



Emerald Fire

Fire Sprinkler Specialists

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Step by Step ELC

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Fire Sprinkler Product Submittal Data

Step by Step ELC

Fire Sprinkler Product Submittal Data

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TECHNICAL DATA

MICROFAST® QUICK RESPONSE UPRIGHT SPRINKLER VK300 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

1. DESCRIPTION

The Viking Microfast® Quick Response Upright Sprinkler VK300 is a small, thermosensitive, glass-bulb spray sprinkler available in several different finishes and temperature ratings to meet design requirements. The special Polyester and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive atmospheres and are listed/approved as corrosion resistant as indicated in the Approval Charts.

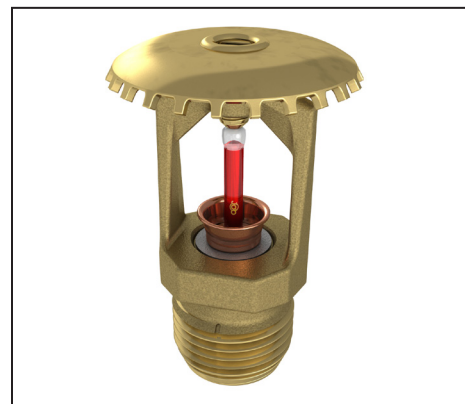
2. LISTINGS AND APPROVALS



cULus Listed: Category VNIV

FM Approved: Classes 2002 and 2020

Refer to Approval Charts and Design Criteria for listing and approval requirements that must be followed.



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

3. TECHNICAL DATA

Specifications:

Minimum Operating Pressure: 7 psi (0.5 bar)*

Maximum Working Pressure: 175 psi (12 bar) wwp.

Factory tested hydrostatically to 500 psi (34.5 bar)

Testing: U.S.A. Patent No. 4,831,870

Thread size: 1/2" NPT, 15 mm BSP

Nominal K-Factor: 5.6 U.S. (80.6 metric**)

Glass-bulb fluid temperature rated to -65 °F (-55 °C)

Overall Length: 2-3/16" (56 mm)

*cULus Listing, FM Approval, and NFPA 13 installs require a minimum of 7 psi (0.5 bar). The minimum operating pressure for LPCB and CE Approvals ONLY is 5 psi (0.35 bar).

Material Standards:

Frame Casting: Brass UNS-C84400 or QM Brass

Deflector: Brass UNS-C23000 or Copper UNS-C19500

Bulb: Glass, nominal 3 mm diameter

Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape

Screw: Brass UNS-C36000

Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400

For Polyester Coated Sprinklers: Belleville Spring-Exposed

For ENT Coated Sprinklers: Belleville Spring-Exposed, Screw and Pipcap - ENT plated

Ordering Information: (Also refer to the current Viking price list.)

Order Viking Microfast® Quick Response Upright Sprinkler VK300 by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.

Finish Suffix: Brass = A, Chrome = F, White Polyester = M-/W, Black Polyester = M-/B, and ENT = JN

Temperature Suffix (°F/°C): 135°/57° = A, 155°/68° = B, 175°/79° = D, 200°/93° = E, and 286°/141° = G

For example, sprinkler VK300 with a 1/2" NPT thread, Brass finish and a 155 °F/68 °C temperature rating = Part No. 12978AB

Available Finishes And Temperature Ratings: Refer to Table 1.

Accessories: (Also refer to the Viking website.)

Sprinkler Wrench: Standard Wrench: Part No. 21475M/B (available since 2017)

Sprinkler Cabinets:

A. Six-head capacity: Part No. 01724A (available since 1971)

B. Twelve-head capacity: Part No. 01725A (available since 1971)

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.



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5. OPERATION

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

The Viking Microfast® Quick Response Upright Sprinkler VK300 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ²	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

Sprinkler Finishes: Brass, Chrome, White Polyester, Black Polyester, and ENT

Corrosion-Resistant Coatings³: White Polyester, Black Polyester, and Black PTFE. ENT in all temperature ratings except 135 °F (57 °C)

Footnotes

¹ The sprinkler temperature rating is stamped on the deflector.

² Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

³ The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Polyester, ENT, and PTFE coatings. For ENT coated automatic sprinklers, the waterway is coated.

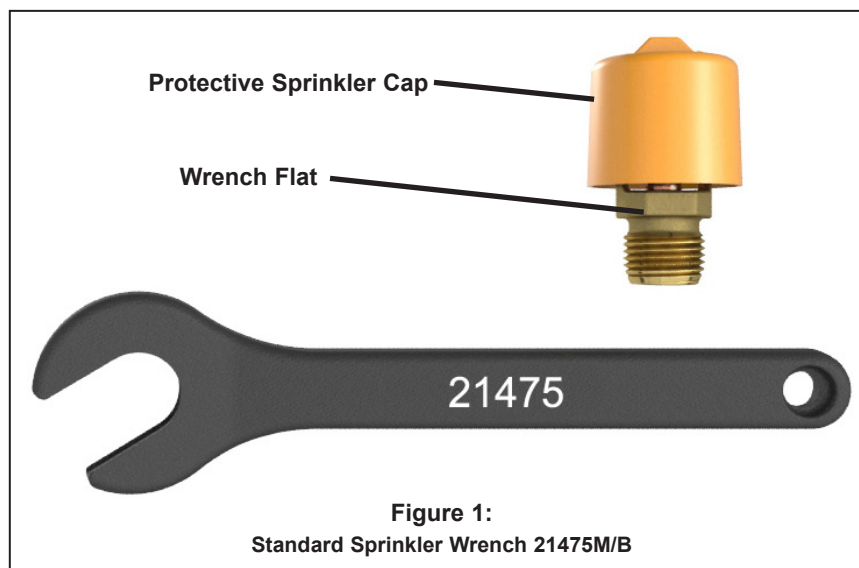


Figure 1:

Standard Sprinkler Wrench 21475M/B



TECHNICAL DATA

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Approval Chart 1 (UL)

Microfast® Quick Response
Upright Sprinkler VK300
Maximum 175 PSI (12 bar) WWP

	Temperature	KEY
↓	Finish	
A1X ←	Escutcheon (if applicable)	

Base Part Number ¹	SIN	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals ³				
		NPT	BSP	U.S.	metric ²	Inches	mm	cULus	VdS	LPCB	NYC ⁸	CE
12978	VK300	1/2"	15 mm	5.6	80.6	2-3/16	56	A1, B2	--	--	See footnote 7.	--

NOTICE - Product Below - Limited Availability (Contact Local Viking Office)

06661B	VK300	1/2"	15 mm	5.6	80.6	2-3/16	56	A1, B2	--	--	See footnote 7.	--
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Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C)

B - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C)

Approved Finishes

1 - Brass, Chrome, White Polyester^{5,6}, and Black Polyester^{5,6}
2 - ENT⁶

Footnotes

¹ Base part number is shown. For complete part number, refer to Viking's current price schedule.

² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

³ This table shows the listings and approvals available at the time of printing. Check with the manufacturer for any additional approvals.

⁴ Listed by Underwriters Laboratories Inc. for us in the U.S. and Canada

⁵ Other colors are available on request with the same Listings and Approvals as the standard colors.

⁶ cULus Listed as corrosion resistant.

⁷ Meets New York City requirements, effective July 1, 2008

⁸ Accepted for use, City of New York Board of Standards and Appeals, Calendar Number 219-76-SA and City of New York Department of Buildings, MEA 89-92-E, Vol. 16.

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1 above.)

cULus Listing Requirements:

The Viking Microfast® Quick Response Upright Sprinkler VK300 is cULus Listed as indicated in Approval Chart 1 for installation in accordance with the latest edition of NFPA 13 for standard spray sprinklers.

- Designed for use in Light and Ordinary Hazard occupancies.
- The sprinkler installation rules contained in NFPA 13 for standard spray upright sprinklers must be followed.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



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Approval Chart 2 (FM)

Microfast® Quick Response
Upright Sprinkler VK300
Maximum 175 PSI (12 bar) WWP

KEY	
Temperature	↓
Finish	→
A1X ← Escutcheon (if applicable)	

Base Part Number ¹	SIN	Thread Size		Nominal K-Factor		Overall Length		FM Approvals ³ (Refer also to Design Criteria below.)
		NPT	BSP	U.S.	metric ²	Inches	mm	
12978	VK300	1/2"	15 mm	5.6	80.6	2-3/16	56	A1, B2
NOTICE - Product Below - Limited Availability (Contact Local Viking Office)								
06661B	VK300	1/2"	15 mm	5.6	80.6	2-3/16	56	A1, B2
Approved Temperature Ratings A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141°C) B - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141°C)							Approved Finishes 1 - Brass, Chrome, White Polyester ⁵ , and Black Polyester ⁵ 2 - ENT ⁶	
Footnotes ¹ Base part number is shown. For complete part number, refer to Viking's current price schedule. ² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0. ³ This table shows the FM Approvals available at the time of printing. Check with the manufacturer for any additional approvals. ⁵ Other colors are available on request with the same Approvals as the standard colors. ⁶ FM approved as corrosion resistant.								

DESIGN CRITERIA - FM

(Also refer to Approval Chart 2 above.)

FM Approval Requirements:

The Microfast® Quick Response Upright Sprinkler VK300 is FM Approved as a quick response **Non-Storage** upright sprinkler as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

SPRINKLERS ARE FRAGILE - HANDLE WITH CARE!

General Handling and Storage:

- Store sprinklers in a cool, dry place.
- Protect sprinklers during storage, transport, handling, and after installation.
- Use the original shipping containers. DO NOT place sprinklers loose in boxes, bins, or buckets.
- Keep sprinklers separated at all times. DO NOT allow metal parts to contact sprinkler operating elements.

For Pre-Assembled Drops:

- Protect sprinklers during handling and after installation.
- For recessed assemblies, use the protective sprinkler cap (Viking Part Number 10364).

Sprinklers with Protective Shields or Caps:

- DO NOT remove shields or caps until after sprinkler installation and there no longer is potential for mechanical damage to the sprinkler operating elements.
- **Sprinkler shields or caps MUST be removed BEFORE placing the system in service!**
- Remove the sprinkler shield by carefully pulling it apart where it is snapped together.
- Remove the cap by turning it slightly and pulling it off the sprinkler.

Sprinkler Installation:

- DO NOT use the sprinkler deflector or operating element to start or thread the sprinkler into a fitting.
- **Use only the designated sprinkler head wrench!** Refer to the current sprinkler technical data page to determine the correct wrench for the model of sprinkler used.
- DO NOT install sprinklers onto piping at the floor level.
- Install sprinklers after the piping is in place to prevent mechanical damage.
- DO NOT allow impacts such as hammer blows directly to sprinklers or to fittings, pipe, or couplings in close proximity to sprinklers. Sprinklers can be damaged from direct or indirect impacts.
- DO NOT attempt to remove drywall, paint, etc., from sprinklers.
- **Take care not to over-tighten the sprinkler and/or damage its operating parts!**

Maximum Torque:

1/2" NPT: 14 ft-lbs. (19.0 N-m)

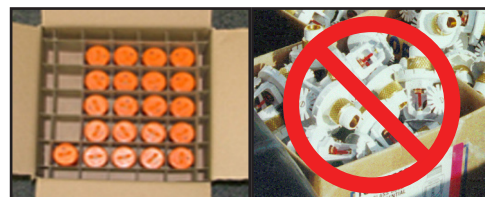
3/4" NPT: 20 ft-lbs. (27.1 N-m)

1" NPT: 30 ft-lbs. (40.7 N-m)



CORRECT
(Original container used)

INCORRECT
(Placed loose in box)



CORRECT
(Protected with caps)

INCORRECT
(Protective caps not used)



CORRECT
(Piping is in place at the ceiling)

INCORRECT
(Sprinkler at floor level)



CORRECT
(Special installation wrenches)

INCORRECT
(Designated wrench not used)



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

! WARNING

Any sprinkler with a loss of liquid from the glass bulb or damage to the fusible element should be destroyed. Never install sprinklers that have been dropped, damaged, or exposed to temperatures exceeding the maximum ambient temperature allowed. Sprinklers that have been painted in the field must be replaced per NFPA 13. Protect sprinklers from paint and paint overspray in accordance with the installation standards. Do not clean sprinklers with soap and water, ammonia, or any other cleaning fluid. Do not use adhesives or solvents on sprinklers or their operating elements.

Refer to the appropriate technical data page and NFPA standards for complete care, handling, installation, and maintenance instructions. For additional product and system information Viking data pages and installation instructions are available on the Viking Web site at www.vikinggroupinc.com.



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

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PROTECTIVE SPRINKLER SHIELDS AND CAPS

General Handling and Storage:

Many Viking sprinklers are available with a plastic protective cap or shield temporarily covering the operating elements. The snap-on shields and caps are factory installed and are intended to help protect the operating elements from mechanical damage during shipping, storage, and installation. NOTE: It is still necessary to follow the care and handling instructions on the appropriate sprinkler technical data sheets* when installing sprinklers with bulb shields or caps.

WHEN TO REMOVE THE SHIELDS AND CAPS:

NOTE: SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

Remove the shield or cap from the sprinkler only after checking all of the following:

- The sprinkler has been installed*.
- The wall or ceiling finish work is completed where the sprinkler is installed and there no longer is a potential for mechanical damage to the sprinkler operating elements.

SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

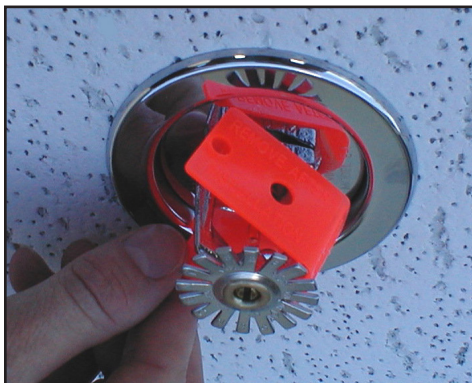


Figure 1: Sprinkler shield being removed from a pendent sprinkler.



Figure 2: Sprinkler cap being removed from a pendent sprinkler.



Figure 3: Sprinkler cap being removed from an upright sprinkler.

HOW TO REMOVE SHIELDS AND CAPS:

No tools are necessary to remove the shields or caps from sprinklers. DO NOT use any sharp objects to remove them! **Take care not to cause mechanical damage to sprinklers when removing the shields or caps.** When removing caps from fusible element sprinklers, use care to prevent dislodging ejector springs or damaging fusible elements. NOTE: Squeezing the sprinkler cap excessively could damage sprinkler fusible elements.

- To remove the shield, simply pull the ends of the shield apart where it is snapped together. Refer to Figure 1.
- To remove the cap, turn it slightly and pull it off the sprinkler. Refer to Figures 2 and 3.

NOTICE

Refer to the current sprinkler technical data page to determine the correct sprinkler wrench for the model of sprinkler used.

WARNING

Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

* Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



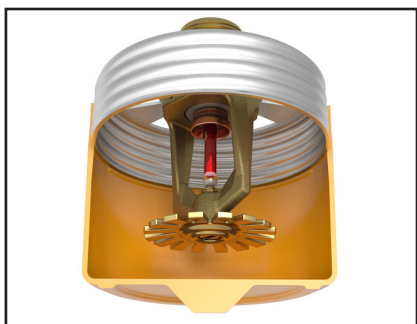
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CONCEALED COVER ASSEMBLIES ARE FRAGILE!
TO ASSURE SATISFACTORY PERFORMANCE OF THE PRODUCT, HANDLE WITH CARE.



Concealed Sprinkler and Adapter
 Assembly with Protective Cap



Concealed Sprinkler and Adapter
 Assembly (Protective Cap Removed)

Cover Plate Assembly
 (Pendent Cover 12381 shown)



GENERAL HANDLING AND STORAGE INSTRUCTIONS:

- Do not store in temperatures exceeding 100 °F (38 °C). Avoid direct sunlight and confined areas subject to heat.
- Protect sprinklers and cover assemblies during storage, transport, handling, and after installation.
 - Use original shipping containers.
 - Do not place sprinklers or cover assemblies loose in boxes, bins, or buckets.
- Keep the sprinkler bodies covered with the protective sprinkler cap any time the sprinklers are shipped or handled, during testing of the system, and while ceiling finish work is being completed.
- Use only the designated Viking recessed sprinkler wrench (refer to the appropriate sprinkler data page) to install these sprinklers. **NOTE:** The protective cap is temporarily removed during installation and then placed back on the sprinkler for protection until finish work is completed.
- Do not over-tighten the sprinklers into fittings during installation.
- Do not use the sprinkler deflector to start or thread the sprinklers into fittings during installation.
- Do not attempt to remove drywall, paint, etc., from the sprinklers.
- Remove the plastic protective cap from the sprinkler before attaching the cover plate assembly. **PROTECTIVE CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!**

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



BULLETIN

CARE AND HANDLING
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USE THE FOLLOWING PRECAUTIONS WHEN HANDLING WAX-COATED SPRINKLERS

Many of Viking's sprinklers are available with factory-applied wax coating for corrosion resistance. These sprinklers **MUST** receive appropriate care and handling to avoid damaging the wax coating and to assure satisfactory performance of the product.

General Handling and Storage of Wax-Coated Sprinklers:

- Store the sprinklers in a cool, dry place (in temperatures below the maximum ambient temperature allowed for the sprinkler temperature rating. Refer to Table 1 below.)
- Store containers of wax-coated sprinklers separate from other sprinklers.
- Protect the sprinklers during storage, transport, handling, and after installation.
- Use original shipping containers.
- Do not place sprinklers in loose boxes, bins, or buckets.

Installation of Wax-Coated Sprinklers:

Use only the special sprinkler head wrench designed for installing wax-coated Viking sprinklers (any other wrench may damage the unit).

- Take care not to crack the wax coating on the units.
- For touching up the wax coating after installation, wax is available from Viking in bar form. Refer to Table 1 below. The coating **MUST** be repaired after sprinkler installation to protect the corrosion-resistant properties of the sprinkler.
- Use care when locating sprinklers near fixtures that can generate heat. Do not install sprinklers where they would be exposed to temperatures exceeding the maximum recommended ambient temperature for the temperature rating used.
- Inspect the coated sprinklers frequently soon after installation to verify the integrity of the corrosion resistant coating. Thereafter, inspect representative samples of the coated sprinklers in accordance with NFPA 25. Close up visual inspections are necessary to determine whether the sprinklers are being affected by corrosive conditions.

TABLE 1

Sprinkler Temperature Rating (Fusing Point)	Wax Part Number	Wax Melting Point	Maximum Ambient Ceiling Temperature ¹	Wax Color
155 °F (68 °C) / 165 °F (74 °C)	02568A	148 °F (64 °C)	100 °F (38 °C)	Light Brown
175 °F (79 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
200 °F (93 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
220 °F (104 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown
286 °F (141 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown

¹ Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.



Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.

**BULLETIN****REGULATORY AND HEALTH
WARNINGS**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

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Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

1. DESCRIPTION

Regulatory and Health Warnings applying to materials used in the manufacture and construction of fire protection products are provided herein as they relate to legally mandated jurisdictional regions.

⚠ WARNING**STATE OF CALIFORNIA, USA**

Installing or servicing fire protection products such as sprinklers, valves, piping etc. can expose you to chemicals including, but not limited to, lead, nickel, butadiene, titanium dioxide, chromium, carbon black, and acrylonitrile which are known to the State of California to cause cancer or birth defects or other reproductive harm.

For more information, go to www.P65Warnings.ca.gov

2. WARRANTY TERMS AND CONDITIONS

For details of warranty, refer to Viking's current list price schedule at www.vikinggroupinc.com or contact Viking directly.



TECHNICAL DATA SHEET

VK3021 Quick Response Pendent Sprinkler K5.6 (80.6)

1. PRODUCT IDENTIFICATION

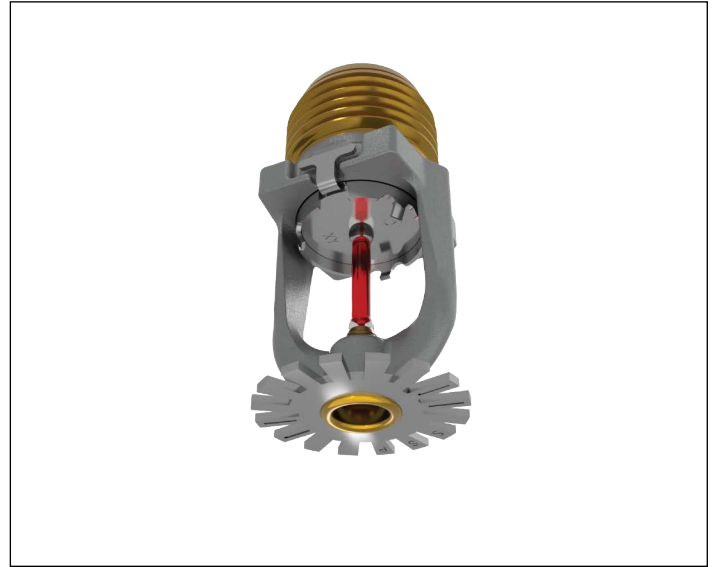
This document covers the following product, hereafter referred to as “sprinkler”:

VK3021: Quick Response, Standard Coverage, Pendent, K5.6 (80.6) Sprinkler.

2. INTENDED USE

The sprinkler is intended to be used in automatic fire sprinkler systems as allowed by applicable approval authorities. The sprinkler must be used in accordance with:

1. the sprinkler's Listings, Approvals, and associated design requirements.
2. the recognized design and installations standards issued, for example NFPA, FM, EN, VdS, or LPCB.
3. the latest revisions of all applicable manufacturer's documentation.



Governmental codes, ordinances, and standards may apply and may differ from one another.

WARNING

Cancer and Reproductive Harm www.P65Warnings.ca.gov

3. LISTING AND APPROVALS

Refer to section 5 for details and requirements that must be followed.



cULus Listed



VdS Approved



FM Approved



UKCA Approved



CE



MED Approved



LPCB Approved

China Approved



TECHNICAL DATA SHEET

VK3021 Quick Response Pendent Sprinkler K5.6 (80.6)

4. TECHNICAL SPECIFICATIONS

4.1 Definitions

Standard Pendent Sprinkler: A sprinkler intended to be oriented with the deflector below the frame so water flows downward through the orifice, striking the deflector and forming an umbrella-shaped spray pattern downward. These sprinklers are marked “SP/RP” (Standard Pendent/Recessed Pendent). When a standard pendent sprinkler is used with a recessed escutcheon, it becomes a recessed pendent sprinkler.

Recessed Sprinkler: A spray sprinkler assembly intended for installation with a concealed piping system. The assembly consists of a sprinkler installed in a decorative adjustable recessed escutcheon that minimizes the protrusion of the sprinkler beyond the ceiling or wall without adversely affecting the sprinkler distribution or sensitivity. Refer to the appropriate technical data page for allowable sprinkler models, temperature ratings, and occupancy classifications.

NOTICE: Do not recess any sprinkler not listed or approved for use with the escutcheon. Refer to Section 5.

Corrosion-Resistant Sprinkler: A special service sprinkler with non-corrosive protective coatings, or that is fabricated from non-corrosive material, for use in atmospheres that would normally corrode sprinklers. Sprinklers can be ordered as corrosion-resistant sprinklers and can be used with escutcheons when allowed by the approval body.

4.2 Ratings and Physical Characteristics

Parameter	Value
Minimum operating pressure	7 psi (0.5 bar)
Maximum rated pressure	UL: 250 psi (17 bar) FM and CE: 175 psi (12 bar)
Factory tested pressure	500 psi (35 bar)
Thread size	1/2" NPT or 15 mm BSPT
Nominal K-factor	5.6 U.S. (80.6)
Minimum temperature rating (glass bulb)	–65 °F (–55 °C)



TECHNICAL DATA SHEET

VK3021 Quick Response Pendent Sprinkler K5.6 (80.6)

4.3 Markings and Dimensions

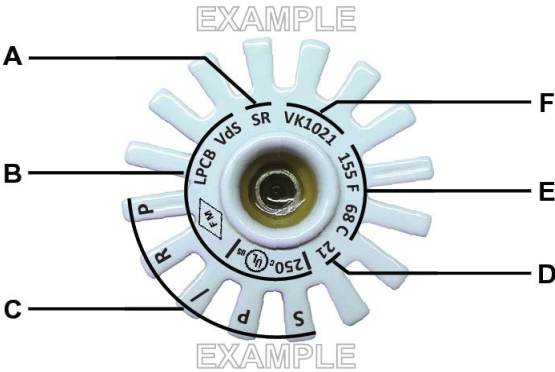


Figure – 1 Markings

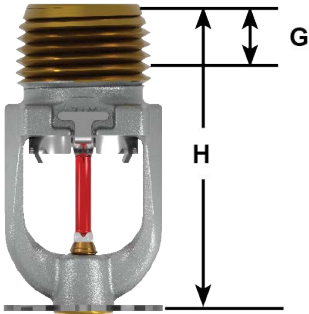


Figure – 2: Dimensions

Ref	Description	Value
A	Response type	QR: Quick Response
B	Listings and Approvals	See sections 3 and 5
C	Sprinkler type	SP/RP: Standard Pendent/Recessed Pendent
D	Manufacture date (year)	See marking
E	Nominal temperature rating	See marking
F	Manufacturers Sprinkler Identification Number (SIN)	VK3021
G	Nominal pipe engagement	7/16" (11 mm)
H	Height	1-15/16" (49 mm)



TECHNICAL DATA SHEET

VK3021 Quick Response Pendent Sprinkler K5.6 (80.6)

4.4 Materials of Construction

NOTICE: Do not disassemble the sprinkler.

