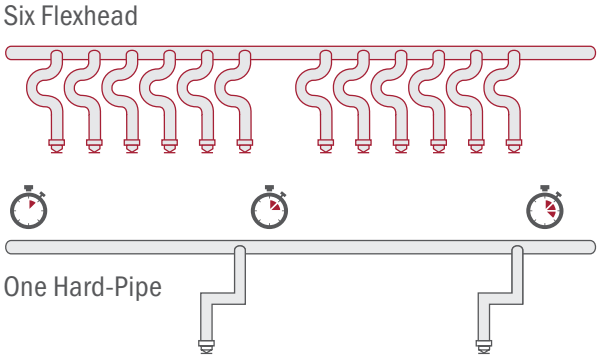
## NEW CONSTRUCTION COMPARISON

During a typical installation, a minimum of four FlexHeads can be installed in the same time it takes to do one hard-pipe.




## RETROFIT COMPARISON

During a typical installation, a minimum of six FlexHeads can be installed in the same time it takes to do one hard-pipe. Retrofits in less time.




### WANT PINPOINT LOCATIONS? NO PROBLEM.

The design makes it easy to accurately locate sprinkler heads every time. If the spec calls for center-of-tile placement, you can do it with ease. In fact, you get center-of-tile placement every install whether the spec calls for it or not. It takes one more headache out of specifying and bidding.

### ACCOMMODATE FLOOR PLAN CHANGES.

Need to relocate sprinkler heads? No problem. With its built-in flexibility it's much easier to move heads to a new location to accommodate new layouts or uses of the space.

### RETROFITS IN LESS TIME.

Need to comply to code in unsprinklered buildings? In contrast to costly and labor-intensive hard-pipe retrofits, FlexHead connections install in minutes in even the most restrictive spaces.

### SHORTEN YOUR TIME TO OCCUPANCY.

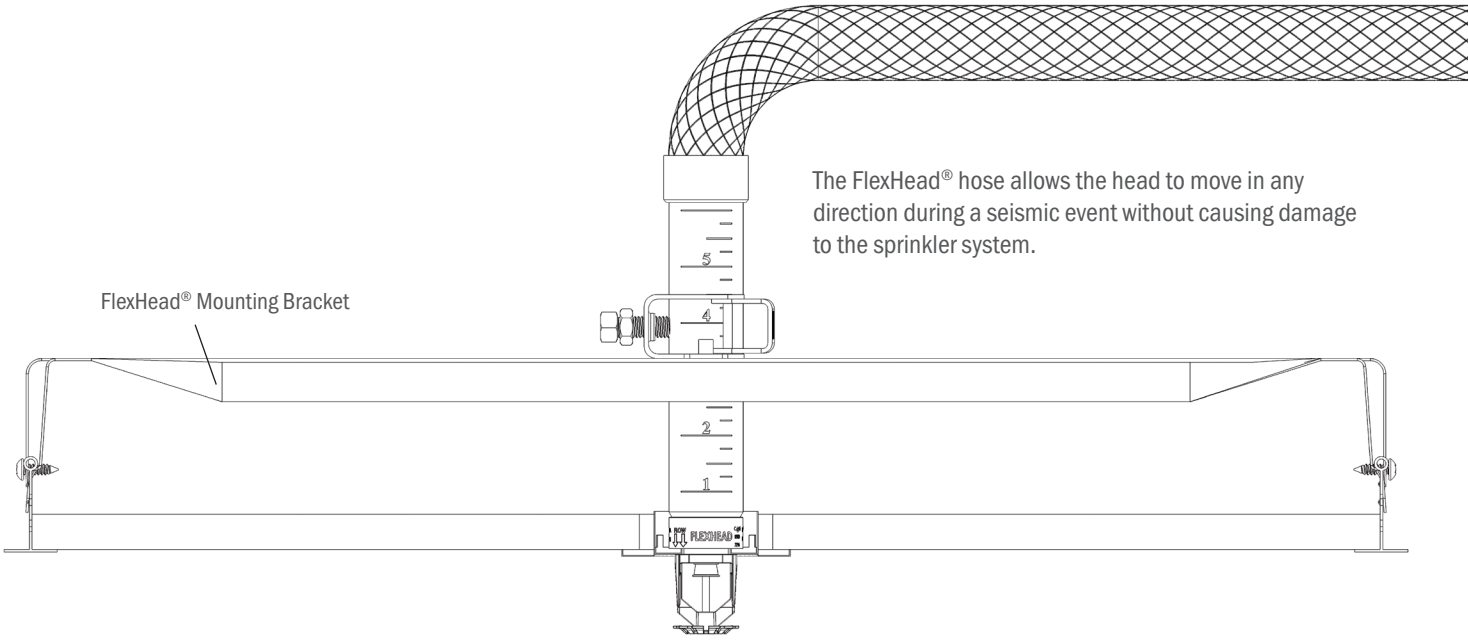
Faster installation times help get end-users into their spaces more quickly—and get installers on their next projects faster. FlexHead connections virtually eliminate punch list items commonly found with hard-pipe armovers.

# NFPA 13 CODE LANGUAGES & SEISMIC QUALIFICATION

## NFPA 13 STANDARDS FOR INSTALLATION OF SPRINKLER SYSTEMS 2019

| | |
|---|---|
| 17 .4.1.3.3* | Flexible Sprinkler Hose Fittings |
| 17.4.1.3.3.1 | Listed flexible sprinkler hose fittings and their anchoring components intended for use in installations connecting the sprinkler system piping to sprinklers shall be installed in accordance with the requirements of the listing, including any installation instructions. |
| 17.4.1.3.3.2 | When installed and supported by suspended ceilings, the ceiling shall meet ASTM C635/C635M, *Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings*, and shall be installed in accordance with ASTM C636/C636M, *Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.* |
| 17.4.1.3.3.3* | Where flexible sprinkler hose fittings exceed 6 ft (1.8 m) in length and are supported by a suspended ceiling in accordance with 17.4.1.3.3.2, a hanger(s) attached to the structure shall be required to ensure that the maximum unsupported length does not exceed 6 ft (1.8 m) . |
| 17 .4.1.3.3.4* | Where flexible sprinkler hose fittings are used to connect sprinklers to branch lines in suspended ceilings, a label limiting relocation of the sprinkler shall be provided on the anchoring component. |

# FLEXHEAD® SATISFIES SEISMIC CODE REQUIREMENTS

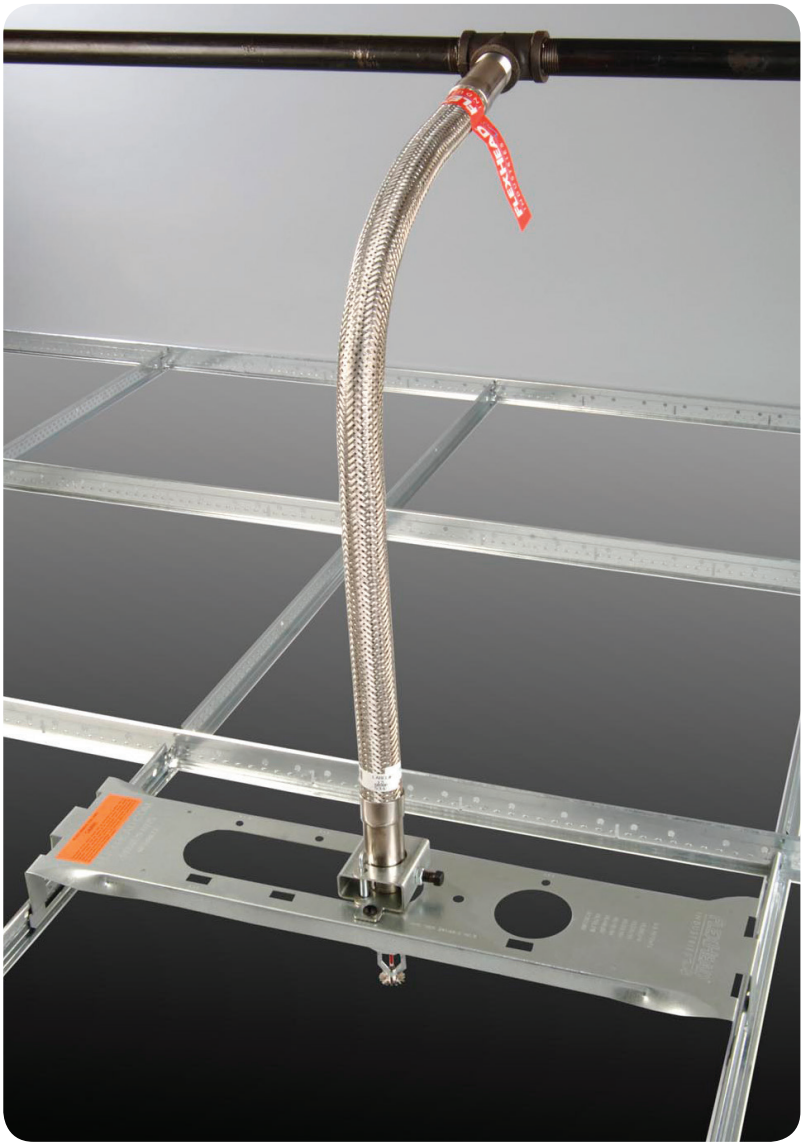



FlexHead® satisfactorily completed full-scale seismic qualification testing at the Structural Engineering Earthquake Simulation Laboratory located at the State University of New York at Buffalo. Tests were conducted using the International Code Council (ICC) acceptance criteria “ICC-ES AC-156 Seismic Qualification Testing of Nonstructural Components”.

- More than 90% of the states in the U.S. are adopting the International Building Code (IBC) that address, among other things, the installation of fire sprinkler systems in seismic zones.
- The latest version of the IBC defers to ASCE 7 and ASTM E580/580M-17 for the sprinkler/ceiling design in Seismic Design Categories C and D, E & F.
- In Seismic Design Category C, suspended ceilings are to be designed and installed in accordance with Ceilings & Interior Systems Construction Association (CISCA) recommendations for Zones 0-2; and sprinkler heads and other penetrations shall have a minimum of ¼ inch clearance on all sides.
- In Seismic Design Categories D, E & F, suspended ceilings are to be designed and installed in accordance with CISCA recommendations for seismic Zones 3 and 4 with some additional requirements. Except where rigid braces are used to limit lateral deflections, sprinkler heads and other penetrations shall have a 2-inch oversized ring, sleeve, or adapter through the ceiling to allow for free movement of at least 1 inch of ceiling movement in all horizontal directions.
- Flexible sprinkler connection provide characteristics that exceed the most stringent seismic code requirements. The flexibility of the hose allows the head to move with the ceiling in any direction during a seismic event without causing damage to the sprinkler system.

# FLEXIBLE FIRE SPRINKLER CONNECTIONS

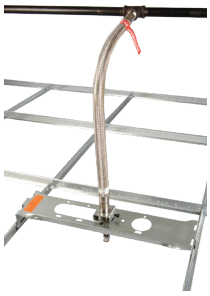
We invented the concept of Flexible Fire Protection™. All our flexible sprinkler pipe and connections are UL Listed and/or FM Approved.



## THE ONLY PRODUCT THAT:

- Has undergone full-scale head deployment testing
- Is seismically qualified for use in Seismic Design Categories D, E & F
- Is made of 100% 304 stainless steel including end fittings
- Is fully welded without the need for o-rings or gaskets

**FLEXHEAD®**
**TRUST THE ORIGINAL™**



## FLEXHEAD® FLEXIBLE FIRE SPRINKLER CONNECTIONS

- UL Listed/ FM Approved
- Undergone full-scale head deployment testing
- Seismically qualified for use in Seismic Design Categories C, D, E & F
- Made of 100% 304 stainless steel including end fittings
- Every FlexHead hose is leak tested before shipment
- Fully welded 304SS hose doesn't contain any O-rings or gaskets

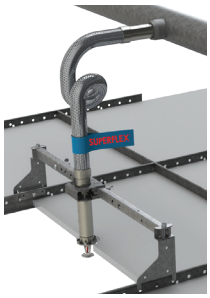
## INSTITUTIONAL FLEXIBLE FIRE SPRINKLER CONNECTIONS

- Available in hose lengths from 24" - 72" Designed to be installed in concrete walls or ceiling penetrations
- Available with open hub UHO-3 bracket for easier installation
- Easy installation in tight spaces
- UL Listed / FM Approved

# FLEXIBLE FIRE SPRINKLER CONNECTIONS

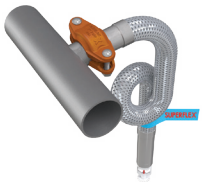
FlexHead® systems connect sprinkler heads to sub-mains at least four times faster than hard pipe. Delivers even greater savings in retrofits. All our flexible sprinkler pipe and connections are UL Listed and/or FM Approved.

## TRUST THE ORIGINAL™



### SUPERFLEX® FLEXIBLE FIRE SPRINKLER CONNECTIONS

- No need to measure or count the number of bends, 72" SuperFlex hose is UL listed for up to (12) bends
- Increased bends create more flexibility during installation
- All Welded, no o-rings
- Quick inspections and sign offs by AHJ's for final walkthrough
- Available with MPT (Multi-positional tail) mounting bracket. No need to touch the ceiling tile during installation.
- Also available with Adjustable ADO24BKT3 mounting bracket.
- UL Listed / FM Approved



### SUPERFLEX® FLEXIBLE FIRE SPRINKLER CONNECTION WITH PATENTED SLT TECHNOLOGY

- Fast and easy installation with 1" integrated SlideLOK® Coupling
- Comes fully assembled
- UL listed for 2" bend radius, up to 12 bends per hose* (72"hose)
- Eliminates taping or doping of threaded fittings
- Flexible design provides versatility for changes in plan
- Installs on a **standard 1"** Welded Outlet
- UL Listed / FM Approved

### 1.25" I.D. HOSE WITH BEST FLOW CHARACTERISTICS

- Best flow characteristics for flexible drops in the industry
- 1¼" NPT Standard, and **1¼" SLT integrated coupling option available**
- Great for tenant improvement projects, similar flow characteristic to 1" pipe
- FM Approved

### FLEXIBLE FIRE SPRINKLER DRY PENDENT SYSTEM

- Suitable for **wet sprinkler systems with a dry pendent sprinkler head** (Dry pendant sprinkler head not included)
- Mounts on the top of freezer or sidewall
- Moves and flexes along with the structure protecting the integrity of the freezer seal
- Now available with a Drain Tee
- FM Approved

# FLEXIBLE FIRE SPRINKLER CONNECTIONS

We invented the concept of Flexible Fire Protection™. All our flexible sprinkler pipe and connections are UL Listed and/or FM Approved.

## TRUST THE ORIGINAL™

### NO TOUCH CEILING TILE TALL BRACKET MOUNTING SYSTEM (MPT24BKT1)

- Superior height allows the “MPT” to be mounted without pre-installing the ceiling tile and comes out of the box fully assembled at 24"
- Within seconds the MPT Bracket can be adjusted from 24" to 16” to 14 ½" in length accommodating numerous applications without additional fabrication
- Adjustable Open Hub allows for swift & accurate repositioning at the 1/4 points
- UL Listed / FM Approved

### ARMSTRONG® TECHZONE™ BRACKET MOUNTING SYSTEM

- The mounting bracket is specifically designed to be compatible with the Armstrong®TechZone™ suspended ceiling systems
- FlexHead TechZone™ mounting bracelets allow for quick TechZone™ ceiling installations. The FlexHead TechZone™ system installs in a quarter of the time compared to typical black pipe armovers.
- Allows for rapid installation or relocation of sprinkler heads in suspended ceilings
- UL Listed / FM Approved


### UHO-3 THREADED ROD INSTALLATION

- “Open Hub” design for quick and easy installation
- Can be installed with ⅜" or ½" threaded rod attachments
- The ⅜" rod is FM approved to be installed up to 4ft off the structure and the ½" threaded rod up to 6ft off the structure
- Good option for temporary fire protection
- Ideal for shell applications; easily transitions from UHO-3 to suspended ceiling bracket
- FM Approved

### DRY WALL CEILING AND SIDEWALL INSTALLATION (ADO16BKT3 & ADO24BKT3)

- FlexHead ADO16BKT3 and ADO24BKT3 can be installed in hard ceilings or sidewall applications.
- For use with FlexHead hose model numbers 20XX, 20XXH, where XX designates hose length in inches.
- FM Approved

# FLEXIBLE FIRE SPRINKLER CONNECTIONS

Whether your application is commercial, industrial, clean room, or institutional, FlexHead® flexible sprinkler systems can save you time and money by offering reliable, highly efficient, seismically qualified, and environmentally responsible products

## DROP NIPPLE FLEXIBLE SPRINKLER CONNECTIONS FOR ANVIL-STRUT™

- Attach to structure with Anvil-Strut™ and pipe clamp
- Drop nipple with reducer (not included)
- Perfect for applications where you have a concrete deck above the ceiling which secures the flexible hose to the building structure.
- This model will have a 1 inch female outlet
- FM Approved

## LOW-PROFILE FLEXIBLE FIRE SPRINKLER CONNECTIONS FOR ANVIL-STRUT™

- Perfect for applications where you have limited space
- The FlexHead Low-Profile Model uses traditional Anvil-Strut™ Channel (not included) to secure the FlexHead sprinkler hose to the building structure
- FM Approved

## INDUSTRIAL/DUCT FLEXIBLE FIRE SPRINKLERS CONNECTIONS

- FlexHead flexible sprinkler systems have been protecting exhaust ducts in semi-conductor/ electronics facilities for more than thirty years
- Quick installation, install in minutes
- No need for inspection port
- Available in Steel, FRP, Polypropylene, and PVC
- Flexible hoses allow for independent motion (sway) between duct and water main to compensate for duct vibration and during possible seismic activity—eliminating potential leaks.
- Allows for quick and easy inspection of sprinkler heads
- FM Approved

## CLASS 100 CLEANROOM FLEXIBLE FIRE SPRINKLER CONNECTIONS

- Custom manufactured for “walkable" cleanroom ceiling systems in Class 100 cleanrooms.
- 100% stainless-steel, one-piece system is leak-tested prior to shipping
- Allows quick and easy relocation when floor plan changes due to reconfiguration of tool layout
- Allows for independent motion (sway) between ceiling grid and water main to accommodate filter vibration and during possible seismic activity.
- Eliminates potential leaks and protecting gel seals
- Eliminates ceiling stress/leaks due to miss-aligned hard-pipe installation
- FM Approved