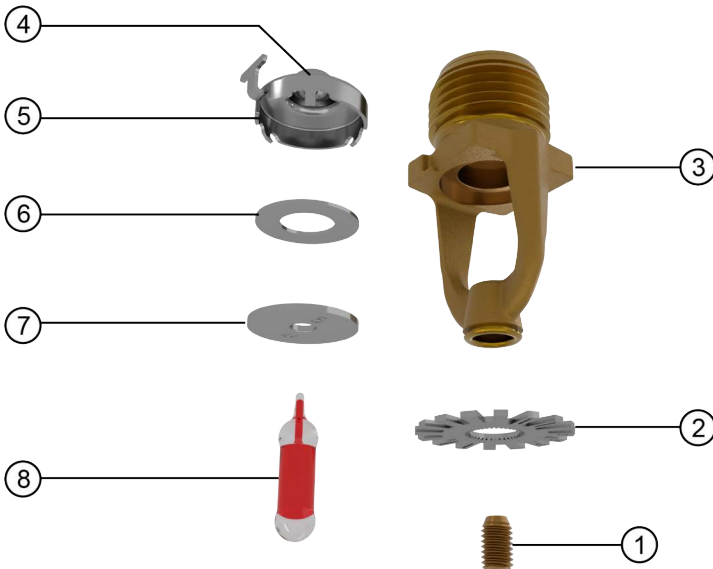


Figure – 3 Sprinkler Components

Ref	Description	Material
1	Compression screw	Brass CW612N, CW508L, UNS–C36000 or UNS–C26000
2	Deflector	Stainless steel UNS S30400
3	Sprinkler body	CW602N, UNS–C84400 or QM brass
4	Pip cap seal	Polytetrafluoroethylene (PTFE)
5	Pip cap shell	Stainless steel UNS–S44400
6	Belleville spring	Nickel alloy
7	Pip cap disc	Stainless steel UNS–S30100
8	Bulb	Glass, nominal 0.10" (3 mm) diameter



TECHNICAL DATA SHEET

VK3021 Quick Response Pendent Sprinkler K5.6 (80.6)

5. LISTING AND APPROVAL DESIGN REQUIREMENTS

5.1 Listing and Approval Specifications

Sprinkler Base Part Number ¹	Thread Size		Approval Body							
	NPT	BSPT	cULus	FM	CE	LPCB	VdS	UKCA	MED	China
Maximum WWP PSI (bar) →			250 (17)	175 (12)						
23870	1/2"	—	A1, A2X, A3Y	A1, B2X, B3Y	A1, B2X, B3Y	A1, A2X, A3Y	A1	A1, A2X, A3Y	A1, A2X, A3Y	—
23882	—	15 mm	A1, A2X, A3Y	A1, B2X, B3Y	A1, B2X, B3Y	A1, A2X, A3Y	A1	A1, A2X, A3Y	A1, A2X, A3Y	—
26756	—	15 mm	C4	C4	—	—	—	—	—	C4
Approval Specification (Temperature Ratings) Key: A = 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C) and 286 °F (141 °C) B = 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C) C = 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C) and 286 °F (141 °C)										
Approval Specification (Finishes) Key: 1 = Brass, Chrome, White Polyester ^{2,3} , Black Polyester ^{2,3} , and ENT ^{3,4} 2 = Brass, Chrome, White Polyester ^{2,3} , and Black Polyester ^{2,3} 3 = ENT ^{3,4} 4 = Chrome										
Approval Specification (Escutcheons) Key: X = Installed with Viking Recessed Escutcheons Models E-1, E-2, E-3, NP-1, NP-2, and NP-3, or Viking Standard Surface Mounted Escutcheons Y = Installed with Viking Recessed Escutcheons Models E-1 and NP-1, or Viking Standard Surface Mounted Escutcheons										
¹ For complete part number, refer to Viking's current price list. ² For White Polyester and Black Polyester, other colors are available upon request and will carry the same Listings and Approvals as the standard colors. ³ cULus Listed as corrosion-resistant. ⁴ FM Approved as corrosion-resistant.										

5.2 cULus Listing Requirements and Details

The sprinkler is cULus Listed as indicated in Table 5.1 for installation in accordance with the latest edition of NFPA 13 for standard spray sprinklers. This sprinkler is designed for use in light and ordinary hazard occupancies. Venting is not required.

5.3 FM Approval Requirements and Details

The sprinkler is FM Approved as quick response Non-Storage pendent sprinkler as indicated in the FM Approval Guide. The sprinkler is also approved for use in FM Approved vacuum dry sprinkler systems with a maximum supervisory vacuum pressure of -3 psi (-207 mbar). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling. For specific application and installation requirements, refer to the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0).



TECHNICAL DATA SHEET

VK3021 Quick Response Pendent Sprinkler K5.6 (80.6)

5.4 Additional Approval Requirements and Details

Refer to Table 5.1 for approved configurations allowed by each of the following approvals.

- CE CPR: Standard EN 12259-1:1999 +A3:2006; Declaration of Performance DOP_VK3021.
- LPCB: Standard EN 12259-1:1999 +A3:2006; Certificate Number 096m.
- VdS: Standard EN 12259-1:1999 +A3:2006; Certificate Number G 422006.
- UKCA: Standard EN12259-1:1999 +A3:2006; Declaration of Conformity UKCA DOC_S5048.
- MED: Standard EN 12259-1:1999 +A3:2006; Declaration of Conformity DOC_MED_XT1.
- China Approval: Approved according to China GB standard.

For specific application and installation requirements, refer to the latest applicable governmental codes, ordinances, and standards for the installation location.

5.5 Corrosion-Resistant Coatings

The corrosion-resistant coatings have passed the standard corrosion tests required by the approving agencies and are listed and approved as indicated in Table 5.1. These tests do not represent all possible corrosive environments. The Electro-less Nickel PTFE (ENT) finish passed the UL 199 thirty-day corrosion test and is cULus listed and FM Approved as corrosion-resistant. For automatic sprinklers, the ENT coating is applied to all exposed exterior surfaces, including the waterway.

Prior to installation, verify that the coatings are compatible with, or suitable for, the proposed environment. The ENT finish has not been evaluated for environments containing chlorine, such as indoor swimming pools. It is not recommended for these applications.

5.6 Sprinkler Guards and Water Shields

The sprinkler is approved for use with the Model XG Sprinkler Guard and the Model F-1 water shield. Refer to the Guards and Water Shields for XT1 Sprinklers technical data sheet for more information.

5.7 Escutcheons

The sprinkler is approved for use with various styles of Viking escutcheons. Specific installation dimensions apply that must be observed. Refer to the sprinkler's Handling and Installation instructions for more information.

5.8 Available Temperature Ratings

Viking sprinklers are available in several temperature ratings that relate to a specific temperature classification. Applicable installation rules mandate the use and limitations of each temperature classification. In selecting the appropriate temperature classification, the maximum expected ceiling temperature must be known. When there is doubt as to the maximum temperature at the sprinkler location, a maximum-reading thermometer should be used to determine the temperature under conditions that would show the highest readings to be expected. In addition, recognized installation rules may require a higher temperature classification, depending upon sprinkler location, occupancy classification, commodity classification, storage height, and other hazards. In all cases, the maximum expected ceiling temperature dictates the lowest allowable temperature classification. Sprinklers located immediately adjacent to a heat source may require a higher temperature rating.



TECHNICAL DATA SHEET

VK3021 Quick Response Pendent Sprinkler K5.6 (80.6)

6. ORDERING PROCEDURE

6.1 Sprinkler

1. Choose a sprinkler base part number with the required thread size and listing or approval (refer to section 5):
2. Add the suffix for the desired finish.
3. Add the suffix for the desired temperature rating.

NOTE: For Polyester, insert the desired temperature rating suffix where the dash (–) is shown.

EXAMPLE: 23870MB/W = VK3021 with white polyester finish and 155 °F (68 °C) nominal temperature rating. This sprinkler is to be installed into an area with a maximum ambient temperature of 100 °F (38 °C).

NOTE: When ordering sprinklers that will be installed into InstaSeal® CPVC fittings, refer to Form No. F_032219 for installation instructions. Use the InstaSeal® alignment tool and NOT the sprinkler wrench for InstaSeal® sprinkler installations.

1. Sprinkler Base Part Number		2. Finish		3. Temperature Rating			
See Section 5		Description	Suffix	Nominal Temperature Rating	Bulb Color	Maximum Ambient Ceiling Temperature	Suffix
23870	1/2" NPT	Brass	A	135 °F (57 °C)	Orange	100 °F (38 °C)	A
23882	15 mm BSPT	Chrome	F	155 °F (68 °C)	Red	100 °F (38 °C)	B
26756*	15 mm BSPT	White Polyester	M–/W	175 °F (79 °C)	Yellow	150 °F (65 °C)	D
		Black Polyester	M–/B	200 °F (93 °C)	Green	150 °F (65 °C)	E
		ENT	JN	286 °F (141 °C)	Blue	225 °F (107 °C)	G
				OPEN	—	—	Z

*Only for China



TECHNICAL DATA SHEET

VK3021 Quick Response Pendent Sprinkler K5.6 (80.6)

6.2 Sprinkler Accessories



Figure – 4: Sprinkler Accessories

Image Reference	Part Number	Description
1)	23559MB	Straight wrench: required for proper installation
2)	23560MB	Recessed socket wrench
3)	01724A	Sprinkler cabinet: holds up to 6 sprinklers
4)	01725A	Sprinkler cabinet: holds up to 12 sprinklers (not shown)
5)	06419A	Model E-1 Slip-on style recessed escutcheon
	07902	Model E-1 Slip-on style recessed escutcheon (stainless steel)
6)	11038	Model E-2 Threaded recessed escutcheon
7)	18347	Model E-3 Threaded recessed escutcheon (large diameter outer cup)
8)	01960A	Large standard flat surface mount escutcheon (steel)
	09488	Large standard flat surface mount escutcheon (stainless steel)
9)	26676	InstaSeal® alignment tool
10)	02960A	Small standard flat surface mount escutcheon (steel)
	07526	Small standard flat surface mount escutcheon (stainless steel)
11)	01961B	Large standard raised surface mount escutcheon (brass)



TECHNICAL DATA SHEET

VK3021 Quick Response Pendent Sprinkler K5.6 (80.6)

7. CONTACT

The sprinkler and accessories are available through Viking distributors only. Contact your local Viking sales office which can be found on our website:

Americas and Asia: www.vikinggroupinc.com/locations OR Europe, Middle East, Africa (EMEA):
www.viking-emea.com/contact

Manufacturer:

The Viking Corporation
5150 Beltway SE
Caledonia, MI 49316
Tel.: (800) 968-9501
Fax: 269-818-1680
Technical Services: 1-877-384-5464
techsvcs@vikingcorp.com

Importer EU:

Viking S.A.
21, Z.I, Haneboesch
L-4562 Differdange / Niederkorn
Tel.: +352 58 37 37 – 1
Fax: +352 58 37 36
vikinglux@viking-emea.com

Asia Pacific (APAC) Main Office:

The Viking Corporation (Far East) Pte. Ltd.
69 Tuas View Square
Westlink Techpark, Singapore 637621
Tel: (+65) 6 278 4061
Fax: (+65) 6 278 4609
vikingAPAC@vikingcorp.com



Handling and Installation Instructions

Model XT-1 Pendent Sprinklers

	bg	Инсталирайте и пуснете продукта в експлоатация само ако следната инструкция е ясно разбрана.	lv	Produkta iemontēšanu un ekspluatācijas sākšanu veikt tikai tad, ja dotā instrukcija ir pilnībā saprasta.
	cs	Namontujte a spust'te do provozu produkt pouze tehdy, když jste jasně pochopili tento návod.	lt	Produktą montuokite ir pradėkite eksploatuoti tik tuomet, jei aiškiai suprantate šią instrukciją.
	de	Du må kun montere og idriftsætte produktet, hvis du har forstået følgende vejledning til fulde.	mt	Installa u f'ad dem il-prodott biss jekk l-istruzzjonijiet li ġejjin jinftehm u b'mod ċar.
	de	Produkt nur einbauen und in Betrieb nehmen, wenn die nachfolgende Anleitung klar verstanden wird.	nl	Product alleen installeren en in gebruik nemen, als de volgende instructies begrepen zijn.
	el	Η εγκατάσταση και θέση σε λειτουργία του προϊόντος επιτρέπονται μόνο εάν οι ακόλουθες οδηγίες έχουν γίνει κατανοητές.	no	Ikke installer og ta i bruk produktet uten at følgende anvisninger er tydelig forstått.
	en	Do not install and commission the product unless you have clearly understood the instructions below.	pl	Produkt należy montować i uruchamiać tylko wtedy, gdy poniższe instrukcje są w pełni zrozumiałe.
	es	Instalar el producto y ponerlo en funcionamiento solo cuando se hayan comprendido claramente las siguientes instrucciones.	pt	Instalar e colocar o produto em funcionamento somente se as instruções a seguir forem claramente compreendidas.
	et	Paigaldage toode ja kasutage seda ainult siis, kui saate alljärgnevast juhendist selgelt aru.	ro	Montați produsul și puneți-l în funcțiune numai dacă instrucțiunea următoare este înțeleasă clar.
	fi	Tuotteen saa asentaa ja ottaa käyttöön vain, jos jäljempänä oleva ohje ymmärretään selvästi.	ru	Не устанавливайте и не принимайте оборудование в эксплуатацию, если вы четко не поняли инструкции ниже
	fr	N'installer et ne mettre en service le produit que si les instructions suivantes ont été clairement comprises.	sk	Namontujte a spustite do prevádzky výrobok iba vtedy, pokiaľ ste jasne pochopili tento návod.
	ga	Ná déan an táirge a shuiteail agus a choimisiunu mura dtuigean tu na teoracha thíos go soileir.	sl	Izdelek vgradite in zaženite samo, če ste dobro razumeli navodila v nadaljevanju.
	hr	Ne instalirajte i ne puštajte proizvod u rad ako niste jasno razumjeli donje upute.	sr	Ne instalirajte i ne puštajte proizvod u rad ako niste jasno razumeli uputstva u nastavku.
	hu	Csak akkor építse be a terméket és helyezze üzembe, ha a következő útmutatót egyértelműen megértette.	sv	Montera och driftsätt produkten endast om du förstår den efterföljande instruktionen.
	is	Settu ekki upp eða taktu vöruna í notkun nema þú hafir skilið greinilega leiðbeiningarnar hér að neðan.	tr	Aşağıdaki talimatları açıkça anlamadan ürünü kurmayın ve devreye almayın.
	it	Montare il prodotto e metterlo in funzione solo se si sono comprese appieno le seguenti istruzioni.		

1. PRODUCT IDENTIFICATION

This document covers the following products, hereafter referred to as “sprinkler”:

- VK1021 Standard Response Pendent Sprinkler K5.6 (80.6)
- VK2021 Standard Response Pendent Sprinkler K8.0 (115)
- VK2022 Standard Response Pendent Sprinkler K8.0 (115)
- VK3021 Quick Response Pendent Sprinkler K5.6 (80.6)
- VK3521 Quick Response Pendent Sprinkler K8.0 (115)
- VK3522 Quick Response Pendent Sprinkler K8.0 (115)

2. OTHER APPLICABLE DOCUMENTS

For intended use and relevant conditions for the safe use of the specific sprinkler refer to the appropriate *Technical Data Sheet*.



Handling and Installation Instructions

Model XT-1 Pendent Sprinklers

3. TRANSPORT AND HANDLING

WARNING

A damaged or compromised sprinkler poses the risk of fatal consequences.

Damaged or compromised sprinklers will not operate properly which could lead to loss of life.

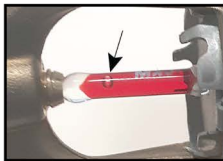
- NEVER use a sprinkler that has been exposed to temperatures exceeding the maximum allowed ambient temperature.
- NEVER use a sprinkler with a loss of liquid from the glass bulb or damage to the fusible element. A small bubble should be visible within the glass bulb; rotate the sprinkler to a horizontal position while observing the bulb to see the bubble.
- NEVER use a sprinkler that has been dropped or damaged.
- ALWAYS Protect the sprinkler from mechanical damage during storage, transport, and handling.
- NEVER use sprinklers that have been painted by anyone other than the manufacturer.
- ALWAYS protect sprinklers from being painted during installation or replacement in accordance with the installation standards.
- NEVER clean sprinklers with anything other than 7 psi or lower compressed air.
- NEVER apply soap, water, ammonia, adhesives, solvents or any other fluids on sprinklers.
- Destroy every damaged or compromised sprinkler.

NOTICE

Protect sprinklers during transport and handling.

- ALWAYS handle the sprinkler with care.
- ALWAYS keep the protective cap on the sprinkler during transport and handling.
- NEVER remove the protective cap until the fire sprinkler system is placed in service and the potential for mechanical damage no longer exists.
- ALWAYS protect the sprinkler from direct sunlight during transport and handling.
- ALWAYS store sprinkler in a cool, dry, protected area.
- ALWAYS use original manufacturer's shipping containers.
- NEVER store a sprinkler loose in a box, bin, bucket, or other type of container.
- ALWAYS keep the sprinkler separated from other sprinklers.
- NEVER allow metal parts to contact the sprinkler operating elements.

NOTE: If the glass bulb included on the sprinkler has been exposed to ultraviolet light, the color inside the bulb may fade. This color change does not affect the operation of the sprinkler.



CORRECT
(Bulb intact, bubble visible)



INCORRECT
(bulb cracked, fluid missing)



CORRECT
(Protective caps in place)



INCORRECT
(Protective caps not in place)



CORRECT
Container



INCORRECT
(Stored loose in a box)



Handling and Installation Instructions

Model XT-1 Pendent Sprinklers

4. INSTALLATION

WARNING

Installation by insufficiently qualified personnel poses the risk of fatal consequences.

- This sprinkler must be installed properly by qualified personnel familiar with safe practices and applicable and recognized design and installation standards issued, for example, by NFPA, FM, VdS, or LPCB, and trained how to properly perform the installation procedures.

WARNING

Incorrect recessed installation poses the risk of fatal consequences.

- For recessed applications, this sprinkler must be installed according to the dimensions shown in Figure 1.

CAUTION

Cutting Hazard.

Sprinklers, accessories, cabinets, and packaging can have sharp edges that can cause cuts.

- Wear appropriate personal protective equipment (gloves) while handling product.

NOTICE

If the sprinkler will be installed into an IS-W2 InstaSeal™ fitting, refer to F_021123 or F_032219 (CPVC InstaSeal™ adapter) for the proper installation instructions.



Handling and Installation Instructions

Model XT-1 Pendent Sprinklers

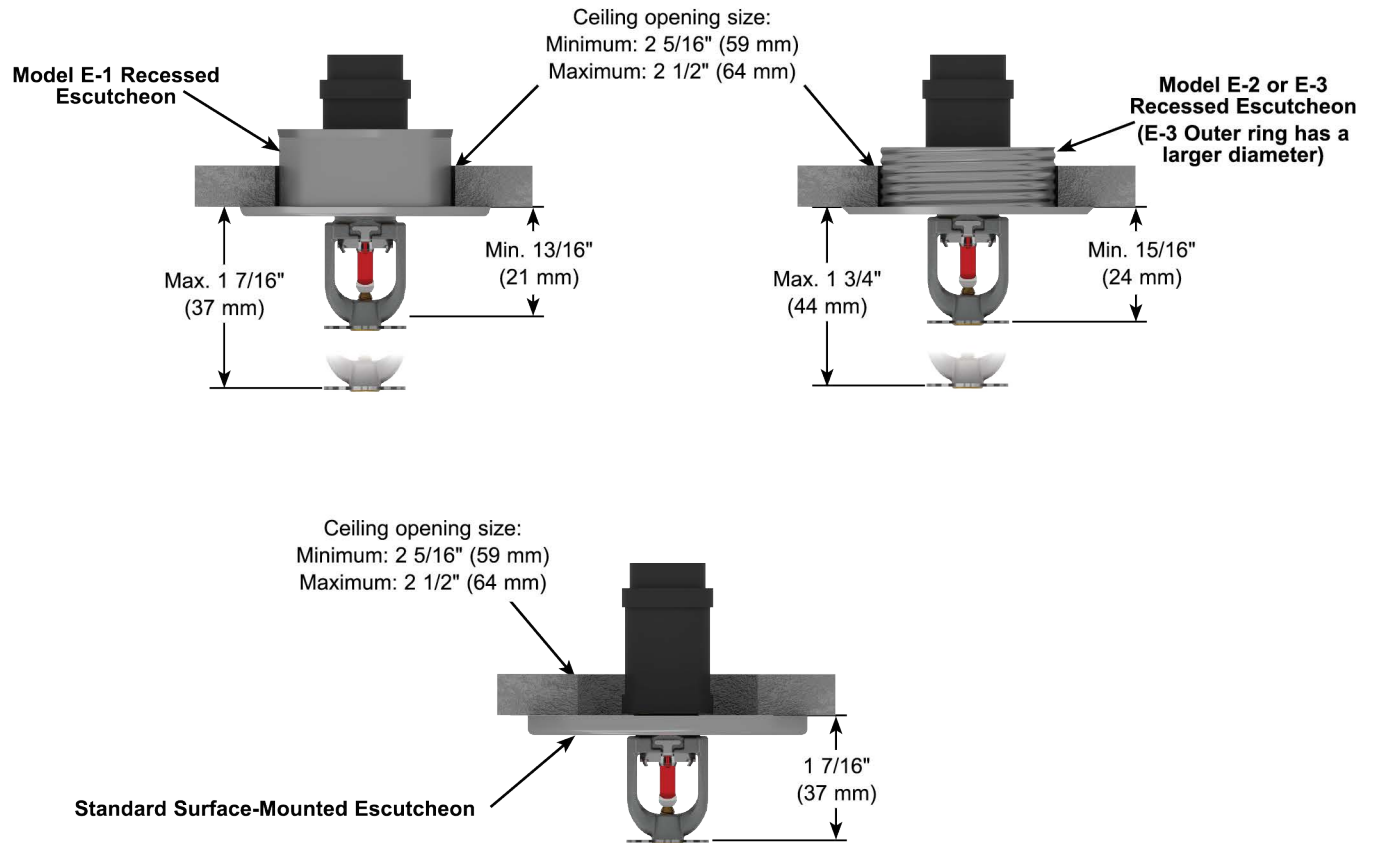


Figure – 1 Installation Dimensions with Viking Escutcheons



Handling and Installation Instructions

Model XT-1 Pendent Sprinklers

Optional Guards, Shields, and Escutcheons: If the sprinkler shall be installed together with a guard, shield, or escutcheon refer to the applicable documents for the products used.

1. Install all required piping in the intended installation location.
2. Verify that the sprinkler model/style, K-factor, temperature rating, and response characteristics are appropriate for the intended installation location. See Table 1 and Figure 5.
3. Inspect the sprinkler for damage. Destroy every damaged or compromised sprinkler.
The following are examples in which sprinklers are considered damaged or compromised. Replace the sprinkler in the following cases:
 - Sprinkler with a loss of fluid from the glass bulb or damage to the fusible element.
 - Sprinklers that have been field painted, caulked, or mechanically damaged.
 - Sprinklers showing signs of corrosion.
4. Verify that the sprinkler is protected with the protective cap or clip.
5. Apply a small amount of pipe-joint compound or tape to the external threads of the sprinkler only. Do not allow a build-up of compound inside the sprinkler inlet (Figure 2).

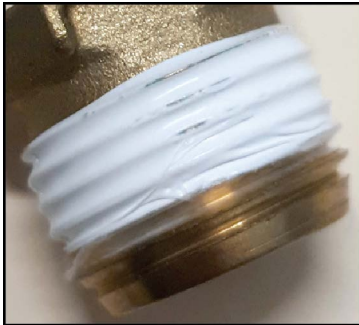


Figure – 2

6. If applicable, Install the escutcheon on the sprinkler threads.
7. **NOTICE: Do not use the deflector to start threading the sprinkler into a fitting. Use ONLY the approved wrench to install the sprinkler. Refer to the sprinkler's *Technical Data Sheet*.**
 - a) **For recessed sprinkler wrench (Figure 3a):** Carefully slide the wrench sideways around the protective cap and push upwards to engage with the sprinkler wrench flats.
 - b) **For the standard sprinkler wrench (Figure 3b):** Carefully slide the wrench onto the sprinkler wrench flats.

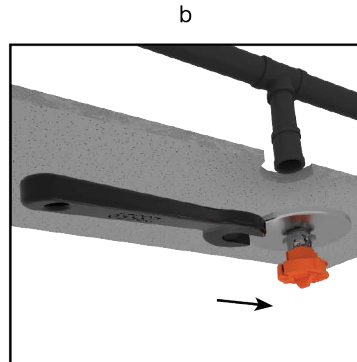
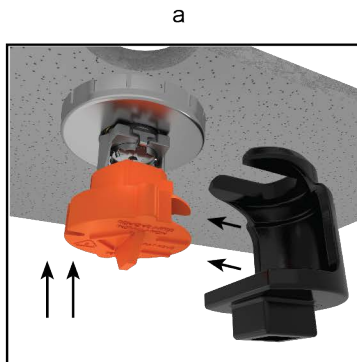


Figure – 3



Handling and Installation Instructions

Model XT-1 Pendent Sprinklers

8. **NOTICE: Over-tightening the sprinkler can cause permanent damage. For 1/2" NPT (or 15 mm BSPT) sprinkler, tighten up to a maximum torque of 14 ft-lbs (19 Nm). For 3/4" NPT (or 20 mm BSPT) sprinkler, tighten up to a maximum of 20 ft-lbs (27,1 Nm).**
Tighten the sprinkler as necessary (Figure 4a and 4b). If applicable, install a sprinkler guard and water shield.

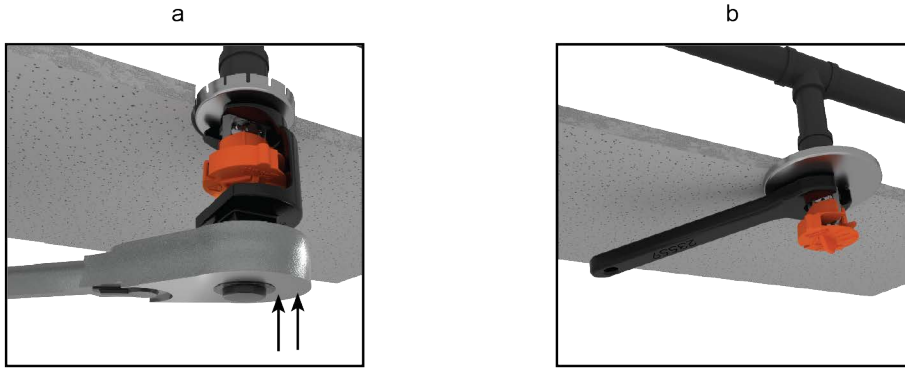


Figure – 4

9. **NOTICE: Sprinkler protective caps/clips must be removed from the sprinkler before placing the system in service. Test the entire sprinkler system.**
Refer to the applicable system documentation, regulations, and standards to ensure compliance.

Table 1: Sprinkler Markings

Ref	Parameter	
A	Response type	
B	Listings and approvals	
C	Sprinkler type	
D	Manufacture date	
E	Nominal temperature rating	
F	Manufacturer's Sprinkler Identification Number (SIN)	

Figure – 5



Handling and Installation Instructions

Model XT-1 Pendent Sprinklers

5. CONTACT

The sprinkler and accessories are available through Viking distributors only. Contact your local Viking sales office which can be found on our website:

Americas and Asia: www.vikinggroupinc.com/locations OR Europe, Middle East, Africa (EMEA): www.viking-emea.com/contact

Manufacturer:

The Viking Corporation
5150 Beltway SE
Caledonia, MI 49316
Tel.: (800) 968-9501
Fax: 269-818-1680
Technical Services: 1-877-384-5464
techsvcs@vikingcorp.com

Importer EU:

Viking S.A.
21, Z.I., Haneboesch
L-4562 Differdange / Niederkorn
Tel.: +352 58 37 37 – 1
Fax: +352 58 37 36
vikinglux@viking-emea.com

Asia Pacific (APAC) Main Office:

The Viking Corporation (Far East) Pte. Ltd.
69 Tuas View Square
Westlink Techpark, Singapore 637621
Tel: (+65) 6 278 4061
Fax: (+65) 6 278 4609
vikingAPAC@vikingcorp.com



Operation and Maintenance Instructions

Model XT-1 Sprinklers

1. PRODUCT IDENTIFICATION

This document covers the following product, hereafter referred to as “sprinkler” (SR=Standard Response, QR=Quick Response):

- VK1001 SR Upright Sprinkler K5.6 (80.6)
- VK2001 SR Upright Sprinkler K8.0 (115)
- VK2002 SR Upright Sprinkler K8.0 (115)
- VK3001 QR Upright Sprinkler K5.6 (80.6)
- VK3501 QR Upright Sprinkler K8.0 (115)
- VK3502 QR Upright Sprinkler K8.0 (115)
- VK1021 SR Pendent Sprinkler K5.6 (80.6)
- VK2021 SR Pendent Sprinkler K8.0 (115)
- VK2022 SR Pendent Sprinkler K8.0 (115)
- VK3021 QR Pendent Sprinkler K5.6 (80.6)
- VK3521 QR Pendent Sprinkler K8.0 (115)
- VK3522 QR Pendent Sprinkler K8.0 (115)
- VK1181 SR Conventional Sprinkler K5.6 (80.6)
- VK1201 SR Conventional Sprinkler K8.0 (115)
- VK1202 SR Conventional Sprinkler K8.0 (115)
- VK3101 QR Conventional Sprinkler K5.6 (80.6)
- VK3541 QR Conventional Sprinkler K8.0 (115)
- VK3542 QR Conventional Sprinkler K8.0 (115)

WARNING

Cancer and Reproductive Harm www.P65Warning.ca.gov

2. OTHER APPLICABLE DOCUMENTS

For intended use and relevant conditions for the safe use of the specific sprinkler, refer to the appropriate Technical Data Sheet. In case an installed sprinkler needs to be replaced, refer to the appropriate Handling and Installation Instructions for the installation of the new sprinkler.