# FRICTION LOSS DATA & SPECIFICATIONS

| Model Number | Outlet Orifice Size | Hose Assembly Length | Minimum Bend Radius | | Maximum Number of 90˚ Bends | | Equivalent Length of 1in. Diameter Schedule 40 Pipe (Ft) | | | | | | | Max Rated Pressure | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FM | UL | UL | FM | UL | FM | | | | | | FM | LU |
| | | | | | | | | 5.6k-factor | 8.0k-factor | 11.2k-factor | 14.0k-factor | 16.8k-factor | 22.4k-factor | | |
| | in (cm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | Ft (mm) | Ft (mm) | Ft (mm) | Ft (mm) | Ft (mm) | Ft (mm) | Ft (mm) | PSI/Kpa | PSI/Kpa |
| **SUPERFLEX® 1" INTERNAL DIAMETER (I.D.) HOSE SERIES (Data equivalent for all end connection 1" NPT, 1" Cut Groove and SLT)** | | | | | | | | | | | | | | | |
| 2036SF-50 | ½ (1.27) | 36 (914) | 7 (178) | 2 (50.8) | 5 | 2 | 30 (9.1) | 16.2 (4.9) | 16.9 (5.1) | 11.5 (3.5) | – | – | – | | |
| 2048SF-50 | | 48 (1219) | | | 8 | 3 | 47 (14.3) | 28.7 (8.7) | 29.3 (8.9) | 15.4 (4.7) | – | – | – | | |
| 2072SF-50 | | 72 (1828) | | | 12 | 4 | 71 (21.6) | 53.9 (16.4) | 54.3 (16.5) | 23.2 (7) | – | – | – | | |
| 2036SF-75 | ¾ (1.90) | 36 (914) | 7 (178) | 2 (50.8) | 5 | 2 | 29 (8.8) | – | 21.5 (6.5) | 21.6 (6.5) | 21.8 (6.6) | 22 (6.7) | – | | |
| 2048SF-75 | | 48 (1219) | | | 8 | 3 | 44 (13.4) | – | 30.5 (9.2) | 30.6 (9.3) | 31.1 (9.4) | 30.8 (9.3) | – | | |
| 2072SF-75 | | 72 (1828) | | | 12 | 4 | 70 (21.3) | – | 48.5 (14.7) | 48.8 (14.8) | 49.9 (15.2) | 48.6 (14.8) | – | | |
| **FLEXHEAD STANDARD TALL 1" INTERNAL DIAMETER (I.D.) HOSE SERIES** | | | | | | | | | | | | | | | |
| 2024T-50 | ½ (1.27) | 24 (610) | 8 (200) | 3 (76.2) | 3 | 1 | 11 (3.4) | 18.4 (5.6) | 7.7 (2.3) | 7.6 (2.3) | – | – | – | 175 (1205) | 175 (1205) |
| 2036T-50 | | 36 (914) | | | 3 | 2 | 16 (4.9) | 26.6 (8.1) | 11.5 (3.5) | 11.5 (3.5) | – | – | – | | |
| 2048T-50 | | 48 (1219) | | | 4 | 3 | 24 (7.3) | 30.3 (9.2) | 15.3 (4.6) | 15.4 (4.7) | – | – | – | | |
| 2060T-50 | | 60 (1524) | | | 4 | 4 | 29 (8.8) | 35.8 (10.9) | 19.1 (5.8) | 19.3 (5.8) | – | – | – | | |
| 2072T-50 | | 72 (1828) | | | 4 | 4 | 35 (10.7) | 45.6 (13.9) | 23.0 (7) | 23.2 (7) | – | – | – | | |
| 2024T-75 | ¾ (1.90) | 24 (610) | 8 (200) | 3 (76.2) | 3 | 1 | 12 (3.7) | – | 7.3 (2.2) | 5.9 (1.8) | 14.7 (4.5) | 7.1 (2.1) | – | 175 (1205) | 175 (1205) |
| 2036T-75 | | 36 (914) | | | 3 | 2 | 18 (5.5) | – | 21.5 (6.5) | 10.4 (3.1) | 21.8 (6.6) | 10.9 (3.3) | – | | |
| 2048T-75 | | 48 (1219) | | | 4 | 3 | 23 (7) | – | 30.5 (9.3) | 14.9 (4.5) | 29 (8.8) | 14.8 (4.5) | – | | |
| 2060T-75 | | 60 (1524) | | | 4 | 4 | 29 (8.8) | – | 39.5 (12) | 19.4 (4.5) | 36.1 (11) | 18.7 (5.6) | – | | |
| 2072T-75 | | 72 (1828) | | | 4 | 4 | 32 (9.8) | – | 48.5 (14.7) | 24.0 (7.3) | 43.2 (13.1) | 22.6 (6.8) | – | | |
| **FLEXHEAD® STANDARD TALL ELBOW 1" INTERNAL DIAMETER (I.D.) HOSE SERIES** | | | | | | | | | | | | | | | |
| 2024ET-50 | ½ (1.27) | 24 (610) | 8 (200) | 3 (76.2) | 3 | 1 | 19 (5.8) | 26.4 (8.0) | 6.8 (2) | 7.4 (2.2) | – | – | – | 175 (1205) | 175 (1205) |
| 2036ET-50 | | 36 (914) | | | 3 | 2 | 23 (7.0) | 30.1 (9.2) | 11.8 (3.6) | 12.5 (3.8) | – | – | – | | |
| 2048ET-50 | | 48 (1219) | | | 4 | 3 | 27 (8.2) | 33.8 (10.3) | 16.9 (5.1) | 17.6 (5.3) | – | – | – | | |
| 2060ET-50 | | 60 (1524) | | | 4 | 4 | 32 (9.8) | 37.5 (11.4) | 21.9 (6.6) | 22.7 (6.9) | – | – | – | | |
| 2072ET-50 | | 72 (1828) | | | 4 | 4 | 35 (10.7) | 41.2 (12.5) | 27.0 (8.2) | 27.8 (8.4) | – | – | – | | |
| 2024ET-75 | ¾ (1.90) | 24 (610) | 8 (200) | 3 (76.2) | 3 | 1 | 18 (5.5) | - | 8.8 (2.6) | 8.7 (2.6) | 14.7 (4.5) | 8.2 (2.5) | – | 175 (1205) | 175 (1205) |
| 2036ET-75 | | 36 (914) | | | 3 | 2 | 23 (7.0) | – | 25.5 (7.7) | 14.2 (4.2) | 21.8 (6.6) | 13 (3.9) | – | | |
| 2048ET-75 | | 48 (1219) | | | 4 | 3 | 23 (7.0) | – | 32.9 (10) | 18.4 (5.6) | 29 (8.8) | 17.8 (5.4) | – | | |
| 2060ET-75 | | 60 (1524) | | | 4 | 4 | 29 (8.8) | – | 40.6 (12.3) | 22.7 (6.9) | 36.1 (11.0) | 22.6 (6.8) | – | | |
| 2072ET-75 | | 72 (1828) | | | 4 | 4 | 32 (9.8) | – | 48.5 (14.7) | 27.0 (8.2) | 43.2 (13.1) | 27.5 (8.3) | – | | |
| **FLEXHEAD® HIGH PRESSURE 1" INTERNAL DIAMETER (I.D.) HOSE SERIES** | | | | | | | | | | | | | | | |
| 2024H-50 | ½ (1.27) | 24 (610) | 8 (200) | 3 (76.2) | 3 | 2 | 11 (3.4) | 18.4 (5.6) | 7.7 (2.3) | 7.6 (2.3) | – | – | – | 300 (2068) | 300 (2068) |
| 2036H-50 | | 36 (914) | | | 3 | 3 | 16 (4.9) | 26.6 (8.1) | 11.5 (3.5) | 11.5 (3.5) | – | – | – | | |
| 2048H-50 | | 48 (1219) | | | 4 | 4 | 24 (7.3) | 30.3 (9.2) | 15.3 (4.6) | 15.4 (4.7) | – | – | – | | |
| 2060H-50 | | 60 (1524) | | | 4 | 4 | 29 (8.8) | 35.8 (10.9) | 19.1 (5.8) | 19.3 (5.8) | – | – | – | | |
| 2072H50 | | 72 (1828) | | | 4 | 4 | 35 (10.7) | 45.6(12.5) | 23.0 (7) | 23.2 (7) | – | – | – | | |
| 2024ET-75 | ¾ (1.90) | 24 (610) | 8 (200) | 3 (76.2) | 3 | 1 | 12 (3.7) | - | 14.7 (4.5) | 6.8 (2.0) | 14.7 (4.5) | 8.2 (2.1) | – | 300 (2068) | 300 (2068) |
| 2036ET-75 | | 36 (914) | | | 3 | 2 | 18 (5.5) | – | 21.5 (6.5) | 11.4 (3.4) | 21.8 (6.6) | 10.9 (3.3) | – | | |
| 2048ET-75 | | 48 (1219) | | | 4 | 3 | 23 (7.0) | – | 30.5 (9.2) | 16.0 (5.1) | 29 (8.8) | 14.8 (4.5) | – | | |
| 2060ET-75 | | 60 (1524) | | | 4 | 4 | 29 (8.8) | – | 39.5 (12) | 20.6 (6.2) | 36.1 (11.0) | 18.7 (5.7) | – | | |
| 2072ET-75 | | 72 (1828) | | | 4 | 4 | 32 (9.8) | – | 48.5 (14.7) | 25.3 (7.7) | 43.2 (13.1) | 22.6 (6.5) | – | | |

# FRICTION LOSS DATA & SPECIFICATIONS (CONT'D)

| Model Number | Outlet Orifice Size | Hose Assembly Length | Minimum Bend Radius | | Maximum Number of 90˚ Bends | | Equivalent Length of 1in. Diameter Schedule 40 Pipe (Ft) | | | | | | | Max Rated Pressure | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FM | UL | UL | FM | UL | FM | | | | | | FM | LU |
| | | | | | | | | 5.6k-factor | 8.0k-factor | 11.2k-factor | 14.0k-factor | 16.8k-factor | 22.4k-factor | | |
| | in (cm) | in (mm) | in (mm) | in (mm) | in (mm) | in (mm) | Ft (mm) | Ft (mm) | Ft (mm) | Ft (mm) | Ft (mm) | Ft (mm) | Ft (mm) | PSI/Kpa | PSI/Kpa |
| **FLEXHEAD® HIGH PRESSURE ELBOW 1" INTERNAL DIAMETER (I.D.) HOSE SERIES** | | | | | | | | | | | | | | | |
| 2024HE-50 | ½ (1.27) | 24 (610) | 8 (200) | 3 (76.3) | 3 | 2 | 19 (5.8) | 14.7 (4.5) | 6.8 (2) | 7.4 (2.2) | – | – | – | 300 (2068) | 300 (2068) |
| 2036HE-50 | | 36 (914) | | | 3 | 3 | 23 (7.0) | 21.8 (6.6) | 11.8 (3.6) | 12.5 (3.8) | – | – | – | | |
| 2048HE-50 | | 48 (1219) | | | 4 | 4 | 27 (8.2) | 29.0 (8.8) | 16.9 (5.1) | 17.6 (5.3) | – | – | – | | |
| 2060HE-50 | | 60 (1524) | | | 4 | 4 | 32 (9.8) | 36.1 (11) | 21.9 (6.6) | 22.7 (6.9) | – | – | – | | |
| 2072HE-50 | | 72 (1828) | | | 4 | 4 | 35 (10.7) | 43.2 (13.1) | 27.0 (8.2) | 27.8 (8.4) | – | – | – | | |
| 2024HE-75 | ¾ (1.90) | 24 (610) | 8 (200) | 3 (76.3) | 3 | 2 | 18 (5.5) | - | 14.7 (4.5) | - | 14.7 (4.5) | 8.2 (4.5) | – | 300 (2068) | 300 (2068) |
| 2036HE-75 | | 36 (914) | | | 3 | 3 | 23 (7.0) | - | 25.2 (7.7) | 26 (7.9) | 21.8 (8.6) | 13 (3.9) | – | | |
| 2048HE-75 | | 48 (1219) | | | 4 | 4 | 23 (7.0) | – | 32.9 (10) | 33 (10) | 29 (8.8) | 17.8 (5.4) | – | | |
| 2060HE-75 | | 60 (1524) | | | 4 | 4 | 29 (8.8) | - | 40.5 (12.3) | 40 (12.2) | 36.1 (11.0) | 22.6 (6.8) | - | | |
| 2072HE-75 | | 72 (1828) | | | 4 | 4 | 32 (9.8) | - | 48.5 (14.8) | 47 (14.3) | 43.2 (13.1) | 27.5 (8.3) | - | | |
| **FLEXHEAD® DRY PENDENT SYSTEM 1" INTERNAL DIAMETER (I.D.) HOSE SERIES** | | | | | | | | | | | | | | | |
| 2024-DPS | 1 (2.54) | 24 (610) | 7 (200) | - | - | 1 | - | 18.4 (5.6) | 7.7 (2.3) | 7.6 (2.3) | – | 7.1 (2.1) | 10.7 (3.3) | - | 175 (1205) |
| 2036-DPS | | 36 (914) | | | - | 2 | - | 26.6 (8.1) | 11.5 (3.5) | 11.5 (3.5) | – | 10.9 (3.3) | 15.1 (4.6) | | |
| 2048-DPS | | 48 (1219) | | | - | 3 | - | 30.3 (9.2) | 15.3 (4.7) | 15.4 (4.7) | – | 14.8 (4.5) | 21.5 (6.5) | | |
| 2060-DPS | | 60 (1524) | | | - | 4 | - | 35.8 (10.9) | 19.1 (5.8) | 19.3 (5.9) | – | 18.7 (5.7) | 25.3 (7.7) | | |
| 2072-DPS | | 72 (1828) | | | - | 4 | - | 45.6 (13.9) | 23.0 (7) | 32.2 (7) | – | 22.6 (6.9) | 26.9 (8.1) | | |
| **FLEXHEAD® INSTITUTIONAL 1" INTERNAL DIAMETER (I.D.) HOSE SERIES** | | | | | | | | | | | | | | | |
| 2024I | ½ (1.27) | 24 (610) | 8 (200) | 3 (76.2) | 3 | 1 | 11 (3.4) | 18.4 (5.6) | – | – | – | – | – | 175 (1205) | 175 (1205) |
| 2036I | | 36 (914) | | | 3 | 3 | 16 (4.9) | 26.6 (8.1) | – | – | – | – | – | | |
| 2048I | | 48 (1219) | | | 4 | 4 | 24 (7.3) | 30.3 (9.2) | – | – | – | – | – | | |
| 2060I | | 60 (1524) | | | 4 | 4 | 29 (8.8) | 35.8 (10.9) | – | – | – | – | – | | |
| 2072ET-50 | | 72 (1828) | | | 4 | 4 | 35 (10.7) | 45.6 (13.9) | – | – | – | – | – | | |
| 2024I | ¾ (1.90) | 24 (610) | 8 (200) | 3 (76.2) | 3 | 1 | 12 (3.7) | - | – | – | 11.6 (3.5) | – | – | 175 (1205) | 175 (1205) |
| 2036I | | 36 (914) | | | 3 | 2 | 18 (5.5) | – | – | – | 16 (4.9) | – | – | | |
| 2048I | | 48 (1219) | | | 4 | 3 | 23 (7.0) | – | – | – | 17.9 (5.4) | – | – | | |
| 2060I | | 60 (1524) | | | 4 | 4 | 29 (8.8) | – | – | – | 24.7 (7.5) | – | – | | |
| 2072I | | 72 (1828) | | | 4 | 4 | 32 (9.8) | – | – | – | 28.9 (8.8) | – | – | | |

Notes:

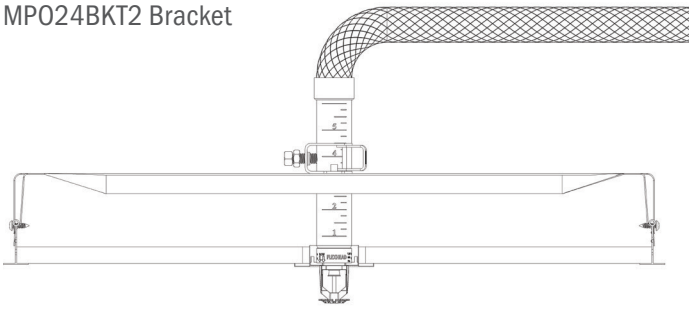
Model Numbers:

- "SF" designates SuperFlex® Hose series.
- "ESF" designates SuperFlex® Elbow Hose series.
- "E" designates elbow drop hose series
- "T" designates straight tall style hose
- "ET" designates elbow tall style hose series.
- "H" designates high pressure 300psi working pressure hose series.
- "HE" designates high pressure 300psi elbow hose series.
- "DPS" designates dry pendant system.
- "DT" designates drain tee hose series used in dry pendent/freezer application.
- "SLT" designates SlideLOK® technology.
- "DPS" and "DT" models are approved for use in cold storage application (Freezer, Cold Chamber) and combine an approved flexible sprinkler hose and an approved dry pendent sprinkler. UHO-1 or UHO-3 is required to connect the flexible sprinkler hose to the dry sprinkler.
- "I" indicates instiutional flexible hose.
- "A" indicates models for use with Amerlux Ceiling System.
- "50" designates 1⁄2" Outlet Hose series. The "75" designates 3⁄4" Outlet Hose series. Inlet size 1".
- Max Ambient Temperature Rating on all model numbers are 300˚ F (148˚ C).
- Equivalent lengths are shown with maximum number of 90˚ bends at the minimum bend radius per agency. 2-45˚ or 3-30˚ bend equal 1-90˚ bend. Different values were obtained by FM and UL due to the difference in minimum bend radius, testing protocol and calculation methods. Please see individual standards for more information relative to Friction Loss (equivalent length of pipe).
- All hoses require a minimum of one bend for installation. Bend radius tool available for 3" bend "T" hose, "SF" hose does not require bend radius tool.
- FM equivalent length calculation includes Sprinkler Head Friction Loss.
- See listing(s) approval agency for the latest approval details.
- Friction loss data and specification of SuperFlex series include all end connection such as 1" NPT, 1" cut groove, and SLT. Specify end connection when ordering.

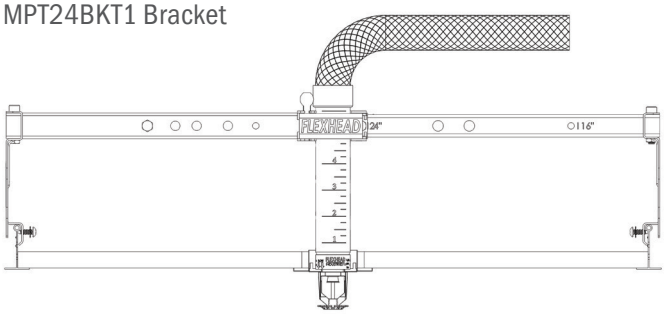
# FLEXHEAD® CEILING DETAIL

## SUSPENDED CEILING DETAIL

MPO24BKT2 Bracket



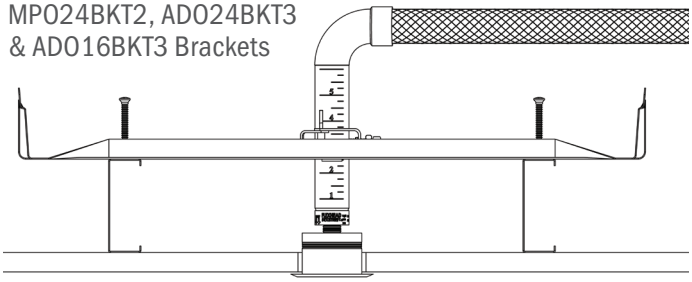
MPT24BKT1 Bracket



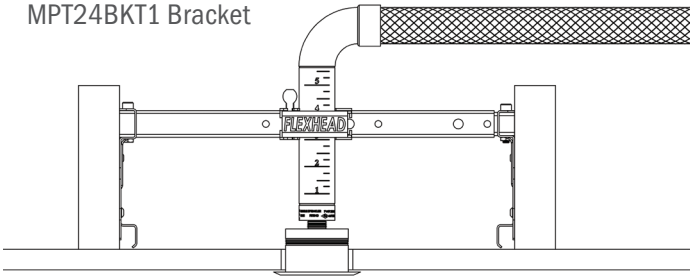

*Allows for bracket installation without pre-installing the ceiling tile

## GYPSUM BOARD HARD CEILING DETAIL

MPO24BKT2, ADO24BKT3 & ADO16BKT3 Brackets

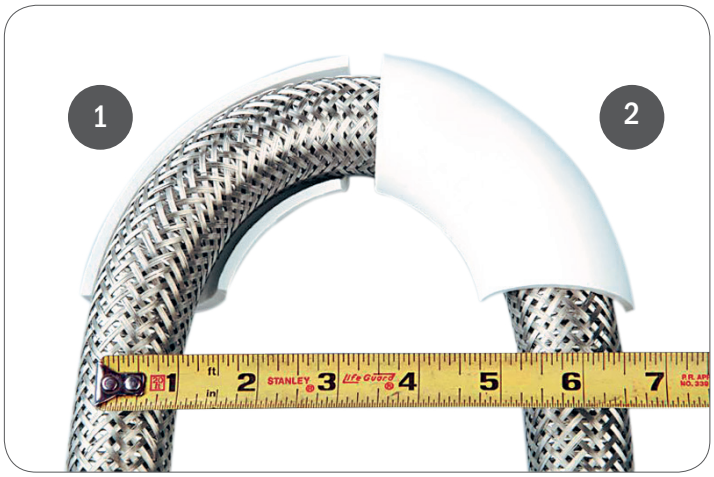


MPT24BKT1 Bracket

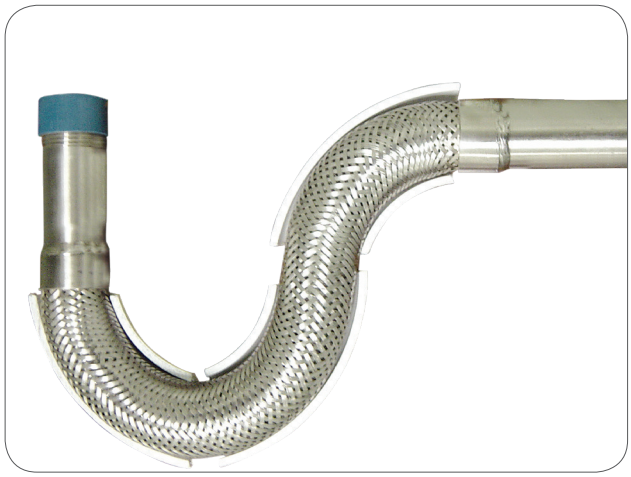



Each FM approved and UL listed unit is ready to install, pressure- and leak-tested, and comes complete with a flexible stainless steel hose and mounting bracket with adjustable hub.

## FLEXHEAD® STANDARD HOSE 3" BEND RADIUS PER UL GUIDELINES (2 BENDS SHOWN)*

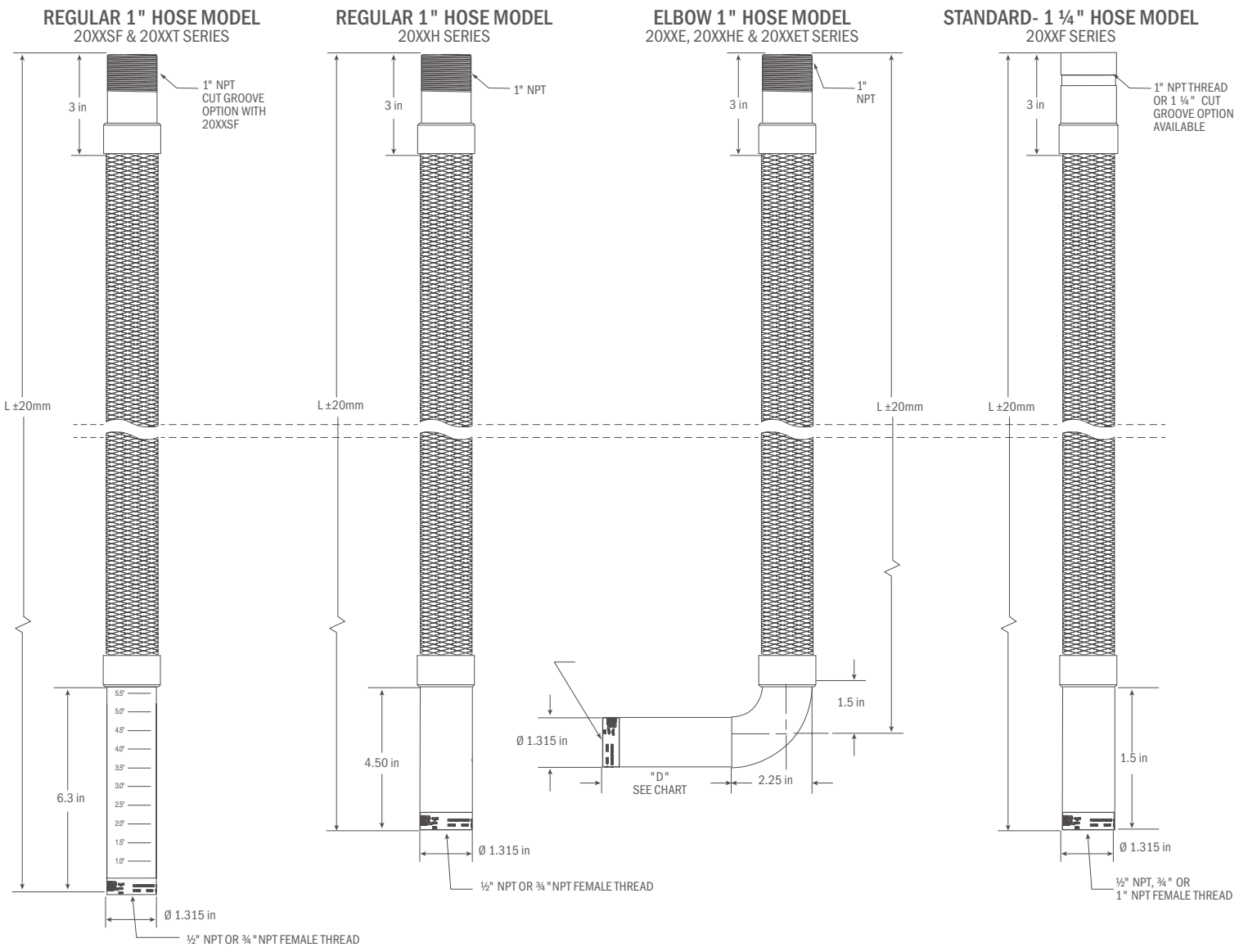



## FLEXHEAD® STANDARD HOSE SHOWN WITH 3 BENDS



* Notes: SuperFlex® has a 2" bend radius. For more information on SuperFlex® specification refer to page 10.

# FLEXHEAD® CEILING DETAIL

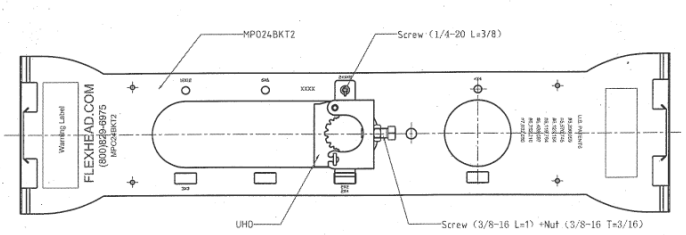



| MODEL # | "Hose Assembly (L) Length Inches (mm)" | "Drop ""D"" Size (Inches)" |
|---|---|---|
| 2024E/2024HE | 24 (610) | 1.5, 3.0, & 4.0 |
| 2036E/2036HE | 36 (914) | |
| 2048E/2048HE | 48 (1219) | |
| 2060E/2060HE | 60 (1524) | |
| 2072E/2072HE | 72 (1828) | |
| 2024ET | 24 (610) | 5.71 |
| 2036ET | 36 (914) | |
| 2048ET | 48 (1219) | |
| 2060ET | 60 (1524) | |
| 2072ET | 72 (1828) | |

# BRACKET SPECIFICATION SHEET

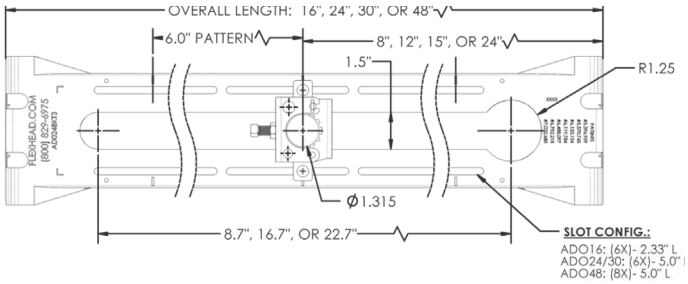
## MODEL MP024BKT2

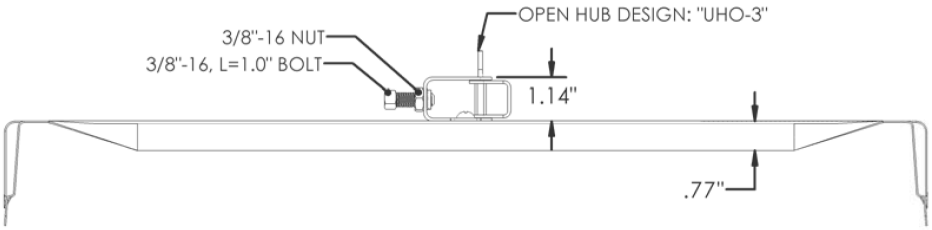
Multiport Design (For use with T-bar and Metal Stud Applications)




## MODEL AD016BKT3, AD024BKT3, AD030BKT3, & AD048BKT3

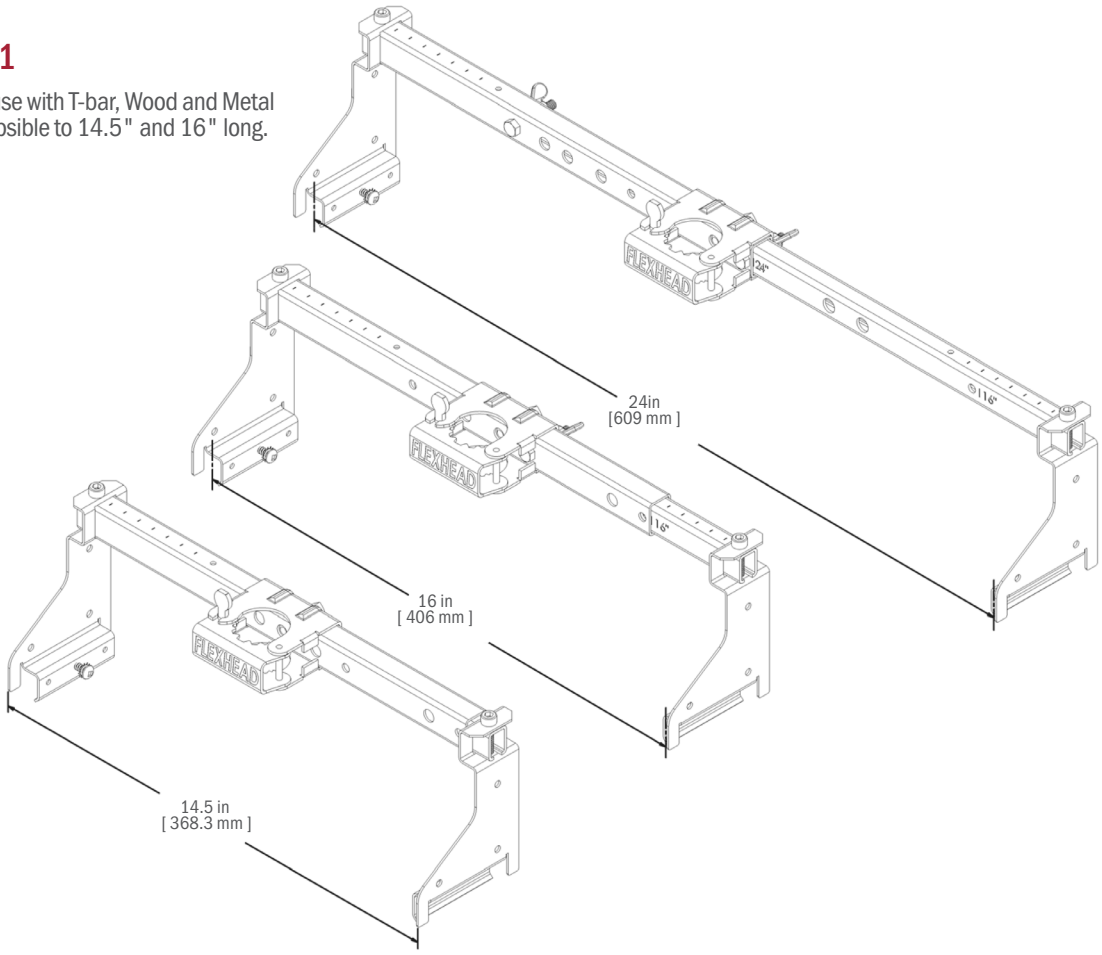
Adjustable Design (For use with T-bar, Metal Stud and Chicago Grid Applications): standard sizes are 16", 24", 30" and 48" long




## MODEL MPT24BKT1

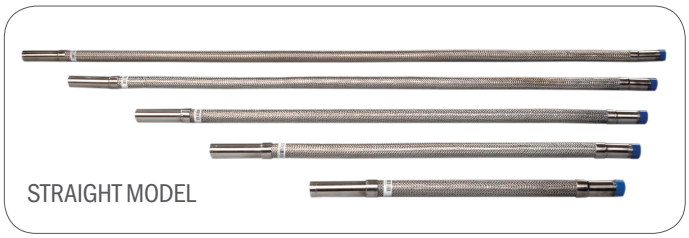
Multi-Position Tall Bracket (For use with T-bar, Wood and Metal Studs): 24" standard size collapsible to 14.5" and 16" long.



# FLEXHEAD® COMMERCIAL PRODUCTS

## STANDARD FLEXHEAD® HOSE LENGTHS: 24", 36", 48", 60" AND 72"

24", 36", 48", 60",and 72" hose lengths, Rated working pressure 175psi, optional 300psi. Standard 1" I.D., optional 1¼" I.D.



STRAIGHT MODEL

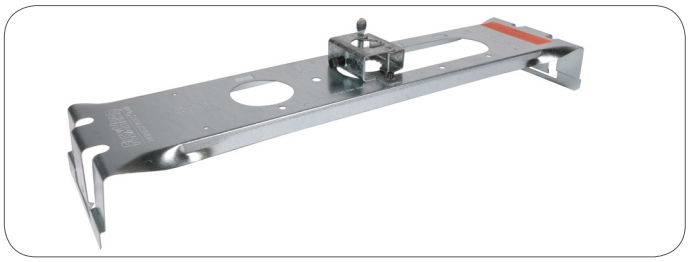
24", 36", 48", 60",and 72" hose lengths. Rated working pressure 175psi, optional 300psi.

ELBOW MODEL

## SUPERFLEX® HOSE LENGTHS: 36", 48", AND 72"

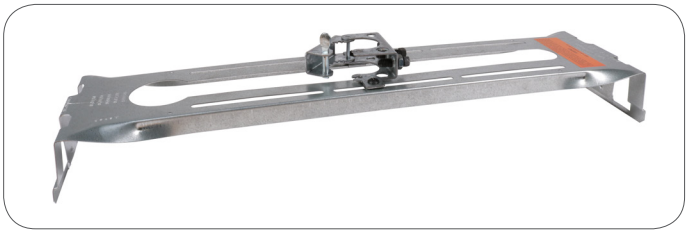
## MODEL MP024BKT2

24" Multiport Bracket for T-bar Grid or Metal Stud applications. 6" stable mounting bracket.



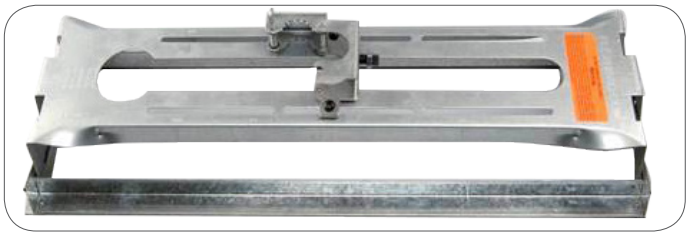
## MODELS AD016BKT3, AD024BKT3, AD030BKT3 & AD048BKT3

16", 24", 30", 48" Adjustable Bracket for T-bar Grid, Chicago Grid or Metal Stud applications.



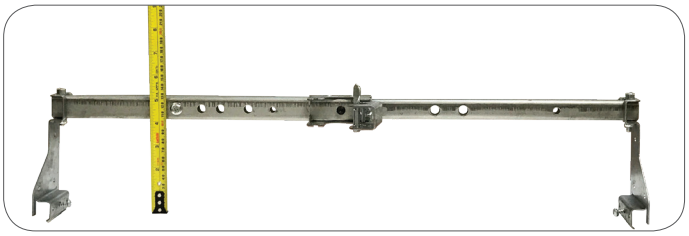
## MODEL AD024BKT3 WITH BKT-HTA

Hat Channel Bracket System for Metal Stud or Hat Channel applications.



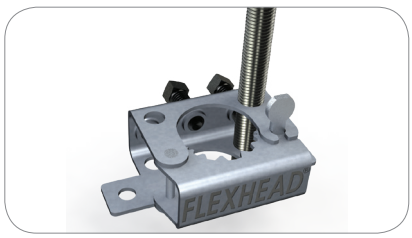
## MODEL MPT24BKT1

24" Multi-Position Tall Bracket, collapses to 14 ½" and 16". Installs in suspended ceilings without touching the ceiling tiles.



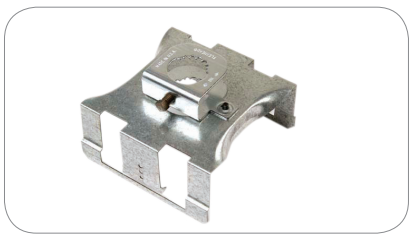
## MODEL UHO-3

Designed for quick and easy installation. Ideal for shell applications. Can be installed with ⅜" threaded rod up to 4' off structure and with ½" threaded rod up to 6' off structure.



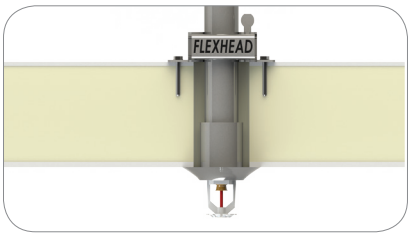

## MODEL SP06TZBKT2

Armstrong® TechZone Ceiling Bracket for use with Armstrong TechZone Ceiling systems. Available in 6" widths.



## MODEL 20XX-DPS-UHO-3

Dry Pendent System for Freezer and Cold Storage applications



# FLEXHEAD® STANDARD SPECIFICATIONS

## DIVISION 21 MECHANICAL – SECTION 15300
## FIRE PROTECTION PIPING

FLEXIBLE SPRINKLER HOSE FITTINGS FOR FIRE PROTECTION SERVICE

**A.** Manufacturer: FlexHead; Brand of Anvil International

**B.** Contact: 160 Frenchtown Rd, North Kingstown RI 02852 ; Telephone: (800) 829-6975; Email: FlexHeadsales@anvilintl.com; website: www.flexhead.com & www.anvilintl.com

1. Substitutions: No substitutions allowed.

**C.** Description:

1. Regulatory Requirements: Provide flexible stainless steel hose fittings that comply with the following requirements:
   a. In accordance with General Requirements contained in Division 1 of specification.
   b. In accordance with NFPA 13.

**D.** Performance Criteria: Comply with the following to suit project requirements:

1. 1. FM 1637 Approval Standard for Flexible Sprinkler Hose with Threaded End Fittings.
2. 2. UL 2443 Standard for Flexible Sprinkler Hose with Fittings for Fire Protection Service
3. 3. ICC-ES AC-156 Acceptance Criteria for Seismic Qualification by Shake-Table Testing of Nonstructural Components and Systems

**E.** Materials: FlexHead Commercial Sprinkler Connections

1. FlexHead flexible stainless steel hose assemblies:
   a. Straight Hose Assembly Lengths: {2ft length, Model #2024T, 2024SF} {3ft length, Model #2036T, 2036SF} {4ft length, Model #2048T, 2048SF} {5ft length, Model #2060T, 2060SF} {6ft length, Model #2072T, 2072SF}.}
      1. {½ inch} {¾ inch} outlet.
      2. {175 psi} {300 psi} maximum rated pressure.
      3. Fully welded non-mechanical fittings, braided, 100% leak-tested, with a minimum 1 inch true-bore internal corrugated hose diameter made of 100% 304 stainless steel braid, hose and end fittings. 1” NPT, 1” cut groove, or SLT end connection with 74FP SlideLOK®.
   b. Elbow Hose Assembly Lengths (For use in confined spaces): {2ft length, Model #2024E, 2024ET} {3ft length, Model #2036E, 2036ET} { 4ft length, Model #2048E, 2048ET} {5ft length, Model #2060E, 2060ET} { 6ft length, Model #2072E, 2072ET}
      1. {½ inch} {¾ inch} outlet.
      2. {175 psi} {300psi} maximum rated pressure.
      3. Fully welded non-mechanical fittings, braided, leak-tested with minimum 1 inch true-bore internal corrugated hose diameter made of 100% 304 stainless steel including end fittings.
2. FlexHead Ceiling Bracket: Direct attachment type having integrated ends positively attached to the ceiling using screws and attachment hub with set screw for attaching and adjusting flexible hose.

## APPLICABLE STANDARDS

American Society of Civil Engineers (ASCE) -SEI/ASCE 7-05, Section 13.5.6 Suspended Ceilings

### ASTM INTERNATIONAL

- ASTM C635 Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings
- ASTM C636 Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels
- FM Global Technologies LLC (FM) - FM Class Number 1637 Approval Standard for Flexible Sprinkler Hose with Threaded End Fittings

### INTERNATIONAL CODE COUNCIL (ICC)

- ICC International Building Code (IBC), 2006
  - Section 803.9 Acoustical Ceiling Systems
  - Section 1613 Earthquake Loads

### NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

- NFPA 13 Standard for the Installation of Sprinkler Systems
- NFPA 13D Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes
- NFPA 13R Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height Underwriters Laboratories, Inc. (UL) - UL 2443 Standard for Flexible Sprinkler Hose with Fittings for Fire Protection Service

## APPROVALS

Underwriters Laboratories, Inc. (UL) - UL Listed, VENF. EX5269, Flexible Sprinkler Hose Fitting

## PHYSICAL/CHEMICAL PROPERTIES

Test reports are available to design professionals upon request.

## PREPARATORY WORK

Installation should only be performed by qualified and licensed technicians in the fire protection field. Consult NFPA, FM, UL and state and local guidelines prior to installation.

## METHODS

Each FlexHead ceiling sprinkler connection includes a mounting bracket and a 1-piece, leak tested FlexHead sprinkler drop.

Attach the bracket to the t-bar ceiling grid; then attach the FlexHead sprinkler to the sub-main. Secure the sprinkler to the bracket. Test installation of sprinkler system for any leaks per NFPA guidelines.

## BUILDING CODES

Current data on building code requirements and product compliance may be obtained from the manufacturer's technical support specialists. Installation must comply with the requirements of applicable local, state and national code jurisdictions.

## COST

Budget installed cost information may be obtained from the manufacturer upon request.

## MAINTENANCE

Contact the manufacturer for complete maintenance information.

## TECHNICAL SERVICES

Design assistance and technical support are available upon request from the manufacturer's trained staff.

## FILING SYSTEMS

- MANU-SPEC®
- Additional product information is available from the manufacturer upon request

## PRECAUTIONS

Consult the manufacturer's installation instructions for complete installation information. Failure to follow the cited instructions may cause personal injury. During maintenance or inspection of FlexHead product, the facility fire protection system must be inactive. Do not attempt relocation or maintenance of FlexHead product while fire protections system is live.

### DISCLAIMER

- It is the responsibility of the system designer to verify suitability of 300-series stainless steel flexible hose for use with the intended fluid media within the piping system and external environments. The effect of chemical composition, pH level, operating temperature, chloride level, oxygen level, and flow rate on 300-series stainless steel flexible hose must be evaluated by the material specifier to confirm system life will be acceptable for the intended service.
- Failure to follow these instructions could causeproduct failure, resulting in serious personal injury and/or property damage.

# BRANDS OF ANVIL INTERNATIONAL

Anvil product lines include malleable and cast iron fittings, unions and flanges; seamless and welded steel pipe nipples; steel pipe couplings; universal anvilets; forged steel fittings and unions; pipe hangers and supports; threaded rod; and engineered hangers

Anvil-Strut products include a complete line of channel in stock lengths of 10 and 20 feet, with custom lengths available upon request. A variety of fittings and accessories are also offered. All products can be ordered in an assortment of finishes and material choices including SupR-GreenTM, Zinc Trivalent Chromium, pre- galvanized, hot-dipped galvanized, electro-galvanized, aluminum, plain, and stainless steel.

The SPF/Anvil product line includes a variety of internationally sourced products such as grooved couplings, fittings, cast iron, malleable iron and ductile iron threaded fittings, steel pipe nipples, as well as tee-lets.

Anvil EPS-Engineered Pipe Supports are products used to support piping systems under thermal, seismic, and other dynamic loading conditions. The product line encompasses variable spring hangers, constant supports, sway struts and snubbers as well as standard and special design clamps. Anvil EPS brings the highest quality products and innovative engineering solutions to common and uncommon piping system problems.

The Merit product line includes a variety of tee-lets and drop nipples for fire protection applications. Most Merit products are UL/ ULC Listed, FM Approved, and rated from 175 to 300 psi.

Catawissa hammer unions are offered in threaded ends and butt weld ends, and are interchangeable with most leading union manufacturers. Fully traceable and available with complete mill certifications, Catawissa's oilfield hammer union product line includes the standard ball-and-cone design plus our unique Figure 300 Flat Face design, where space and pipe line separation are a consideration.

The AnvilPress™ Technology for Copper Systems and Stainless Steel Systems includes couplings, elbows, tees, adapters, fitting reducers, caps, unions, and flanges for mechanical copper systems. They provide an economical and reliable piping connection that can be used for commercial, industrial, and residential markets. Fittings are available in sizes 1/2" to 4". Copper fittings can be easily identified with a visual inspection of the patented green indicator band extruded at each joint.

GRUVLOK®

The Gruvlok product line consists of couplings for grooved and plain-end fittings, butterfly valves and check valves; flanges; pump protection components; pipe grooving tools; as well as copper and stainless steel system components.

FLEXHEAD®

We invented the concept of Flexible Fire Protection™. FlexHead systems connect sprinkler heads to sub-mains at least four times faster than hard pipe. Delivers even greater savings in retrofits. All our flexible sprinkler pipe and connections are UL Listed and/or FM Approved.

Afcon®

The Afcon seismic bracing line includes UL listed and FM approved structural attachments for concrete, wood or steel structural members like bar joist or I-beams, swivel connections that accept from 1" to 2" schedule 40 pipe. Afcon's seismic system attachments are engineered for up to 12" IPS steel pipe, copper tubing or plastic pipe.

SprinkFLEX®

The SprinkFLEX® product line includes a variety of hoses and brackets offering a cost effective solution for the installation of fire sprinkler systems which result in a quick and easy way to connect the sprinkler heads to the branch lines. All hoses and brackets are UL and/or FM Approved.

JBS®

JB Smith is the leading manufacturer of oil country tubular fittings, swages and bull plugs – all meeting API specifications. Offering tubing nipples, casing nipples as well as a full line of traditional line pipe and oil country threads in every schedule, JB Smith is the resource for all your oilfield needs.

BECK®

Steel pipe nipples and steel pipe couplings are manufactured in accordance with the ASTM A733 Standard Specification for Welded and Seamless Carbon Steel and Stainless Steel Pipe Nipples. Steel pipe couplings are manufactured in accordance with the ASTM A865 Standard Specification for Threaded Couplings, Steel, Black or Zinc-Coated (Galvanized) Welded or Seamless, for Use in Steel Pipe Joints. API couplings are manufactured in accordance with the API Specification for line pipe.

North Alabama Pipe

Founded in 1983, NAP is a manufacturer of fabrication equipment, including automatic welders, plasma cut-off equipment, hole cutting equipment, make-on machines and pipe threaders. NAP, innovators of pipe fabrication equipment.

# CUSTOMER SERVICE CENTERS

## UNITED STATES

**TEL:** 800-301-2701
**FAX:** 708-534-5441
**EMAIL:** customerservice@anvilintl.com

## CANADA

**TEL:** 800-661-8998
**FAX:** 519-426-5509
**EMAIL:** canadacs@anvilintl.com

## LATIN AMERICA

**TEL:** +1-800-885-3000
**FAX:** +1-708-534-5441
**EMAIL:** latinoamerica@anvilintl.com

## INTERNATIONAL

**TEL:** +31-53-572-5570
**EMAIL:** internationalsales@anvilintl.com


# REGIONAL DISTRIBUTION CENTERS

## UNITED STATES

**ILLINOIS**
7979 W. 183rd Street, Unit D
Tinley Park, IL 60484

**TEXAS**
1401 Valley View Lane, Suite 150
Irving, TX 75061

**PENNSYLVANIA**
800 Malleable Road
Columbia, PA 17512

**CALIFORNIA**
551 North Loop Drive
Ontario, CA 91761

**FLORIDA**
236 Outlook Point Drive, Suite 100
Orlando, FL 32809

## CANADA

**ONTARIO**
390 Second Avenue, P.O. Box 40
Simcoe Ontario, Canada
N3Y 4K9


ANVIL MAINTAINS CONTRACTS WITH A CORE FLEET OF CARRIERS TO PROVIDE EFFICIENTLY CONSISTENT DELIVERY SERVICES TO OUR CLIENTS.