3. MAINTAINING OPERATIONAL READINESS

Functionality

During fire conditions, the operating element fuses or shatters (depending on the type of sprinkler), releasing the pip cap and sealing assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to control or extinguish the fire.

WARNING

This section contains important safety information. Read and follow all information.

Damaged or Compromised Sprinklers

Damaged or compromised sprinklers will not operate properly which could lead to loss of life.

- NEVER clean, paint, or caulk sprinklers.
- NEVER apply soap, water, ammonia, adhesives, solvents or any other fluids on sprinklers.
- NEVER expose sprinklers to temperatures exceeding the maximum allowed ambient ceiling temperature. See the Technical Data Sheet.
- ALWAYS replace a compromised or damaged sprinkler.
- NEVER attempt to repair or reassemble a sprinkler.
- ALWAYS replace operated sprinklers and cover assemblies and sprinklers exposed to corrosive products of combustion.
- Replacement of sprinklers must only be performed following the instructions in section 4.

The following are examples in which sprinklers are considered damaged or compromised. Replace the sprinkler in the following cases:

- Sprinkler with a loss of fluid from the glass bulb or damage to the fusible element.
- Sprinklers or cover plate assemblies that have been field painted, caulked, or mechanically damaged.
- Sprinklers showing signs of extraordinary corrosion.



Operation and Maintenance Instructions

Model XT-1 Sprinklers

Obstructions and obstacles

Obstructions and obstacles may compromise sprinkler discharge patterns which are critical for proper fire protection.

- NEVER attach items to sprinklers or hang items from the ceiling in an area protected with sprinklers.
- NEVER install walls in areas protected with sprinklers without having a specialized company verifying the design of the sprinkler system.
- ALWAYS remove obstructions and obstacles to sprinkler spray patterns.

Sprinkler systems that have been subjected to a fire

Sprinkler systems that have been subjected to a fire must be returned to service as soon as possible.

- After an event of fire, the entire sprinkler system must be inspected for damage and repaired as necessary.
- Refer to the minimum requirements of the Authority Having Jurisdiction for replacement of sprinklers.
- Consider the employment of a fire patrol as long as the sprinkler system is out of service.

Inspections and testing

The owner is responsible for having the sprinklers inspected and tested according to standards of the applicable approval body and to the requirements of the Authority Having Jurisdiction to maintain proper operating condition of the system.

- Sprinklers must be inspected on a regular basis for corrosion, mechanical damage, obstructions, paint, etc. Frequency of inspections may vary due to corrosive atmospheres, water supplies, and activity around the sprinkler.

The applicable approval body or Authority Having Jurisdiction may require sprinklers to be replaced after a specified term of service.

- Refer to the standards of the applicable approval body, such as NFPA, FM, VdS, or LPCB, and the requirements of the Authority Having Jurisdiction for detailed inspection, testing and replacements requirements.

Sprinklers removed from the system for testing or for any other purpose must be replaced according to section 4.

4. REMOVAL AND REPLACEMENT

WARNING

Removal and replacement of sprinklers by insufficiently qualified personnel poses the risk of fatal consequences in case of fire.

- Removal or replacement of sprinklers must be performed by qualified personnel familiar with safe practices and applicable and recognized design and installation standards issued, for example, by NFPA, FM, VdS, or LPCB, and trained how to properly perform the installation procedures.

WARNING

Removal and replacement of sprinklers will temporarily eliminate the fire protection capabilities of the sprinkler system.

- Consider the employment of a fire patrol in the affected area.
- Prior to proceeding, notify all Authorities Having Jurisdiction.



Operation and Maintenance Instructions

Model XT-1 Sprinklers

⚠ WARNING

Re-installation of a removed sprinkler may compromise the operational safety of the sprinkler system.

- NEVER reinstall a removed sprinkler.
 - ALWAYS use new sprinklers for replacement.
1. Select new sprinklers with identical performance characteristics as well as respective accessories such as escutcheons, cover plates, and protective caps. A stocked spare sprinkler cabinet may be provided for this purpose on site.
 2. According to appropriate system description and/or valve instructions, remove the system from service, drain all water, and relieve all pressure on the piping.
 3. Only for flush and concealed style sprinklers: Remove the ceiling ring or cover plate assembly of the old sprinkler by gently unthreading or pulling it off the sprinkler body (depends on the sprinkler model used).
 4. Use the proper sprinkler wrench for the old sprinkler according to its Technical Data Sheet.
 5. Only for flush and concealed style sprinklers, but not for domed concealed sprinklers: Replace the plastic protective cap over the old sprinkler and fit the wrench over the cap.
 6. Use the wrench to remove the old sprinkler by turning it counterclockwise to unthread it from the piping.
 7. Install the new sprinkler by following its Handling and Installation Instructions.
 8. Place the system back in service and secure all valves.
 9. Check for and repair all leaks.

5. DISPOSAL

At end of use the product described here should be disposed of via the national recycling system.

6. CONTACT

The sprinkler and accessories are available through Viking distributors only. Contact your local Viking sales office which can be found on our website:

Americas and Asia: www.vikinggroupinc.com/locations OR Europe, Middle East, Africa (EMEA): www.viking-emea.com/contact

Manufacturer:

The Viking Corporation
5150 Beltway SE
Caledonia, MI 49316
Tel.: (800) 968-9501
Fax: 269-818-1680
Technical Services: 1-877-384-5464
techsvcs@vikingcorp.com

Importer EU:

Viking S.A.
21, Z.I. Haneboesch
L-4562 Differdange / Nieder Korn
Tel.: +352 58 37 37 – 1
Fax: +352 58 37 36
vikinglux@viking-emea.com

Asia Pacific (APAC) Main Office:

The Viking Corporation (Far East) Pte. Ltd.
69 Tuas View Square
Westlink Techpark, Singapore 637621
Tel: (+65) 6 278 4061
Fax: (+65) 6 278 4609
vikingAPAC@vikingcorp.com



TECHNICAL DATA

MICROFAST® QUICK RESPONSE HORIZONTAL SIDEWALL SPRINKLER VK305 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
 Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

1. DESCRIPTION

The Viking Microfast® Quick Response Horizontal Sidewall Sprinkler VK305 is a small thermosensitive glass bulb spray sprinkler available with various finishes and temperature ratings to meet design requirements. The special Polyester and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive atmospheres and are listed/approved as corrosion resistant as indicated in Approval Charts.

2. LISTINGS AND APPROVALS



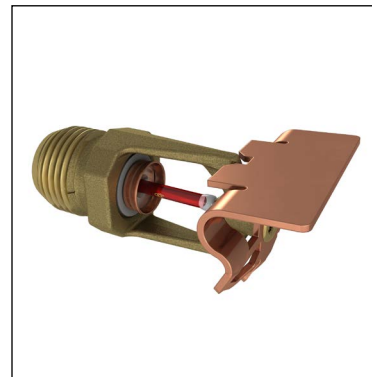
cULus Listed: Category VNIV



FM Approved: Class 2020

China Approval: Approved according to China GB Standard

Refer to Approval Charts and Design Criteria for listing and approval requirements that must be followed.



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

3. TECHNICAL DATA

Specifications:

Minimum Operating Pressure: 7 psi (0.5 bar)
 Rated to 175 psi (12 bar) water working pressure
 Factory tested hydrostatically to 500 psi (34.5 bar)
 Nominal K-Factor: 5.6 U.S. (80.6 metric*)

* Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

Overall Length: 2-3/4" (68 mm)

Material Standards:

Frame Casting: Brass UNS-C84400 or QM Brass
 Deflector: Phosphor Bronze UNS-C51000
 Bulb: Glass, nominal 3 mm diameter
 Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape
 Screw: Brass UNS-C36000
 Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400
For Polyester Coated Sprinklers: Belleville Spring-Exposed
For ENT Coated Sprinklers: Belleville Spring - Exposed, Screw and Pip cap - ENT plated.

Ordering Information: (Also refer to the current Viking price list.)

Order Viking Microfast® Quick Response Horizontal Sidewall Sprinkler VK305 by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.

Finish Suffix: Brass = A, Chrome = F, White Polyester = M-/W, Black Polyester = M-/B, and ENT = JN

Temperature Suffix: 135 °F / 57 °C = A, 155 °F / 68 °C = B, 175 °F / 79 °C = D, 200 °F / 93 °C = E, and 286 °F / 141 °C = G

For example, sprinkler 12997 with a Brass finish and a 155 °F / 68 °C temperature rating = Part No. 12997AB

Available Finishes And Temperature Ratings: Refer to Table 1.

Accessories: (Also refer to the Viking website.)

Sprinkler Wrenches:

A. Standard Wrench: Part No. 21475M/B (available since 2017).

B. Wrench for recessed and/or wax coated sprinklers: Part No. 13655W/B** (available since 2006)

**A 1/2" ratchet is required (not available from Viking).



TECHNICAL DATA

MICROFAST® QUICK RESPONSE HORIZONTAL SIDEWALL SPRINKLER VK305 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

Sprinkler Cabinets:

- A. Six-head capacity: Part No. 01724A (available since 1971)
- B. Twelve-head capacity: Part No. 01725A (available since 1971)

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, the heat-sensitive fusible link disengages, the pip cap and spring are released, and the waterway is opened. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

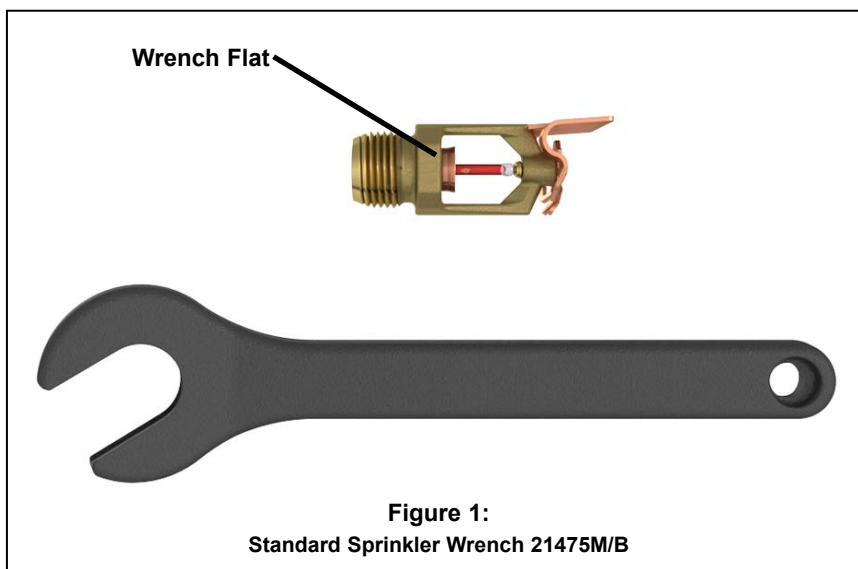
Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

Viking Microfast® Quick Response Horizontal Sidewall Sprinkler VK305 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.





TECHNICAL DATA

MICROFAST® QUICK RESPONSE HORIZONTAL SIDEWALL SPRINKLER VK305 (K5.6)

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TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ²	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

Sprinkler Finishes: Brass, Chrome, White Polyester, Black Polyester, and ENT

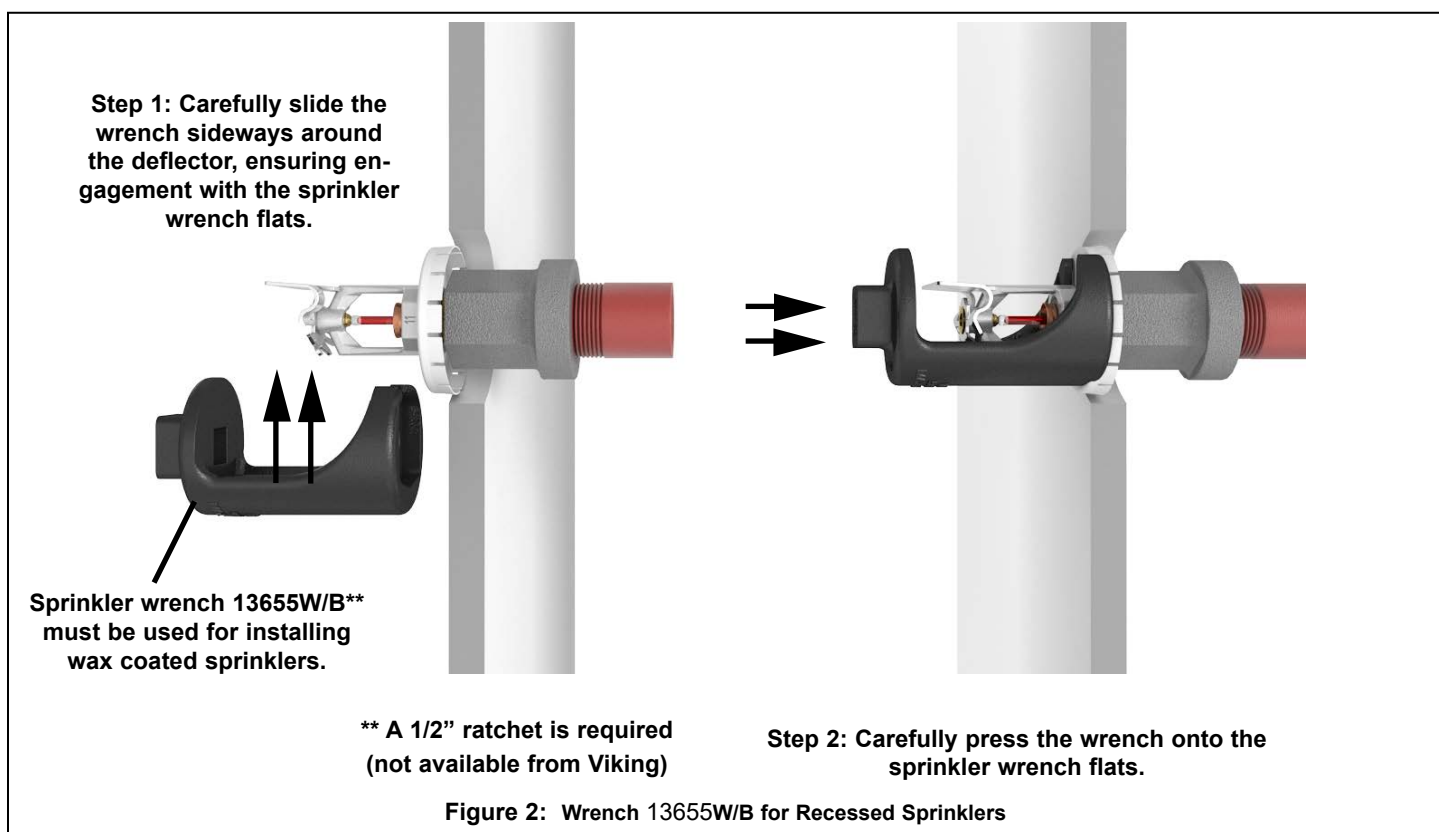
Corrosion-Resistant Coatings³: White Polyester, Black Polyester, and ENT

Footnotes

¹ The sprinkler temperature rating is stamped on the deflector.

² Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

³ The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. For ENT coated sprinklers, the waterway is coated. Note that the spring is exposed on sprinklers with Polyester, and ENT coatings.





TECHNICAL DATA

MICROFAST® QUICK RESPONSE HORIZONTAL SIDEWALL SPRINKLER VK305 (K5.6)

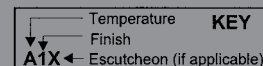
The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
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Approval Chart 1 (UL)

Microfast® Quick Response Horizontal Sidewall Sprinkler VK305
 For Light or Ordinary Hazard Occupancies

Maximum 175 PSI (12 Bar) WWP

Deflector must be located 4" to 12" (102 mm to 305 mm) below the ceiling.



Sprinkler Base Part Number ¹	SIN	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals ³ (Refer also to UL Design Criteria.)	
		NPT	BSPT	U.S.	metric ²	Inches	mm	cULus ⁴	China Approval
12997	VK305	1/2"	15 mm	5.6	80.6	2-11/16	68	A1W, B1X, C2W, D2Z	--
19782 ⁷	VK305	1/2"	--	5.6	80.6	2-11/16	68	E3	E3

NOTICE - Product Below - Limited Availability (Contact Local Viking Office)

12121	VK305	1/2"	15 mm	5.6	80.6	2-11/16	68	A1W, B1X, C2W, D2Z	--
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Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C),
 200 °F (93 °C), and 286 °F (141 °C)
 B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C),
 and 200 °F (93 °C)
 C - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C),
 and 286 °F (141 °C)
 D - 155 °F (68 °C), 175 °F (79 °C), and 200 °F
 (93 °C)
 E - 155 °F (68 °C)

Approved Finishes

1 - Brass, Chrome, White Poly-ester^{5,6},
 and Black Polyester^{5,6}
 2 - ENT⁵
 3 - Chrome

Approved Escutcheons

W - Installed with standard surface-mounted escutcheons
 X - Installed with standard surface-mounted escutch-
 eons or recessed with the Viking Micromatic® Model
 E-1, E-2, or G-1 Recessed Escutcheon
 Z - Installed with standard surface-mounted escutch-
 eons or recessed with the Viking Micromatic Model
 E-1

Footnotes

- ¹ Base part number shown. For complete part number, refer to Viking's current price schedule.
² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
³ This table shows the listings and approvals available at the time of printing. Other approvals may be in process.
⁴ Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada.
⁵ cULus Listed as corrosion-resistant.
⁶ Other colors are available on request with the same Listings and Approvals as the standard colors.
⁷ Approved according to China GB Standard.

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1.)

cULus Listing Requirements:

Quick Response Horizontal Sprinkler VK305 is cULus Listed as indicated in Approval Chart 1 for installation in accordance with the latest edition of NFPA 13 for sidewall standard spray sprinklers.

- Designed for use in Light and Ordinary Hazard occupancies.
- Locate with the deflector 4" to 12" (102 mm to 305 mm) below the ceiling.
- Protection areas and maximum spacing shall be in accordance with the tables provided in NFPA 13.
- Minimum spacing allowed is 6 ft. (1.8 m).
- Align the top of the deflector parallel with the ceiling.
- Locate no less than 4" (102 mm) from end walls.
- Maximum distance from end walls shall be no more than one-half of the allowable distance between sprinklers. The distance shall be measured perpendicular to the wall.
- The sprinkler installation and obstruction rules contained in NFPA 13 for sidewall standard spray sprinklers must be followed.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Bulletin Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



TECHNICAL DATA

MICROFAST® QUICK RESPONSE HORIZONTAL SIDEWALL SPRINKLER VK305 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
 Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

Approval Chart 1 (FM)

Microfast® Quick Response Sidewall Sprinklers
 Maximum 175 PSI WWP

	Temperature	KEY
↓	Finish	
A1X	Escutcheon (if applicable)	

Sprinkler Base Part Number ¹	SIN	Thread Size		Nominal K-Factor		Overall Length		FM Approvals ^{3,4} (Refer also to Design Criteria below.)	
		NPT	BSPT	U.S.	metric ²	Inches	mm		
12997	VK305	1/2"	15 mm	5.6	80.6	2-11/16	68	A1Y, B1X	
NOTICE - Product Below - Limited Availability (Contact Local Viking Office)									
12121	VK305	1/2"	15 mm	5.6	80.6	2-11/16	68	A1W, B1X, C2W, D2Z	--
Approved Temperature Ratings A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C) B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)				Approved Finishes 1 - Brass			Approved Escutcheons X - Installed with standard surface-mounted escutcheons or recessed with the Viking Micromatic® Model E-1, E-2, E-3, or G-1 Recessed Escutcheon Y - Installed with standard surface-mounted escutcheons		
Footnotes ¹ Base part number shown. For complete part number, refer to Viking's current price schedule. ² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0. ³ This table shows the FM Approvals available at the time of printing. Other approvals may be in process. ⁴ Viking vertical sidewall sprinklers may be installed pendent or upright. ⁵ Approved according to China GB Standard.									

DESIGN CRITERIA - FM

(Also refer to Approval Chart 2 above.)

FM Approval Requirements:

Horizontal Sidewall Sprinkler VK305 is FM Approved as a quick response **Non-Storage** sidewall sprinkler as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

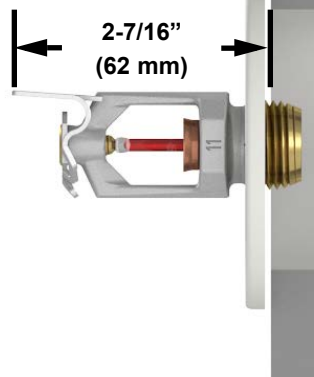
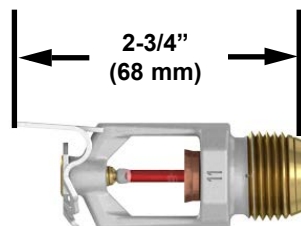
IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Bulletin Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



TECHNICAL DATA

MICROFAST® QUICK RESPONSE HORIZONTAL SIDEWALL SPRINKLER VK305 (K5.6)

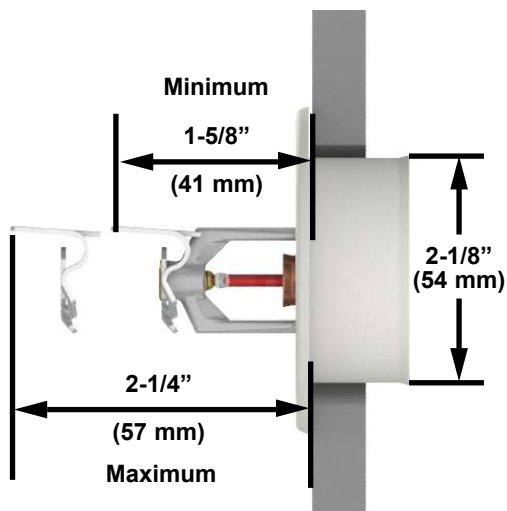
The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
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 Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com



Wall Opening Size:
 2-5/16" (58.7 mm) minimum
 2-1/2" (63.5 mm) maximum

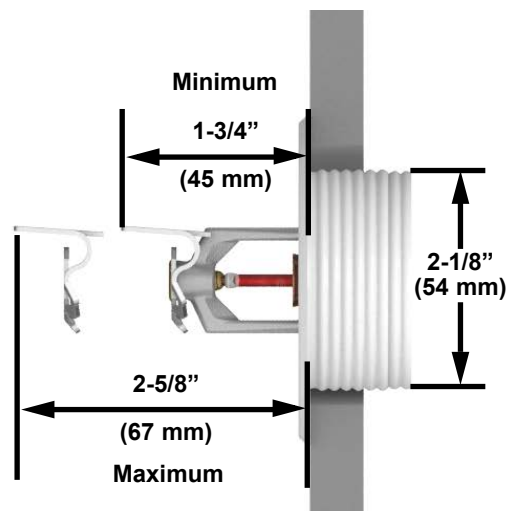
Installed with a Standard
 1/8" Surface-Mounted
 Escutcheon

Figure 3: Sidewall Sprinkler Dimensions with a Standard Escutcheon



Wall Opening Size:
 2-5/16" (58.7 mm) minimum
 2-1/2" (63.5 mm) maximum

Installed with the
 Micromatic Model E-1
 Recessed Escutcheon



Installed with the
 Threaded Model E-2
 Recessed Escutcheon

Figure 4: Sidewall Sprinkler VK305 Dimensions with the Model E-1 and E-2 Recessed Escutcheons



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

SPRINKLERS ARE FRAGILE - HANDLE WITH CARE!

General Handling and Storage:

- Store sprinklers in a cool, dry place.
- Protect sprinklers during storage, transport, handling, and after installation.
- Use the original shipping containers. DO NOT place sprinklers loose in boxes, bins, or buckets.
- Keep sprinklers separated at all times. DO NOT allow metal parts to contact sprinkler operating elements.

For Pre-Assembled Drops:

- Protect sprinklers during handling and after installation.
- For recessed assemblies, use the protective sprinkler cap (Viking Part Number 10364).

Sprinklers with Protective Shields or Caps:

- DO NOT remove shields or caps until after sprinkler installation and there no longer is potential for mechanical damage to the sprinkler operating elements.
- **Sprinkler shields or caps MUST be removed BEFORE placing the system in service!**
- Remove the sprinkler shield by carefully pulling it apart where it is snapped together.
- Remove the cap by turning it slightly and pulling it off the sprinkler.

Sprinkler Installation:

- DO NOT use the sprinkler deflector or operating element to start or thread the sprinkler into a fitting.
- **Use only the designated sprinkler head wrench!** Refer to the current sprinkler technical data page to determine the correct wrench for the model of sprinkler used.
- DO NOT install sprinklers onto piping at the floor level.
- Install sprinklers after the piping is in place to prevent mechanical damage.
- DO NOT allow impacts such as hammer blows directly to sprinklers or to fittings, pipe, or couplings in close proximity to sprinklers. Sprinklers can be damaged from direct or indirect impacts.
- DO NOT attempt to remove drywall, paint, etc., from sprinklers.
- **Take care not to over-tighten the sprinkler and/or damage its operating parts!**

Maximum Torque:

1/2" NPT: 14 ft-lbs. (19.0 N-m)

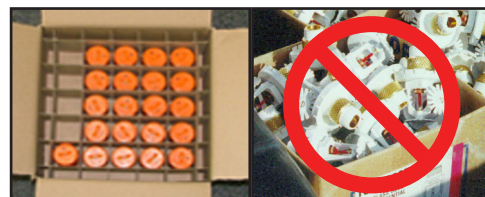
3/4" NPT: 20 ft-lbs. (27.1 N-m)

1" NPT: 30 ft-lbs. (40.7 N-m)



CORRECT
(Original container used)

INCORRECT
(Placed loose in box)



CORRECT
(Protected with caps)

INCORRECT
(Protective caps not used)



CORRECT
(Piping is in place at the ceiling)

INCORRECT
(Sprinkler at floor level)



CORRECT
(Special installation wrenches)

INCORRECT
(Designated wrench not used)



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

! WARNING

Any sprinkler with a loss of liquid from the glass bulb or damage to the fusible element should be destroyed. Never install sprinklers that have been dropped, damaged, or exposed to temperatures exceeding the maximum ambient temperature allowed. Sprinklers that have been painted in the field must be replaced per NFPA 13. Protect sprinklers from paint and paint overspray in accordance with the installation standards. Do not clean sprinklers with soap and water, ammonia, or any other cleaning fluid. Do not use adhesives or solvents on sprinklers or their operating elements.

Refer to the appropriate technical data page and NFPA standards for complete care, handling, installation, and maintenance instructions. For additional product and system information Viking data pages and installation instructions are available on the Viking Web site at www.vikinggroupinc.com.



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

PROTECTIVE SPRINKLER SHIELDS AND CAPS

General Handling and Storage:

Many Viking sprinklers are available with a plastic protective cap or shield temporarily covering the operating elements. The snap-on shields and caps are factory installed and are intended to help protect the operating elements from mechanical damage during shipping, storage, and installation. NOTE: It is still necessary to follow the care and handling instructions on the appropriate sprinkler technical data sheets* when installing sprinklers with bulb shields or caps.

WHEN TO REMOVE THE SHIELDS AND CAPS:

NOTE: SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

Remove the shield or cap from the sprinkler only after checking all of the following:

- The sprinkler has been installed*.
- The wall or ceiling finish work is completed where the sprinkler is installed and there no longer is a potential for mechanical damage to the sprinkler operating elements.

SHIELDS AND CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!

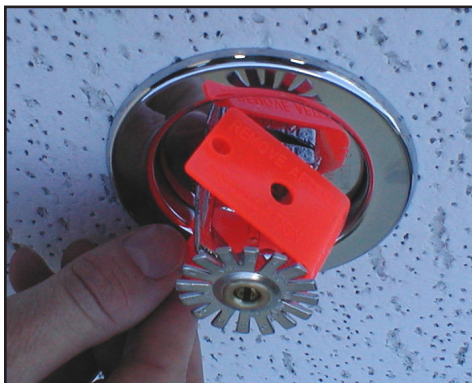


Figure 1: Sprinkler shield being removed from a pendent sprinkler.



Figure 2: Sprinkler cap being removed from a pendent sprinkler.



Figure 3: Sprinkler cap being removed from an upright sprinkler.

HOW TO REMOVE SHIELDS AND CAPS:

No tools are necessary to remove the shields or caps from sprinklers. DO NOT use any sharp objects to remove them! **Take care not to cause mechanical damage to sprinklers when removing the shields or caps.** When removing caps from fusible element sprinklers, use care to prevent dislodging ejector springs or damaging fusible elements. NOTE: Squeezing the sprinkler cap excessively could damage sprinkler fusible elements.

- To remove the shield, simply pull the ends of the shield apart where it is snapped together. Refer to Figure 1.
- To remove the cap, turn it slightly and pull it off the sprinkler. Refer to Figures 2 and 3.

NOTICE

Refer to the current sprinkler technical data page to determine the correct sprinkler wrench for the model of sprinkler used.



Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

* Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



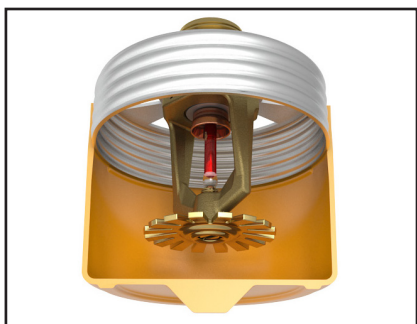
BULLETIN

CARE AND HANDLING
OF SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com



CONCEALED COVER ASSEMBLIES ARE FRAGILE!
TO ASSURE SATISFACTORY PERFORMANCE OF THE PRODUCT, HANDLE WITH CARE.



Concealed Sprinkler and Adapter
 Assembly with Protective Cap



Concealed Sprinkler and Adapter
 Assembly (Protective Cap Removed)

Cover Plate Assembly
 (Pendent Cover 12381 shown)



GENERAL HANDLING AND STORAGE INSTRUCTIONS:

- Do not store in temperatures exceeding 100 °F (38 °C). Avoid direct sunlight and confined areas subject to heat.
- Protect sprinklers and cover assemblies during storage, transport, handling, and after installation.
 - Use original shipping containers.
 - Do not place sprinklers or cover assemblies loose in boxes, bins, or buckets.
- Keep the sprinkler bodies covered with the protective sprinkler cap any time the sprinklers are shipped or handled, during testing of the system, and while ceiling finish work is being completed.
- Use only the designated Viking recessed sprinkler wrench (refer to the appropriate sprinkler data page) to install these sprinklers. **NOTE:** The protective cap is temporarily removed during installation and then placed back on the sprinkler for protection until finish work is completed.
- Do not over-tighten the sprinklers into fittings during installation.
- Do not use the sprinkler deflector to start or thread the sprinklers into fittings during installation.
- Do not attempt to remove drywall, paint, etc., from the sprinklers.
- Remove the plastic protective cap from the sprinkler before attaching the cover plate assembly. **PROTECTIVE CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!**

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.



BULLETIN

CARE AND HANDLING
OF SPRINKLERS

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USE THE FOLLOWING PRECAUTIONS WHEN HANDLING WAX-COATED SPRINKLERS

Many of Viking's sprinklers are available with factory-applied wax coating for corrosion resistance. These sprinklers **MUST** receive appropriate care and handling to avoid damaging the wax coating and to assure satisfactory performance of the product.

General Handling and Storage of Wax-Coated Sprinklers:

- Store the sprinklers in a cool, dry place (in temperatures below the maximum ambient temperature allowed for the sprinkler temperature rating. Refer to Table 1 below.)
- Store containers of wax-coated sprinklers separate from other sprinklers.
- Protect the sprinklers during storage, transport, handling, and after installation.
- Use original shipping containers.
- Do not place sprinklers in loose boxes, bins, or buckets.

Installation of Wax-Coated Sprinklers:

Use only the special sprinkler head wrench designed for installing wax-coated Viking sprinklers (any other wrench may damage the unit).

- Take care not to crack the wax coating on the units.
- For touching up the wax coating after installation, wax is available from Viking in bar form. Refer to Table 1 below. The coating **MUST** be repaired after sprinkler installation to protect the corrosion-resistant properties of the sprinkler.
- Use care when locating sprinklers near fixtures that can generate heat. Do not install sprinklers where they would be exposed to temperatures exceeding the maximum recommended ambient temperature for the temperature rating used.
- Inspect the coated sprinklers frequently soon after installation to verify the integrity of the corrosion resistant coating. Thereafter, inspect representative samples of the coated sprinklers in accordance with NFPA 25. Close up visual inspections are necessary to determine whether the sprinklers are being affected by corrosive conditions.

TABLE 1

Sprinkler Temperature Rating (Fusing Point)	Wax Part Number	Wax Melting Point	Maximum Ambient Ceiling Temperature ¹	Wax Color
155 °F (68 °C) / 165 °F (74 °C)	02568A	148 °F (64 °C)	100 °F (38 °C)	Light Brown
175 °F (79 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
200 °F (93 °C)	04146A	161 °F (71 °C)	150 °F (65 °C)	Brown
220 °F (104 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown
286 °F (141 °C)	02569A	170 °F (76 °C)	150 °F (65 °C)	Dark Brown

¹ Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.



WARNING Never install sprinklers that have been dropped, damaged, or exposed to temperatures in excess of the maximum ambient temperature allowed.

Refer to the appropriate current technical data pages for complete care, handling, and installation instructions. Data pages are included with each shipment from Viking or Viking distributors. They can also be found on the Web site at www.vikinggroupinc.com.

**BULLETIN****REGULATORY AND HEALTH
WARNINGS**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

1. DESCRIPTION

Regulatory and Health Warnings applying to materials used in the manufacture and construction of fire protection products are provided herein as they relate to legally mandated jurisdictional regions.

⚠ WARNING**STATE OF CALIFORNIA, USA**

Installing or servicing fire protection products such as sprinklers, valves, piping etc. can expose you to chemicals including, but not limited to, lead, nickel, butadiene, titanium dioxide, chromium, carbon black, and acrylonitrile which are known to the State of California to cause cancer or birth defects or other reproductive harm.

For more information, go to www.P65Warnings.ca.gov

2. WARRANTY TERMS AND CONDITIONS

For details of warranty, refer to Viking's current list price schedule at www.vikinggroupinc.com or contact Viking directly.



TECHNICAL DATA

SPRINKLER WATER SHIELDS AND GUARDS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

1. DESCRIPTION

Viking Model A-1, B-1, and C-1 Sprinkler Water Shields and Guards are used in conjunction with Viking frame style upright or pendent sprinklers where allowed by the approvals. (Refer to the Approval Chart) The guards are hard-wire cages designed to encase the sprinklers and protect them from mechanical damage. They are recommended for areas where sprinklers are installed at a low elevation and/or near a high degree of human or mechanical activity.

Water shields protect the sprinklers' heat-sensing operating element from water spray discharge from sprinklers located at a higher elevation. Viking frame style sprinklers with Model B-1 or C-1 Water Shields are converted to intermediate level/rack storage sprinklers. They may be used in any application where water shielding is required, such as in-rack sprinkler systems, under grating, on pilot sprinklers for deluge systems, and outdoors as a weather shield.

NOTE: Sprinkler water shields and guards are not designed to be used on sprinklers installed in recessed escutcheons.

2. LISTINGS AND APPROVALS

FM Approved: Class 2091

VdS Approved: Certificate G4920022

Refer to the Approval Chart for more information.



WARNING: Cancer and Reproductive Harm-
www.P65Warnings.ca.gov

3. TECHNICAL DATA

Specifications:

Model A-1, B-1, and C-1 Sprinkler Guards (Available since 1982)

Diameter: 2-5/16" (59 mm), Height: 2-1/4" (57 mm)

Model B-1 Sprinkler Water Shield (Available since 1984)

Diameter: 4-3/8" (111 mm), Thickness: 0.0359" (1 mm)

Model C-1 Sprinkler Water Shield (Available since 1986)

Diameter: 3-1/2" (89 mm), Thickness: 0.0359" (1 mm)

Material Standards:

Sprinkler Guards: UNS-G10100 Bright Basic Steel Wire

Water Shields: UNS-G10080 Cold Rolled Steel

TABLE 1: ORDERING INFORMATION

Sprinklers must be ordered separately. Refer to the appropriate sprinkler Technical Data Page

Part Number	Description	Size	
		NPT	BSP
05446A	Model A-1 Guard	1/2"	15 mm
21934	Model A-1 Guard	3/4"	20 mm
05866A	Model B-1 Guard with shield	1/2"	15 mm
06509A	Model C-1 Guard with shield	1/2"	15 mm
06682A	Model C-1 Guard with shield	3/4"	20 mm
06467B	Model C-1 Water Shield	1/2"	15 mm
06656B	Model C-1 Water Shield	3/4"	20 mm
06471A*	Model C-1 Guard	1/2"	15 mm
06471A*	Model C-1 Guard	3/4"	20 mm

* Must be installed in conjunction with the Model C-1 Water Shield.



Model A-1 Sprinkler Guard



Model B-1 Upright Water Shield and Guard Assembly



Model C-1 Pendent Water Shield and Guard Assembly



Model C-1 Pendent Water Shield



Model C-1 Pendent Guard

Figure 1: Guards and Shields



TECHNICAL DATA

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4. INSTALLATION

NOTE: Viking Model A-1, B-1, and C-1 Sprinkler Water Shields and Guards are not available factory pre-assembled with the sprinklers. They must be ordered separately and then field installed onto the Viking frame style sprinklers.

Refer to the appropriate Viking sprinkler Technical Data Page for warnings and additional installation instructions. Then install units according to the following steps.

A. MODEL A-1 SPRINKLER GUARD

Viking frame style sprinklers must be installed on the system prior to adding the Model A-1 Sprinkler Guards onto the sprinklers. After the sprinklers are installed:

1. Remove the retaining ring from the Model A-1 Sprinkler Guard.
2. Spread and hold the two bracket halves at the base of the guard just enough to place the guard over the deflector and wrench boss of the sprinkler.

NOTICE

Excessive spreading of the guard may break the weld.

3. With the sprinkler inside the sprinkler guard, orient the guard with the heavy wire base parallel to the sprinkler wrench boss. The two halves of the bracket should grip the sprinkler in the slot between the wrench boss and the threads.
4. Press the retaining ring over the guard and toward the base of the sprinkler until the ring snaps firmly into the depressions provided on each of the six wire members of the guard.

Removal:

To remove, reverse the instructions. If the sprinkler must also be removed, follow the system instructions and notify appropriate personnel.

B. MODEL B-1 UPRIGHT SPRINKLER WATER SHIELD AND GUARD ASSEMBLY

The Model B-1 Upright Water Shield and Guard are available as a welded assembly only. Viking frame style upright sprinklers must be installed on the system prior to installing the Model B-1 Upright Water Shield and Guard Assembly onto the sprinklers. After the sprinklers are installed:

1. Position the retaining ring against the water shield.
2. Spread and hold the two bracket halves at the base of the guard just enough to place the guard over the deflector and wrench boss of the sprinkler.

NOTICE

Excessive spreading of the guard may break the weld.

3. With the sprinkler inside the sprinkler guard, orient the guard with the heavy wire base parallel to the sprinkler wrench boss. The two halves of the bracket should grip the sprinkler in the slot just below the wrench boss, and above the threads.
4. Press the retaining ring down until it slides into the notches in the six wire members of the guard.

Removal:

To remove, reverse the instructions. If the sprinkler must also be removed, follow the system instructions and notify appropriate personnel.

C. MODEL C-1 PENDENT SPRINKLER WATER SHIELDS AND GUARDS

The Model C-1 Pendent Water Shields can be installed with or without the Model C-1 Guard. However, the Model C-1 Guard cannot be installed without the Model C-1 Water Shield.

Water Shield:

1. Thread the Viking frame style pendent sprinkler into the shield. The concave surface of the shield should face the sprinkler deflector.
2. Apply a small amount of pipe-joint compound or tape to the external threads of the sprinkler only, taking care not to allow a build-up of compound in the sprinkler inlet.
3. Install the sprinkler unit on the piping using the standard sprinkler wrench. DO NOT use the shield to start or thread the sprinkler into the fitting.
4. Tighten the sprinkler until the water shield is snug against the face of the fitting.



TECHNICAL DATA

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C-1 Guard with Water Shield:

Viking frame style pendent sprinklers and Model C-1 Water Shields must be installed on the system prior to installing the Model C-1 Guard onto the sprinkler. If the Model C-1 Guard is used:

1. Remove the retaining ring from the guard.
2. Place the Model C-1 Guard over the sprinkler.
3. Spread each half of the cage slightly and gently push the cage onto the shield retainer until it snaps into place.

NOTICE

Excessive spreading of the guard may break the weld.

4. Slide the retaining ring onto the cage by pressing up until it locks into the notches on each of the six wire cage members.

Removal:

To remove, reverse the instructions. If the sprinkler must also be removed, follow the system instructions and notify appropriate personnel.

5. OPERATION

Refer to the sprinkler technical data page for the sprinkler model used. Water shields protect the sprinklers' heat-sensing operating element from water spray discharge from sprinklers located at a higher elevation. The Sprinkler Guard is a hard-wire cage designed to encase the sprinkler and protect it from mechanical damage.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

Viking sprinkler water shields and guards are available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

NOTICE

IMPORTANT

- Viking Model A-1, B-1, and C-1 Sprinkler Water Shields and Guards are used in conjunction with Viking frame style ½" or ¾" NPT (15 mm or 20 mm BSP) upright or pendent sprinklers where allowed by the approvals. (Refer to the Approval Chart.)
- Model A-1, B-1 and C-1 Sprinkler Water Shields and Guards are NOT designed to be used on sprinklers installed in recessed escutcheons.
- Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to the appropriate sprinkler data page. Viking sprinklers are designed to be installed in accordance with the latest edition of Viking technical data, the latest standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards whenever applicable. The use of certain types of sprinklers may be limited due to occupancy and hazard. Refer to the Authority Having Jurisdiction prior to installation.

⚠ WARNING

Viking products are manufactured and tested to meet the rigid requirements of the approving agency. The sprinklers are designed to be installed in accordance with recognized installation standards. Deviation from the standards or any alteration to the sprinkler after it leaves the factory including, but not limited to: painting, plating, coating, or modification, may render the sprinkler inoperative and will nullify the approval and any guarantee made by The Viking Corporation.



TECHNICAL DATA

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APPROVAL CHART			
Guard Model	Sprinkler SIN	FM	VdS
A-1	VK100	✓	
	VK102	✓	
	VK108	✓	
	VK110		✓ ¹
	VK130	✓	
	VK132	✓	
	VK200	✓	
	VK202	✓	✓ ¹
	VK206	✓	✓ ¹
	VK300	✓	
	VK302	✓	✓ ¹
	VK350	✓	
	VK352	✓	✓ ¹
B-1	VK100	✓	
	VK108	✓	
	VK200	✓	
	VK300	✓	
	VK350	✓	
C-1	VK102		✓ ¹
	VK110		✓ ¹
	VK202		✓ ¹
	VK206	✓	✓ ¹
	VK302	✓	✓ ¹
	VK352	✓	✓ ¹
¹ For VdS, only the 3/4" guard PN 06656B is approved. ² This table shows the listing and approvals available at the time of printing. Other approvals may be in process.			



Fig. 200 - "Trimline" Adjustable Band Hanger (B-Line Fig. B3170NF)

~~Fig. 200F "Trimline" Adjustable Band Hanger with Felt Lining (B-Line Fig. B3170NFF)~~

~~Fig. 200C "Trimline" Adjustable Band Hanger with Plastic Coated (B-Line Fig. B3170NFC)~~

~~Fig. 200S "Trimline" Adjustable Band Hanger with Non-Captured Nut~~

Size Range:

Fig. 200 - 1/2" (15mm) thru 8" (200mm) pipe

Material: Steel, Pre-Galvanized to G90 specifications

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)) Flared edges ease installation for all pipe types and protect CPVC plastic pipe from abrasion. Captured design keeps adjusting nut from separating with hanger. Hanger is easily installed around pipe.
- For hanger with non-captured nut order Fig. 200S.
- (2 1/2" (65mm) thru 8" (200mm)) Spring tension on nut holds it securely in hanger before installation. Adjusting nut is easily removed.

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: Figure number and pipe size

Designed to meet or exceed requirements of FM DS 2-0.

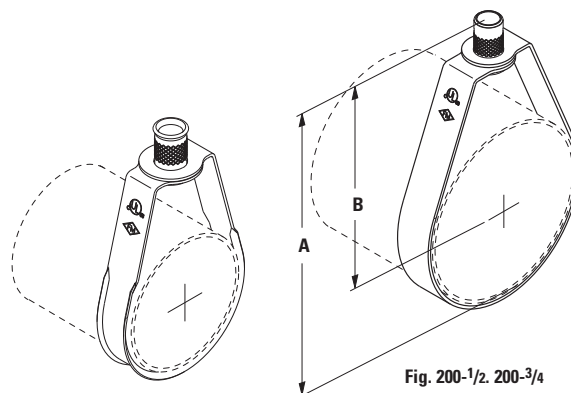


Fig. 200-1 to 200-2

Fig. 200-1/2, 200-3/4

Fig. 200-2 1/2 to 200-8



Fig. 200C



Fig. 200F



Fig. 200



Fig. 200S

Part No.	Pipe Size in. (mm)	Rod Size	A in. (mm)	B in. (mm)	Approx. Wt./100 lbs. (kg)
200-1/2	1/2" (15)	3/8"-16	3 1/8" (79.4)	2 5/8" (66.7)	11 (5.0)
200-3/4	3/4" (20)	3/8"-16	3 1/8" (79.4)	2 1/2" (63.5)	11 (5.0)
200-1	1" (25)	3/8"-16	3 3/8" (85.7)	2 5/8" (66.7)	12 (5.5)
200-1 1/4	1 1/4" (32)	3/8"-16	3 3/4" (94.0)	2 7/8" (73.0)	13 (5.9)
200-1 1/2	1 1/2" (40)	3/8"-16	3 7/8" (98.4)	2 7/8" (73.0)	14 (6.4)
200-2	2" (50)	3/8"-16	4 1/2" (114.3)	3" (76.3)	15 (6.9)
200-2 1/2	2 1/2" (65)	3/8"-16	5 5/8" (142.9)	4 1/8" (104.7)	27 (12.3)
200-3	3" (75)	3/8"-16	5 7/8" (149.1)	4" (101.6)	29 (13.3)
200-3 1/2	3 1/2" (90)	3/8"-16	7 3/8" (187.3)	5 1/4" (133.3)	34 (15.6)
200-4	4" (100)	3/8"-16	7 3/8" (187.3)	5" (127.0)	35 (16.0)
200-5	5" (125)	1/2"-13	9 1/8" (231.8)	6 1/4" (158.7)	66 (30.2)
200-6	6" (150)	1/2"-13	10 1/8" (257.2)	6 3/4" (171.4)	73 (33.4)
200-8	8" (200)	1/2"-13	13 1/8" (333.4)	8 3/4" (222.2)	136 (62.3)

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

Fig. 98 - Rod Stiffener

Fig. 98B - Rod Stiffener w/Break-off Bolt Head

Size Range — Secures 3/8" thru 7/8" hanger rod

Material — Carbon Steel

Function — Secures channel to hanger rod for vertical seismic bracing.

Approvals — Included in our Seismic Restraints Catalog 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 the TOLCO Seismic Restraint Systems Guidelines

Finish — Electro Galvanized

Note — Available in HDG finish or Stainless Steel materials.

Order By — Figure number

Component of State of
California OSHPD Approved
Seismic Restraints System

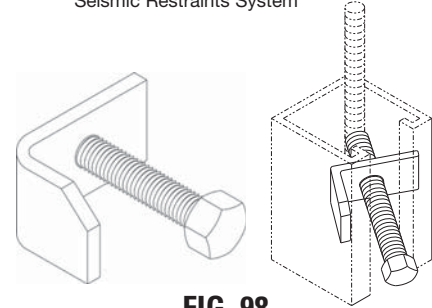


FIG. 98

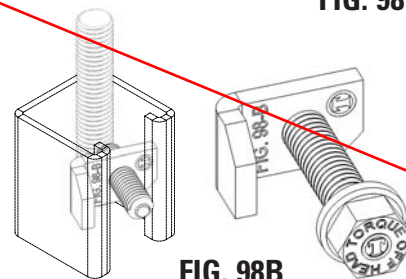


FIG. 98B

Fig. 99 - All Thread Rod Cut to Length

Size Range — Secures 3/8" thru 7/8" rod in 1" increments

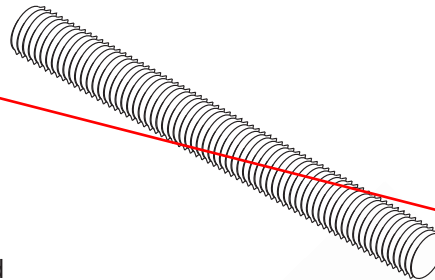
Material — Carbon Steel

Maximum Temperature — 750°F

Finish — Plain

Note — Available in Electro-Galvanized and HDG finish or Stainless Steel materials.

Order By — Figure number, rod diameter, rod length and finish



Dimensions

Rod Size	Max. Rec. Load Lbs. For Service Temp 650°F
3/8	730
1/2	1350
5/8	2160
3/4	3230
7/8	4480

Fig. 100 - All Thread Rod Full Length

Size Range — Secures 3/8" thru 1½" rod in 10' lengths

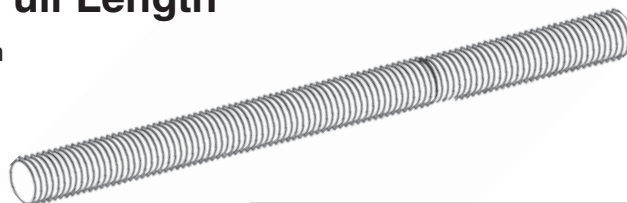
Material — Carbon Steel

Maximum Temperature — 750°F

Finish — Plain

Note — Available in Electro-Galvanized and HDG finish or Stainless Steel materials.

Order By — Figure number, rod diameter and finish



Dimensions • Weights

Rod Size	Max Rec. Load Lbs. For Service Temps 650°F	Approx. Wt./100
1/4	240	12
3/8	730	29
1/2	1350	53
5/8	2160	84
3/4	3230	123
7/8	4480	169
1	5900	222
1¼	9500	360
1½	13800	510

Seismic Structural Attachments

TOLCO Fig. 75 - swivel attachment

Size Range: 3/8"-16 Rod Attachment

Material: Steel

Function: Three recommended applications for this product:

- May be used as a Branch Line Restraint for structural attachment to anchor bolt, beam clamp, etc.
- May be used as an upper attachment with short hanger rod to omit seismic bracing.
- May be used in a pitched or sloped roof application, to meet requirements of NFPA 13 - 9.1.2.6.

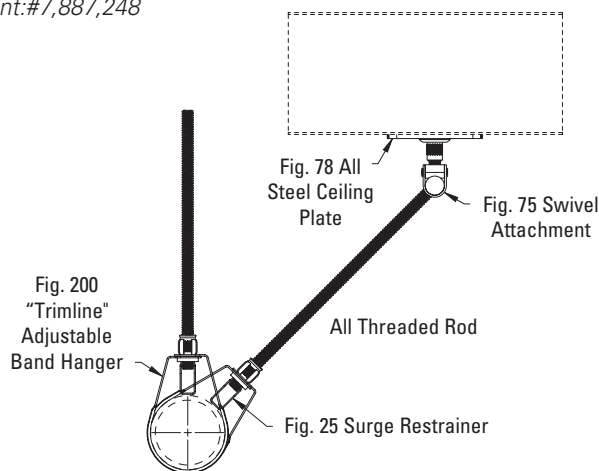
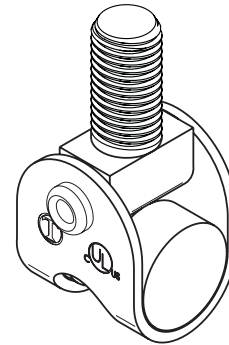
Approvals: Underwriters Laboratories Listed in the USA and Canada (cULus) to support up to 4" (100mm) pipe.

Finish: Electro-Galvanized

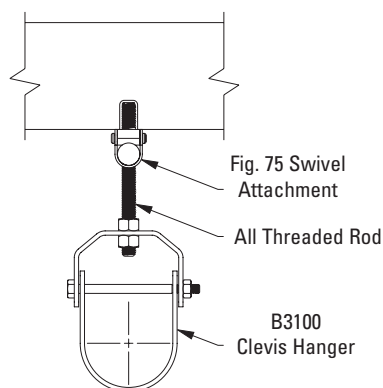
Weight: Approx. Wt./100 - 13.3 lbs. (6.0kg)

Order By: Figure number and finish

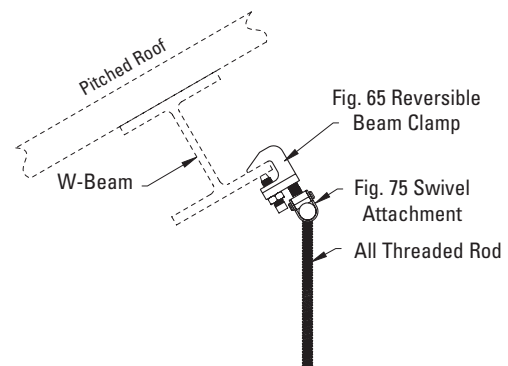
US Patent:#7,887,248



May be used as a structural attachment component of a branch line restraint



May be used as an upper attachment with short hanger rod to omit seismic bracing



May be used with a pitched roof application, to meet requirements of NFPA 13 (2016) Sec. 9.1.2.6.