ANVIL® INTERNATIONAL

ANVIL®
INTERNATIONAL
*Building Connections That Last*

*www.anvilintl.com*



**ANV_BRO_FP_190625**

# TOLCO™ Fig. 200 - "Trimline" Adjustable Band Hanger
# TOLCO™ Fig. 200F - "Trimline" Adjustable Band Hanger with Felt Lining for Copper Tubing
# TOLCO™ Fig. 200C - "Trimline" Adjustable Band Hanger with Plastic Coated
# TOLCO™ Fig. 200S - "Trimline" Adjustable Band Hanger with Removable Nut (For sizes 1" thru 2")

**Size Range:**
Fig. 200 - 1/2" (15mm) thru 8" (200mm) pipe

**Material:** Steel, Pre-Galvanized

**Function:** For fire sprinkler and other general piping purposes. Knurled swivel nut design permits hanger adjustment after installation.

**Features:**

- 1/2" (15mm) thru 2" (50mm) sizes have flared edges for ease of installation on all pipe types and protects CPVC plastic pipe from abrasion. Captured knurled nut design (flared top) on 1" thru 2" sizes keep nut from separating with hanger. Hanger is easily installed around pipe.
- 1/2" (15mm), 3/4" (20mm), and 2 1/2" (65mm) thru 8" (200mm)) Spring tension on nut holds it securely in hanger before installation. Knurled nut is easily removed.
- For 1/2" (15mm) and 3/4" (20mm) sizes with non-captured knurl nuts order Fig. 200S

**Approvals:** Underwriters Laboratories listed (1/2" (15mm) thru 8" (200mm)) in the USA **(UL)** and Canada **(cUL)** for steel and CPVC plastic pipe and Factory Mutual Engineering Approved **(FM)** (3/4" (20mm) thru 8" (200mm)). Conforms to Federal Specifications WW-H-171E & A-A-1192A, Type 10 and Manufacturers Standardization Society ANSI/MSS SP-69 & SP-58, Type 10.

**Maximum Temperature:** 650°F (343°C)

**Finish:** Pre-Galvanized. Stainless Steel materials will be supplied with (2) hex nuts in place of a knurl nut.

**Order By:** Part number and pipe size

**** Note:** For metric hanger rod sizes add the metric rod size to the figure number. Example: 200M8-1 1/2 or 200M10-1 1/2

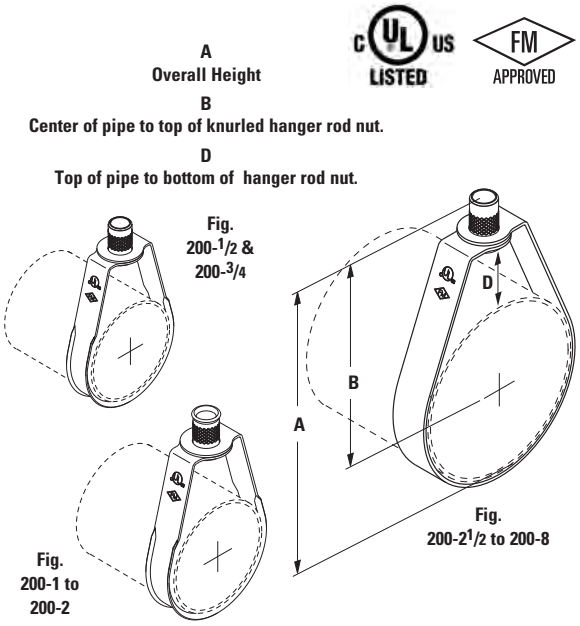



**Fig. 200C**
200C-1 1/2 shown

**Fig. 200F**
200F-1 1/2 shown

**Fig. 200**
shown with captured nut
1" thru 2" sizes only

**Fig. 200 & Fig. 200S**
shown with
non-captured nut

| Part No.** | Pipe Size in. | (mm) | Rod Size in. | mm** | A in. | (mm) | B in. | (mm) | D in. | (mm) | Max. Rec. Load lbs. | (kN) | Approx. Wt./100 lbs. | (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **200-1/2** | 1/2" | (15) | 3/8"-16 | M8 or M10 | 3 1/8" | (79.4) | 2 5/8" | (66.7) | 1 11/32" | (34.1) | 400 | (1.78) | 11 | (5.0) |
| **200-3/4** | 3/4" | (20) | 3/8"-16 | M8 or M10 | 3 1/8" | (79.4) | 2 1/2" | (63.5) | 1 1/16" | (27.0) | 400 | (1.78) | 11 | (5.0) |
| **200-1** | 1" | (25) | 3/8"-16 | M8 or M10 | 3 3/8" | (85.7) | 2 5/8" | (66.7) | 1 1/8" | (28.6) | 400 | (1.78) | 12 | (5.5) |
| **200-1 1/4** | 1 1/4" | (32) | 3/8"-16 | M8 or M10 | 3 3/4" | (94.0) | 2 7/8" | (73.0) | 1 5/32" | (29.3) | 400 | (1.78) | 13 | (5.9) |
| **200-1 1/2** | 1 1/2" | (40) | 3/8"-16 | M8 or M10 | 3 7/8" | (98.4) | 2 7/8" | (73.0) | 1 3/16" | (30.2) | 400 | (1.78) | 14 | (6.4) |
| **200-2** | 2" | (50) | 3/8"-16 | M8 or M10 | 4 1/2" | (114.3) | 3" | (76.3) | 1 3/16" | (30.2) | 400 | (1.78) | 15 | (6.9) |
| **200-2 1/2** | 2 1/2" | (65) | 3/8"-16 | M10 | 5 5/8" | (142.9) | 4 1/8" | (104.7) | 1 7/16" | (36.5) | 600 | (2.67) | 27 | (12.3) |
| **200-3** | 3" | (75) | 3/8"-16 | M10 | 5 7/8" | (149.1) | 4" | (101.6) | 1 1/4" | (31.7) | 600 | (2.67) | 29 | (13.3) |
| **200-3 1/2** | 3 1/2" | (90) | 3/8"-16 | M10 | 7 3/8" | (187.3) | 5 1/4" | (133.3) | 2 3/16" | (55.6) | 600 | (2.67) | 34 | (15.6) |
| **200-4** | 4" | (100) | 3/8"-16 | M10 | 7 3/8" | (187.3) | 5" | (127.0) | 1 3/8" | (34.9) | 1000 | (4.45) | 35 | (16.0) |
| **200-5** | 5" | (125) | 1/2"-13 | M12 | 9 1/8" | (231.8) | 6 1/4" | (158.7) | 3 11/32" | (84.9) | 1250 | (5.56) | 66 | (30.2) |
| **200-6** | 6" | (150) | 1/2"-13 | M12 | 10 1/8" | (257.2) | 6 3/4" | (171.4) | 2 7/32" | (56.3) | 1250 | (5.56) | 73 | (33.4) |
| **200-8** | 8" | (200) | 1/2"-13 | M12 | 13 1/8" | (333.4) | 8 3/4" | (222.2) | 3 7/32" | (81.7) | 1250 | (5.56) | 136 | (62.3) |

All dimensions in charts and on drawings are in inches. Dimensions shown in parentheses are in millimeters unless otherwise specified.

## TOLCO™ Fig. 1CBS - Clevis Bolt Spacer

**OPM**

**Size Range:** Size 1" (25mm) thru 20" (500mm) clevis hanger

**Material:** Steel

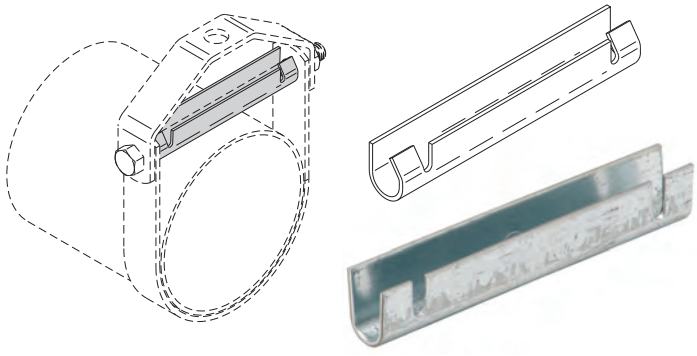
**Function:** Used as a spacer at a seismic brace location to keep clevis hanger from collapsing during seismic event.

**Approvals:** Included in our Seismic Engineering Guidelines approved by the State of California Office of Statewide Health Planning and Development **(OSHPD)**. For additional load, spacing and placement information relating to OSHPD projects, please refer to our Seismic Engineering Guidelines OPM-0052-13, for 2½" - 8" (B3100) only

**Installation Note:** Fig. 1CBS fits easily over the cross bolt and attaches by pinching tabs down.

**Finish:** Pre-Galvanized. Contact customer service for alternative finishes and materials.

**Order By:** Figure number and finish.



| Part No. | Pipe Size in. | (mm) | Approx. Wt./100 lbs. | (kg) |
|---|---|---|---|---|
| 1CBS-1 | 1" | (25) | 3.2 | (1.4) |
| 1CBS-1 1/4 | 1 1/4" | (32) | 4.1 | (1.8) |
| 1CBS-1 1/2 | 1 1/2" | (40) | 4.8 | (2.2) |
| 1CBS-2 | 2" | (50) | 9.4 | (4.2) |
| 1CBS-2 1/2 | 2 1/2" | (65) | 11.4 | (5.2) |
| 1CBS-3 | 3" | (75) | 13.9 | (6.8) |
| 1CBS-3 1/2 | 3 1/2" | (90) | 16.0 | (7.2) |
| 1CBS-4 | 4" | (100) | 18.0 | (8.1) |
| 1CBS-5 | 5" | (125) | 27.3 | (12.4) |
| 1CBS-6 | 6" | (150) | 32.5 | (14.7) |
| 1CBS-8 | 8" | (200) | 42.5 | (19.2) |
| 1CBS-10 | 10" | (250) | 72.7 | (32.9) |
| 1CBS-12 | 12" | (300) | 86.3 | (39.1) |
| 1CBS-14 | 14" | (350) | 157.6 | (71.5) |
| 1CBS-16 | 16" | (400) | 183.7 | (83.3) |
| 1CBS-18 | 18" | (450) | 224.6 | (101.9) |
| 1CBS-20 | 20" | (500) | 254.0 | (115.2) |



## TOLCO™ Fig. 25 - Surge Restrainer

**Size Range:** — One size fits 3/4" (20mm) thru 2" (40mm) pipe.

**Material:** — Pre-Galvanized Steel

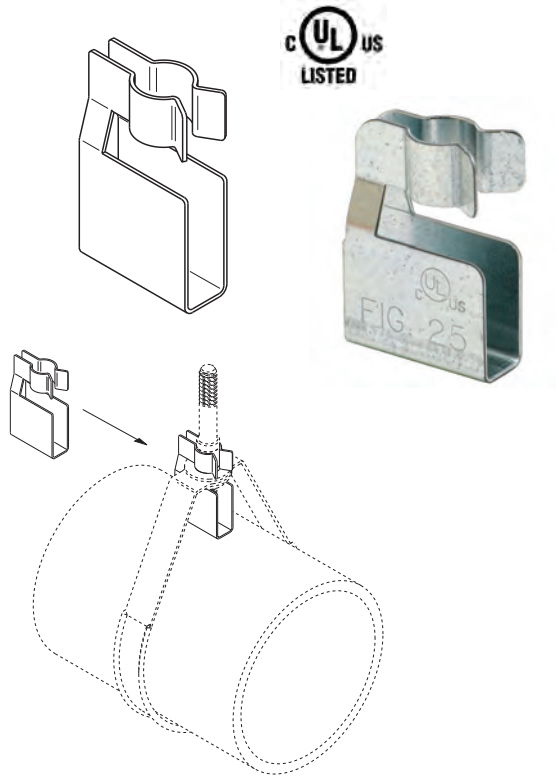
**Function:** — Designed to be used in conjunction with Fig. 200 band hangers to restrict the upward movement of piping as it occurs during sprinkler head activation or earthquake type activity. The surge restrainer is easily and efficiently installed by snapping into a locking position on the band hanger. This product is intended to satisfy the requirements as indicated in the National Fire Protection Association NFPA 13, 2016 edition, 9.2.3.4.4.1 and 9.2.3.4.4.4 Can be used to restrain either steel pipe or CPVC plastic Pipe.

**Approvals:** — Underwriters Laboratories Listed only when used with band hanger Fig. 200, in the USA **(UL)** and Canada **(cUL)**.

**Finish:** Pre-Galvanized

**Order By:** Figure number and band hanger, size from 3/4" (20mm) thru 2" (40mm).

**Patent #5,344,108**




| Part No. | Approx. Wt./100 lbs. | (kg) |
|---|---|---|
| 25 | 4.8 | (2.2) |

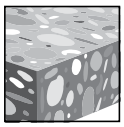
All dimensions in charts and on drawings are in inches. Dimensions shown in parentheses are in millimeters unless otherwise specified.

# 3.3.8 KWIK HUS-EZ I AND KWIK HUS-EZ E CARBON STEEL SCREW ANCHOR

## PRODUCT DESCRIPTION

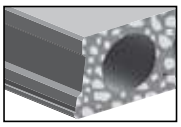
**KWIK HUS EZ I and KWIK HUS-EZ E carbon steel anchors**

| Anchor System | | Features and Benefits |
|---|---|---|
|  | Carbon Steel<br>1/4", 3/8"<br>KWIK HUS-EZ I | • OSHA compliant installation options including the Hilti SafeSet™ hollow drill bit technology<br>• Easy installation using impact tool or torque wrench<br>• Product and length identification marks facilitate quality control after installation<br>• Thread design enables quality setting and exceptional load values in wide variety of base material strengths<br>• 1/4" diameter available in internally and externally threaded head styles<br>• Anchor is fully removable<br>• Anchor diameter is same as drill bit diameter. No special diameter bit requiredt.<br>• Suitable for reduced edge distances and spacing<br>• Suitable for seismic and non-seismic areas |
|  | Carbon Steel 1/4"<br>KWIK HUS EZ E | |

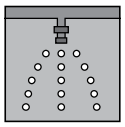


Uncracked concrete

Cracked concrete



Hollowcore concrete



Fire sprinkler listings

SafeSet™ System with Hollow Drill Bit


Profis Anchor design software

| Approvals/Listings | |
|---|---|
| ICC-ES (International Code Council) | ESR-3027 in concrete per ACI 318 Ch. 17 / ACI 355.2/ ICC-ES AC193 |
| City of Los Angeles | City of Los Angeles 2020 LABC Supplement (within ESR-3027) |
| FM (Factory Mutual) | Pipe hanger components for automatic sprinkler systems for KH-EZ I and KH-EZ E |

## INSTALLATION PARAMETERS

**Table 1 — Hilti KWIK HUS-EZ I and KWIK HUS-EZ E specifications[1,2]**

| Setting information | Symbol | Units | Nominal anchor diameter | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1/4 | | | | | 3/8 |
| Head style | | | KH-EZ E | KH-EZ I | | | | |
| Internal thread or external thread diameter | | in. | 3/8 | 1/4 | | 3/8 | | 1/2 |
| Nominal bit diameter | $d_{bit}$ | in. | 1/4 | | | | | 3/8 |
| Nominal embedment | $h_{nom}$ | in. | 1-5/8 | 1-5/8 | 2-1/2 | 1-5/8 | 2-1/2 | 2-1/8 |
| Effective embedment | $h_{ef}$ | in. | 1.18 | 1.18 | 1.92 | 1.18 | 1.92 | 1.54 |
| Minimum hole depth | $h_o$ | in. | 2 | 2 | 2-7/8 | 2 | 2-7/8 | 2-3/8 |
| Installation torque | $T_{inst}$ | ft-lb (N-m) | 18 (24) | | | | | 40 (54) |
| Wrench size | | in. | 1/2 | 3/8 | | 1/2 | | 11/16 |

1 $T_{inst}$ is the maximum installation torque that may be applied with a torque wrench.

2 See table 5 and figure 2 of section 3.3.6 for spacing, edge distance, and concrete thickness parameters

**Figure 1 — KWIK HUS-EZ I anchor installation details**

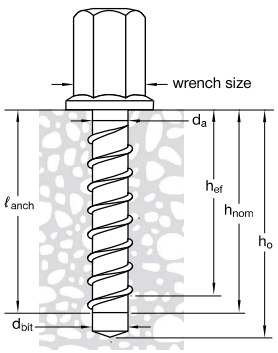
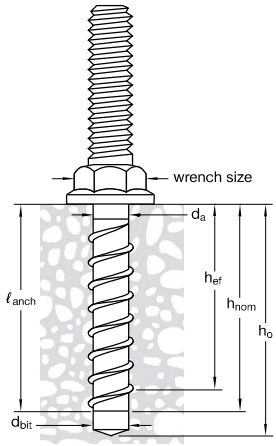



**Figure 2 — KWIK HUS-EZ E anchor installation details**



# DESIGN INFORMATION IN CONCRETE PER ACI 318

## ACI 318 Chapter 17 design

The load values contained in this section are Hilti Simplified Design Tables. The load tables in this section were developed using the Strength Design parameters and variables of ESR-3027 and the equations within ACI 318 Chapter 17. For a detailed explanation of the Hilti Simplified Design Tables, refer to section 3.1.8. Data tables from ESR-3027 are not contained in this section, but can be found at www.icc-es.org or at www.hilti.com.

**Table 2 — Hilti KWIK HUS-EZ I and KWIK HUS-EZ E design strength with concrete / pullout failure in uncracked concrete[1,2,3,4]**

| Nominal anchor diameter in. | Nominal embed. depth in. (mm) | Tension - $\phi N_n$ | | | | | | | Shear - $\phi V_n$ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $f'_c$ = 2,500 psi (17.2 MPa) lb (kN) | $f'_c$ = 3,000 psi (20.7 MPa) lb (kN) | $f'_c$ = 4,000 psi (27.6 MPa) lb (kN) | $f'_c$ = 5,000 psi (34.5 MPa) lb (kN) | $f'_c$ = 6,000 psi (41.4 MPa) lb (kN) | $f'_c$ = 7,000 psi (48.3 MPa) lb (kN) | $f'_c$ = 8,000 psi (55.2 MPa) lb (kN) | $f'_c$ = 2,500 psi (17.2 MPa) lb (kN) | $f'_c$ = 3,000 psi (20.7 MPa) lb (kN) | $f'_c$ = 4,000 psi (27.6 MPa) lb (kN) | $f'_c$ = 6,000 psi (41.4 MPa) lb (kN) |
| 1/4 | 1-5/8 | 585 | 620 | 675 | 725 | 765 | 800 | 830 | 1,075 | 1,180 | 1,360 | 1,670 |
| | (41) | (2.6) | (2.8) | (3.0) | (3.2) | (3.4) | (3.6) | (3.7) | (4.8) | (5.2) | (6.0) | (7.4) |
| | 2-1/2 | 1,525 | 1,670 | 1,930 | 2,160 | 2,365 | 2,555 | 2,730 | 2,235 | 2,450 | 2,825 | 3,460 |
| | (64) | (6.8) | (7.4) | (8.6) | (9.6) | (10.5) | (11.4) | (12.1) | (9.9) | (10.9) | (12.6) | (15.4) |
| 3/8 | 2-1/8 | 1,490 | 1,635 | 1,885 | 2,110 | 2,310 | 2,495 | 2,665 | 1,605 | 1,760 | 2,030 | 2,485 |
| | (54) | (6.6) | (7.3) | (8.4) | (9.4) | (10.3) | (11.1) | (11.9) | (7.1) | (7.8) | (9.0) | (11.1) |

**Table 3 — Hilti KWIK HUS-EZ I and KWIK HUS-EZ E design strength with concrete/pullout failure in cracked concrete[1,2,3,4,5]**

| Nominal anchor diameter in. | Nominal embed. depth in. (mm) | Tension - $\phi N_n$ | | | | | | | Shear - $\phi V_n$ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $f'_c$ = 2,500 psi (17.2 MPa) lb (kN) | $f'_c$ = 3,000 psi (20.7 MPa) lb (kN) | $f'_c$ = 4,000 psi (27.6 MPa) lb (kN) | $f'_c$ = 5,000 psi (34.5 MPa) lb (kN) | $f'_c$ = 6,000 psi (41.4 MPa) lb (kN) | $f'_c$ = 7,000 psi (48.3 MPa) lb (kN) | $f'_c$ = 8,000 psi (55.2 MPa) lb (kN) | $f'_c$ = 2,500 psi (17.2 MPa) lb (kN) | $f'_c$ = 3,000 psi (20.7 MPa) lb (kN) | $f'_c$ = 4,000 psi (27.6 MPa) lb (kN) | $f'_c$ = 6,000 psi (41.4 MPa) lb (kN) |
| 1/4 | 1-5/8 | 300 | 315 | 345 | 370 | 390 | 410 | 425 | 765 | 835 | 965 | 1,180 |
| | (41) | (1.3) | (1.4) | (1.5) | (1.6) | (1.7) | (1.8) | (1.9) | (3.4) | (3.7) | (4.3) | (5.2) |
| | 2-1/2 | 760 | 830 | 960 | 1,070 | 1,175 | 1,270 | 1,355 | 1,585 | 1,735 | 2,000 | 2,450 |
| | (64) | (3.4) | (3.7) | (4.3) | (4.8) | (5.2) | (5.6) | (6.0) | (7.1) | (7.7) | (8.9) | (10.9) |
| 3/8 | 2-1/8 | 1,055 | 1,155 | 1,335 | 1,495 | 1,635 | 1,765 | 1,890 | 1,135 | 1,245 | 1,440 | 1,760 |
| | (54) | (4.7) | (5.1) | (5.9) | (6.7) | (7.3) | (7.9) | (8.4) | (5.0) | (5.5) | (6.4) | (7.8) |

3.3.8

1 See section 3.1.8 to convert design strength value to ASD value.

2 Linear interpolation between embedment depths and concrete compressive strengths is not permitted.

3 Apply spacing, edge distance, and concrete thickness factors in tables 5 and 6 as necessary. Compare to the steel values in table 4. The lesser of the values is to be used for the design.

4 Tabular values are for normal weight concrete only. For lightweight concrete multiply design strength by $\lambda_a$ as follows: for sand-lightweight, $\lambda_a$ = 0.68; for all-lightweight, $\lambda_a$ = 0.60

5 Tabular values are for static loads only. For seismic tension loads, multiply cracked concrete tabular values in tension by the following reduction factors:
1/4-in diameter by 1-5/8-in nominal embedment depth - $\alpha_{N,seis}$ = 0.60
1/4-in diameter by 2-1/2-in nominal embedment depth - $\alpha_{N,seis}$ = 0.75
3/8-in diameter by 2-1/8-in nominal embedment depth - $\alpha_{N,seis}$ = 0.75
No reduction needed for seismic shear. See Section 3.1.8 for additional information on seismic applications.

**Table 4 — Steel design strength for Hilti KWIK HUS-EZ I and KWIK HUS-EZ E anchors[1,2]**

| Nominal anchor diameter in. | Nominal internal thread diameter in. | Tensile[3] $\phi N_{sa}$ lb (kN) | Shear[4] $\phi V_{sa}$ lb (kN) | Seismic shear[5] $\phi V_{sa}$ lb (kN) |
|---|---|---|---|---|
| 1/4 | 1/4-20 UNC | 3,680 (16.4) | 815 (3.6) | 365 (1.6) |
| | 3/8-16 UNC | 3,680 (16.4) | 790 (3.5) | 670 (3.0) |
| 3/8 | 1/2-13 UNC | 5,990 (26.6) | 1,130 (5.0) | 1,130 (5.0) |

1 See section 3.1.8 to convert design strength value to ASD value.

2 Hilti KWIK HUS-EZ I anchors are to be considered brittle steel elements.

3 Tension $\phi N_{sa} = \phi A_{se,N} f_{uta}$ as noted in ACI 318 Chapter 17.

4 Shear determined by static tests with $\phi V_{sa} < \phi\ 0.60\ A_{se,V} f_{uta}$ as noted in ACI 318 Chapter 17.

5 Seismic shear values determined by seismic shear tests with $\phi V_{sa} \leq \phi\ 0.60\ A_{se,V} f_{uta}$ as noted in ACI 318 Chapter 17. See Section 3.1.8 for additional information on seismic applications.

## Table 5 — Load adjustment factors for 1/4-in. diameter Hilti KWIK HUS-EZ I and KWIK HUS-EZ E in uncracked concrete[1,2]

| 1/4-in. KH-EZ uncracked concrete | | | Spacing factor in tension $f_{AN}$ | | Edge distance factor in tension $f_{RN}$ | | Spacing factor in shear[3] $f_{AV}$ | | Edge distance in shear | | | | Conc. thickness factor in shear[4] $f_{HV}$ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | ⊥ toward edge $f_{RV}$ | | II to and away from edge $f_{RV}$ | | | |
| Embedment $h_{nom}$ | | in. (mm) | 1-5/8 (41) | 2-1/2 (64) | 1-5/8 (41) | 2-1/2 (64) | 1-5/8 (41) | 2-1/2 (64) | 1-5/8 (41) | 2-1/2 (64) | 1-5/8 (41) | 2-1/2 (64) | 1-5/8 (41) | 2-1/2 (64) |
| Spacing (s) / edge distance ($c_a$) / concrete thickness (h) - in. (mm) | 1-1/2 | (38) | 0.71 | 0.63 | 0.78 | 0.65 | 0.59 | 0.56 | 0.40 | 0.21 | 0.78 | 0.42 | n/a | n/a |
| | 2 | (51) | 0.78 | 0.67 | 1.00 | 0.77 | 0.62 | 0.58 | 0.61 | 0.33 | 1.00 | 0.65 | n/a | n/a |
| | 2-1/2 | (64) | 0.85 | 0.72 | | 0.90 | 0.65 | 0.60 | 0.86 | 0.46 | | 0.90 | n/a | n/a |
| | 3 | (76) | 0.92 | 0.76 | | 1.00 | 0.68 | 0.62 | 1.00 | 0.60 | | 1.00 | n/a | n/a |
| | 3-1/4 | (83) | 0.96 | 0.78 | | | 0.70 | 0.63 | | 0.68 | | | 0.88 | n/a |
| | 3-1/2 | (89) | 0.99 | 0.80 | | | 0.71 | 0.64 | | 0.76 | | | 0.92 | n/a |
| | 4 | (102) | 1.00 | 0.85 | | | 0.74 | 0.66 | | 0.92 | | | 0.98 | n/a |
| | 4-1/8 | (105) | | 0.86 | | | 0.75 | 0.66 | | 0.97 | | | 1.00 | 0.81 |
| | 4-1/2 | (114) | | 0.89 | | | 0.77 | 0.68 | | 1.00 | | | | 0.84 |
| | 5 | (127) | | 0.93 | | | 0.80 | 0.70 | | | | | | 0.89 |
| | 5-1/2 | (140) | | 0.98 | | | 0.83 | 0.72 | | | | | | 0.93 |
| | 6 | (152) | | 1.00 | | | 0.86 | 0.74 | | | | | | 0.97 |
| | 7 | (178) | | | | | 0.92 | 0.78 | | | | | | 1.00 |
| | 8 | (203) | | | | | 0.98 | 0.82 | | | | | | |
| | 9 | (229) | | | | | 1.00 | 0.86 | | | | | | |
| | 10 | (254) | | | | | | 0.89 | | | | | | |
| | 11 | (279) | | | | | | 0.93 | | | | | | |
| | 12 | (305) | | | | | | 0.97 | | | | | | |
| | 14 | (356) | | | | | | 1.00 | | | | | | |

## Table 6 — Load adjustment factors for 1/4-in. diameter Hilti KWIK HUS-EZ I and KWIK HUS-EZ E in cracked concrete[1,2]

| 1/4-in. KH-EZ cracked concrete | | | Spacing factor in tension $f_{AN}$ | | Edge distance factor in tension $f_{RN}$ | | Spacing factor in shear[3] $f_{AV}$ | | Edge distance in shear | | | | Conc. thickness factor in shear[4] $f_{HV}$ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | ⊥ toward edge $f_{RV}$ | | II to and away from edge $f_{RV}$ | | | |
| Embedment $h_{nom}$ | | in. (mm) | 1-5/8 (41) | 2-1/2 (64) | 1-5/8 (41) | 2-1/2 (64) | 1-5/8 (41) | 2-1/2 (64) | 1-5/8 (41) | 2-1/2 (64) | 1-5/8 (41) | 2-1/2 (64) | 1-5/8 (41) | 2-1/2 (64) |
| Spacing (s) / edge distance ($c_a$) / concrete thickness (h) - in. (mm) | 1-1/2 | (38) | 0.71 | 0.63 | 0.88 | 0.65 | 0.59 | 0.56 | 0.40 | 0.21 | 0.80 | 0.43 | n/a | n/a |
| | 2 | (51) | 0.78 | 0.67 | 1.00 | 0.77 | 0.62 | 0.58 | 0.62 | 0.33 | 1.00 | 0.66 | n/a | n/a |
| | 2-1/2 | (64) | 0.85 | 0.72 | | 0.90 | 0.65 | 0.60 | 0.87 | 0.46 | | 0.90 | n/a | n/a |
| | 3 | (76) | 0.92 | 0.76 | | 1.00 | 0.68 | 0.62 | 1.00 | 0.60 | | 1.00 | n/a | n/a |
| | 3-1/4 | (83) | 0.96 | 0.78 | | | 0.70 | 0.63 | | 0.68 | | | 0.89 | n/a |
| | 3-1/2 | (89) | 0.99 | 0.80 | | | 0.71 | 0.64 | | 0.76 | | | 0.92 | n/a |
| | 4 | (102) | 1.00 | 0.85 | | | 0.74 | 0.66 | | 0.93 | | | 0.98 | n/a |
| | 4-1/8 | (105) | | 0.86 | | | 0.75 | 0.66 | | 0.97 | | | 1.00 | 0.81 |
| | 4-1/2 | (114) | | 0.89 | | | 0.77 | 0.68 | | 1.00 | | | | 0.85 |
| | 5 | (127) | | 0.93 | | | 0.80 | 0.70 | | | | | | 0.89 |
| | 5-1/2 | (140) | | 0.98 | | | 0.83 | 0.72 | | | | | | 0.93 |
| | 6 | (152) | | 1.00 | | | 0.86 | 0.74 | | | | | | 0.98 |
| | 7 | (178) | | | | | 0.92 | 0.78 | | | | | | 1.00 |
| | 8 | (203) | | | | | 0.98 | 0.82 | | | | | | |
| | 9 | (229) | | | | | 1.00 | 0.86 | | | | | | |
| | 10 | (254) | | | | | | 0.90 | | | | | | |
| | 11 | (279) | | | | | | 0.94 | | | | | | |
| | 12 | (305) | | | | | | 0.98 | | | | | | |
| | 14 | (356) | | | | | | 1.00 | | | | | | |

1 Linear interpolation not permitted.

2 When combining multiple load adjustment factors (e.g. for a 4 anchor pattern in a corner with thin concrete member) the design can become very conservative. To optimize the design, use Hilti PROFIS Engineering software or perform anchor calculation using design equations from ACI 318 Chapter 17.

3 Spacing factor reduction in shear, $f_{AV}$, assumes an influence of a nearby edge. If no edge exists, then $f_{AV} = f_{AN}$.

4 Concrete thickness reduction factor in shear, $f_{HV}$, assumes an influence of a nearby edge. If no edge exists, then $f_{HV} = 1.0$.

If a reduction factor value is in a shaded cell, this indicates that this specific edge distance may not be permitted with a certain spacing (or vice versa). Check with table 5 and figure 2 of section 3.3.6 to calculate permissable edge distance, spacing and concrete thickness combinations.

### Table 7 — Load Adjustment Factors for 3/8-in. diameter KWIK HUS-EZ I and KWIK HUS-EZ E in uncracked concrete [1,2]

| 3/8-in. KH-EZ uncracked concrete | | Spacing factor in tension $f_{AN}$ | | | | Edge distance factor in tension $f_{RN}$ | | | | Spacing factor in shear [3] $f_{AV}$ | | | | Edge distance in shear: ⊥ toward edge $f_{RV}$ | | | | Edge distance in shear: II to and away from edge $f_{RV}$ | | | | Conc. thickness factor in shear [4] $f_{HV}$ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Embedment $h_{nom}$ | in. | 1-5/8 | 2-1/8 | 2-1/2 | 3-1/4 | 1-5/8 | 2-1/8 | 2-1/2 | 3-1/4 | 1-5/8 | 2-1/8 | 2-1/2 | 3-1/4 | 1-5/8 | 2-1/8 | 2-1/2 | 3-1/4 | 1-5/8 | 2-1/8 | 2-1/2 | 3-1/4 | 1-5/8 | 2-1/8 | 2-1/2 | 3-1/4 |
| | (mm) | (41) | (54) | (64) | (83) | (41) | (54) | (64) | (83) | (41) | (54) | (64) | (83) | (41) | (54) | (64) | (83) | (41) | (54) | (64) | (83) | (41) | (54) | (64) | (83) |
| Spacing (s)/edge distance ($c_a$)/concrete thickness (h) - in. (mm) | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-1/2 | (38) | n/a | n/a | n/a | n/a | 0.58 | 0.62 | 0.63 | 0.57 | n/a | n/a | n/a | n/a | 0.49 | 0.32 | 0.25 | 0.08 | 0.58 | 0.62 | 0.50 | 0.17 | n/a | n/a | n/a | n/a |
| 2 | (51) | n/a | n/a | n/a | n/a | 0.76 | 0.75 | 0.75 | 0.66 | n/a | n/a | n/a | n/a | 0.75 | 0.49 | 0.38 | 0.13 | 0.76 | 0.75 | 0.75 | 0.26 | n/a | n/a | n/a | n/a |
| 2-1/4 | (57) | 0.84 | 0.74 | 0.70 | 0.65 | 0.86 | 0.82 | 0.81 | 0.70 | 0.65 | 0.62 | 0.60 | 0.55 | 0.90 | 0.59 | 0.46 | 0.16 | 0.90 | 0.82 | 0.81 | 0.31 | n/a | n/a | n/a | n/a |
| 2-1/2 | (64) | 0.88 | 0.77 | 0.72 | 0.67 | 0.95 | 0.91 | 0.88 | 0.75 | 0.67 | 0.63 | 0.61 | 0.55 | 1.00 | 0.69 | 0.54 | 0.18 | 1.00 | 0.91 | 0.88 | 0.37 | n/a | n/a | n/a | n/a |
| 3 | (76) | 0.95 | 0.82 | 0.77 | 0.70 | 1.00 | 1.00 | 1.00 | 0.85 | 0.71 | 0.66 | 0.63 | 0.56 | | 0.90 | 0.71 | 0.24 | | 1.00 | 1.00 | 0.48 | n/a | n/a | n/a | n/a |
| 3-1/4 | (83) | 0.99 | 0.85 | 0.79 | 0.72 | | | | 0.90 | 0.72 | 0.67 | 0.64 | 0.57 | | 1.00 | 0.80 | 0.27 | | | | 0.54 | 0.95 | n/a | n/a | n/a |
| 3-1/2 | (89) | 1.00 | 0.88 | 0.81 | 0.73 | | | | 0.95 | 0.74 | 0.68 | 0.65 | 0.58 | | | 0.89 | 0.30 | | | | 0.61 | 0.98 | n/a | n/a | n/a |
| 4 | (102) | | 0.93 | 0.86 | 0.77 | | | | 1.00 | 0.78 | 0.71 | 0.68 | 0.59 | | | 1.00 | 0.37 | | | | 0.74 | 1.00 | 0.91 | 0.84 | n/a |
| 4-1/2 | (114) | | 0.99 | 0.90 | 0.80 | | | | | 0.81 | 0.73 | 0.70 | 0.60 | | | | 0.44 | | | | 0.88 | | | 0.89 | n/a |
| 4-3/4 | (121) | | 1.00 | 0.93 | 0.82 | | | | | 0.83 | 0.75 | 0.71 | 0.60 | | | | 0.48 | | | | 0.96 | | | 0.91 | 0.639 |
| 5 | (127) | | | 0.95 | 0.83 | | | | | 0.84 | 0.76 | 0.72 | 0.61 | | | | 0.52 | | | | 1.00 | | | 0.94 | 0.655 |
| 6 | (152) | | | 1.00 | 0.90 | | | | | 0.91 | 0.81 | 0.76 | 0.63 | | | | 0.68 | | | | | | | 1.00 | 0.718 |
| 7 | (178) | | | | 0.97 | | | | | 0.98 | 0.86 | 0.81 | 0.65 | | | | 0.86 | | | | | | | | 0.775 |
| 8 | (203) | | | | 1.00 | | | | | 1.00 | 0.91 | 0.85 | 0.67 | | | | 1.00 | | | | | | | | 0.829 |
| 9 | (229) | | | | | | | | | | 0.97 | 0.90 | 0.69 | | | | | | | | | | | | 0.879 |
| 10 | (254) | | | | | | | | | | 1.00 | 0.94 | 0.71 | | | | | | | | | | | | 0.927 |
| 11 | (279) | | | | | | | | | | | 0.98 | 0.74 | | | | | | | | | | | | 0.972 |
| 12 | (305) | | | | | | | | | | | 1.00 | 0.76 | | | | | | | | | | | | 1.000 |
| 14 | (356) | | | | | | | | | | | | 0.80 | | | | | | | | | | | | |
| 16 | (406) | | | | | | | | | | | | 0.84 | | | | | | | | | | | | |
| 18 | (457) | | | | | | | | | | | | 0.89 | | | | | | | | | | | | |
| 20 | (508) | | | | | | | | | | | | 0.93 | | | | | | | | | | | | |
| 24 | (610) | | | | | | | | | | | | 1.000 | | | | | | | | | | | | |

### Table 8 — Load Adjustment Factors for 3/8-in. diameter Hilti KWIK HUS-EZ I and KWIZ HUS-EZ E in cracked concrete [1,2]

3.3.6

| 3/8-in. KH-EZ cracked concrete | | Spacing factor in tension $f_{AN}$ | | | | Edge distance factor in tension $f_{RN}$ | | | | Spacing factor in shear [3] $f_{AV}$ | | | | Edge distance in shear: ⊥ toward edge $f_{RV}$ | | | | Edge distance in shear: II to and away from edge $f_{RV}$ | | | | Conc. thickness factor in shear [4] $f_{HV}$ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Embedment $h_{nom}$ | in. | 1-5/8 | 2-1/8 | 2-1/2 | 3-1/4 | 1-5/8 | 2-1/8 | 2-1/2 | 3-1/4 | 1-5/8 | 2-1/8 | 2-1/2 | 3-1/4 | 1-5/8 | 2-1/8 | 2-1/2 | 3-1/4 | 1-5/8 | 2-1/8 | 2-1/2 | 3-1/4 | 1-5/8 | 2-1/8 | 2-1/2 | 3-1/4 |
| | (mm) | (41) | (54) | (64) | (83) | (41) | (54) | (64) | (83) | (41) | (54) | (64) | (83) | (41) | (54) | (64) | (83) | (41) | (54) | (64) | (83) | (41) | (54) | (64) | (83) |
| Spacing (s)/edge distance ($c_a$)/concrete thickness (h) - in. (mm) | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-1/2 | (38) | n/a | n/a | n/a | n/a | 0.92 | 0.74 | 0.66 | 0.57 | n/a | n/a | n/a | n/a | 0.49 | 0.32 | 0.25 | 0.09 | 0.92 | 0.64 | 0.50 | 0.17 | n/a | n/a | n/a | n/a |
| 2 | (51) | n/a | n/a | n/a | n/a | 1.00 | 0.90 | 0.79 | 0.66 | n/a | n/a | n/a | n/a | 0.76 | 0.50 | 0.39 | 0.13 | 1.00 | 0.90 | 0.77 | 0.26 | n/a | n/a | n/a | n/a |
| 2-1/4 | (57) | 0.84 | 0.74 | 0.70 | 0.65 | 1.00 | 0.98 | 0.85 | 0.70 | 0.66 | 0.62 | 0.60 | 0.55 | 0.90 | 0.59 | 0.46 | 0.16 | 1.00 | 0.98 | 0.85 | 0.31 | n/a | n/a | n/a | n/a |
| 2-1/2 | (64) | 0.88 | 0.77 | 0.72 | 0.67 | 1.00 | 1.00 | 0.92 | 0.75 | 0.67 | 0.63 | 0.61 | 0.55 | 1.00 | 0.69 | 0.54 | 0.18 | 1.00 | 1.00 | 0.92 | 0.37 | n/a | n/a | n/a | n/a |
| 3 | (76) | 0.95 | 0.82 | 0.77 | 0.70 | 1.00 | | 1.00 | 0.85 | 0.71 | 0.66 | 0.63 | 0.56 | 1.00 | 0.91 | 0.71 | 0.24 | 1.00 | 1.00 | 1.00 | 0.48 | n/a | n/a | n/a | n/a |
| 3-1/4 | (83) | 0.99 | 0.85 | 0.79 | 0.72 | | | | 0.90 | 0.73 | 0.67 | 0.64 | 0.57 | | 1.00 | 0.80 | 0.27 | | | | 0.55 | 0.95 | n/a | n/a | n/a |
| 3-1/2 | (89) | 1.00 | 0.88 | 0.81 | 0.73 | | | | 0.95 | 0.74 | 0.68 | 0.65 | 0.58 | | | 0.90 | 0.31 | | | | 0.61 | 0.98 | n/a | n/a | n/a |
| 4 | (102) | | 0.93 | 0.86 | 0.77 | | | | 1.00 | 0.78 | 0.71 | 0.68 | 0.59 | | | 1.00 | 0.37 | | | | 0.75 | 1.00 | 0.91 | 0.84 | n/a |
| 4-1/2 | (114) | | 0.99 | 0.90 | 0.80 | | | | | 0.81 | 0.73 | 0.70 | 0.60 | | | | 0.44 | | | | 0.89 | | 0.97 | 0.89 | n/a |
| 4-3/4 | (121) | | 1.00 | 0.93 | 0.82 | | | | | 0.83 | 0.75 | 0.71 | 0.60 | | | | 0.48 | | | | 0.97 | | 1.00 | 0.92 | 0.64 |
| 5 | (127) | | | 0.95 | 0.83 | | | | | 0.85 | 0.76 | 0.72 | 0.61 | | | | 0.52 | | | | 1.00 | | | 0.94 | 0.66 |
| 6 | (152) | | | 1.00 | 0.90 | | | | | 0.92 | 0.81 | 0.77 | 0.63 | | | | 0.69 | | | | | | | 1.00 | 0.72 |
| 7 | (178) | | | | 0.97 | | | | | 0.98 | 0.87 | 0.81 | 0.65 | | | | 0.86 | | | | | | | | 0.78 |
| 8 | (203) | | | | 1.00 | | | | | 1.00 | 0.92 | 0.85 | 0.67 | | | | 1.00 | | | | | | | | 0.83 |
| 9 | (229) | | | | | | | | | | 0.97 | 0.90 | 0.69 | | | | | | | | | | | | 0.88 |
| 10 | (254) | | | | | | | | | | 1.00 | 0.94 | 0.72 | | | | | | | | | | | | 0.93 |
| 11 | (279) | | | | | | | | | | | 0.99 | 0.74 | | | | | | | | | | | | 0.97 |
| 12 | (305) | | | | | | | | | | | 1.00 | 0.76 | | | | | | | | | | | | 1.00 |
| 14 | (356) | | | | | | | | | | | | 0.80 | | | | | | | | | | | | |
| 16 | (406) | | | | | | | | | | | | 0.85 | | | | | | | | | | | | |
| 18 | (457) | | | | | | | | | | | | 0.89 | | | | | | | | | | | | |
| 20 | (508) | | | | | | | | | | | | 0.93 | | | | | | | | | | | | |
| 24 | (610) | | | | | | | | | | | | 1.00 | | | | | | | | | | | | |

1 Linear interpolation not permitted.

2 When combining multiple load adjustment factors (e.g. for a 4 anchor pattern in a corner with thin concrete member) the design can become very conservative. To optimize the design, use Hilti PROFIS Engineering software or perform anchor calculation using design equations from ACI 318 Chapter 17.

3 Spacing factor reduction in shear, $f_{AV}$, assumes an influence of a nearby edge. If no edge exists, then $f_{AV} = f_{AN}$.

4 Concrete thickness reduction factor in shear, $f_{HV}$, assumes an influence of a nearby edge. If no edge exists, then $f_{HV} = 1.0$.

If a reduction factor value is in a shaded cell, this indicates that this specific edge distance may not be permitted with a certain spacing (or vice versa). Check table 5 and figure 2 of this section to calculate permissable edge distance, spacing and concrete thickness combinations.