Universal Swivel Attachment Fig. AF700

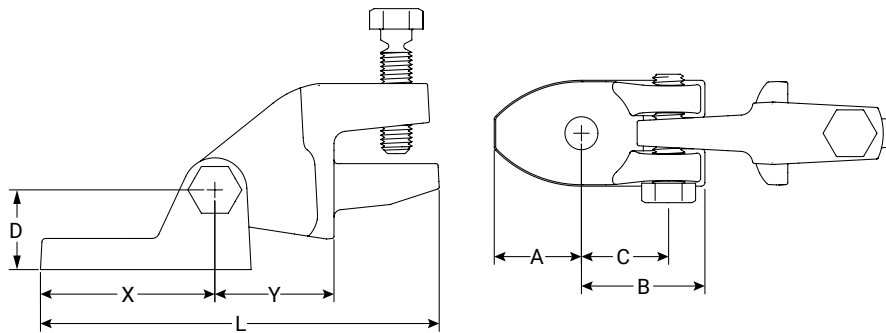
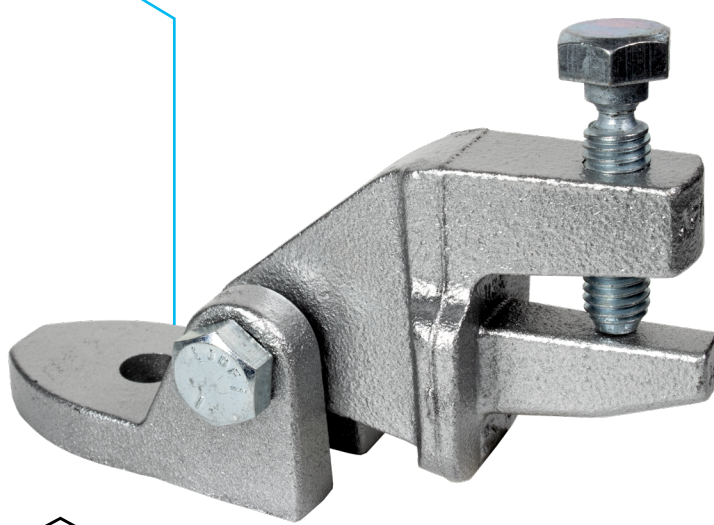


FIG. AF700 Dimensions and Weight

A	B	C	D	L	X	Y	Weight
in./mm	in./mm	in./mm	in./mm	in./mm	in./mm	in./mm	lbs/kgs
1.40	1.983	1.400	1.280	6.40	2.80	1.91	2.25
35.56	50.37	35.56	32.51	162.6	71.1	48.5	1.02

Notes:

ASC Engineered Solutions™ brand bracing components are designed to be compatible ONLY with other ASC Engineered Solutions brand bracing components, resulting in a Listed seismic bracing assembly. Updated UL listing information may be viewed at www.ul.com and updated FM approval information may be viewed at www.approvalguide.com.

Material Specifications

Size Range

Brace Member: See Table

Anchors: ½" – ¾" (M12–M18)

Material

Ductile Iron with Carbon Steel Hardware

Finish

☐ Plain

☐ Electro-Galvanized per ASTM B633

Service

A seismic swivel attachment designed to connect a brace member to the building structure or to a seismic structural attachment. The AF700 rigidly braces piping systems subjected to horizontal and vertical seismic loads.

Approvals

cULus Listed (ANSI/UL 203a), FM Approved (FM 1950-13), & FM Tested (FM 1950-16). FM Tested (ANSI/FM 1950-16). Complies with NFPA 13, ASCE 7, IBC, & MSS SP-127 bracing requirements.

Features

- The set screw provides a visual indication that proper installation has been achieved
- Eliminates brace member eccentricity by concentrically loading 1" and 1 ¼" brace pipes

Ordering

Specify figure number, fastener size, finish and description.

Disclaimer:

ASC Engineered Solutions does not provide any warranties and specifically disclaims any liability whatsoever with respect to ASC bracing products and components that are used in combination with products, parts or systems not manufactured or sold by ASC. In no event shall ASC be liable for any incidental, direct, consequential, special or indirect damages or lost profits where non-ASC bracing components have been, or are used.

Seis Brace® Seismic Fire Protection Design Tool may be accessed at www.seisbrace.com



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

Universal Swivel Attachment Fig. AF700

FIG. AF700 cULus Listing per ANSI/UL 203a (ASD)

Brace Member	Fastener Size	Horizontal Load Rating at Brace Angle			
		30°- 44°	45°- 59°	60°- 90°	Listed
1" - 2" Sch 40 Pipe (DN25 - DN50)	½" - ¾" (M12-M18)	942 lbf (4.19 kN)	1333 lbf (5.93 kN)	1632 lbf (7.26 kN)	1885 lbf (8.38 kN)

- 1) Load ratings may apply to NPFA 13 fastener orientations A, B, C, D, E, F, G, H, or I.
- 2) Brace Angles are determined from Vertical.
- 3) Listed load ratings reduced for angle ranges in accordance with NFPA 13-2019 Table 18.5.2.3.
- 4) See table below for listed brace members.
- 5) Minimum safety factor of 2.2 in accordance with NFPA 13-2019 Section A.18.5.2.3.

FIG. AF700 FM Approved (Listing) per FM 1950-13 (ASD)

Brace Member	Fastener Size	Horizontal Load Rating at Brace Angle			
		30°-44°	45°-59°	60°-74°	74°-90°
1" - 2" Sch 40 Pipe (DN25 - DN50)	½" - ¾" (M12-M18)	1780 lbf (7.92 kN)	2510 lbf (11.17 kN)	3080 lbf (13.70 kN)	3440 lbf (15.30 kN)

- 1) Load ratings may apply to NPFA 13 fastener orientations A, B, C, D, E, F, G, H, or I.
- 2) Brace Angles are determined from Vertical.
- 3) Listed load ratings reduced for angle ranges in accordance with NFPA 13-2019 Table 18.5.2.3.
- 4) See table below for listed brace members.
- 5) Minimum safety factor of 1.5 in accordance with NFPA 13-2016 Section A.9.3.5.2.3. To convert the load ratings above to a safety factor of 2.2 per NFPA 13-2019 Section A.18.5.2.3, multiply load ratings by a factor of 0.68.
- 6) To convert to LRFD Load Ratings, ASD Load Ratings may be multiplied by a factor of 1.5.

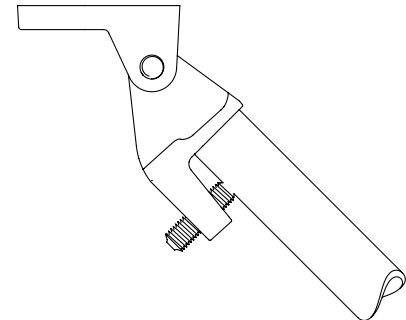
FIG. AF700 FM Listed, Approved & Tested Brace Members

Brace Member	Brace Size	Standard (or Equivalent)	UL	FM
Sch. 40 NPS Pipe	1", 1¼", 1½", 2"	ASTM A53, A106, A135, or A795	✓	✓
Sch. 40 Metric Pipe	DN25	KS S 3562	✓	✓
	DN32	EN10255H		✓
	DN40	GB/T 3091		✓
Metric Pipe	DN50	JIS G3454		✓

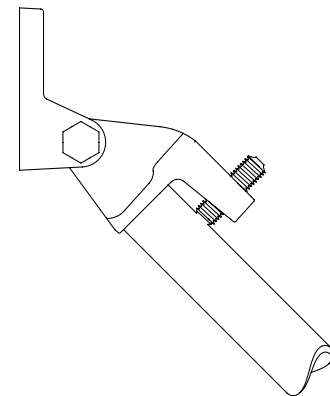
FIG AF700 Horizontal Prying Factors (Pr) Per NFPA 13: Angles (Deg)

Fastener Orientation	A	B	C	D	E	F	G	H	I
Brace Angle	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
AF700	2.55	1.09	0.91	1.41	1.45	2.00	1.83	1.29	1.06
AF700 w/ Metal Deck ¹	2.55	1.09	1.14	-	-	-	-	-	-
AF700 w/ Metal Deck ²	2.75	1.11	1.14	-	-	-	-	-	-

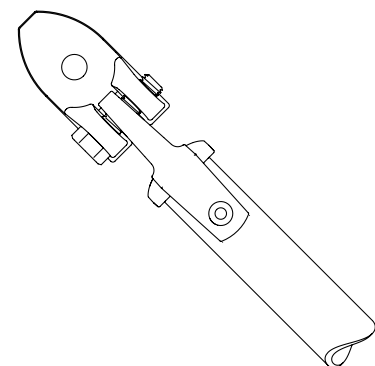
- 1) Prying factors reflect the baseplate "B" dimension overhanging the edge of the metal deck. Used for DeWalt anchor loads.
- 2) Prying factors reflect the baseplate "A" or "B" dimension overhanging the edge of the metal deck. Used for NFPA & Hilti anchor loads.
- 3) Prying Factors calculated in accordance with NFPA 13-2019 Section A.18.5.12.2.



NFPA 13 Orientations A, B, or C



NFPA 13 Orientations D, E, or F



NFPA 13 Orientations G, H, or I



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Universal Swivel Attachment Fig. AF700

Method 1 – Connection to Brace Member First

- 1 Slide the brace member over the lower jaw until it contacts the back wall.
- 2 Hand tighten the set screw until it contacts the brace member. Continue to torque the set screw until the head breaks off.
- 3 Rotate the brace assembly up to the fastener or the related seismic structural attachment and connect through the mounting hole.
- 4 Tighten per the fastener or structural attachment specifications.
- 5 Ensure the brace angle is within the range specified.

Notes: The cross bolt should be hand tight. For visual inspection, at least one thread should be exposed.

Method 2 – Connection to Structure First

- 1 Connect the AF700 to the fastener or the related seismic structural attachment.
- 2 Tighten per the fastener or structural attachment specifications.
- 3 Slide the brace member over the lower jaw until it contacts the back wall.
- 4 Hand tighten the set screw until it contacts the brace member. Continue to torque the set screw until the head breaks off.
- 5 Rotate the brace member until the brace angle is within the specified range.

Notes: The cross bolt should be hand tight. For visual inspection, at least one thread should be exposed..

Structural Attachments, Anchors, & Fasteners Listed, Approved, & Tested with the AF700

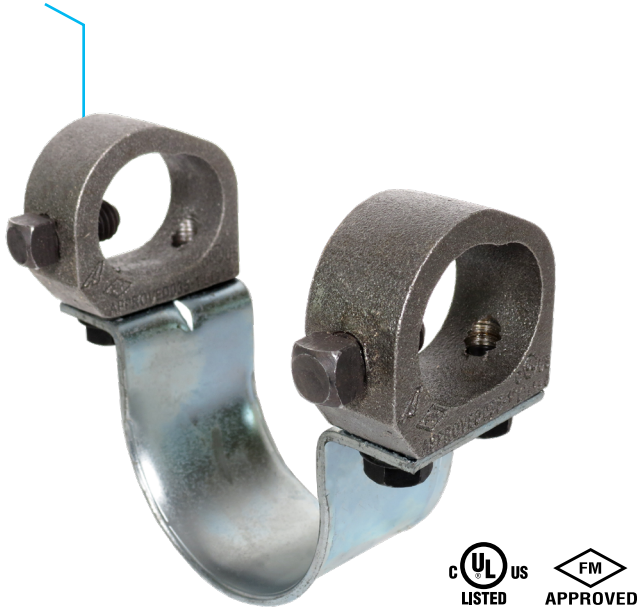
Structural Attachment	Structure
AF085	Steel Joist (Top Chord)
AF086	Horizontal Steel Flange (I-Beam Bottom Flange)
AF772	Horizontal Steel Flange (I-Beam Bottom Flange)
AF778	Horizontal Steel Flange (I-Beam Top or Bottom Flange) C-Channel (Top or Bottom Flange) Vertical Flange of a Joist (Top Chord)
AF779	All Structures with the Applicable Approved Anchor or Fastener
DeWalt Power-Stud®+ SD1	Cracked Concrete Cracked Concrete Filled Metal Deck
DeWalt Power-Stud®+ SD2	Cracked Concrete Cracked Concrete Filled Metal Deck
DeWalt Wood-Knocker®II+	Cracked Concrete
DeWalt Bang-It®+	Cracked Concrete Filled Metal Deck
DeWalt DDI+™	Cracked Concrete Filled Metal Deck
Anchors & Fasteners Per NFPA 13	Cracked Concrete Cracked Concrete Filled Metal Deck Steel Wood Saw Lumber or Glue-Laminated Timbers



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Building connections that last™

Model K Lateral Sway Brace Fig. AF035



Material Specifications

Size Range:

Service Pipe Size: 1" – 12"

Brace Member: 1" – 2"

Material

Ductile Iron Casting with Carbon Steel Strap and Hardware

Finish

- ☐ Plain
- ☐ Electro-Galvanized

Service

A seismic lateral brace designed to connect a brace member to the service pipe. The AF035 rigidly braces steel and CPVC piping systems subjected to horizontal and vertical seismic loads.

Approvals

cULus Listed (ANSI/UL 203a) and FM Approved (FM 1950-13). Complies with NFPA 13, ASCE 7, IBC, & MSS SP-127 bracing requirements.

Features

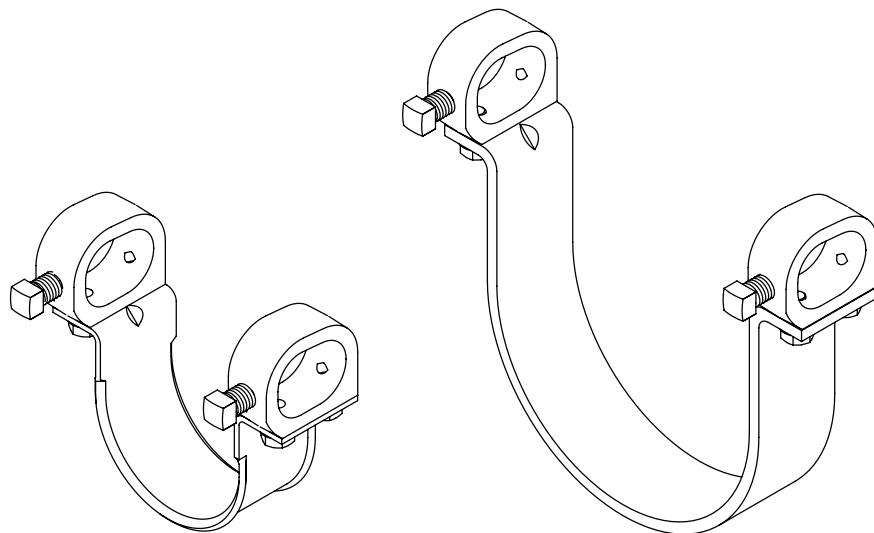
- The set screw provides a visual indication that proper installation has been achieved
- Rounded edge design eliminates potential for abrasion of CPVC pipe

Patents

No. 7,516,922, No. 7,523,895

Ordering

Specify figure number, service pipe size, brace size, finish, and description.



1" (DN25) to 3" (DN80) Service Pipe

4" (DN100) to 12" Service Pipe



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

Model K Lateral Sway Brace Fig. AF035

FIG. AF035: Weight Per Size

Service Pipe Size	Brace Member Size			
	1" (DN25)	1¼" (DN32)	1½" (DN40)	2" (DN50)
1 (DN25)	1.60 lbs	1.80 lbs	2.00 lbs	2.28 lbs
1¼" (DN32)	1.68 lbs	1.88 lbs	2.08 lbs	2.36 lbs
1½" (DN40)	1.64 lbs	1.84 lbs	2.04 lbs	2.32 lbs
2" (DN50)	1.88 lbs	2.08 lbs	2.28 lbs	2.56 lbs
2½"	1.90 lbs	2.10 lbs	2.30 lbs	2.58 lbs
DN65	2.00 lbs	2.20 lbs	2.40 lbs	2.68 lbs
3" (DN80)	2.10 lbs	2.30 lbs	2.50 lbs	2.78 lbs
4" (DN100)	2.18 lbs	3.38 lbs	3.58 lbs	3.76 lbs
5" (DN125)	3.40 lbs	3.60 lbs	3.80 lbs	4.08 lbs
DN150	3.80 lbs	4.00 lbs	4.20 lbs	4.48 lbs
6"	3.90 lbs	4.10 lbs	4.30 lbs	4.58 lbs
DN200	4.70 lbs	4.90 lbs	5.10 lbs	5.38 lbs
8"	4.80 lbs	5.00 lbs	5.20 lbs	5.48 lbs
10"	5.60 lbs	5.80 lbs	6.00 lbs	6.28 lbs
12"	6.16 lbs	6.36 lbs	6.56 lbs	6.84 lbs



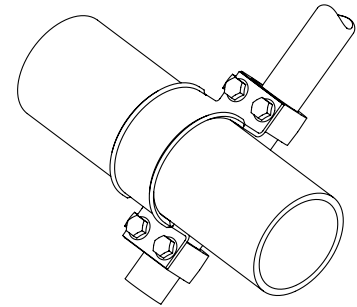
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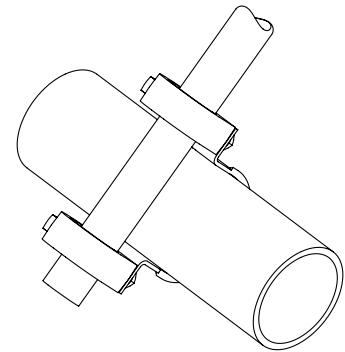
Model K Lateral Sway Brace Fig. AF035

FIG. AF035 cULus Listing per ANSI/UL 203a (ASD)

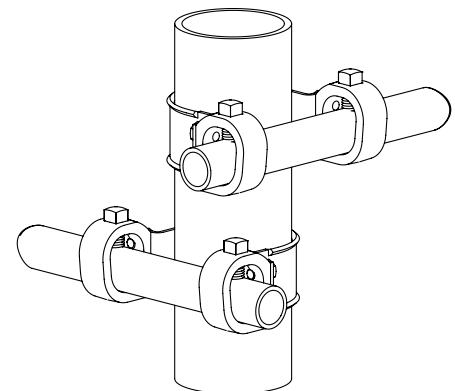
Service Pipe Size	Standard Service Pipe	Specialty Service Pipe	Horizontal Load Rating at Brace Angle			
			30°-44°	45°-59°	60°-90°	Listed
			lbf/kN	lbf/kN	lbf/kN	lbf/kN
1" (DN25)	Sch. 10 Sch. 40 CPVC Metric Pipe	Mega-Thread MLT / GL Eddy Thread EZ-Thread				
1¼" (DN32)	Sch. 10 Sch. 40 CPVC Metric Pipe	Mega-Flow MLT / GL Mega-Thread Eddy Flow Eddy Thread EZ-Thread				
1½" (DN40)	Sch. 10 Sch. 40 CPVC Metric Pipe	Mega-Flow MLT / GL Mega-Thread Eddy Flow Eddy Thread EZ-Thread Fire-Flo	625 2.78	884 3.93	1082 4.81	1250 5.56
2" (DN50)	Sch. 10 Sch. 40 CPVC Metric Pipe	Mega-Flow MLT / GL Mega-Thread Eddy Flow Eddy Thread EZ-Thread Fire-Flo				
2½"	Sch. 10 Sch. 40 CPVC	Mega-Flow Eddy Flow Fire-Flo				
DN65	Metric Pipe	–				
3" (DN80)	Sch. 10 Sch. 40 CPVC Metric Pipe	Mega-Flow Eddy Flow Fire-Flo				
4" (DN100)	Sch. 10 Sch. 40 Metric Pipe	Mega-Flow Eddy Flow Fire-Flo				
5" (DN125)	Sch. 10 Sch. 40 Metric Pipe	–				
DN150	Metric Pipe	–	942 4.19	1333 5.93	1632 7.26	1885 8.38
6"	Sch. 10 Sch. 40	Mega-Flow				
DN200	Metric Pipe	–				
8"	0.188" wall Sch. 40	–				
10"	0.188" wall Sch. 40	–				
12"	0.188" wall Sch. 40	–	1125 5.00	1591 7.08	1948 8.67	2250 10.01



Lateral Application



Lateral Application



Riser Application

- 1) Brace Angles are determined from Vertical.
- 2) Sch. 10 & 0.188" Wall Load Ratings may be used for any thicker wall pipe of the same diameter.
- 3) Listed load ratings reduced for angle ranges in accordance with NFPA 13-2019 Table 18.5.2.3.
- 4) See table below for UL listed specialty pipes & UL Listed metric service pipes.
- 5) Load Ratings reflect 1" (DN25) – 2" (DN50) brace members. See table below for listed brace members.
- 6) Minimum safety factor of 2.2 in accordance with NFPA 13-2019 Section A.18.5.2.3.



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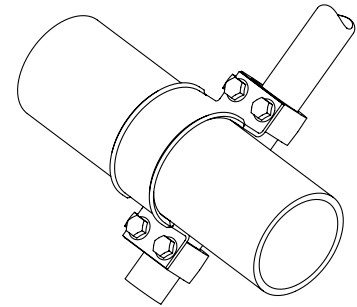
Model K Lateral Sway Brace Fig. AF035

FIG. AF035 cULus Listing Per UL 203a (ASD) For NFPA 13-2016 Editions Or Earlier

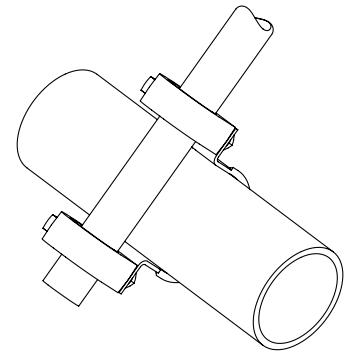
UL's current Listings are predicated on installation in accordance with the latest edition of NFPA 13. The 2016 and earlier editions of NFPA 13 referenced a minimum safety factor of 1.5 for the load rating as compared to 2.2 for the current edition. The load ratings noted in this table are consistent with the historical cULus Listings that were evaluated to the requirements of UL 203A, Outline of Investigation for Sway Brace Devices for Fire Sprinkler System Piping, based upon a minimum safety factor of 1.5 in accordance with the earlier editions of NFPA 13. The load ratings based upon the 2016 or earlier editions of NFPA 13 should only be used where approved by the Authority Having Jurisdiction (AHJ).

Service Pipe Size	Standard Service Pipe	Specialty Service Pipe	Horizontal Load Rating at Brace Angle			
			30°-44°	45°-59°	60°-74°	75°-90°
			lbf/kN	lbf/kN	lbf/kN	lbf/kN
1" (DN25)	Sch. 10 Sch. 40 Metric Pipe	Mega-Thread MLT / GL Eddy Thread EZ-Thread				
1¼" (DN32)	Sch. 10 Sch. 40 Metric Pipe	Mega-Flow MLT / GL Mega-Thread Eddy Flow Eddy Thread EZ-Thread				
1½" (DN40)	Sch. 10 Sch. 40 Metric Pipe	Mega-Flow MLT / GL Mega-Thread Eddy Flow Eddy Thread EZ-Thread Fire-Flo				
2" (DN50)	Sch. 10 Sch. 40 Metric Pipe	Mega-Flow MLT / GL Mega-Thread Eddy Flow Eddy Thread EZ-Thread Fire-Flo				
2½"	Sch. 10 Sch. 40 Metric Pipe	Mega-Flow Eddy Flow Fire-Flo	1382 6.15	1955 8.70	2393 10.65	2765 15.52
DN65	Metric Pipe	—				
3" (DN80)	Sch. 10 Sch. 40 Metric Pipe	Mega-Flow Eddy Flow Fire-Flo				
4" (DN100)	Sch. 10 Sch. 40 Metric Pipe	Mega-Flow Eddy Flow Fire-Flo				
5" (DN125)	Sch. 10 Sch. 40 Metric Pipe	—				
DN150	Metric Pipe	—				
6"	Sch. 10 Sch. 40	Mega-Flow				
DN200	Metric Pipe	—				
8"	0.188" Wall Sch. 40	—				
10"	0.188" Wall Sch. 40	—				
12"	0.188" Wall Sch. 40	—	1870 8.32	2644 11.77	3238 14.40	3740 16.64

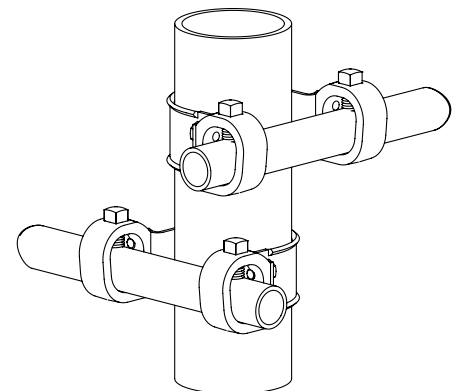
- 1) Brace Angles are determined from Vertical.
- 2) Sch. 10 & 0.188" Wall Load Ratings may be used for any thicker wall pipe of the same diameter.
- 3) Listed load ratings reduced for angle ranges in accordance with NFPA 13-2016 Section A.9.3.5.2.3.
- 4) See table below for UL listed specialty pipes & UL Listed metric service pipes.
- 5) Load Ratings reflect 1" (DN25) – 2" (DN50) brace members. See table below for listed brace members.
- 6) Minimum safety factor of 2.2 in accordance with NFPA 13-2016 Section A.9.3.5.2.3.