**Table 9 — Hilti KWIK HUS-EZ I and KWIK HUS-EZ E in the soffit of uncracked lightweight concrete over metal deck[1,2,3,4,5,6]**

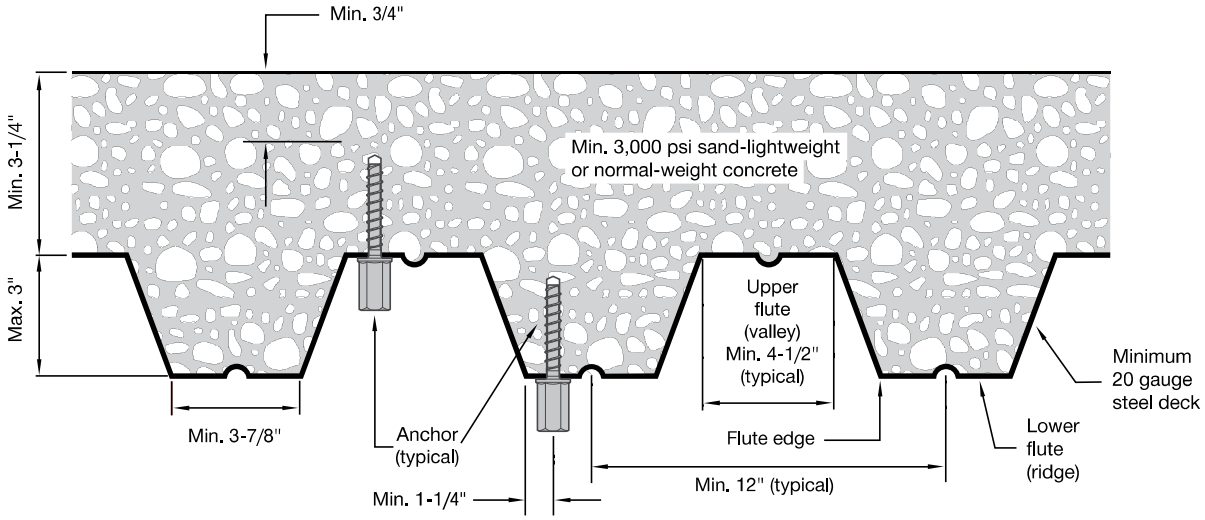
| Nominal anchor diameter in. | Nominal internal thread diameter in. | Nominal embed. depth in. (mm) | Installation in lower flute | | | | Installation in upper flute | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Tension - $\phi N_n$ | | Shear - $\phi V_n$ | | Tension - $\phi N_n$ | | Shear - $\phi V_n$ | |
| | | | $f'_c$ = 3,000 psi (20.7 MPa) lb (kN) | $f'_c$ = 4,000 psi (27.6 MPa) lb (kN) | $f'_c$ = 3,000 psi (20.7 MPa) lb (kN) | $f'_c$ = 4,000 psi (27.6 MPa) lb (kN) | $f'_c$ = 3,000 psi (20.7 MPa) lb (kN) | $f'_c$ = 4,000 psi (27.6 MPa) lb (kN) | $f'_c$ = 3,000 psi (20.7 MPa) lb (kN) | $f'_c$ = 4,000 psi (27.6 MPa) lb (kN) |
| 1/4 | 1/4-20 UNC | 1-5/8 (41) | 545 (2.4) | 595 (2.6) | 515 (2.3) | 515 (2.3) | 670 (3.0) | 730 (3.2) | 610 (2.7) | 610 (2.7) |
| | | 2-1/2 (64) | 1,220 (5.4) | 1,410 (6.3) | 515 (2.3) | 515 (2.3) | 1,275 (5.7) | 1,470 (6.5) | 610 (2.7) | 610 (2.7) |
| | 3/8-16 UNC | 1-5/8 (41) | 545 (2.4) | 595 (2.6) | 615 (2.7) | 615 (2.7) | 670 (3.0) | 730 (3.2) | 915 (4.1) | 915 (4.1) |
| | | 2-1/2 (64) | 1,220 (5.4) | 1,410 (6.3) | 615 (2.7) | 615 (2.7) | 1,275 (5.7) | 1,470 (6.5) | 915 (4.1) | 915 (4.1) |
| 3/8 | 1/2-13 UNC | 2-1/8 (54) | 1,120 (5.0) | 1,295 (5.8) | 1,430 (6.4) | 1,430 (6.4) | 1,730 (7.7) | 2,000 (8.9) | 2,190 (9.7) | 2,190 (9.7) |

**Table 10 — Hilti KWIK HUS-EZ I and KWIK HUS-EZ E in the soffit of cracked lightweight concrete over metal deck[1,2,3,4,5,6,7,8]**

| Nominal anchor diameter in. | Nominal internal thread diameter in. | Nominal embed. depth in. (mm) | Installation in lower flute | | | | Installation in upper flute | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Tension - $\phi N_n$ | | Shear - $\phi V_n$ | | Tension - $\phi N_n$ | | Shear - $\phi V_n$ | |
| | | | $f'_c$ = 3,000 psi (20.7 MPa) lb (kN) | $f'_c$ = 4,000 psi (27.6 MPa) lb (kN) | $f'_c$ = 3,000 psi (20.7 MPa) lb (kN) | $f'_c$ = 4,000 psi (27.6 MPa) lb (kN) | $f'_c$ = 3,000 psi (20.7 MPa) lb (kN) | $f'_c$ = 4,000 psi (27.6 MPa) lb (kN) | $f'_c$ = 3,000 psi (20.7 MPa) lb (kN) | $f'_c$ = 4,000 psi (27.6 MPa) lb (kN) |
| 1/4 | 1/4-20 UNC | 1-5/8 (41) | 280 (1.2) | 305 (1.4) | 515 (2.3) | 515 (2.3) | 330 (1.5) | 360 (1.6) | 610 (2.7) | 610 (2.7) |
| | | 2-1/2 (64) | 605 (2.7) | 700 (3.1) | 515 (2.3) | 515 (2.3) | 635 (2.8) | 735 (3.3) | 610 (2.7) | 610 (2.7) |
| | 3/8-16 UNC | 1-5/8 (41) | 280 (1.2) | 325 (1.4) | 615 (2.7) | 615 (2.7) | 330 (1.5) | 380 (1.7) | 915 (4.1) | 915 (4.1) |
| | | 2-1/2 (64) | 605 (2.7) | 700 (3.1) | 615 (2.7) | 615 (2.7) | 635 (2.8) | 735 (3.3) | 915 (4.1) | 915 (4.1) |
| 3/8 | 1/2-13 UNC | 2-1/8 (54) | 795 (3.5) | 920 (4.1) | 1,430 (6.4) | 1,430 (6.4) | 1,225 (5.4) | 1,415 (6.3) | 2,190 (9.7) | 2,190 (9.7) |

1 See Section 3.1.8 to convert design strength value to ASD value.
2 Linear interpolation between embedment depths and concrete compressive strengths is not permitted.
3 Tabular value is for one anchor per flute. Minimum spacing along the length of the flute is 3 x $h_{nom}$ (nominal embedment).
4 Tabular values are lightweight concrete and no additional reduction factor is needed.
5 No additional reduction factors for spacing or edge distance need to be applied.
6 Comparison of the tabular values to the steel strength is not necessary. Tabular Values control.
7 Tabular values are for static loads only. For seismic tenison loads, multiply cracked concrete tabular values in tension by $\alpha_{N,seis}$ = 0.75.
8 For seismic shear, an additional factor must be applied to the cracked concrete tabular values for seismic conditions:
1/4-in diameter by 1-5/8-in nominal embedment depth - $\alpha_{V,seis}$ = 0.44
1/4-in diameter by 2-1/2-in nominal embedment depth - $\alpha_{V,seis}$ = 0.85
See Section 3.1.8 for additional information on seismic applications.

**Figure 2 — Installation of Hilti KWIK HUS-EZ I and KWIK HUS-EZ E in soffit of concrete over steel deck floor and roof assemblies**




1 Anchors may be placed in the upper or lower flute of the steel deck profile provided the minimum concrete cover above the drilled hole is satisfied. Anchors in the lower flute may be installed with a maximum 1-inch offset in either direction from the center of the flute. The offset distance may be increased proportionally for profiles with lower flute widths greater than those shown provided the minimum lower flute edge distance is also satisfied.

## DESIGN INFORMATION IN CONCRETE PER CSA A23.3

Limit State Design of anchors is described in the provisions of CSA A23.3 Annex D for post-installed anchors tested and assessed in accordance with ACI 355.2 for mechanical anchors and ACI 355.4 for adhesive anchors. This section contains the Limit State Design tables with unfactored characteristic loads that are based on the published loads in ICC Evaluation Services ESR-3027. These tables are followed by factored resistance tables. The factored resistance tables have characteristic design loads that are prefactored by the applicable reduction factors for a single anchor with no anchor-to-anchor spacing or edge distance adjustments for the convenience of the user of this document. All the figures in the previous ACI 318 Chapter 17 design section are applicable to Limit State Design and the tables will reference these figures.

For a detailed explanation of the tables developed in accordance with CSA A23.3 Annex D, refer to Section 3.1.8. Technical assistance is available by contacting Hilti Canada at (800) 363-4458 or at www.hilti.com.



**Table 11 — Steel resistance for Hilti KWIK HUS-EZ I and KWIK HUS-EZ E carbon steel screw anchor[1,2]**

| Nominal anchor diameter in. | Internal thread diameter (UNC) | Tensile[3] $N_{sar}$ lb (kN) | Shear[4] $V_{sar}$ lb (kN) | Seismic shear[5] $V_{sar,eq}$ lb (kN) |
|---|---|---|---|---|
| 1/4 | 1/4-20 | 3,370 (15.0) | 750 (3.3) | 335 (1.5) |
| 1/4 | 3/8-16 | 3,370 (15.0) | 725 (3.2) | 620 (2.8) |
| 3/8 | 1/2-13 | 5,515 (24.5) | 1,040 (4.6) | 1,040 (4.6) |

1 See Section 3.1.8 of Hilti Product Technical Guide Ed 21 to convert factored resistance value to ASD value.

2 Hilti KWIK HUS-EZ I carbon steel screw anchors are to be considered brittle steel elements.

3 Tensile $N_{sar} = A_{se,N}\ \phi_s\ f_{uta}$ R as noted in CSA A23.3 Annex D.

4 Shear determined by static shear tests with $V_{sar} < 0.6\ A_{se,V}\ \phi_s\ f_{uta}$ R as noted in CSA A23.3 Annex D.

5 Seismic shear values determined by seismic shear tests with $V_{sar,eq} \leq 0.60\ A_{se,V}\ \phi_s\ f_{uta}$ R as noted in CSA A23.3 Annex D. See Section 3.1.8 of Hilti Product Technical Guide Ed 21 for additional information on seismic applications.

## Table 12 — Hilti KWIK HUS-EZ I and KWIK HUS-EZ E design information in accordance with CSA A23.3 Annex D[1]

| Design parameter | | Symbol | Units | Nominal anchor diameter | | | Ref |
|---|---|---|---|---|---|---|---|
| | | | | 1/4 | | 3/8 | A23.3 |
| Anchor O.D. | | $d_a$ | in.<br>(mm) | 0.25<br>(6.4) | | 0.375<br>(9.5) | |
| Effective embedment[2] | | $h_{ef}$ | in.<br>(mm) | 1.18<br>(30) | 1.92<br>(49) | 1.54<br>(39) | |
| Minimum nominal embedment[2] | | $h_{nom}$ | in.<br>(mm) | 1-5/8<br>(41) | 2-1/2<br>(64) | 2 1/8<br>(54) | |
| Minimum concrete thickness | | $h_{min}$ | in.<br>(mm) | 3-1/4<br>(83) | 4-1/8<br>(105) | 3 5/8<br>(92) | |
| Critical edge distance | | $c_{ac}$ | in.<br>(mm) | 2.00<br>(51) | 2.78<br>(71) | 2.75<br>(70) | |
| Minimum spacing at critical edge distance | | $s_{min,cac}$ | in.<br>(mm) | 1.5<br>(38) | | 2.25<br>(57) | |
| Minimum edge distance | | $c_{min}$ | in.<br>(mm) | 1.50<br>(38) | | 1.5<br>(38) | |
| Minimum anchor spacing at minimum edge distance | | for s > | in.<br>(mm) | 3.0<br>(76) | | 3<br>(76) | |
| Mininimum hole depth in concrete | | $h_0$ | in.<br>(mm) | 2<br>(51) | 2-7/8<br>(73) | 2 3/8<br>(60) | |
| Minimum specified ultimate strength | | $f_{uta}$ | psi<br>(N/mm²) | 125,000<br>(862) | | 106,975<br>(826) | |
| Effective tensile stress area | | $A_{se,N}$ | in²<br>(mm²) | 0.045<br>(29.0) | | 0.086<br>(55.5) | |
| Steel embed. material resistance factor for reinforcement | | $\phi_s$ | - | 0.85 | | | 8.4.3 |
| Resistance modification factor for tension, steel failure modes[3] | | R | - | 0.70 | | | D.5.3 |
| Resistance modification factor for shear, steel failure modes[3] | | R | - | 0.65 | | | D.5.3 |
| Factored steel resistance in tension | | $N_{sar}$ | lb<br>(kN) | 3,370<br>(15.0) | | 5,475<br>(24.4) | D.6.1.2 |
| Factored steel resistance in shear | 1/4-20 UNC internal thread | $V_{sar}$ | lb<br>(kN) | 750<br>(3.3) | | N/A | D.7.1.2 |
| Factored steel resistance in shear, seismic | 1/4-20 UNC internal thread | $V_{sar,eq}$ | lb<br>(kN) | 335<br>(1.5) | | N/A | |
| Factored steel resistance in shear | 3/8-16 UNC internal thread | $V_{sar}$ | lb<br>(kN) | 725<br>(3.2) | | N/A | D.7.1.2 |
| Factored steel resistance in shear, seismic | 3/8-16 UNC internal thread | $V_{sar,eq}$ | lb<br>(kN) | 620<br>(2.8) | | N/A | |
| Factored steel resistance in shear | 1/2-13 UNC internal thread | $V_{sar}$ | lb<br>(kN) | N/A | | 1040<br>(4.6) | |
| Factored steel resistance in shear, seismic | 1/2-13 UNC internal thread | $V_{sar,eq}$ | lb<br>(kN) | N/A | | 1040<br>(4.6) | |
| Coeff. for factored conc. breakout resistance, uncracked concrete | | $k_{c,uncr}$ | - | 10 | | | D.6.2.2 |
| Coeff. for factored conc. breakout resistance, cracked concrete | | $k_{c,cr}$ | - | 7 | | | D.6.2.2 |
| Modification factor for anchor resistance, tension, uncracked conc.[4] | | $\psi_{c,N}$ | - | 1.0 | | | D.6.2.6 |
| Anchor category | | - | - | 3 | 1 | 1 | D.5.3 (c ) |
| Concrete material resistance factor | | $\phi_c$ | - | 0.65 | | | 8.4.2 |
| Resistance modification factor for tension and shear, concrete failure modes, Condition B[5] | | R | - | 0.75 | 1.00 | 1.00 | D.5.3 (c ) |
| Factored pullout resistance in 20 MPa uncracked concrete[6] | | $N_{pr,uncr}$ | lb<br>(kN) | 665<br>(3.0) | 1,645<br>(7.3) | N/A | D.6.3.2 |
| Factored pullout resistance in 20 MPa cracked concrete[6] | | $N_{pr,cr}$ | lb<br>(kN) | 340<br>(1.5) | 815<br>(3.6) | N/A | D.6.3.2 |
| Factored seismic pullout resistance in 20 MPa cracked concrete[6] | | $N_{pr,eq}$ | lb<br>(kN) | 275<br>(1.2) | 815<br>(3.6) | N/A | D.6.3.2 |

1 Design information in this table is taken from ICC-ES ESR-3027, tables 6, 7, and 8, and converted for use with CSA A23.3 Annex D.
2 See figure 1 of this section.
3 The KWIK HUS-EZ I is considered a brittle steel element as defined by CSA A23.3 Annex D section D.2.
4 For all design cases, $\psi_{c,N}$ = 1.0. The appropriate coefficient for breakout resistance for cracked concrete ($k_{c,cr}$) or uncracked concrete ($k_{c,uncr}$) must be used.
5 For use with the load combinations of CSA A23.3 chapter 8. Condition B applies where supplementary reinforcement in conformance with CSA A23.3 section D.5.3 is not provided, or where pullout or pryout strength governs. For cases where the presence of supplementary reinforcement can be verified, the resistance modification factors associated with Condition A may be used.
6 For all design cases, $\psi_{c,P}$ = 1.0. NA (not applicable) denotes that this value does not control for design. See section 4.1.4 of ESR-3027 for additional information.

### Table 13 — Hilti KWIK HUS-EZ I and KWIK HUS-EZ E carbon steel screw anchor factored resistance with concrete/pullout failure in uncracked concrete[1,2,3,4,5]

| Nominal anchor diameter in. | Effective embed. in. (mm) | Nominal embed. in. (mm) | Effec-tiveness Factor | Strength Reduction Factor Tension | Concrete material resistance factor | Pullout Strength (2500 psi concrete) | Tension - $N_r$ | | | | Shear - $V_r$ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | $f'_c$ = 20 MPa (2,900 psi) lb (kN) | $f'_c$ = 25 MPa (3,625 psi) lb (kN) | $f'_c$ = 30 MPa (4,350 psi) lb (kN) | $f'_c$ = 40 MPa (5,800 psi) lb (kN) | $f'_c$ = 20 MPa (2,900 psi) lb (kN) | $f'_c$ = 25 MPa (3,625 psi) lb (kN) | $f'_c$ = 30 MPa (4,350 psi) lb (kN) | $f'_c$ = 40 MPa (5,800 psi) lb (kN) |
| 1/4 | 1.18 (30) | 1-5/8 (41) | 10 | 0.75 | 0.65 | 1305 (5.8) | 665 (3.0) | 710 (3.2) | 750 (3.3) | 820 (3.6) | 805 (3.6) | 900 (4.0) | 985 (4.4) | 1,135 (5.1) |
| | 1.92 (49) | 2-1/2 (64) | 10 | 1 | 0.65 | 2350 (10.5) | 1,645 (7.3) | 1,840 (8.2) | 2,015 (9.0) | 2,325 (10.3) | 2,225 (9.9) | 2,490 (11.1) | 2,725 (12.1) | 3,145 (14.0) |
| 3/8 | 1.54 (39) | 2-1/8 (54) | 10 | 1 | 0.65 | N/A | 1,595 (7.1) | 1,785 (7.9) | 1,955 (8.7) | 2,260 (10.0) | 1,595 (7.1) | 1,785 (7.9) | 1,955 (8.7) | 2,260 (10.0) |

### Table 14 — Hilti KWIK HUS-EZ I and KWIK HUS-EZ E carbon steel screw anchor factored resistance with concrete/pullout failure in cracked concrete[1,2,3,4,5]

| Nominal anchor diameter in. | Effective embed. in. (mm) | Nominal embed. in. (mm) | Effec-tiveness Factor | Strength Reduction Factor Tension | Concrete material resistance factor | Pullout Strength (2500 psi concrete) | Tension - $N_r$ | | | | Shear - $V_r$ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | $f'_c$ = 20 MPa (2,900 psi) lb (kN) | $f'_c$ = 25 MPa (3,625 psi) lb (kN) | $f'_c$ = 30 MPa (4,350 psi) lb (kN) | $f'_c$ = 40 MPa (5,800 psi) lb (kN) | $f'_c$ = 20 MPa (2,900 psi) lb (kN) | $f'_c$ = 25 MPa (3,625 psi) lb (kN) | $f'_c$ = 30 MPa (4,350 psi) lb (kN) | $f'_c$ = 40 MPa (5,800 psi) lb (kN) |
| $d_a$ in (mm) | $h_{ef}$ (mm) | $h_{nom}$ (mm) | $k_{cr}$ | R | $\Phi_c$ | $N_{p,uncr}$ ($N/mm^2$) | 20 | 25 | 30 | 40 | 20 | 25 | 30 | 40 |
| 1/4 | 1.18 (30) | 1-5/8 (41) | 7 | 0.75 | 0.65 | 665 (3.0) | 340 (1.5) | 360 (1.6) | 385 (1.7) | 415 (1.9) | 565 (2.5) | 630 (2.8) | 690 (3.1) | 795 (3.5) |
| | 1.92 (49) | 2-1/2 (64) | 7 | 1 | 0.65 | 1165 (5.2) | 815 (3.6) | 910 (4.1) | 1,000 (4.4) | 1,155 (5.1) | 1,800 (8.0) | 1,740 (7.7) | 1,910 (8.5) | 2,205 (9.8) |
| 3/8 | 1.54 (39) | 2-1/8 (54) | 7 | 1 | 0.65 | N/A | 1,120 (5.0) | 1,250 (5.6) | 1,370 (6.1) | 1,580 (7.0) | 1,120 (5.0) | 1,250 (5.6) | 1,370 (6.1) | 1,580 (7.0) |

1 See section 3.1.8 to convert design strength value to ASD value.

2 Linear interpolation between embedment depths and concrete compressive strengths is not permitted.

3 Apply spacing, edge distance, and concrete thickness factors in tables 5 to 6 as necessary. Compare to the steel values in table 9. The lesser of the values is to be used for the design.

4 Tabular values are for normal weight concrete only. For lightweight concrete multiply design strength by $\lambda_a$ as follows: for sand-lightweight, $\lambda_a$ = 0.68; for all-lightweight, $\lambda_a$ = 0.60

5 5 Tabular values are for static loads only. Seismic design is not permitted for uncracked concrete. For seismic tension loads, multiply cracked concrete tabular values in tension by the following reduction factors:

1/4-in diameter by 1-5/8-in nominal embedment depth - $\alpha_{N,seis}$ = 0.60

1/4-in diameter by 2-1/2-in nominal embedment depth - $\alpha_{N,seis}$ = 0.75.

No reduction needed for seismic shear. See section 3.1.8 for additional information on seismic applications.