Lateral Application



Lateral Application



Riser Application



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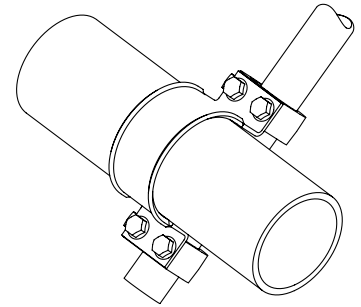
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Model K Lateral Sway Brace Fig. AF035

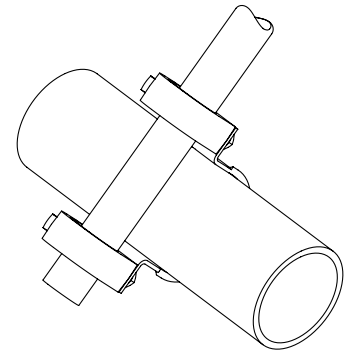
FIG. AF035 FM Approved (Listing) per FM 1950-13 (ASD)

Service Pipe Size	Standard Service Pipe	Specialty Service Pipe	Horizontal Load Rating at Brace Angle			
			30°-44°	45°-59°	60°-74°	75°-90°
			lbf/kN	lbf/kN	lbf/kN	lbf/kN
1" (DN25)	Sch. 10 Sch. 40 Metric Pipe	Mega-Thread MLT / GL Eddy Thread EZ-Thread				
1¼" (DN32)	Sch. 10 Sch. 40 Metric Pipe	Mega-Flow MLT / GL Mega-Thread Eddy Flow Eddy Thread EZ-Thread	1660 7.38	2350 10.45	2880 12.81	3210 14.28
1½" (DN40)	Sch. 10 Sch. 40 Metric Pipe	Mega-Flow MLT / GL Mega-Thread Eddy Flow Eddy Thread EZ-Thread Fire-Flo				
2" (DN50)	Sch. 10 Sch. 40 Metric Pipe	Mega-Flow MLT / GL Mega-Thread Eddy Flow Eddy Thread EZ-Thread Fire-Flo	1540 6.85	2170 9.65	2660 11.83	2970 13.21
2½"	Sch. 10 Sch. 40	Mega-Flow Eddy Flow Fire-Flo				
DN65	Metric Pipe	–	1270 5.65	1790 7.96	2200 9.79	2450 10.90
3" (DN80)	Sch. 10 Sch. 40 Metric Pipe	Mega-Flow Eddy Flow Fire-Flo				
4" (DN100)	Sch. 10 Sch. 40 Metric Pipe	Mega-Flow Eddy Flow Fire-Flo	1020 4.54	1450 6.45	1770 7.87	1980 8.81
5" (DN125)	Sch. 10 Sch. 40 Metric Pipe	–				
DN150	Metric Pipe	–	860 3.83	1220 5.43	1490 6.63	1660 7.38
6"	Sch. 10 Sch. 40	Mega-Flow				
DN200	Metric Pipe	–				
8"	0.188" Wall Sch. 40	–	540 2.40	770 3.43	950 4.23	1060 4.72

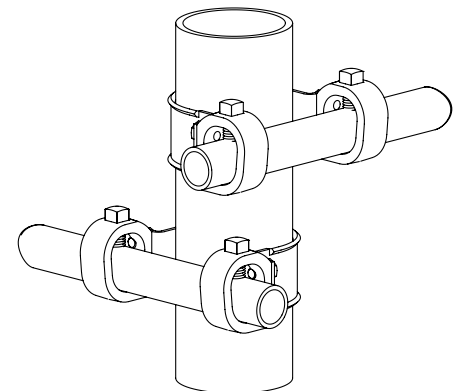
- 1) Brace Angles are determined from Vertical.
- 2) Sch. 10 & 0.188" Wall Load Ratings may be used for any thicker wall pipe of the same diameter.
- 3) See table below for FM listed specialty pipes & FM Listed metric service pipes.
- 4) Load Ratings reflect 1" (DN25) – 2" (DN50) brace members. See table below for listed brace members.
- 5) Minimum safety factor of 1.5 in accordance with NFPA 13-2016 Section A.9.3.5.2.3. To convert the load ratings above to a safety factor of 2.2 per NFPA 13-2019 Section A.18.5.2.3, multiply load ratings by a factor of 0.68.
- 5) To convert to LRFD Load Ratings, ASD Load Ratings may be multiplied by a factor of 1.5.



Lateral Application



Lateral Application



Riser Application



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Model K Lateral Sway Brace Fig. AF035

- 1 Place the AF035 over the service pipe to be braced.
- 2 Insert the brace member through the cast hoop ends.
The end of the brace pipe shall extend at least 1" (25.4 mm) past the cast hoop ends.
- 3 Hand tighten the set screws until they contact the brace member.
Continue to torque the set screws until the heads bottom out on the cast hoop ends.
- 4 Tighten per the fastener or structural attachment specifications.
- 5 Ensure the brace angle is within the specified range.

Notes: The brace member may be installed above or below the service pipe.

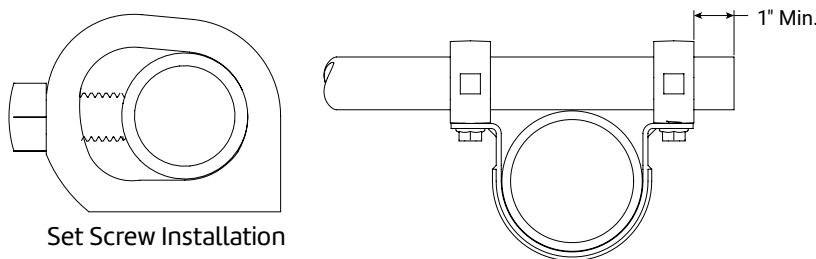


FIG. AF035 cULus Listed & FM Approved Brace Members

Brace Member	Brace Size	Standard (or Equivalent)	UL	FM
Sch. 40 NPS Pipe	1", 1¼", 1½", 2"	ASTM A53, A106, A135, or A795	✓	✓
Sch. 40 Metric Pipe	DN25 DN32 DN40	KS S 3562	✓	✓
		EN10255H		✓
		GB/T 3091		✓
Metric Pipe	DN50	JIS G3454		✓

FIG. AF035 cULus Listed & FM Approved Metric Service Pipes

Service Pipe Standard (or Equivalent)	Service Pipe Size	UL	FM
KS D 3507 KS D 3537	DN25	✓	✓
KS D 3562 Sch. 40	DN32	✓	✓
GB/T 3091 GB/T 3092	DN40		✓
	DN50		✓
JIS G3452	DN65		✓
	DN80		✓
EN 10255M	DN100		✓
	DN125		✓
EN 10255H	DN150		✓
	DN200		✓

Notes:

ASC Engineered Solutions™ brand bracing components are designed to be compatible ONLY with other ASC Engineered Solutions brand bracing components, resulting in a Listed seismic bracing assembly. Updated UL listing information may be viewed at www.ul.com and updated FM approval information may be viewed at www.approvalguide.com.

Disclaimer:

ASC Engineered Solutions does not provide any warranties and specifically disclaims any liability whatsoever with respect to ASC bracing products and components that are used in combination with products, parts or systems not manufactured or sold by ASC. In no event shall ASC be liable for any incidental, direct, consequential, special or indirect damages or lost profits where non-ASC bracing components have been, or are used.

Seis Brace® Seismic Fire Protection Design Tool may be accessed at www.seisbrace.com



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Longitudinal & Lateral Seismic Clamp Fig. AF730

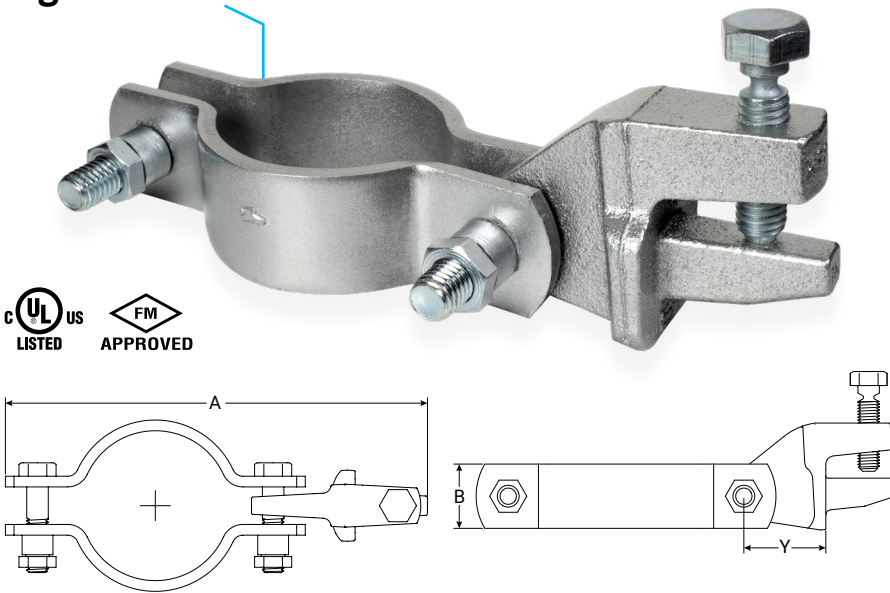


FIG. AF730 Dimensions and Weight

Size	A In./mm	B In./mm	Y In./mm	Weight lbs/kgs
1" (DN25)	7.6 193	1.50 38.1	1.91 48.5	2.49 1.13
1½" (DN32)	8.0 203			2.55 1.13
1½" (DN40)	8.2 208			2.64 1.20
2" (DN50)	8.7 221			2.78 1.26
2½"	9.2 234			2.92 1.32
3" (DN80)	9.8 249			3.13 1.42
4" (DN100)	10.8 274			3.38 1.53
5"	12.1 307			3.81 1.73
6"	13.2 335			4.12 1.87
8"	15.2 386			6.40 2.90
10"	18.1 460			7.60 3.45
12"	20.1 511			8.60 3.90

Notes:

ASC Engineered Solutions™ brand bracing components are designed to be compatible ONLY with other ASC Engineered Solutions brand bracing components, resulting in a Listed seismic bracing assembly. Updated UL listing information may be viewed at www.ul.com and updated FM approval information may be viewed at www.approvalguide.com.

Material Specifications

Size Range

Service Pipe Size: 1" – 12", DN25–DN100

Material

Carbon Steel Clamp and Hardware. Ductile Iron Brace Member Attachment Fitting.

Finish

- ☐ Plain
- ☐ Clamp: Hot Dipped Galvanized per ASTM A153
- ☐ Brace Member Attachment Fitting: Electro-Galvanized per ASTM B633

Service

A seismic longitudinal and lateral brace clamp designed to connect a piping system to a brace member. The AF730 rigidly braces piping systems subjected to horizontal and vertical seismic loads.

Approvals

cULus Listed (ANSI/UL 203a) and FM Approved (FM 1950–13). FM Tested (ANSI/FM 1950–16). Complies with NFPA 13, ASCE 7, IBC, & MSS SP-127 bracing requirements.

Features

- Torque off set screw and nuts provide a visual indication that the desired installation torque values have been achieved.

Ordering

Specify figure number, service pipe size, finish, and description.

Disclaimer:

ASC Engineered Solutions does not provide any warranties and specifically disclaims any liability whatsoever with respect to ASC bracing products and components that are used in combination with products, parts or systems not manufactured or sold by ASC. In no event shall ASC be liable for any incidental, direct, consequential, special or indirect damages or lost profits where non-ASC bracing components have been, or are used.

Seis Brace® Seismic Fire Protection Design Tool may be accessed at www.seisbrace.com

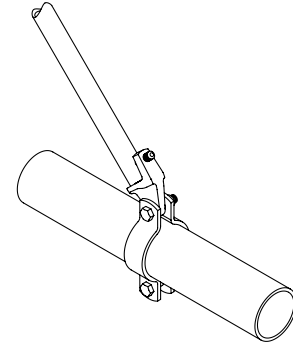


PROJECT INFORMATION	APPROVAL STAMP
Project:	☐ Approved
Address:	☐ Approved as noted
Contractor:	☐ Not approved
Engineer:	Remarks:
Submittal Date:	
Notes 1:	
Notes 2:	

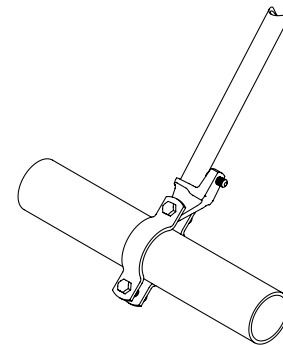
Longitudinal & Lateral Seismic Clamp Fig. AF730

FIG. AF730 cULus Listing per ANSI/UL 203a (ASD)

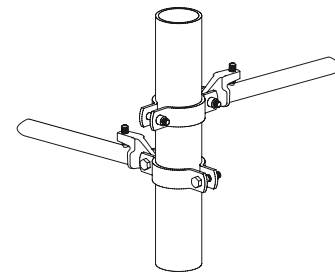
Service Pipe Size	Standard Service Pipe	Specialty Service Pipe	Horizontal Load Rating at Brace Angle							
			Longitudinal Load Rating				Lateral Load Rating			
			30°-44°	45°-59°	60°-90°	Listed	30°-44°	45°-59°	60°-90°	Listed
			lbf/kN	lbf/kN	lbf/kN	lbf/kN	lbf/kN	lbf/kN	lbf/kN	lbf/kN
1" (DN25)	Sch. 10 Sch. 40 Metric Pipe	Mega-Thread MLT / GL Eddy Thread EZ-Thread	340 1.51	480 2.14	588 2.62	680 3.02	340 1.51	480 2.14	588 2.62	680 3.02
1¼" (DN32)	Sch. 10 Sch. 40 Metric Pipe	Mega-Flow MLT / GL Mega-Thread Eddy Flow Eddy Thread EZ-Thread								
1½" (DN40)	Sch. 10 Sch. 40 Metric Pipe	Mega-Flow MLT / GL Mega-Thread Eddy Flow Eddy Thread Fire-Flo EZ-Thread	375 1.67	530 2.36	649 2.89	750 3.34	375 1.67	530 2.36	649 2.89	750 3.34
2" (DN50)	Sch. 10 Sch. 40 Metric Pipe	Mega-Flow MLT / GL Mega-Thread Eddy Flow Eddy Thread Fire-Flo EZ-Thread								
2½"	Sch. 10 Sch. 40	Mega-Flow Eddy Flow Fire-Flo	545 2.42	770 3.43	943 4.19	1090 4.85	545 2.42	770 3.43	943 4.19	1090 4.85
3" (DN80)	Sch. 10 Sch. 40 Metric Pipe	Mega-Flow Eddy Flow Fire-Flo								
4" (DN100)	Sch. 10 Sch. 40 Metric Pipe	Mega-Flow Eddy Flow Fire-Flo								
5"	Sch. 10 Sch. 40	—								
6"	Sch. 10 Sch. 40	Mega-Flow	942 4.19	1333 5.93	1632 7.26	1885 8.38	942 4.19	1333 5.93	1632 7.26	1885 8.38
8"	Sch. 10 0.188" Wall Sch. 40	—								
10"	0.188" Wall Sch. 40	—								



Longitudinal Application



Lateral Application



Riser Application

Brace Angles are determined from Vertical.

Sch. 10 & 0.188" Wall Load Ratings may be used for any thicker wall pipe of the same diameter.

Listed load ratings reduced for angle ranges in accordance with NFPA 13-2019 Table 18.5.2.3.

See table on page 4 for UL listed specialty pipes & UL Listed metric service pipes.

See table on page 4 for UL listed brace members.

Load ratings include a minimum safety factor of 2.2 in accordance with NFPA 13-2019 Section A.18.5.2.3.

All load ratings may be used for NFPA 13-2016 designs.



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Longitudinal & Lateral Seismic Clamp Fig. AF730

FIG. AF730 FM Approved (Listing) per FM 1950-13 (ASD)

Service Pipe Size	Standard Service Pipe	Specialty Service Pipe	Horizontal Load Rating at Brace Angle							
			Longitudinal Load Rating				Lateral Load Rating			
			30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°
			lbf/kN	lbf/kN	lbf/kN	lbf/kN	lbf/kN	lbf/kN	lbf/kN	lbf/kN
1" (DN25)	Sch. 10 Sch. 40 Metric Pipe	Mega-Thread MLT / GL Eddy Thread EZ-Thread	550 2.24	640 2.84	670 2.98	740 3.29	1740 7.74	2460 10.94	3010 13.39	3360 14.95
1¼" (DN32)	Sch. 10 Sch. 40 Metric Pipe	Mega-Flow MLT / GL Mega-Thread Eddy Flow Eddy Thread EZ-Thread	740 3.29	680 3.02	820 3.65	1620 7.21	1430 6.36	2020 8.99	2480 11.03	2770 12.32
1½" (DN40)	Sch. 10 Sch. 40 Metric Pipe	Mega-Flow MLT / GL Mega-Thread Eddy Flow Eddy Thread Fire-Flo EZ-Thread	800 3.56	650 2.89	790 3.51	1800 8.01	1790 7.96	2530 11.25	3100 13.79	3460 15.39
2" (DN50)	Sch. 10 Sch. 40 Metric Pipe	Mega-Flow MLT / GL Mega-Thread Eddy Flow Eddy Thread Fire-Flo EZ-Thread	830 3.69	990 4.4	1190 5.29	1620 7.21	1820 8.1	2580 11.48	3160 14.06	3530 15.7
2½"	Sch. 10 Sch. 40	Mega-Flow Eddy Flow Fire-Flo	800 3.65	700 3.11	850 3.78	1930 8.59	1610 7.16	2280 10.14	2790 12.41	3120 13.88
3" (DN80)	Sch. 10 Sch. 40 Metric Pipe	Mega-Flow Eddy Flow Fire-Flo	960 4.27	1330 5.92	1540 6.85	1700 7.56	1550 6.89	2200 9.79	2690 11.97	3010 13.39
4" (DN100)	Sch. 10 Sch. 40 Metric Pipe	Mega-Flow Eddy Flow Fire-Flo	760 3.38	1040 4.63	1270 5.65	1400 6.23	1260 5.6	1790 7.96	2190 9.74	2440 10.85
5"	Sch. 10 Sch. 40	—	890 3.96	1230 5.47	1410 6.27	1550 6.89	1260 5.6	1790 7.96	2190 9.74	2440 10.85
6"	Sch. 10 Sch. 40	Mega-Flow	700 3.11	940 4.18	1140 5.07	1310 5.83	950 4.23	1340 5.96	1640 7.3	1830 8.14
8"	0.188" Wall Sch. 40	—	990 4.4	1130 5.03	1360 6.05	1520 6.76	1540 6.85	2170 9.65	2660 11.82	2970 13.21
10"	0.188" Wall Sch. 40	—	1020 4.54	850 3.78	1000 4.45	1100 4.89	1700 7.56	2410 10.72	2950 13.12	3290 14.63
12"	0.188" Wall Sch. 40	—	970 4.31	1010 4.49	1220 5.43	1430 6.36	1690 7.52	2390 10.63	2930 13.03	3270 14.55

Brace Angles are determined from Vertical.

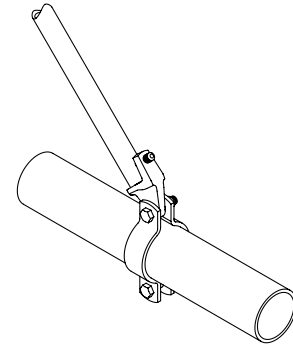
Sch. 10 & 0.188" Wall Load Ratings may be used for any thicker wall pipe of the same diameter.

Load ratings include a minimum safety factor of 1.5 in accordance with NFPA 13-2016 Section A.9.3.5.2.3. To convert the load ratings above to a safety factor of 2.2 per NFPA 13-2019 Section A.18.5.2.3, multiply load ratings by a factor of 0.68.

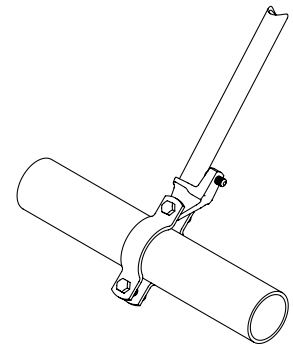
To convert to LRFD Load Ratings, ASD Load Ratings may be multiplied by a factor of 1.5.

See table on page 4 for FM approved metric service pipes.

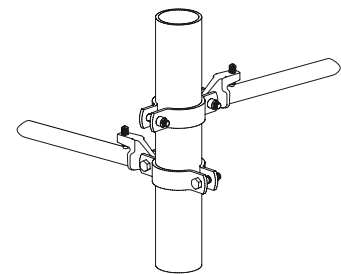
See table on page 4 for FM approved brace members.



Longitudinal Application



Lateral Application



Riser Application



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Longitudinal & Lateral Seismic Clamp Fig. AF730

Method 1 – Connection to Brace Member First

- 1 Slide the brace member over the lower jaw until it contacts the back wall of the brace member attachment fitting.
- 2 Hand tighten the set screw until it contacts the brace member. Continue to torque the set screw until the head breaks off.
- 3 Rotate the brace assembly to the service pipe. Unbolt the back nut & bolt and rotate the clamp halves over the service pipe. Re-assemble the nut and bolt.
- 4 Hand tighten the nuts on both sides of the clamp. Evenly and alternately torque the nut until the head breaks off. It is best practice to tighten the nut at the jaw side first.
- 5 Ensure the brace angle is within the range specified.

Method 2 – Connection to Service Pipe First

- 1 Unbolt the back nut & bolt and rotate the clamp halves over the service pipe. Re-assemble the nut and bolt.
- 2 Hand tighten the nuts on both sides of the clamp. Evenly and alternately torque the nut until the head breaks off. It is best practice to tighten the nut at the jaw side first.
- 3 Slide the brace member over the lower jaw until it contacts the back wall of the brace member attachment fitting.
- 4 Hand tighten the set screw until it contacts the brace member. Continue to torque the set screw until the head breaks off.

FIG. AF730 cULus Listed & FM Approved Brace Members

Brace Member	Sizes	Standards (or Equivalent)	UL Listed	FM Approved
Sch. 40 NPS Pipe	1", 1¼", 1½", 2"	ASTM A53, A106, A135, or A795	✓	✓
Sch. 40 Metric Pipe		KS D 3562	✓	✓
Metric Pipe	DN25, DN32, DN40, DN50	EN10255H		✓
		GB/T 3091		✓
		JIS G3454		✓

FIG. AF730 cULus Listed & FM Approved Metric Service Pipes

Brace Member	Service Pipe Sizes	UL Listed	FM Approved
KS D 3507 KS D 3537		✓	✓
KS D 3562 Sch. 40		✓	✓
GB/T 3091 GB/T 3092	DN25, DN32, DN40, DN50, DN 80, DN100		✓
JIS G3452			✓
EN 10255M			
EN 10255H			



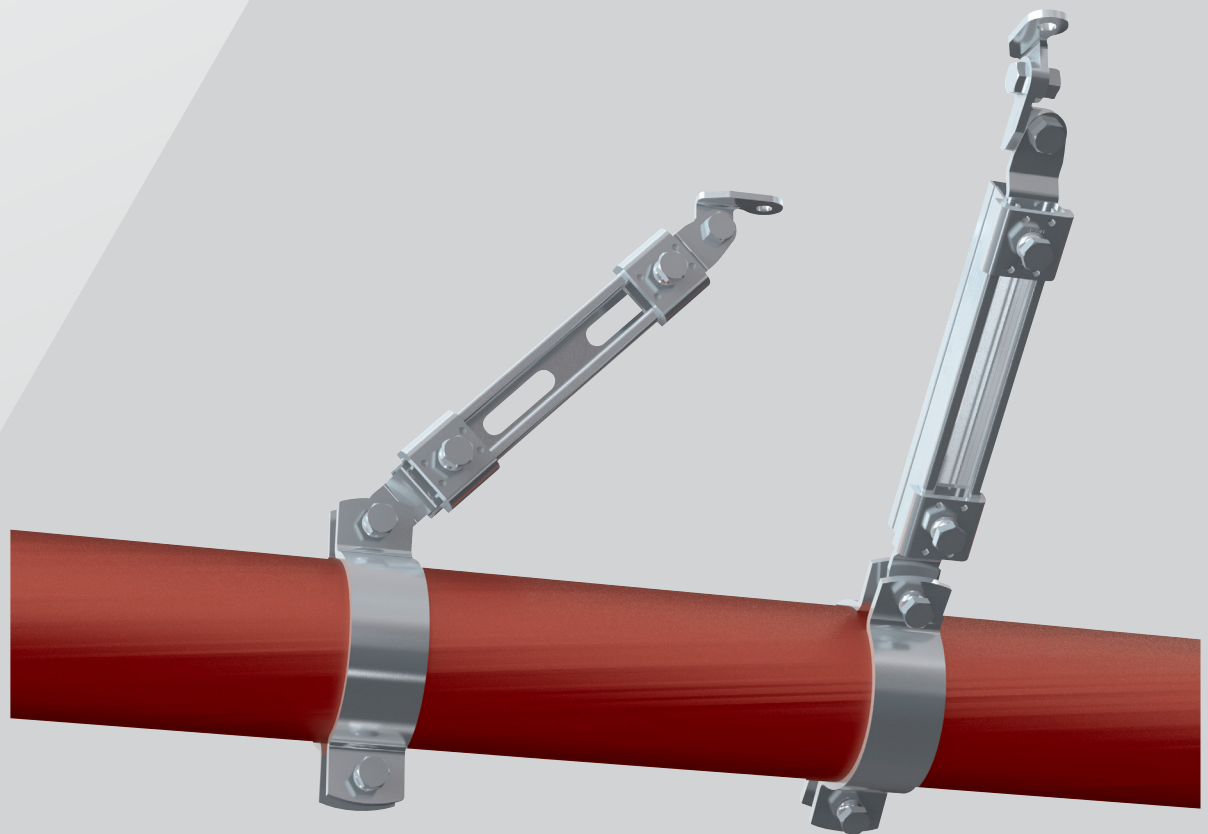
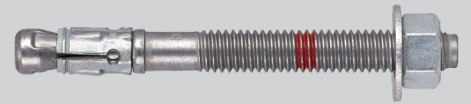
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MECHANICAL ANCHORS FOR SEISMIC BRACING

NFPA 13 seismic bracing
anchor load tables



HILTI MECHANICAL ANCHORS AND CAST-IN ANCHORS FOR SEISMIC BRACING IN ACCORDANCE WITH NFPA 13

Hilti post-installed mechanical anchors and single point cast-in-place anchors are common, cost effective methods for attaching both structural and non-structural elements to concrete base materials. Non-structural elements, such as fire sprinkler pipes; electrical conduit and cable trays; heating, ventilation and air conditioning (HVAC) equipment and ductwork are especially suited for Hilti anchoring systems.

For fire sprinkler pipe applications, Hilti anchors have been effectively used for many years to support the gravity loaded hangers as well as the sway bracing for resisting the lateral and vertical motion resulting from seismic loads.

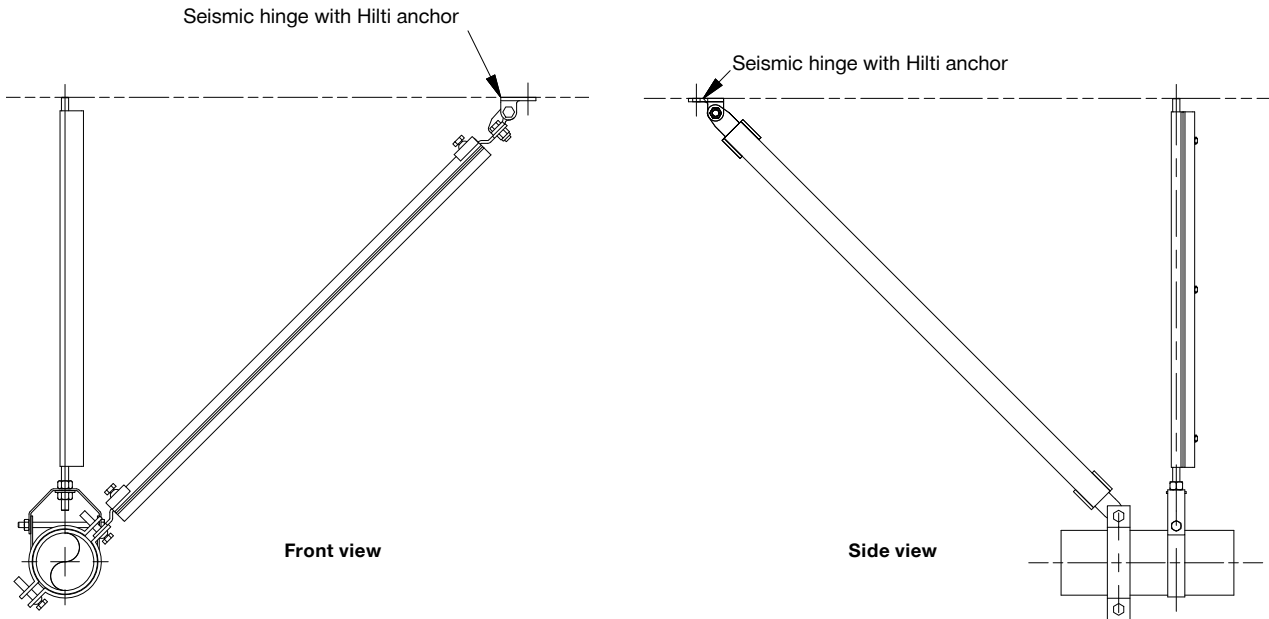


Figure 1 — Typical sprinkler pipe hanger with seismic sway brace

While Hilti anchors can be designed and installed to support gravity loads of the pipe through the attachment of the hanger to the concrete, this document will focus on the design of the anchorage to attach the sway brace assembly to the concrete structure. Contact Hilti for more information related to Hilti anchors to support the vertical pipe hanger.

In a seismic event the earthquake forces are resisted by the transverse and longitudinal sway bracing and the sway braces will transfer the loads through a fastener that is attached to the concrete. In general, the capacity of the fastener in concrete is dictated by a design per ACI 318-19 Chapter 17, and the design of the sway brace components is dictated by NFPA 13-16 Section 9.3.5 (which references ACI 318-11) and NFPA 13-19 Section 18.5 (which references ACI 318-14).

Note: For simplicity, this document will reference the 2016 NFPA-13 and 2019 NFPA-13 document sections.

This document will not cover the design of the components of the pipe support hangers or sway bracing. Rather, this document will provide the maximum horizontal load that can be applied to the sway brace, F_{pw} , based on the Hilti fastener type and embedment depth, fastener load capacity, the concrete strength and configuration, the sway brace to fastener connector (seismic hinge) geometry, and the brace angle. See Figure 2 on the following page. F_{pw} does not consider the adequacy of the seismic hinge or other components of the sway bracing or vertical hanger. The design engineer of record must ensure all of these components are suitable for the application and design loads.

This document is a supplement to the Hilti North American Product Technical Guide, Volume 2, Anchor Fastening Technical Guide, Edition 21 (PTG Ed. 21). Please refer to the publication in its entirety, which is available at www.hilti.com or www.hilti.ca, for complete details including data development, product specifications, general suitability, installation, corrosion and spacing and edge distance guidelines, for the Hilti anchoring systems noted within.

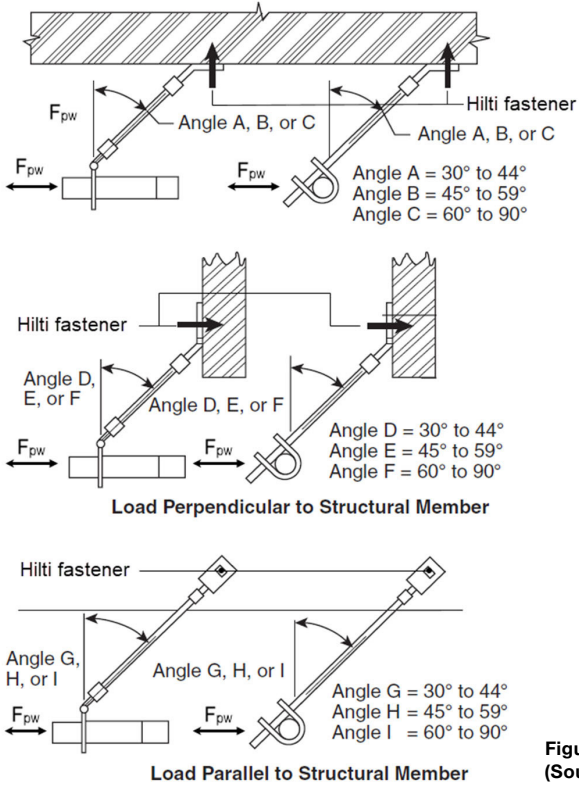


Figure 2 — Sway brace load, F_{pw} , from typical sway brace configuration
(Source: NFPA 13 2016 Edition Figure 9.3.5.12.1 and NFPA 13 2019 Edition Figure 18.5.12.1)

Horizontal earthquake load design per NFPA-13

The maximum horizontal earthquake load, F_{pw} , that will not exceed the allowable capacity of the anchor, can be derived from NFPA 13-16 Eq. A.9.3.5.12.2a and NFPA 13-19 Eq. A18.5.12.2a:

$$\left(\frac{T}{T_{allow}} \right) + \left(\frac{V}{V_{allow}} \right) \leq 1.2$$

where:

T = applied service tension load, including the effect of prying = $F_{pw} \times P_r$ for all Angle Categories

F_{pw} = horizontal earthquake load

P_r = prying factor based on fitting geometry and brace angle from vertical as determined from NFPA 13-16 A.9.3.5.12.2 and NFPA 13-19 A18.5.12.2

T_{allow} = allowable service tension load

V = applied service shear load =

Angle Category A, B, and C: $V = F_{pw}$

Angle Category D, E, and F: $V = \frac{F_{pw}}{\tan \theta}$

Angle Category G, H, and I: $V = \frac{F_{pw}}{\sin \theta}$

θ = brace angle (see Figure 2)

V_{allow} = allowable service shear load

T/T_{allow} shall not be greater than 1.0

V/V_{allow} shall not be greater than 1.0

Substituting for T and V for the various angle categories:

Angle Category A, B, and C:

$$\left(\frac{F_{pw} \cdot P_r}{T_{allow}} \right) + \left(\frac{F_{pw}}{V_{allow}} \right) \leq 1.2$$

where:

$$F_{pw} \cdot P_r / T_{allow} \leq 1.0$$

$$F_{pw} / V_{allow} \leq 1.0$$

Angle Category D, E, and F:

$$\left(\frac{F_{pw} \cdot P_r}{T_{allow}} \right) + \left(\frac{F_{pw} / \tan \theta}{V_{allow}} \right) \leq 1.2$$

where:

$$F_{pw} \cdot P_r / T_{allow} \leq 1.0$$

$$(F_{pw} / \tan \theta) / V_{allow} \leq 1.0$$

Angle Category G, H, and I:

$$\left(\frac{F_{pw} \cdot P_r}{T_{allow}} \right) + \left(\frac{F_{pw} / \sin \theta}{V_{allow}} \right) \leq 1.2$$

where:

$$F_{pw} \cdot P_r / T_{allow} \leq 1.0$$

$$(F_{pw} / \sin \theta) / V_{allow} \leq 1.0$$

Design Tables for Pre-calculated Horizontal Earthquake Load

The design tables starting on page 8 determine the maximum horizontal load, F_{pw} , that will satisfy NFPA 13-16 Eq. A.9.3.5.12.2a and NFPA 13-19 Eq. A18.5.12.2a, for various Hilti post-installed and cast-in anchors used in conjunction with various seismic brace swivel attachments to attach the sway brace to concrete.

Notes:

- T_{allow} and V_{allow} used as the calculation basis for F_{pw} in the tables are determined from a strength design calculation according to ACI 318-19 Ch. 17 and converted to allowable values per NFPA 13-16 A.9.3.5.12.8.3(D) and NFPA 13-19 A18.5.12.7.3(D).
- Anchor calculation assumes cracked concrete condition and seismic design category C through F.
- Minimum edge distance noted in tables assumes a single anchor with one nearby edge with the shear load perpendicular toward the edge. For an anchor in a corner, the distance to the edge parallel to the direction of the shear must be at least 1.5 times the minimum edge distance noted in the table.
- Minimum spacing distance noted in tables assumes two anchors in the middle of the concrete with no edge distance reductions.
- Seismic brace swivel attachment prying factors noted in the tables are from data published according to the following documents
 - Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2" seismic hinge prying factors taken from Hilti Statement on the Prying Factors in regard to Hilti Seismic hinge (all sizes) technical document, dated November 18, 2019.
 - Tolco™ Figure 909, 910, and 980 swivel brace attachment prying factors taken from Seismic Bracing Anchor Load Charts B-Line series technical publication, given by Tolco on March 1st, 2021.
 - Prying factors for the Afcon AF075, AF076, AF077, AF771 and AF700 were taken from ASC's Part Info Sheets for AF075, AF076, AF077, AF771 and AF700 downloaded May 7th, 2021.
 - The above noted documents are subject to change. Contact Hilti for copies of the reference documents noted above.
 - Contact Hilti for copies of the reference documents noted above.
 - TOLCO™ trademark is owned by Eaton Corporation plc.
 - AFCON™ trademark is owned by ASC Engineered Solutions.
- Prying factors are provided that give the highest value for the given angle category. The corresponding value of P_r and F_{pw} will be conservative for the other angles within the angle category.
- For angle categories D to I, the angle, θ , is selected that leads to the highest value for the applied shear load, V . The corresponding value of F_{pw} will be conservative for the other angles within the angle category. $\theta = 30^\circ$ for Angle D and G, $\theta = 45^\circ$ for Angle E and H, and $\theta = 60^\circ$ or 75° for Angle F and I.
- F_{pw} does not consider the adequacy of the seismic hinge or other components of the sway bracing or vertical hanger. The design engineer of record must ensure all components are suitable for the application and design loads.
- Values in tables are applicable for noted concrete compressive strength and for concrete with higher compressive strengths.
- For applications outside of the above noted parameters, contact Hilti for assistance.

Design Example:

We will use a carbon steel 1/2-in. diameter x 3-1/4-in. effective embedment depth Hilti KWIK Bolt TZ2 (KB-TZ2) expansion anchor to attach a Hilti seismic lateral brace into 3,000 psi normal weight concrete. We will assume the concrete is cracked for the seismic design. We will assume the anchor is in the middle of a concrete slab (no edge or anchor spacing influence). We will use a Hilti MQS-SP-L-1/2" seismic hinge with a brace angle of 45 degrees (Angle B) attached to the underside of the concrete. Prying factor for this specific hinge in angle category B is 1.580.

The LRFD tension and shear capacity of the KB-TZ2 is determined through a calculation per ACI 318-19 Ch. 17 based on the design variables from ICC-ES ESR-4266. A design using the Hilti PROFIS Engineering design software yielded the following LRFD capacities (design is performed in cracked concrete with seismic reduction factors per ACI 318-19 17.10.5.4):

$$T_{LRFD} = 2,660 \text{ lb.}$$

$$V_{LRFD} = 4,471 \text{ lb.}$$

To convert the values to an Allowable Stress Design (ASD) value, multiply the LRFD value by 0.43 (NFPA 13-16 A.9.3.5.12.8.3(D)) or NFPA 13-19 A18.5.12.7.3(D).

$$T_{allow} = 2,660 \cdot 0.43 = 1,144 \text{ lb.}$$

$$V_{allow} = 4,471 \cdot 0.43 = 1,923 \text{ lb.}$$

We will calculate a maximum horizontal shear, $F_{pw} = 631 \text{ lb.}$ Thus:

$$\left(\frac{F_{pw} \cdot P_r}{T_{allow}} \right) + \left(\frac{F_{pw}}{V_{allow}} \right) = \left(\frac{631 \cdot 1.580}{1,144} \right) + \left(\frac{631}{1,923} \right) = 1.20 \leq 1.2 \text{ OK}$$

$$F_{pw} \cdot P_r / T_{allow} = 631 \cdot 1.580 / 1,144 = 0.87 \leq 1.0 \text{ OK}$$

$$F_{pw} / V_{allow} = 631 / 1,923 = 0.33 \leq 1.0 \text{ OK}$$

∴ Maximum horizontal load, $F_{pw} = 631 \text{ lb.}$

Alternatively, the maximum horizontal load, F_{pw} , can be determined from the shortcut tables starting on page 8. Going to page 8, F_{pw} can be selected as shown (refer to the Hilti MQS-SP-L-1/2" table, using Angle B, for the 1/2x3-1/4 KB-TZ2 anchor).

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"											
					A	B	C	D	E	F	G	H	I			
					30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr
					4.100	1.580	0.870	1.850	1.520	2.320	2.900	3.440	3.710	2.620	2.140	1.920
1/2	1-1/2	8	12	5	123	267	388	239	223	201	175	147	119	168	206	230
	2	5	6	5	166	359	522	321	300	271	235	198	160	227	278	310
	2-1/2	9-1/2	7-1/2	5	232	551	837	487	481	406	329	277	243	344	422	470
	3-1/4	8-1/2	9-3/4	5-1/2	279	631	937	561	538	471	394	333	280	397	486	541

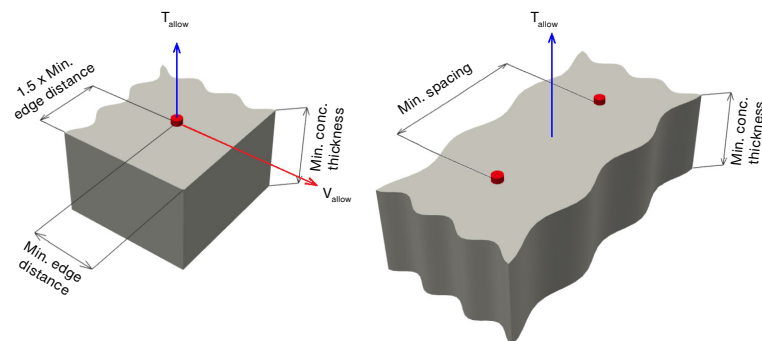


Figure 3 - Flat Slab Concrete Installations

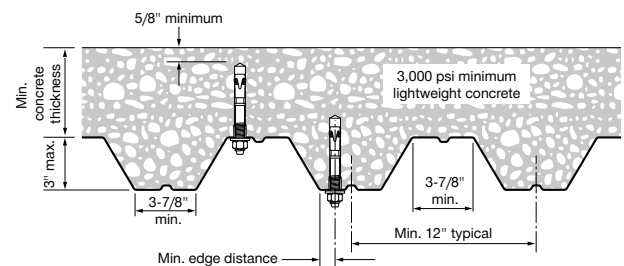


Figure 4 - Lightweight Concrete Over Metal Deck Installations

CONTENTS



CARBON STEEL KWIK BOLT TZ2

8

The Hilti KB-TZ2 is the most versatile anchor of the group and is most often used for pipe supports in seismic areas. The design capacity is the best of its class while remaining a cost effective solution that is easier to install. The anchor is available in 3/8-in. to 3/4-in. diameters and is supported by ICC-ES ESR-4266 and has FM and UL listings for fire-sprinkler applications.

3,000 psi flat slab concrete

8

4,000 psi flat slab concrete

9

5,000 psi flat slab concrete

10

6,000 psi flat slab concrete

11

3,000 and 4,000 psi lightweight concrete over metal deck

12

2-in. and 3-in. deck profiles (i.e. W2, W3)

12



KB1

13

The Hilti KB1 is a cost effective wedge anchor similar to the KB-TZ2, and can also be used for pipe supports in seismic areas. This anchor is available in 3/8-in. to 3/4-in. diameters and is supported by IAPMO ER 678 and has FM and UL listings for fire sprinkler applications.

3,000 psi flat slab concrete

13

4,000 psi flat slab concrete

14

5,000 psi flat slab concrete

15

6,000 psi flat slab concrete

16

3,000 and 4,000 psi lightweight concrete over metal deck

17

2-in. and 3-in. deck profiles (i.e. W2, W3)

17



KCM-WF/-PD

18

The KCM-WF/-PD cast-in anchor has multiple internal threads for ultimate flexibility for many pipe sizes and is intended for flat concrete slabs. The anchor is available in 1/4-in. to 3/4-in. inner thread diameters (3/8-in. to 3/4-in. diameters are applicable for seismic bracing) and is supported by ICC-ES ESR-4145 and has FM and UL listings for fire-sprinkler applications.

3,000 psi flat slab concrete

18

4,000 psi flat slab concrete

19

5,000 psi flat slab concrete

20

6,000 psi flat slab concrete

21

CONTENTS



KCM-MD

22

The KCM-MD cast-in anchor has been optimized for installation in concrete over metal deck applications. With a short plate option for direct installation on the deck or a long plate option to span the lower flutes, the KCM-MD has tremendous flexibility for the fire sprinkler pipe installer. Short plate anchors are shown in this supplement. The KCM-MD is supported by ICC-ES ESR-4145 and has FM and UL listings for fire-sprinkler applications.

3,000 and 4,000 psi lightweight concrete over metal deck
2-in. and 3-in. deck profiles (i.e. W2, W3)

22

22



KCC-WF

23

The KCC-WF quick push-to-connect technology offers ultimate productivity and is intended for flat concrete slabs. The anchor is available in 3/8-in. and 1/2-in. diameters and is supported by ICC-ES ESR-4145 and has FM and UL listings for fire-sprinkler applications.

3,000 psi flat slab concrete

23

4,000 psi flat slab concrete

24

5,000 psi flat slab concrete

25

6,000 psi flat slab concrete

26



KCC-MD

27

Pre-assembled self-tapping screws reduce the installation time of the KCC-MD and color-coded plastic plugs protect the inner threads from concrete, sprayed-on fireproofing, and sprayed-on insulation. The anchor is available in 3/8-in. and 1/2-in. diameters and is supported by ICC-ES ESR-4145 and has FM and UL listings for fire-sprinkler applications.

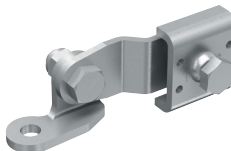
3,000 and 4,000 psi lightweight concrete over metal deck
2-in. and 3-in. deck profiles (i.e. W2, W3)

27

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HILTI MQS-SP-L-1/2" AND MQS-SP-T-1/2"

The Hilti Seismic Hinge MQS-SP is a versatile and quick connect solution for seismic bracing attachments. FM rated for seismic solutions for the lateral or transversal brace assembly. Contact Hilti for more information on the seismic hinge and other Hilti pipe support solutions.



Maximum allowable pipe horizontal load, F_{pw} (lb) carbon steel
Hilti KWIK Bolt TZ2 in 3,000 psi normal weight cracked concrete¹

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"																							
					A		B		C		D		E		F		G		H		I							
					30°-44°		45°-59°		60°-74°		75°-90°		30°-44°		45°-59°		60°-74°		75°-90°		30°-44°		45°-59°		60°-74°		75°-90°	
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
in	in	in	in	in	4.100	1.580	0.870	1.850	1.520	2.320	2.900	3.440	3.710	2.620	2.140	1.920												
1/2	1-1/2	8	12	5	123	267	388	239	223	201	175	147	119	168	206	230												
	2	5	6	5	166	359	522	321	300	271	235	198	160	227	278	310												
	2-1/2	9-1/2	7-1/2	5	232	551	837	487	481	406	329	277	243	344	422	470												
	3-1/4	8-1/2	9-3/4	5-1/2	279	631	937	561	538	471	394	333	280	397	486	541												

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 909 seismic brace																	
					A		B		C		D		E		F		G		H		I	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°		
in	in	in	in	in	Pr 2.490	Pr 1.080	Pr 0.950	Pr 1.360	Pr 1.650	Pr 1.400	Pr 1.830	Pr 2.220	Pr 2.710	Pr 1.920	Pr 1.570	Pr 1.400						
3/8	1-1/2	5	8	5	167	299	323	258	186	254	238	200	130	183	224	251						
	2	5-1/4	6	5	255	455	490	393	282	386	364	307	197	278	341	381						
	2-1/2	5-1/4	7-1/2	5	280	488	524	426	302	418	402	347	213	301	369	413						
1/2	1-1/2	8	12	5	191	342	369	295	213	290	272	228	148	209	256	286						
	2	5	6	5	257	461	497	398	287	390	367	307	199	282	345	386						
	2-1/2	9-1/2	7-1/2	5	383	726	791	616	456	603	521	429	309	436	534	598						
	3-1/4	8-1/2	9-3/4	5-1/2	445	819	888	702	512	688	625	515	352	497	608	681						
5/8	2-3/4	13	8-1/4	5	442	902	989	757	570	740	601	495	379	536	656	734						
	3-1/4	12	9-3/4	5-1/2	567	1078	1175	915	677	896	772	636	459	648	793	887						
	4	11	12	6	617	1153	1254	984	723	964	853	703	493	696	852	954						
3/4	3-1/4	15-1/4	9-3/4	5-1/2	567	1172	1288	982	742	960	772	636	492	695	851	953						
	3-3/4	14	11-1/4	6	703	1370	1497	1159	863	1134	957	789	581	820	1004	1124						
	4-3/4	11-3/4	14-1/4	8	772	1462	1594	1242	918	1216	1051	866	623	879	1076	1205						

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 910/980 seismic brace																				
					A		B		C		D		E		F		G		H		I				
					30°-44° Pr	2,930	45°-59° Pr	1,290	60°-74° Pr	0.750	75°-90° Pr	0.960	30°-44° Pr	1,310	45°-59° Pr	1,670	60°-74° Pr	1,970	75°-90° Pr	2,250	30°-44° Pr	1,920	45°-59° Pr	1,360	60°-74° Pr
in	in	in	in	in																					
3/8	1-1/2	5	8	5	147	268	367	321	211	225	224	197	160	227	278	311									
	2	5-1/4	6	5	224	407	556	487	320	342	343	303	243	344	421	471									
	2-1/2	5-1/4	7-1/2	5	247	440	591	521	340	373	379	343	261	368	451	505									
	1-1/2	8	12	5	167	306	420	367	241	257	256	225	183	259	317	355									
1/2	2	5	6	5	226	412	566	494	325	346	345	303	247	349	428	478									
	2-1/2	9-1/2	7-1/2	5	325	640	918	786	527	528	484	424	393	555	680	761									
	3-1/4	8-1/2	9-3/4	5-1/2	389	728	1021	883	586	606	581	508	441	623	764	855									
	2-3/4	13	8-1/4	5	375	788	1164	982	668	643	558	489	491	694	850	951									
5/8	3-1/4	12	9-3/4	5-1/2	482	951	1364	1167	784	784	717	628	583	824	1010	1130									
	4	11	12	6	533	1021	1447	1245	832	846	793	694	623	880	1078	1206									
	3-1/4	15-1/4	9-3/4	5-1/2	482	1024	1519	1278	872	833	717	628	639	903	1106	1238									
	3-3/4	14	11-1/4	6	598	1205	1746	1486	1003	989	889	778	743	1050	1286	1440									
3/4	4-3/4	11-3/4	14-1/4	8	656	1291	1849	1583	1062	1064	976	855	791	1118	1369	1533									

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace								
					A 30°-44°	B 45°-59°	C 60°-90°	D 30°-44°	E 45°-59°	F 60°-90°	G 30°-44°	H 45°-59°	I 60°-90°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
in	in	in	in	in	2.520	1.070	1.380	1.620	1.420	2.250	2.750	1.940	1.590
1/2	1-1/2	8	12	5	189	344	292	215	287	225	147	208	254
	2	5	6	5	254	463	394	290	387	303	198	280	342
	2-1/2	9-1/2	7-1/2	5	378	730	610	461	597	424	306	433	529
	3-1/4	8-1/2	9-3/4	5-1/2	441	824	695	518	681	508	348	493	603

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace								
					A	B	C	D	E	F	G	H	I
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	4.170	2.000	0.960	1.970	2.380	2.960	1.930	1.360	1.110
1/2	1-1/2	8	12	5	121	225	367	191	197	171	183	259	317
	2	5	6	5	164	303	494	258	266	230	246	349	428
	2-1/2	9-1/2	7-1/2	5	229	458	786	404	398	322	391	555	680
	3-1/4	8-1/2	9-3/4	5-1/2	274	529	883	457	461	386	440	623	764
5/8	2-3/4	13	8-1/4	5	264	550	982	501	462	371	489	694	850
	3-1/4	12	9-3/4	5-1/2	339	680	1167	600	590	477	581	824	1010
	4	11	12	6	374	736	1245	643	641	527	621	880	1078
3/4	3-1/4	15-1/4	9-3/4	5-1/2	339	706	1278	651	594	477	637	903	1106
	3-3/4	14	11-1/4	6	420	856	1486	762	736	592	741	1050	1286
	4-3/4	11-3/4	14-1/4	8	461	924	1583	815	802	650	789	1118	1369

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF700 seismic brace								
					A	B	C	D	E	F	G	H	I
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	1-1/2	8	12	5	2.550	1.090	0.910	1.410	1.450	2.000	1.830	1.290	1.060
	2	5	6	5	187	340	378	232	283	253	188	267	326
	2-1/2	9-1/2	7-1/2	5	252	458	509	313	381	341	254	360	439
	3-1/4	8-1/2	9-3/4	5-1/2	374	721	813	504	588	476	405	574	701
5/8	2-3/4	13	8-1/4	5	436	815	912	562	671	572	455	644	786
	3-1/4	12	9-3/4	5-1/2	431	895	1020	636	720	550	508	720	878
	4	11	12	6	554	1071	1208	749	873	706	602	853	1041
3/4	3-1/4	15-1/4	9-3/4	5-1/2	605	1146	1288	796	939	781	642	909	1109
	3-3/4	14	11-1/4	6	554	1164	1328	829	933	706	662	938	1143
	4-3/4	11-3/4	14-1/4	8	687	1361	1541	957	1104	875	768	1088	1327
					754	1453	1639	1015	1185	962	817	1157	1411

¹ Refer to Figure 3 for flat slab concrete installation.