**Table 15 — Hilti KWIK HUS-EZ I and KWIK HUS-EZ E in the soffit of uncracked lightweight concrete over metal deck[1,2,3,4,5,6,7]**

| Nominal anchor diameter in. | Nominal internal thread diameter in. | Nominal embed. depth in. (mm) | Installation in lower flute | | | | Installation in upper flute | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Tension - $N_r$ | | Shear - $V_r$ | | Tension - $N_r$ | | Shear - $V_r$ | |
| | | | $f'_c$ = 20 MPa (2,900 psi) kN | $f'_c$ = 30 MPa (4,350 psi) kN | $f'_c$ = 20 MPa (2,900 psi) kN | $f'_c$ = 30 MPa (4,350 psi) kN | $f'_c$ = 20 MPa (2,900 psi) kN | $f'_c$ = 30 MPa (4,350 psi) kN | $f'_c$ = 20 MPa (2,900 psi) kN | $f'_c$ = 30 MPa (4,350 psi) kN |
| 1/4 | 1/4-20 UNC | 1-5/8 (41) | 585 (2.6) | 660 (2.9) | 475 (2.1) | 475 (2.1) | 720 (3.2) | 810 (3.6) | 560 (2.5) | 560 (2.5) |
| | | 2-1/2 (64) | 1,200 (5.3) | 1,470 (6.5) | | | 1,255 (5.6) | 1,535 (6.8) | | |
| 1/4 | 3/8-16 UNC | 1-5/8 (41) | 585 (2.6) | 660 (2.9) | 565 (2.5) | 565 (2.5) | 720 (3.2) | 810 (3.6) | 845 (3.8) | 845 (3.8) |
| | | 2-1/2 (64) | 1,200 (5.3) | 1,470 (6.5) | | | 1,255 (5.6) | 1,535 (6.8) | | |
| 3/8 | 1/2-13 UNC | 2-1/8 (54) | 1,100 (4.9) | 1,345 (6.0) | 1,315 (5.8) | 1,315 (5.8) | 1,865 (8.3) | 2,280 (10.1) | 2,015 (9.0) | 2,015 (9.0) |

**Table 16 — Hilti KWIK HUS-EZ I and KWIK HUS-EZ E in the soffit of cracked lightweight concrete over metal deck[1,2,3,4,5,6,7,8]**

| Nominal anchor diameter in. | Nominal internal thread diameter in. | Nominal embed. depth in. (mm) | Installation in lower flute | | | | Installation in upper flute | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Tension - $N_r$ | | Shear - $V_r$ | | Tension - $N_r$ | | Shear - $V_r$ | |
| | | | $f'_c$ = 20 MPa (2,900 psi) kN | $f'_c$ = 30 MPa (4,350 psi) kN | $f'_c$ = 20 MPa (2,900 psi) kN | $f'_c$ = 30 MPa (4,350 psi) kN | $f'_c$ = 20 MPa (2,900 psi) kN | $f'_c$ = 30 MPa (4,350 psi) kN | $f'_c$ = 20 MPa (2,900 psi) kN | $f'_c$ = 30 MPa (4,350 psi) kN |
| 1/4 | 1/4-20 UNC | 1-5/8 (41) | 300 (1.3) | 340 (1.5) | 475 (2.1) | 475 (2.1) | 365 (1.6) | 415 (1.8) | 560 (2.5) | 560 (2.5) |
| | | 2-1/2 (64) | 595 (2.6) | 730 (3.2) | | | 625 (2.8) | 765 (3.4) | | |
| 1/4 | 3/8-16 UNC | 1-5/8 (41) | 300 (1.3) | 340 (1.5) | 565 (2.5) | 565 (2.5) | 365 (1.6) | 415 (1.8) | 845 (3.8) | 845 (3.8) |
| | | 2-1/2 (64) | 595 (2.6) | 730 (3.2) | | | 625 (2.8) | 765 (3.4) | | |
| 3/8 | 1/2-13 UNC | 2-1/8 (54) | 780 (3.5) | 955 (4.2) | 1,315 (5.8) | 1,315 (5.8) | 1,305 (5.8) | 1,595 (7.1) | 2,015 (9.0) | 2,015 (9.0) |

1 See Section 3.1.8 to convert design strength value to ASD value.
2 Linear interpolation between embedment depths and concrete compressive strengths is not permitted.
3 Tabular value is for one anchor per flute. Minimum spacing along the length of the flute is 6 3/8 inches.
4 Tabular value is for lightweight concrete and no additional reduction factor is needed.
5 No additional reduction factors for spacing or edge distance need to be applied.
6 Comparison of the tabular values to the steel strength is not necessary. Tabular values control.
7 Tabular values are for static loads only. For seismic conditions $\alpha_{N,seis}$ = 0.75
8 For seismic shear, an additional factor must be applied to the cracked concrete tabular values for seismic conditions: $\alpha_{v,seis}$ = 0.85
See Section 3.1.8 for additional information on seismic applications.

## ALLOWABLE STRESS DESIGN FOR FM SPRINKLER SYSTEMS

**Table 17 — Hilti KWIK HUS-EZ I and KWIK HUS-EZ E tested load values for FM approval for automatic sprinkler systems[1]**

| Anchor diamenter in. | Hanger rod size | Nominal embedment in. | FM tension test load lb. | FM maximum pipe diameter in. |
|---|---|---|---|---|
| 1/4 | 3/8-16 UNC | 1-5/8 | 1,475 | 4 |
| | | 2-1/2 | | |
| 3/8 | 1/2-13 UNC | 2-1/8 | 3,800 | 8 |

1 Tested in accordance with FM Approval Standard for Pipe Hanger Components for Automatic Sprinklers Systems Class Numbers 1951, 1952 and 1953.

## DESIGN INFORMATION IN HOLLOW CORE CONCRETE PER ALLOWABLE STRESS DESIGN

**Table 18 — Hilti KWIK HUS-EZ I and KWIK HUS-EZ E load values for installations into hollow core concrete panels[1,2]**

| Hanger rod size | anchor diameter in. | Min. effective embedment $h_{ef}$ in. | Min.effective base material thickness t in. | Allowable load[3] | | Ultimate load | |
|---|---|---|---|---|---|---|---|
| | | | | Tension lb | Shear lb[4,5] | Tension lb | Shear lb[4,5] |
| 1/4-20 UNC | 1/4 | 1-3/8 | 1-3/8 | 455 | 485 | 1,810 | 1,930 |
| 3/8-16 UNC | 1/4 | | | | 755 | | 3,025 |
| 1/2-13 UNC | 3/8 | 1-1/8 | 1-1/8 | 435 | N/A | 1,750 | N/A |

1 The admissible anchor location must be established to prevent damage to the prestressed cable during the drilling process. Verify the location and height of the cable with the hollow core plank supplier to confirm admissible anchor location.

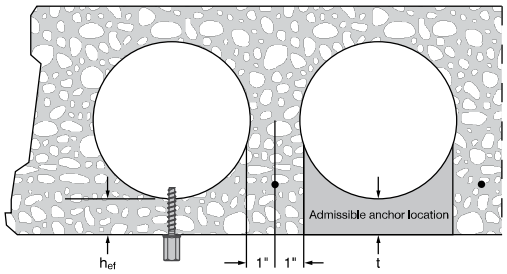
2 Minimum compressive strength of prestressed concrete is 7,000 psi. Published ultimate loads represent the average results conducted in local base materials. Due to variations in materials and dimensionl configurations, on-site testing is required to determine the actual performance.

3 Allowable loads calculated with a factor of safety of 4

4 The bottom of the shear plane adjacent to the top of the coupler.

5 Shear values controlled by the steel strength of the screws used to fasten the shear fixture to the KH EZ-I Screw Anchor. The minimum tensile strength of the screw was 125 ksi. Shear design values should consider the screw or threaded rod steel strength.

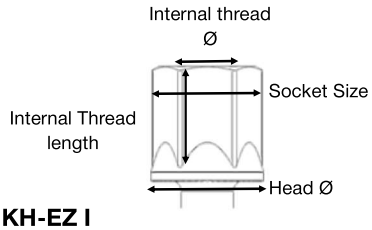
**Figure 3 — Installation of Hilti KWIK HUS–EZ I and KH-EZ E in hollow core concrete**




## INSTALLATION INSTRUCTIONS

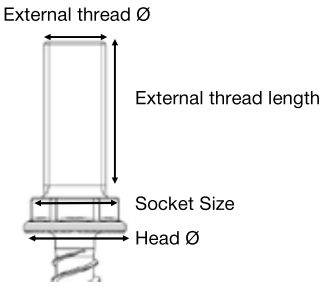
Installation Instructions For Use (IFU) are included with each product package. They can also be viewed or downloaded online at www.hilti.com. Because of the possibility of changes, always verify that downloaded IFU are current when used. Proper installation is critical to achieve full performance. Training is available on request. Contact Hilti Technical Services for applications and conditions not addressed in the IFU.






**KH-EZ I**

| KH-EZ Ø | Socket Size | Head Ø | Internal thread Ø | Internal thread length |
|---|---|---|---|---|
| 1/4'' | 3/8'' | 0.59'' | 1/4'' | 0.37'' |
| 1/4'' | 1/2'' | 0.65'' | 3/8'' | 0.45'' |
| 3/8'' | 11/16'' | 0.81'' | 1/2'' | 0.46'' |




**KH-EZ E**

| KH-EZ Ø | Socket Size | Min Socket Height | Head Ø | Internal thread Ø | Internal thread length | Total Head height |
|---|---|---|---|---|---|---|
| 1/4'' | 1/2'' | 1-1/2'' | 0.65'' | 3/8'' | 1.08'' | 1.32'' |

## ORDERING INFORMATION[1]

| Description | Internal thread diameter | Internal thread length | Drill bit diameter | Minimum embedment | Qty / box |
|---|---|---|---|---|---|
| **KWIK HUS-EZ 1/4x1-5/8 \| 1/4** | 1/4 | 3/8 | 1/4 | 1-5/8 | 100 |
| **KWIK HUS-EZ 1/4x2-1/2 \| 1/4** | 1/4 | 3/8 | 1/4 | 2-1/2 | 100 |
| **KWIK HUS-EZ 1/4x1-5/8 \| 3/8** | 3/8 | 7/16 | 1/4 | 1-5/8 | 100 |
| **KWIK HUS-EZ 1/4x2-1/2 \| 3/8** | 3/8 | 7/16 | 1/4 | 2-1/2 | 100 |
| **KWIK HUS-EZ 3/8x2-1/8 \| 1/2** | 1/2 | 1/2 | 3/8 | 2-1/8 | 100 |
| **KWIK HUS-EZ 1/4x1-5/8 E 3/8** | 3/8 | 1 | 1/4 | 1-5/8 | 100 |

1 All dimensions in inches.

# Fire Sprinkler Pipe

Schedule 10 and Schedule 40

**Submittal Data Sheet**

**FM Approved and Fully Listed Sprinkler Pipe**
Wheatland Tube's Schedule 10 and Schedule 40 steel fire sprinkler pipe is FM Approved and UL® and C-UL Listed.

**Approvals and Specifications**
Schedule 10 and Schedule 40 meet or exceed the following standards:

- ASTM A135, Type E, Grade A (Schedule 10, 1–8 NPS)
- ASTM A795, Type E, Grade A (Schedule 40, 1–2 NPS)
- ASTM A53, Type E, Grade B (Schedule 40, 2–8 NPS)
- ASTM A53, Type F, Grade A (Schedule 40, 1–4 NPS)
- NFPA® 13 and NFPA 14

**Manufacturing Protocols**
Schedule 10 and Schedule 40 are subjected to the toughest possible testing protocols to ensure the highest quality and long-lasting performance.

**Finishes and Coatings**
All Wheatland black steel fire sprinkler pipe receives a proprietary mill coating to ensure a clean, corrosion-resistant surface that outperforms and outlasts standard lacquer coatings. This coating allows the pipe to be easily painted, without special preparation. Schedule 10 and Schedule 40 can be ordered in black or hot-dip galvanized, to meet FM/UL requirements for dry systems that meet the zinc coating specifications of ASTM A795 or A53.

**Product Marking**
Each length of Wheatland fire sprinkler pipe is continuously stenciled to show the manufacturer, type of pipe, grade, size and length. Bar coding is acceptable as a supplementary identification method.

## SUBMITTAL INFORMATION

PROJECT: _____ CONTRACTOR: _____ DATE: _____

ENGINEER: _____ SPECIFICATION REFERENCE: _____ SYSTEM TYPE: _____

LOCATIONS: _____ COMMENTS: _____

☐ BLACK ☐ HOT-DIP GALVANIZED

700 South Dock Street
Sharon, PA 16146
P 800.257.8182
F 724.346.7260

info@wheatland.com
wheatland.com
Follow us on Twitter:
@WheatlandTube

Wheatland Tube
A DIVISION OF ZEKELMAN INDUSTRIES

# Fire Sprinkler Pipe

Schedule 10 and Schedule 40

**Submittal Data Sheet**

## SCHEDULE 10 WEIGHTS AND DIMENSIONS

| NPS | NOMINAL OD | | NOMINAL ID | | NOMINAL WALL | | WT./FT. | WT./FT. $H_2O$ FILLED | PCS./LIFT | WT./LIFT 21' | WT./LIFT 24' | WT./LIFT 25' | UL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | in. | mm | in. | mm | in. | mm | lbs. | lbs. | | lbs. | lbs. | lbs. | CRR* |
| 1 | 1.315 | 33.4 | 1.097 | 27.9 | 0.109 | 2.77 | 1.405 | 1.814 | 70 | 2065 | 2360 | 2459 | 11.4 |
| 1¼ | 1.660 | 42.2 | 1.442 | 36.6 | 0.109 | 2.77 | 1.807 | 2.514 | 61 | 2315 | 2645 | 2756 | 7.3 |
| 1½ | 1.900 | 48.3 | 1.682 | 42.7 | 0.109 | 2.77 | 2.087 | 3.049 | 61 | 2673 | 3055 | 3183 | 5.8 |
| 2 | 2.375 | 60.3 | 2.157 | 54.8 | 0.109 | 2.77 | 2.640 | 4.222 | 37 | 2051 | 2344 | 2442 | 4.7 |
| 2½ | 2.875 | 73.0 | 2.635 | 66.9 | 0.120 | 3.05 | 3.354 | 5.895 | 30 | 2226 | 2544 | 2651 | 3.5 |
| 3 | 3.500 | 88.9 | 3.260 | 82.8 | 0.120 | 3.05 | 4.336 | 7.949 | 19 | 1730 | 1977 | 2060 | 2.6 |
| 4 | 4.500 | 114.3 | 4.260 | 108.2 | 0.120 | 3.05 | 5.619 | 11.789 | 19 | 2242 | 2562 | 2669 | 1.6 |
| 5 | 5.563 | 141.3 | 5.295 | 134.5 | 0.134 | 3.40 | 7.780 | 17.309 | 13 | 2124 | 2427 | 2529 | 1.5 |
| 6 | 6.625 | 168.3 | 6.357 | 161.5 | 0.134 | 3.40 | 9.298 | 23.038 | 10 | 1953 | 2232 | 2325 | 1.0 |
| 8 | 8.625 | 219.1 | 8.249 | 209.5 | 0.188 | 4.78 | 16.960 | 40.086 | 7 | 2493 | 2849 | 2968 | 2.1 |

## SCHEDULE 40 WEIGHTS AND DIMENSIONS

| NPS | NOMINAL OD | | NOMINAL ID | | NOMINAL WALL | | WT./FT. | WT./FT. $H_2O$ FILLED | PCS./LIFT | WT./LIFT 21' | WT./LIFT 24' | WT./LIFT 25' | UL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | in. | mm | in. | mm | in. | mm | lbs. | lbs. | | lbs. | lbs. | lbs. | CRR* |
| 1 | 1.315 | 33.4 | 1.049 | 26.6 | 0.133 | 3.38 | 1.68 | 2.055 | 70 | 2470 | 2822 | 2940 | 1.000 |
| 1¼ | 1.660 | 42.2 | 1.380 | 35.1 | 0.140 | 3.56 | 2.27 | 2.922 | 51 | 2431 | 2778 | 2894 | 1.000 |
| 1½ | 1.900 | 48.3 | 1.610 | 40.9 | 0.145 | 3.68 | 2.72 | 3.602 | 44 | 2513 | 2872 | 2992 | 1.000 |
| 2 | 2.375 | 60.3 | 2.067 | 52.5 | 0.154 | 3.91 | 3.66 | 5.109 | 24 | 1845 | 2108 | 2196 | 1.000 |
| 2½ | 2.875 | 73.0 | 2.469 | 62.7 | 0.203 | 5.16 | 5.80 | 7.871 | 20 | 2436 | 2784 | 2900 | 1.000 |
| 3 | 3.500 | 88.9 | 3.068 | 77.9 | 0.216 | 5.49 | 7.58 | 10.783 | 13 | 2069 | 2365 | 2464 | 1.000 |
| 3½ | 4.000 | 101.6 | 3.548 | 90.1 | 0.226 | 5.74 | 9.12 | 13.400 | 10 | 1915 | 2189 | 2280 | 1.000 |
| 4 | 4.500 | 114.3 | 4.026 | 102.3 | 0.237 | 6.02 | 10.80 | 16.311 | 10 | 2268 | 2592 | 2700 | 1.000 |
| 5 | 5.563 | 141.3 | 5.047 | 158.2 | 0.258 | 6.55 | 14.63 | 23.262 | 7 | 2151 | 2458 | 2560 | 1.000 |
| 6 | 6.625 | 168.3 | 6.065 | 154.1 | 0.280 | 7.11 | 18.99 | 31.498 | 5 | 1994 | 2279 | 2374 | 1.000 |
| 8** | 8.625 | 219.1 | 7.981 | 202.7 | 0.322 | 8.18 | 28.58 | 50.240 | 5 | 3001 | 3430 | 3573 | 1.000 |

** Calculated using Standard UL CRR formula, UL Fire Protection Directory, Category VIZY. The CRR is a ratio value used to measure the ability of a pipe to withstand corrosion. Threaded Schedule 40 steel pipe is used as the benchmark (value of 1.0).*

*** 8 NPS Schedule 40 is FM Approved but not UL Listed.*

WFS-081619

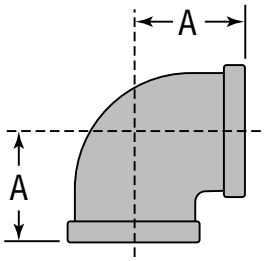
700 South Dock Street
Sharon, PA 16146
P 800.257.8182
F 724.346.7260

info@wheatland.com
wheatland.com
Follow us on Twitter:
@WheatlandTube

Wheatland Tube
A DIVISION OF ZEKELMAN INDUSTRIES

# FIG. 3201

## 90° Elbow





c UL us LISTED FM APPROVED

For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

## FIGURE 3201 - 90° ELBOW

| Nominal Size | Maximum Working Pressure▲ | Dimension A | Approx. Wt. Each |
|---|---|---|---|
| *In. (mm)* | *PSI (kPa)* | *In. (mm)* | *Lbs. (kg)* |
| 1<br>*20* | 500<br>*3450* | 1.50<br>*38.10* | 0.62<br>*0.28* |
| 1¼<br>*32* | 500<br>*3450* | 1.75<br>*44.45* | 0.90<br>*0.41* |
| 1½<br>*40* | 500<br>*3450* | 1.94<br>*49.276* | 1.20<br>*0.54* |
| 2<br>*50* | 500<br>*3450* | 2.25<br>*57.15* | 1.85<br>*0.84* |

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

## MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

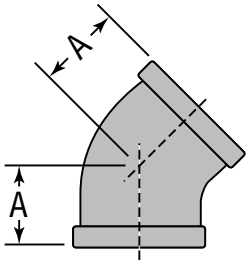
Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

**NOTICE**: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

| PROJECT INFORMATION | APPROVAL STAMP |
|---|---|
| **Project:** | ☐ **Approved** |
| **Address:** | ☐ **Approved as noted** |
| **Contractor:** | ☐ **Not approved** |
| **Engineer:** | **Remarks:** |
| **Submittal Date:** | |
| **Notes 1:** | |
| **Notes 2:** | |

# FIG. 3202

## 45˚ Elbow





c UL us LISTED FM APPROVED

For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

### FIGURE 3202 - 45° ELBOW

| Nominal Size | Maximum Working Pressure▲ | Dimension A | Approx. Wt. Each |
|---|---|---|---|
| *In. (mm)* | *PSI (kPa)* | *In. (mm)* | *Lbs. (kg)* |
| 1<br>*25* | 500<br>*3450* | 1.12<br>*28.44* | 0.46<br>*0.21* |
| 1¼<br>*32* | 500<br>*3450* | 1.29<br>*32.76* | 0.73<br>*0.33* |
| 1½<br>*40* | 500<br>*3450* | 1.43<br>*36.32* | 0.92<br>*0.42* |
| 2<br>*50* | 500<br>*3450* | 1.68<br>*42.67* | 1.50<br>*0.68* |

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

### MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

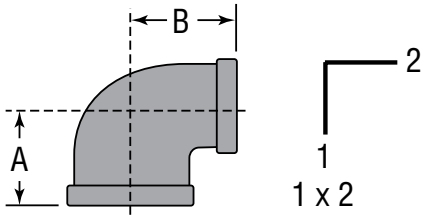
Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

**NOTICE**: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

| PROJECT INFORMATION | APPROVAL STAMP |
|---|---|
| **Project:** | ☐ **Approved** |
| **Address:** | ☐ **Approved as noted** |
| **Contractor:** | ☐ **Not approved** |
| **Engineer:** | **Remarks:** |
| **Submittal Date:** | |
| **Notes 1:** | |
| **Notes 2:** | |

# FIG. 3201R

## Reducing 90° Elbow





c UL us LISTED FM APPROVED

For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

## FIGURE 3201R - REDUCING 90° ELBOW

| Nominal Size 1 x 2 | Max. Working Pressure▲ | Dimensions A | Dimensions B | Approx. Wt. Each |
|---|---|---|---|---|
| *In. (mm)* | *PSI (kPa)* | *In. (mm)* | *In. (mm)* | *Lbs. (kg)* |
| 1 x ½ *25 x 15* | 500 *3450* | 1.26 *32.00* | 1.36 *34.54* | 0.44 *0.20* |
| 1 x ¾ *25 x 20* | 500 *3450* | 1.37 *34.79* | 1.45 *36.83* | 0.52 *0.24* |
| 1¼ x ½ *32 x 15* | 500 *34550* | 1.34 *34.03* | 1.53 *38.86* | 0.64 *0.29* |
| 1¼ x ¾ *32 x 20* | 500 *3450* | 1.45 *36.83* | 1.62 *41.14* | 0.72 *0.33* |
| 1¼ x 1 *32 x 25* | 500 *3450* | 1.58 *40.13* | 1.67 *42.41* | 0.75 *0.34* |
| 1½ x 1 *40 x 25* | 500 *3450* | 1.65 *41.91* | 1.80 *45.72* | 0.92 *0.42* |
| 1½ x 1¼ *40 x 32* | 500 *3450* | 1.82 *46.22* | 1.88 *47.75* | 1.08 *0.49* |
| 2 x ½ *50 x 15* | 500 *3450* | 1.49 *37.84* | 1.88 *47.75* | 1.08 *0.49* |
| 2 x ¾ *50 x 20* | 500 *3450* | 1.60 *40.64* | 1.97 *50.03* | 1.24 *0.56* |
| 2 x 1 *50 x 25* | 500 *3450* | 1.73 *43.94* | 2.02 *51.30* | 1.40 *0.64* |
| 2 x 1¼ *50 x 32* | 500 *3450* | 1.90 *48.26* | 2.10 *53.34* | 1.52 *0.70* |
| 2 x 1½ *50 x 40* | 500 *3450* | 2.02 *51.30* | 2.16 *54.86* | 1.65 *0.75* |

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

## MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

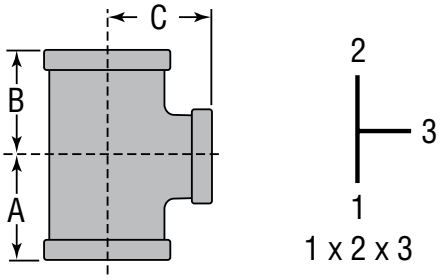
Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

**NOTICE**: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

| PROJECT INFORMATION | APPROVAL STAMP |
|---|---|
| **Project:** | ☐ **Approved** |
| **Address:** | ☐ **Approved as noted** |
| **Contractor:** | ☐ **Not approved** |
| **Engineer:** | **Remarks:** |
| **Submittal Date:** | |
| **Notes 1:** | |
| **Notes 2:** | |

# FIG. 3205R

## Reducing Tee




c UL us LISTED FM APPROVED

For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

## FIGURE 3205R - REDUCING TEE

| Nominal Size 1 x 2 x 3 | Max. Working Pressure▲ | Dimensions A | Dimensions B | Dimensions C | Approx. Wt. Each |
|---|---|---|---|---|---|
| *In. (mm)* | *PSI (kPa)* | *In. (mm)* | *In. (mm)* | *In. (mm)* | *Lbs. (kg)* |
| 1 x ½ x 1<br>*25 x 15 x 25* | 500<br>*3450* | 1.50<br>*38.10* | 1.36<br>*34.54* | 1.50<br>*38.10* | 0.64<br>*0.29* |
| 1 x ¾ x 1<br>*25 x 20 x 25* | 500<br>*3450* | 1.50<br>*38.10* | 1.45<br>*36.83* | 1.50<br>*38.10* | 0.73<br>*0.33* |
| 1 x 1 x ½<br>*25 x 25 x 15* | 500<br>*3450* | 1.26<br>*32.00* | 1.26<br>*32.00* | 1.36<br>*34.54* | 0.71<br>*0.32* |
| 1 x 1 x ¾<br>*25 x 25 x 20* | 500<br>*3450* | 1.37<br>*34.80* | 1.37<br>*34.80* | 1.45<br>*36.83* | 0.76<br>*0.34* |
| 1 x 1 x 1¼*<br>*25 x 25 x 32* | 500<br>*3450* | 1.67<br>*42.41* | 1.67<br>*42.41* | 1.58<br>*40.13* | 0.98<br>*0.44* |
| 1 x 1 x 1½*<br>*25 x 25 x 40* | 500<br>*3450* | 1.80<br>*45.72* | 1.80<br>*45.72* | 1.65<br>*41.91* | 1.16<br>*0.53* |
| 1¼ x 1 x ½*<br>*32 x 25 x 15* | 500<br>*3450* | 1.34<br>*34.04* | 1.26<br>*32.00* | 1.53<br>*38.86* | 0.82<br>*0.37* |
| 1¼ x 1 x ¾<br>*32 x 25 x 20* | 500<br>*3450* | 1.45<br>*36.83* | 1.37<br>*34.80* | 1.62<br>*41.15* | 0.90<br>*0.41* |
| 1¼ x 1 x 1<br>*32 x 25 x 25* | 500<br>*3450* | 1.58<br>*40.13* | 1.50<br>*38.10* | 1.67<br>*42.42* | 1.00<br>*0.45* |
| 1¼ x 1 x 1¼<br>*32 x 25 x 32* | 500<br>*3450* | 1.75<br>*44.45* | 1.67<br>*42.42* | 1.75<br>*44.45* | 1.08<br>*0.49* |
| 1¼ x 1 x 1½<br>*32 x 25 x 40* | 500<br>*3450* | 1.88<br>*47.75* | 1.80<br>*45.72* | 1.82<br>*46.22* | 1.42<br>*0.64* |
| 1¼ x 1¼ x ½<br>*32 x 32 x 15* | 500<br>*3450* | 1.34<br>*34.04* | 1.34<br>*34.04* | 1.53<br>*38.86* | 0.86<br>*0.39* |

## MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

**NOTICE**: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

## FIGURE 3205R - REDUCING TEE

| Nominal Size 1 x 2 x 3 | Max. Working Pressure▲ | Dimensions A | Dimensions B | Dimensions C | Approx. Wt. Each |
|---|---|---|---|---|---|
| *In. (mm)* | *PSI (kPa)* | *In. (mm)* | *In. (mm)* | *In. (mm)* | *Lbs. (kg)* |
| 1¼ x 1¼ x ¾<br>*32 x 32 x 20* | 500<br>*3450* | 1.45<br>*36.83* | 1.45<br>*36.83* | 1.62<br>*41.15* | 0.92<br>*0.42* |
| 1¼ x 1¼ x 1<br>*32 x 32 x 25* | 500<br>*3450* | 1.58<br>*40.13* | 1.58<br>*40.13* | 1.67<br>*42.42* | 0.95<br>*0.43* |
| 1¼ x 1¼ x 1½*<br>*32 x 32 x 40* | 500<br>*3450* | 1.88<br>*47.75* | 1.88<br>*47.75* | 1.82<br>*46.22* | 1.45<br>*0.66* |

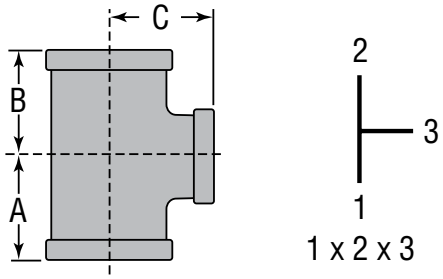
▲ Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

* Part supplied as "Bull Head Tee".

| PROJECT INFORMATION | APPROVAL STAMP |
|---|---|
| **Project:** | ☐ **Approved** |
| **Address:** | ☐ **Approved as noted** |
| **Contractor:** | ☐ **Not approved** |
| **Engineer:** | **Remarks:** |
| **Submittal Date:** | |
| **Notes 1:** | |
| **Notes 2:** | |

# FIG. 3205R

## Reducing Tee




| FIGURE 3205R - REDUCING TEE | | | | | |
|---|---|---|---|---|---|
| Nominal Size | Max. Working Pressure▲ | Dimensions | | | Approx. Wt. Each |
| 1 x 2 x 3 | | A | B | C | |
| *In. (mm)* | *PSI (kPa)* | *In. (mm)* | *In. (mm)* | *In. (mm)* | *Lbs. (kg)* |
| 1¼ x 1¼ x 2* *32 x 32 x 50* | 500 *3450* | 2.10 *53.34* | 2.10 *53.34* | 1.90 *48.26* | 1.75 *0.79* |
| 1½ x 1 x ½ *40 x 25 x 15* | 500 *3450* | 1.41 *35.81* | 1.34 *34.04* | 1.66 *42.16* | 0.95 *0.43* |
| 1½ x 1 x ¾ *40 x 25 x 20* | 500 *3450* | 1.52 *38.61* | 1.37 *34.80* | 1.75 *44.45* | 1.14 *0.52* |
| 1½ x 1 x 1 *40 x 25 x 25* | 500 *3450* | 1.65 *41.91* | 1.50 *38.10* | 1.80 *45.72* | 1.17 *0.53* |
| 1½ x 1 x 1¼ *40 x 25 x 32* | 500 *3450* | 1.82 *46.23* | 1.67 *42.42* | 1.88 *47.75* | 1.34 *0.61* |
| 1½ x 1 x 1½ *40 x 25 x 40* | 500 *3450* | 1.94 *49.28* | 1.80 *45.72* | 1.94 *49.28* | 1.45 *0.66* |
| 1½ x1¼ x ½ *40 x 32 x 15* | 500 *3450* | 1.41 *35.81* | 1.34 *34.04* | 1.66 *42.16* | 1.05 *0.48* |
| 1½ x1¼ x ¾ *40 x 32 x 20* | 500 *3450* | 1.52 *38.61* | 1.45 *36.83* | 1.75 *44.45* | 1.15 *0.5* |
| 1½ x 1¼ x 1 *40 x 32 x 25* | 500 *3450* | 1.65 *41.91* | 1.58 *40.13* | 1.80 *45.72* | 1.25 *0.57* |
| 1½ x 1¼ x 2* *40 x 32 x 50* | 500 *3450* | 2.16 *54.86* | 2.10 *53.34* | 2.02 *51.30* | 1.90 *0.86* |
| 1½ x 1½ x ½ *40 x 40 x 15* | 500 *3450* | 1.41 *35.81* | 1.41 *35.81* | 1.16 *29.46* | 1.15 *0.52* |
| 1½ x 1½ x ¾ *40 x 40 x 20* | 500 *3450* | 1.52 *38.61* | 1.52 *38.61* | 1.75 *44.45* | 1.24 *0.56* |
| 1½ x 1½ x 1 *40 x 40 x 25* | 500 *3450* | 1.65 *41.91* | 1.65 *41.91* | 1.80 *45.72* | 1.30 *0.59* |
| 1½ x 1½ x 1¼ *40 x 40 x 32* | 500 *3450* | 1.82 *46.23* | 1.82 *46.23* | 1.88 *47.75* | 1.48 *0.67* |

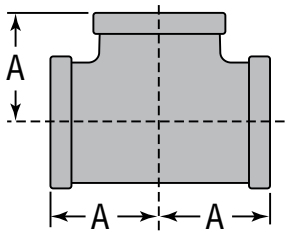
| FIGURE 3205R - REDUCING TEE | | | | | |
|---|---|---|---|---|---|
| Nominal Size | Max. Working Pressure▲ | Dimensions | | | Approx. Wt. Each |
| 1 x 2 x 3 | | A | B | C | |
| *In. (mm)* | *PSI (kPa)* | *In. (mm)* | *In. (mm)* | *In. (mm)* | *Lbs. (kg)* |
| 1½ x 1½ x 2* *40 x 40 x 50* | 500 *3450* | 2.16 *54.86* | 2.16 *54.86* | 2.02 *51.30* | 1.98 *0.90* |
| 2 x 1 x 2 *50 x 25 x 50* | 500 *3450* | 2.25 *57.15* | 2.02 *51.31* | 2.25 *57.15* | 2.15 *0.98* |
| 2 x 1¼ x 2 *50 x 32 x 50* | 500 *3450* | 2.25 *57.15* | 2.10 *53.34* | 2.25 *57.15* | 2.30 *1.04* |
| 2 x 1½ x ½ *50 x 40 x 15* | 500 *3450* | 1.49 *37.85* | 1.41 *35.81* | 1.88 *47.75* | 1.50 *0.68* |
| 2 x 1½ x ¾ *50 x 40 x 20* | 500 *3450* | 1.60 *40.64* | 1.52 *38.61* | 1.97 *50.04* | 1.62 *0.73* |
| 2 x 1½ x 1 *50 x 40 x 25* | 500 *3450* | 1.73 *43.94* | 1.65 *41.91* | 2.02 *51.31* | 1.64 *0.74* |
| 2 x 1½ x 1¼ *50 x 40 x 32* | 500 *3450* | 1.90 *48.26* | 1.82 *46.23* | 2.10 *53.34* | 1.80 *0.82* |
| 2 x 1½ x 1½ *50 x 40 x 40* | 500 *3450* | 2.02 *51.31* | 1.94 *49.28* | 2.16 *54.86* | 2.00 *0.91* |
| 2 x 1½ x 2 *50 x 40 x 50* | 500 *3450* | 2.25 *57.15* | 2.16 *54.86* | 2.25 *57.15* | 2.35 *1.07* |
| 2 x 2 x ½ *50 x 50 x 15* | 500 *3450* | 1.49 *37.85* | 1.49 *37.85* | 1.88 *47.75* | 1.60 *0.73* |
| 2 x 2 x ¾ *50 x 50 x 20* | 500 *3450* | 1.60 *40.64* | 1.60 *40.64* | 1.97 *50.04* | 1.68 *0.76* |
| 2 x 2 x 1 *50 x 50 x 25* | 500 *3450* | 1.73 *43.94* | 1.73 *43.94* | 2.02 *51.31* | 1.85 *0.84* |
| 2 x 2 x 1¼ *50 x 50 x 32* | 500 *3450* | 1.90 *44.45* | 1.90 *42.42* | 2.10 *44.45* | 2.04 *0.93* |
| 2 x 2 x 1½ *50 x 50 x 40* | 500 *3450* | 2.02 *44.45* | 2.02 *42.42* | 2.16 *44.45* | 2.18 *0.99* |

▲ Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

* Part supplied as "Bull Head Tee".

# FIG. 3205

## Straight Tee




c UL us LISTED FM APPROVED

For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

### FIGURE 3205 - STRAIGHT TEE

| Nominal Size | Maximum Working Pressure▲ | Dimension A | Approx. Wt. Each |
|---|---|---|---|
| *In. (mm)* | *PSI (kPa)* | *In. (mm)* | *Lbs. (kg)* |
| 1<br>*25* | 500<br>*3450* | 1.50<br>*38.10* | 0.85<br>*0.39* |
| 1¼<br>*32* | 500<br>*3450* | 1.75<br>*44.45* | 1.22<br>*0.55* |
| 1½<br>*40* | 500<br>*3450* | 1.94<br>*49.27* | 1.55<br>*0.70* |
| 2<br>*50* | 500<br>*3450* | 2.25<br>*57.15* | 2.45<br>*1.11* |

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

### MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

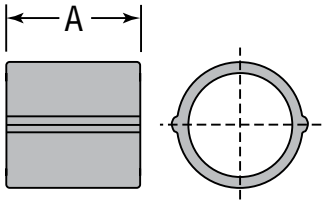
Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

**NOTICE**: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

| PROJECT INFORMATION | APPROVAL STAMP |
|---|---|
| **Project:** | ☐ **Approved** |
| **Address:** | ☐ **Approved as noted** |
| **Contractor:** | ☐ **Not approved** |
| **Engineer:** | **Remarks:** |
| **Submittal Date:** | |
| **Notes 1:** | |
| **Notes 2:** | |

# FIG. 3221

## Coupling




c UL us LISTED FM APPROVED

For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

### FIGURE 3221 - COUPLING

| Nominal Size | Maximum Working Pressure▲ | Dimension A | Approx. Wt. Each |
|---|---|---|---|
| *In. (mm)* | *PSI (kPa)* | *In. (mm)* | *Lbs. (kg)* |
| 1<br>*25* | 500<br>*3450* | 1.67<br>*42.42* | 0.40<br>*0.18* |
| 1¼<br>*32* | 500<br>*3450* | 1.93<br>*49.02* | 0.57<br>*0.26* |
| 1½<br>*40* | 500<br>*3450* | 2.15<br>*54.61* | 0.75<br>*0.34* |
| 2<br>*50* | 500<br>*3450* | 2.53<br>*64.26* | 1.15<br>*0.52* |

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

### MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

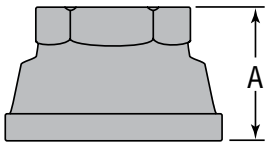
Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

**NOTICE**: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

| PROJECT INFORMATION | APPROVAL STAMP |
|---|---|
| **Project:** | ☐ **Approved** |
| **Address:** | ☐ **Approved as noted** |
| **Contractor:** | ☐ **Not approved** |
| **Engineer:** | **Remarks:** |
| **Submittal Date:** | |
| **Notes 1:** | |
| **Notes 2:** | |

# FIG. 3221R

## Reducing Coupling





c UL us LISTED FM APPROVED

For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

### FIGURE 3221R - REDUCING COUPLING

| Nominal Size | Maximum Working Pressure▲ | Dimension A | Approx. Wt. Each |
|---|---|---|---|
| *In. (mm)* | *PSI (kPa)* | *In. (mm)* | *Lbs. (kg)* |
| 1 x ½<br>*25 x 15* | 500<br>*3450* | 1.69<br>*42.92* | 0.39<br>*0.18* |
| 1 x ¾<br>*25 x 20* | 500<br>*3450* | 1.69<br>*42.92* | 0.53<br>*0.24* |
| 1¼ x ¾<br>*32 x 20* | 500<br>*3450* | 2.06<br>*52.32* | 0.64<br>*0.29* |

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

### MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

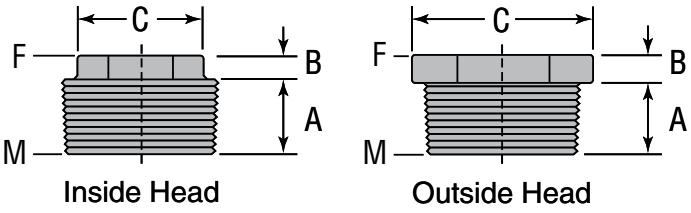
Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

**NOTICE**: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

| PROJECT INFORMATION | APPROVAL STAMP |
|---|---|
| **Project:** | ☐ **Approved** |
| **Address:** | ☐ **Approved as noted** |
| **Contractor:** | ☐ **Not approved** |
| **Engineer:** | **Remarks:** |
| **Submittal Date:** | |
| **Notes 1:** | |
| **Notes 2:** | |

# FIG. 3283

## Bushings




c UL us LISTED FM APPROVED

For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

## FIGURE 3283 - BUSHINGS

| Nominal Size Male (M) x Female (F) | Max. Working Pressure▲ | Dimensions A | Dimensions B | Dimensions C | Style | Approx. Wt. Each |
|---|---|---|---|---|---|---|
| *In. (mm)* | *PSI (kPa)* | *In. (mm)* | *In. (mm)* | *In. (mm)* | | *Lbs. (kg)* |
| 1 x ½<br>*25 x 15* | 500<br>*3450* | 0.75<br>*19.05* | 0.25<br>*6.35* | 1.42<br>*36.06* | Outside | 0.22<br>*0.10* |
| 1 x ¾<br>*25 x 20* | 500<br>*3450* | 0.75<br>*19.05* | 0.25<br>*6.35* | 1.42<br>*36.06* | Outside | 0.17<br>*0.08* |
| 1¼ x 1<br>*32 x 25* | 500<br>*3450* | 0.80<br>*20.32* | 0.28<br>*7.11* | 1.76<br>*44.70* | Outside | 0.28<br>*0.13* |
| 1½ x 1<br>*40 x 25* | 500<br>*3450* | 0.83<br>*21.08* | 0.31<br>*7.874* | 2.00<br>*50.80* | Outside | 0.45<br>*0.20* |
| 1½ x 1¼<br>*40 x 32* | 500<br>*3450* | 0.83<br>*21.08* | 0.31<br>*7.874* | 2.00<br>*50.80* | Outside | 0.30<br>*0.14* |
| 2 x 1<br>*50 x 25* | 500<br>*3450* | 0.88<br>*22.35* | 0.41<br>*10.414* | 1.95<br>*49.53* | Inside | 0.67<br>*0.30* |
| 2 x 1¼<br>*50 x 32* | 500<br>*3450* | 0.88<br>*22.35* | 0.34<br>*8.636* | 2.48<br>*62.99* | Outside | 0.73<br>*0.33* |
| 2 x 1½<br>*50 x 40* | 500<br>*3450* | 0.88<br>*22.35* | 0.34<br>*8.636* | 2.48<br>*62.99* | Outside | 0.61<br>*0.28* |

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

## MATERIAL SPECIFICATIONS

Dimensions: ASME B16.14

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

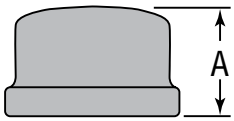
Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

**NOTICE**: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

| PROJECT INFORMATION | APPROVAL STAMP |
|---|---|
| **Project:** | ☐ **Approved** |
| **Address:** | ☐ **Approved as noted** |
| **Contractor:** | ☐ **Not approved** |
| **Engineer:** | **Remarks:** |
| **Submittal Date:** | |
| **Notes 1:** | |
| **Notes 2:** | |

# FIG. 3224

## Cap





c UL us LISTED FM APPROVED

For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

### FIGURE 3224 - CAP

| Nominal Size | Maximum Working Pressure▲ | Dimension A | Approx. Wt. Each |
|---|---|---|---|
| *In. (mm)* | *PSI (kPa)* | *In. (mm)* | *Lbs. (kg)* |
| 1<br>*25* | 500<br>*3450* | 1.16<br>*29.46* | 0.32<br>*0.15* |
| 1¼<br>*32* | 500<br>*3450* | 1.28<br>*32.51* | 0.43<br>*0.20* |
| 1½<br>*40* | 500<br>*3450* | 1.33<br>*33.78* | 0.60<br>*0.27* |
| 2<br>*50* | 500<br>*3450* | 1.45<br>*36.83* | 0.91<br>*0.41* |

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

### MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

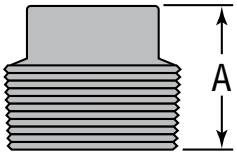
Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

**NOTICE**: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

| PROJECT INFORMATION | APPROVAL STAMP |
|---|---|
| **Project:** | ☐ **Approved** |
| **Address:** | ☐ **Approved as noted** |
| **Contractor:** | ☐ **Not approved** |
| **Engineer:** | **Remarks:** |
| **Submittal Date:** | |
| **Notes 1:** | |
| **Notes 2:** | |

# FIG. 3388

## Cored Plug




c UL us LISTED FM APPROVED

For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

### FIGURE 3388 - CORED PLUG

| Nominal Size | Maximum Working Pressure▲ | Dimension A | Approx. Wt. Each |
|---|---|---|---|
| *In. (mm)* | *PSI (kPa)* | *In. (mm)* | *Lbs. (kg)* |
| ½* *15* | 500 *3450* | 0.94 *23.87* | 0.10 *0.05* |
| ¾ *20* | 500 *3450* | 1.07 *27.17* | 0.17 *0.08* |
| 1 *25* | 500 *3450* | 1.25 *31.75* | 0.28 *0.13* |
| 1¼ *32* | 500 *3450* | 1.36 *34.54* | 0.44 *0.20* |
| 1½ *40* | 500 *3450* | 1.45 *36.83* | 0.62 *0.28* |
| 2 *50* | 500 *3450* | 1.56 *39.62* | 0.91 *0.41* |

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

* Part supplied as Solid Plug.

### MATERIAL SPECIFICATIONS

Dimensions: ASME B16.14

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

▲ Pressure - Temperature Ratings in accordance with ASME B16.3 Class 150

**NOTICE**: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

| PROJECT INFORMATION | APPROVAL STAMP |
|---|---|
| **Project:** | ☐ **Approved** |
| **Address:** | ☐ **Approved as noted** |
| **Contractor:** | ☐ **Not approved** |
| **Engineer:** | **Remarks:** |
| **Submittal Date:** | |
| **Notes 1:** | |
| **Notes 2:** | |