Maximum allowable pipe horizontal load, F_{pw} (lb) carbon steel

Hilti KWIK Bolt TZ2 in 4,000 psi normal weight cracked concrete¹

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"							
					A 30°-44°	B 45°-59°	C 60°-74°	D 75°-90°	E 30°-44°	F 45°-59°	G 60°-74°	H 75°-90°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	1-1/2	8	12	5	4.100	1.580	0.870	1.850	1.520	2.320	2.900	3.440
	2	5	6	5	143	308	448	275	257	232	202	170
	2-1/2	8-1/4	7-1/2	5	192	415	603	371	347	313	271	229
	3-1/4	7-1/2	9-3/4	5-1/2	268	613	915	545	526	457	379	320
					322	699	1018	625	585	527	455	384

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 909 seismic brace							
					A 30°-44°	B 45°-59°	C 60°-74°	D 75°-90°	E 30°-44°	F 45°-59°	G 60°-74°	H 75°-90°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
3/8	1-1/2	5	8	5	2.490	1.080	0.950	1.360	1.650	1.400	1.830	2.220
	2	4-3/4	6	5	193	345	373	298	215	293	275	230
	2-1/2	4-1/2	7-1/2	5	284	494	530	431	306	423	409	355
	3-1/4	7-1/2	9-3/4	5-1/2	312	529	565	465	326	457	450	401
1/2	1-1/2	8	12	5	220	395	426	341	246	335	314	263
	2	5	6	5	297	532	574	459	331	451	423	355
	2-1/2	8-1/4	7-1/2	5	431	799	867	683	500	669	601	496
	3-1/4	7-1/2	9-3/4	5-1/2	499	897	968	774	558	759	712	595
5/8	2-3/4	11-1/4	8-1/4	5	510	1001	1094	845	630	827	694	572
	3-1/4	10-1/4	9-3/4	5-1/2	640	1187	1289	1015	743	994	891	735
	4	9-1/2	12	6	694	1266	1370	1088	790	1066	985	812
	3-1/4	13-1/4	9-3/4	5-1/2	655	1303	1426	1098	822	1074	891	735
3/4	3-3/4	12-1/4	11-1/4	6	805	1513	1646	1288	949	1261	1105	911
	4-3/4	10-1/4	14-1/4	8	828	1547	1682	1319	969	1292	1143	942

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 910/980 seismic brace							
					A 30°-44°	B 45°-59°	C 60°-74°	D 75°-90°	E 30°-44°	F 45°-59°	G 60°-74°	H 75°-90°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
3/8	1-1/2	5	8	5	2.930	1.290	0.750	0.960	1.310	1.670	1.970	2.250
	2	4-3/4	6	5	169	309	424	370	244	259	259	227
	2-1/2	4-1/2	7-1/2	5	251	445	597	527	343	378	386	350
	3-1/4	7-1/2	9-3/4	5-1/2	276	479	632	562	364	409	425	396
1/2	1-1/2	8	12	5	193	353	485	423	279	296	296	260
	2	5	6	5	261	476	653	570	376	399	398	350
	2-1/2	8-1/4	7-1/2	5	376	709	999	862	574	589	559	489
	3-1/4	7-1/2	9-3/4	5-1/2	438	802	1103	962	634	672	670	587
5/8	2-3/4	11-1/4	8-1/4	5	433	879	1277	1086	734	721	645	564
	3-1/4	10-1/4	9-3/4	5-1/2	557	1053	1484	1280	853	874	828	725
	4	9-1/2	12	6	608	1128	1569	1362	902	941	915	801
	3-1/4	13-1/4	9-3/4	5-1/2	557	1143	1669	1416	959	936	828	725
3/4	3-3/4	12-1/4	11-1/4	6	690	1338	1905	1635	1094	1106	1026	899
	4-3/4	10-1/4	14-1/4	8	714	1370	1943	1671	1116	1135	1061	929

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF075/AF076/AF077 seismic brace							
					A 30°-44°	B 45°-59°	C 60°-90°	D 30°-44°	E 45°-59°	F 60°-90°	G 30°-44°	H 45°-59°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	1-1/2	8	12	5	2.520	1.070	1.380	1.620	1.420	2.250	2.750	1.940
	2	5	6	5	218	397	338	248	331	260	169	240
	2-1/2	8-1/4	7-1/2	5	294	535	455	334	446	350	228	323
	3-1/4	7-1/2	9-3/4	5-1/2	427	804	676	506	663	489	339	480
					494	902	767	564	752	587	384	544

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF771 seismic brace							
					A 30°-44°	B 45°-59°	C 60°-90°	D 30°-44°	E 45°-59°	F 60°-90°	G 30°-44°	H 45°-59°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	1-1/2	8	12	5	4.170	2.000	0.960	1.970	2.380	2.960	1.930	1.360
	2	5	6	5	140	260	423	221	228	197	211	299
	2-1/2	8-1/4	7-1/2	5	189	350	570	297	307	266	284	403
	3-1/4	7-1/2	9-3/4	5-1/2	264	513	862	446	447	372	429	609
5/8	2-3/4	11-1/4	8-1/4	5	317	590	962	502	517	446	480	680
	3-1/4	10-1/4	9-3/4	5-1/2	305	624	1086	557	534	429	541	767
	4	9-1/2	12	6	391	762	1280	662	664	551	638	904
	3-1/4	13-1/4	9-3/4	5-1/2	432	823	1362	707	719	609	679	962
3/4	3-3/4	12-1/4	11-1/4	6	391	808	1416	725	685	551	705	1000
	4-3/4	10-1/4	14-1/4	8	485	961	1635	843	836	683	815	1155
					501	987	1671	863	859	706	833	1180

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF700 seismic brace							
					A 30°-44°	B 45°-59°	C 60°-90°	D 30°-44°	E 45°-59°	F 60°-90°	G 30°-44°	H 45°-59°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	1-1/2	8	12	5	2.550	1.090	0.910	1.410	1.450	2.000	1.830	1.290
	2	5	6	5	216	393	437	268	327	292	218	308
	2-1/2	8-1/4	7-1/2	5	291	529	588	361	440	393	293	415
	3-1/4	7-1/2	9-3/4	5-1/2	423	794	891	550	653	550	444	629
5/8	2-3/4	11-1/4	8-1/4	5	490	892	992	610	742	660	495	701
	3-1/4	10-1/4	9-3/4	5-1/2	498	994	1126	700	805	635	561	795
	4	9-1/2	12	6	628	1180	1324	817	970	816	660	935
	3-1/4	13-1/4	9-3/4	5-1/2	681	1259	1406	866	1041	901	701	993
3/4	3-3/4	12-1/4	11-1/4	6	640	1294	1469	914	1045	816	732	1037
	4-3/4	10-1/4	14-1/4	8	789	1503	1692	1047	1229	1011	843	1195
					812	1538	1729	1069	1260	1046	861	1220

¹ Refer to Figure 3 for flat slab concrete installation.

Maximum allowable pipe horizontal load, F_{pw} (lb) carbon steel
Hilti KWIK Bolt TZ2 in 5,000 psi normal weight cracked concrete¹

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"																	
					A		B		C		D		E		F		G		H		I	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°		
in	in	in	in		Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr				
1/2	1-1/2	8	12	5	4.100	1.580	0.870	1.850	1.520	2.320	2.900	3.440	3.710	2.620	2.140	1.920						
	2	5	6	5	159	345	501	308	288	260	225	190	154	218	266	297						
	2-1/2	7-1/4	7-1/2	5	215	464	674	415	387	350	304	256	207	293	359	400						
	3-1/4	6-3/4	9-3/4	5	300	665	978	593	562	499	424	358	296	419	513	572						
				5-1/2	360	754	1082	677	622	574	509	429	338	478	585	652						

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 909 seismic brace												
					A		B	C		D	E		F	G	H	I	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	
in	in	in	in	in	Pr 2,490	Pr 1,080	Pr 0,950	Pr 1,360	Pr 1,650	Pr 1,400	Pr 1,830	Pr 2,220	Pr 2,710	Pr 1,920	Pr 1,570	Pr 1,400	
3/8	1-1/2	5	8	5	215	386	417	334	240	327	307	258	167	236	289	324	
	2	4-1/4	6	5	309	525	562	461	324	453	446	396	231	326	400	447	
	2-1/2	4	7-1/2	5	337	560	597	495	344	487	490	449	248	351	429	480	
1/2	1-1/2	8	12	5	246	441	476	381	275	374	351	294	191	270	330	370	
	2	5	6	5	332	595	642	514	370	504	473	396	257	364	445	498	
	2-1/2	7-1/4	7-1/2	5	472	858	929	738	535	724	671	554	370	523	639	716	
5/8	3-1/4	6-3/4	9-3/4	5-1/2	544	959	1031	833	594	817	779	665	417	589	721	807	
	2-3/4	10	8-1/4	5	570	1081	1179	918	679	899	776	639	460	650	795	891	
	3-1/4	9-1/4	9-3/4	5-1/2	700	1275	1380	1096	795	1075	996	821	550	776	950	1063	
	4	8-1/2	12	6	758	1357	1463	1173	844	1150	1082	908	588	830	1016	1137	
3/4	3-1/4	11-3/4	9-3/4	5-1/2	732	1410	1538	1194	887	1169	997	821	599	846	1034	1158	
	3-3/4	11	11-1/4	6	882	1629	1766	1394	1018	1366	1235	1018	699	987	1208	1352	
	4-3/4	9	14-1/4	8	873	1615	1752	1381	1010	1353	1219	1005	692	978	1197	1340	

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 910/980 seismic brace																	
					A		B		C		D		E		F		G		H		I	
					30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr		
in	in	in	in	in	2,930	1,290	0,750	0,960	1,310	1,670	1,970	2,250	1,920	1,360	1,110	0,990						
3/8	1-1/2	5	8	5	189	346	474	414	273	290	289	254	207	293	359	401						
	2	4-1/4	6	5	274	476	629	559	362	406	421	391	279	395	484	541						
	2-1/2	4	7-1/2	5	300	510	663	594	381	439	464	443	297	420	514	575						
1/2	1-1/2	8	12	5	216	395	542	473	312	331	331	290	237	334	410	458						
	2	5	6	5	291	532	730	638	420	446	445	391	319	450	552	617						
	2-1/2	7-1/4	7-1/2	5	414	765	1062	923	610	639	624	547	461	652	798	893						
5/8	3-1/4	6-3/4	9-3/4	5-1/2	479	861	1167	1025	671	727	734	656	513	724	887	992						
	2-3/4	10	8-1/4	5	484	954	1368	1171	786	787	721	631	585	827	1013	1134						
	3-1/4	9-1/4	9-3/4	5-1/2	614	1136	1579	1371	907	949	926	811	686	969	1186	1328						
3/4	4	8-1/2	12	6	666	1214	1665	1455	957	1019	1018	896	727	1027	1259	1408						
	3-1/4	11-3/4	9-3/4	5-1/2	622	1242	1790	1528	1028	1021	926	811	764	1079	1322	1480						
	3-3/4	11	11-1/4	6	772	1446	2031	1755	1167	1203	1147	1005	878	1240	1519	1699						
	4-3/4	9	14-1/4	8	761	1433	2016	1741	1158	1191	1132	991	870	1230	1506	1685						

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace								
					A 30°-44°	B 45°-59°	C 60°-90°	D 30°-44°	E 45°-59°	F 60°-90°	G 30°-44°	H 45°-59°	I 60°-90°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
in	in	in	in	in	2.520	1.070	1.380	1.620	1.420	2.250	2.750	1.940	1.590
1/2	1-1/2	8	12	5	244	444	378	277	371	290	189	268	328
	2	5	6	5	328	598	509	374	499	391	255	361	441
	2-1/2	7-1/4	7-1/2	5	467	863	731	541	717	547	366	519	634
	3-1/4	6-3/4	9-3/4	5-1/2	539	964	825	600	810	656	413	585	715

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace								
					A	B	C	D	E	F	G	H	I
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	1-1/2	8	12	5	4.170	2.000	0.960	1.970	2.380	2.960	1.930	1.360	1.110
	2	5	6	5	157	291	473	247	255	221	236	334	410
	2-1/2	7-1/4	7-1/2	5	211	392	638	333	343	297	318	450	552
	3-1/4	6-3/4	9-3/4	5-1/2	295	559	923	480	489	416	460	652	798
5/8	2-3/4	10	8-1/4	5	354	640	1025	537	563	499	511	724	887
	3-1/4	9-1/4	9-3/4	5-1/2	437	830	1371	712	726	616	683	969	1186
	4	8-1/2	12	6	483	895	1455	759	785	681	725	1027	1259
3/4	3-1/4	11-3/4	9-3/4	5-1/2	437	885	1528	785	766	616	761	1079	1322
	3-3/4	11	11-1/4	6	542	1049	1755	909	915	764	875	1240	1519
	4-3/4	9	14-1/4	8	535	1038	1741	901	905	754	868	1230	1506

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF700 seismic brace								
					A	B	C	D	E	F	G	H	I
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	1-1/2	8	12	5	2.550	1.090	0.910	1.410	1.450	2.000	1.830	1.290	1.060
	2	5	6	5	242	439	488	300	365	327	243	345	421
	2-1/2	7-1/4	7-1/2	5	463	853	952	586	706	615	475	673	821
	3-1/4	6-3/4	9-3/4	5-1/2	534	953	1056	647	799	725	526	746	910
5/8	2-3/4	10	8-1/4	5	557	1075	1212	751	876	710	604	856	1044
	3-1/4	9-1/4	9-3/4	5-1/2	687	1268	1415	871	1049	912	705	999	1220
	4	8-1/2	12	6	744	1349	1500	921	1124	1005	748	1059	1292
3/4	3-1/4	11-3/4	9-3/4	5-1/2	715	1401	1583	982	1138	912	789	1118	1363
	3-3/4	11	11-1/4	6	865	1619	1814	1119	1333	1130	904	1281	1562
	4-3/4	9	14-1/4	8	856	1605	1799	1110	1320	1115	897	1270	1550

¹ Refer to Figure 3 for flat slab concrete installation.

Maximum allowable pipe horizontal load, F_{pw} (lb) carbon steel

Hilti KWIK Bolt T22 in 6,000 psi normal weight cracked concrete¹

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"							
					A 30°-44°	B 45°-59°	C 60°-74°	D 75°-90°	E 30°-44°	F 45°-59°	G 60°-74°	H 75°-90°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	1-1/2	8	12	5	4.100	1.580	0.870	1.850	1.520	2.320	2.900	3.440
	2	5	6	5	175	377	548	337	315	285	247	208
	2-1/2	6-3/4	7-1/2	5	235	508	739	455	425	384	333	280
	3-1/4	6	9-3/4	5-1/2	329	709	1030	634	592	535	465	392
					393	802	1134	721	652	614	558	470

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 909 seismic brace							
					A 30°-44°	B 45°-59°	C 60°-74°	D 75°-90°	E 30°-44°	F 45°-59°	G 60°-74°	H 75°-90°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
3/8	1-1/2	5	8	5	2.490	1.080	0.950	1.360	1.650	1.400	1.830	2.220
	2	3-3/4	6	5	236	423	457	366	263	359	337	282
	2-1/2	3-3/4	7-1/2	5	330	551	588	486	339	478	479	434
	3-1/4	6	9-3/4	5-1/2	359	586	623	521	359	513	525	492
1/2	1-1/2	8	12	5	270	484	522	418	301	410	385	323
	2	5	6	5	363	652	703	563	405	552	519	434
	2-1/2	6-3/4	7-1/2	5	507	908	980	785	565	770	724	607
	3-1/4	6	9-3/4	5-1/2	583	1010	1083	882	625	866	838	728
5/8	2-3/4	9-1/4	8-1/4	5	615	1150	1250	981	721	961	850	700
	3-1/4	8-1/2	9-3/4	5-1/2	752	1349	1456	1166	839	1143	1074	900
	4	7-3/4	12	6	813	1432	1541	1244	888	1221	1165	995
	3-1/4	10-3/4	9-3/4	5-1/2	797	1501	1634	1277	941	1250	1092	900
3/4	3-3/4	10	11-1/4	6	949	1726	1867	1485	1076	1456	1351	1115
	4-3/4	8-1/4	14-1/4	8	911	1671	1810	1433	1043	1405	1285	1059

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 910/980 seismic brace							
					A 30°-44°	B 45°-59°	C 60°-74°	D 75°-90°	E 30°-44°	F 45°-59°	G 60°-74°	H 75°-90°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
3/8	1-1/2	5	8	5	2.930	1.290	0.750	0.960	1.310	1.670	1.970	2.250
	2	3-3/4	6	5	207	378	520	454	299	318	317	278
	2-1/2	3-3/4	7-1/2	5	293	501	654	585	376	430	452	429
	3-1/4	6	9-3/4	5-1/2	321	536	688	620	396	464	497	485
1/2	1-1/2	8	12	5	237	433	594	519	341	363	362	318
	2	5	6	5	319	583	800	699	460	489	488	429
	2-1/2	6-3/4	7-1/2	5	445	812	1115	974	641	682	681	599
	3-1/4	6	9-3/4	5-1/2	515	911	1220	1077	701	773	790	719
5/8	2-3/4	9-1/4	8-1/4	5	531	1018	1444	1242	830	843	789	691
	3-1/4	8-1/2	9-3/4	5-1/2	661	1207	1657	1447	953	1013	1011	888
	4	7-3/4	12	6	716	1286	1743	1532	1002	1086	1098	982
	3-1/4	10-3/4	9-3/4	5-1/2	682	1326	1891	1623	1087	1096	1014	888
3/4	3-3/4	10	11-1/4	6	832	1538	2136	1856	1227	1286	1257	1101
	4-3/4	8-1/4	14-1/4	8	797	1486	2076	1798	1193	1238	1194	1045

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF075/AF076/AF077 seismic brace							
					A 30°-44°	B 45°-59°	C 60°-90°	D 30°-44°	E 45°-59°	F 60°-90°	G 30°-44°	H 45°-59°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	1-1/2	8	12	5	2.520	1.070	1.380	1.620	1.420	2.250	2.750	1.940
	2	5	6	5	267	486	414	304	406	318	207	294
	2-1/2	6-3/4	7-1/2	5	360	655	557	410	547	429	279	396
	3-1/4	6	9-3/4	5-1/2	502	913	777	571	763	599	390	552
					577	1015	874	631	858	709	438	620

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF771 seismic brace							
					A 30°-44°	B 45°-59°	C 60°-90°	D 30°-44°	E 45°-59°	F 60°-90°	G 30°-44°	H 45°-59°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	1-1/2	8	12	5	4.170	2.000	0.960	1.970	2.380	2.960	1.930	1.360
	2	5	6	5	172	319	519	270	279	242	259	366
	2-1/2	6-3/4	7-1/2	5	231	429	699	364	376	326	348	494
	3-1/4	6	9-3/4	5-1/2	323	599	974	508	525	455	485	688
5/8	2-3/4	9-1/4	8-1/4	5	387	683	1077	566	602	546	537	761
	3-1/4	8-1/2	9-3/4	5-1/2	373	734	1242	641	638	525	619	877
	4	7-3/4	12	6	479	889	1447	755	779	675	721	1022
	3-1/4	10-3/4	9-3/4	5-1/2	530	957	1532	802	841	746	764	1082
3/4	3-3/4	10	11-1/4	6	479	952	1623	836	827	675	809	1146
	4-3/4	8-1/4	14-1/4	8	594	1125	1856	964	983	837	925	1311
					564	1082	1798	933	944	794	896	1270

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF700 seismic brace							
					A 30°-44°	B 45°-59°	C 60°-90°	D 30°-44°	E 45°-59°	F 60°-90°	G 30°-44°	H 45°-59°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	1-1/2	8	12	5	2.550	1.090	0.910	1.410	1.450	2.000	1.830	1.290
	2	5	6	5	265	481	535	328	400	358	267	378
	2-1/2	6-3/4	7-1/2	5	357	648	721	442	539	482	359	509
	3-1/4	6	9-3/4	5-1/2	498	903	1004	616	752	673	500	709
5/8	2-3/4	9-1/4	8-1/4	5	572	1005	1108	677	847	781	553	783
	3-1/4	8-1/2	9-3/4	5-1/2	603	1143	1285	794	937	777	640	907
	4	7-3/4	12	6	738	1342	1492	916	1117	998	744	1054
	3-1/4	10-3/4	9-3/4	5-1/2	798	1425	1577	966	1194	1084	786	1114
3/4	3-3/4	10	11-1/4	6	782	1491	1679	1039	1218	999	837	1186
	4-3/4	8-1/4	14-1/4	8	931	1716	1915	1179	1421	1238	955	1352
					893	1661	1858	1145	1370	1176	926	1312

¹ Refer to Figure 3 for flat slab concrete installation.

Maximum allowable pipe horizontal load, F_{pw} (lb) carbon steel Hilti KWIK Bolt TZ2 in the soffit of 3,000 psi or 4,000 psi lightweight concrete over metal deck — 2-in and 3-in W-deck profiles^{1,2}

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"							
					3,000 psi				4,000 psi			
					A	B	C		A	B	C	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	1-1/2	1 1/4	12	2-1/2	4.100	1.580	0.870	1.850	4.100	1.580	0.870	1.850
	2	1 1/4	6	2-1/2	84	183	266	163	97	200	286	180
	2-1/2	1 1/4	7-1/2	2-1/2	109	235	340	210	126	259	368	233
	3-1/4	1 1/4	9-3/4	2-1/2	167	354	509	317	191	388	547	349
					171	387	575	344	192	420	615	375

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 909 seismic brace							
					3,000 psi				4,000 psi			
					A	B	C		A	B	C	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
3/8	1-1/2	1-1/4	8	2-1/2	2.490	1.100	1.050	1.360	2.490	1.100	1.050	1.360
	2	1-1/4	6	2-1/2	121	205	210	181	134	221	226	197
	2-1/2	1-1/4	7-1/2	2-1/2	175	302	310	266	193	325	334	288
	3-1/4	1-1/4	9-3/4	2-1/2	181	310	318	274	192	324	333	287
1/2	1-1/2	1-1/4	12	2-1/2	131	232	238	202	145	251	258	221
	2	1-1/4	6	2-1/2	168	297	306	260	188	323	332	285
	2-1/2	1-1/4	7-1/2	2-1/2	255	446	458	391	283	483	496	427
	3-1/4	1-1/4	9-3/4	2-1/2	273	497	512	431	299	535	550	466
5/8	2-3/4	1-1/4	8-1/4	2-1/2	303	528	543	464	338	573	588	507
	4	1-1/4	12	2-1/2	346	611	629	535	386	666	684	586
	3-1/4	1-1/4	9-3/4	2-1/2	270	489	504	425	293	522	537	456
	3-3/4	1-1/4	11-1/4	3-1/4	314	645	668	547	355	706	730	601

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 910/980 seismic brace							
					3,000 psi				4,000 psi			
					A	B	C		A	B	C	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
3/8	1-1/2	1-1/4	8	2-1/2	3.070	1.320	0.960	1.070	3.070	1.320	0.960	1.070
	2	1-1/4	6	2-1/2	103	184	220	208	115	200	236	224
	2-1/2	1-1/4	7-1/2	2-1/2	149	271	326	307	165	293	349	330
	3-1/4	1-1/4	9-3/4	2-1/2	154	279	334	315	164	293	349	329
1/2	1-1/2	1-1/4	12	2-1/2	110	206	251	236	123	225	271	255
	2	1-1/4	6	2-1/2	142	265	322	302	160	290	349	329
	2-1/2	1-1/4	7-1/2	2-1/2	216	399	483	453	241	434	520	491
	3-1/4	1-1/4	9-3/4	2-1/2	228	440	542	506	253	475	581	544
5/8	2-3/4	1-1/4	8-1/4	2-1/2	257	473	571	537	288	516	617	582
	4	1-1/4	12	2-1/2	293	545	663	622	328	597	718	676
	3-1/4	1-1/4	9-3/4	2-1/2	227	433	533	498	248	465	567	531
	3-3/4	1-1/4	11-1/4	3-1/4	255	560	713	658	288	615	778	720

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace					
					3,000 psi			4,000 psi		
					A	B	C	A	B	C
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr
1/2	1-1/2	1-1/4	12	2-1/2	2.520	1.160	1.380	2.520	1.160	1.380
	2	1-1/4	6	2-1/2	129	224	200	144	244	219
	2-1/2	1-1/4	7-1/2	2-1/2	166	288	257	186	314	282
	3-1/4	1-1/4	9-3/4	2-1/2	252	432	387	280	469	423
					270	480	426	296	517	461

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace					
					3,000 psi			4,000 psi		
					A	B	C	A	B	C
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr
1/2	1-1/2	1-1/4	12	2-1/2	4.170	2.000	0.960	4.170	2.000	0.960
	2	1-1/4	6	2-1/2	83	154	251	95	170	271
	2-1/2	1-1/4	7-1/2	2-1/2	107	198	322	124	220	349
	3-1/4	1-1/4	9-3/4	2-1/2	165	300	483	188	331	520
5/8	2-3/4	1-1/4	8-1/4	2-1/2	168	324	542	188	354	581
	4	1-1/4	12	2-1/2	198	357	571	226	395	617
	3-1/4	1-1/4	9-3/4	2-1/2	221	408	663	255	453	718
	3-3/4	1-1/4	11-1/4	3-1/4	167	321	533	186	347	567
					188	391	713	212	441	778

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF700 seismic brace					
					3,000 psi			4,000 psi		
					A	B	C	A	B	C
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr
1/2	1-1/2	1-1/4	12	2-1/2	2.750	1.110	1.140	2.750	1.110	1.140
	2	1-1/4	6	2-1/2	121	231	227	134	250	246
	2-1/2	1-1/4	7-1/2	2-1/2	155	295	291	174	322	317
	3-1/4	1-1/4	9-3/4	2-1/2	236	444	437	262	481	473
5/8	2-3/4	1-1/4	8-1/4	2-1/2	252	494	485	276	532	523
	4	1-1/4	12	2-1/2	281	525	517	314	570	562
	3-1/4	1-1/4	9-3/4	2-1/2	320	608	598	358	662	652
	3-3/4	1-1/4	11-1/4	3-1/4	249	486	478	271	519	511
					284	640	627	321	701	687

¹ Anchor may be placed in upper or lower flute.

² Refer to Figure 4 for lightweight concrete on metal deck installations.

Maximum allowable pipe horizontal load, F_{pw} (lb) carbon steel
Hilti KB1 in 3,000 psi normal weight cracked concrete¹

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"												
					A		B	C		D	E		F	G	H	I	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	
1/2	2	6-1/4	6	5	135	291	423	260	243	220	190	161	130	184	225	251	
	3-1/4	6-1/4	9-3/4	6	264	560	806	502	463	425	374	315	250	354	434	484	

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 909 seismic brace											
					A	B	C		D	E	F		G	H	I	
					30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr
in	in	in	in	in	2.490	1.080	0.950	1.360	1.650	1.400	1.830	2.220	2.710	1.920	1.570	1.400
3/8	1-1/2	8	8	5	135	242	261	209	151	205	193	162	105	148	181	203
	2	4	6	5	203	357	384	310	221	305	291	249	155	220	269	301
1/2	2	6-1/4	6	5	208	373	402	322	232	316	297	249	161	228	279	312
	3-1/4	6-1/4	9-3/4	6	402	713	768	618	443	607	576	488	310	438	536	600
5/8	2-3/4	11-1/4	8-1/4	5	357	743	817	622	471	608	486	401	312	440	539	603
	4	9-1/2	12	6	601	1098	1188	943	685	924	853	703	473	668	817	914
3/4	3-1/4	10	9-3/4	5-1/2	460	879	958	745	552	730	626	516	374	528	646	723
	4-3/4	7-3/4	14-1/4	8	674	1186	1276	1031	735	1012	967	827	517	730	893	999

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 910/980 seismic brace											
					A	B	C		D	E	F		G	H	I	
					30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr
in	in	in	in	in	2.930	1.290	0.750	0.960	1.310	1.670	1.970	2.250	1.920	1.360	1.110	0.990
3/8	1-1/2	8	8	5	119	217	297	260	171	182	181	159	130	183	225	251
	2	4	6	5	179	321	434	382	250	271	274	245	191	270	330	369
1/2	2	6-1/4	6	5	183	334	458	400	263	280	279	245	200	283	346	387
	3-1/4	6-1/4	9-3/4	6	354	640	871	764	501	539	542	482	382	540	661	739
5/8	2-3/4	11-1/4	8-1/4	5	304	648	964	811	554	527	452	396	405	573	701	785
	4	9-1/2	12	6	527	977	1361	1181	782	816	793	694	590	834	1022	1143
3/4	3-1/4	10	9-3/4	5-1/2	391	775	1113	952	640	638	582	509	476	672	823	922
	4-3/4	7-3/4	14-1/4	8	594	1066	1443	1268	829	900	911	816	634	896	1098	1228

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace									
					A	B	C	D	E	F	G	H	I	
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	2	6-1/4	6	5	206	375	319	234	313	245	160	227	277	
	3-1/4	6-1/4	9-3/4	6	399	717	613	447	601	482	307	435	531	

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace								
					A	B	C	D	E	F	G	H	I
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in		Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	2	6-1/4	6	5	4.170	2.000	0.960	1.970	2.380	2.960	1.930	1.360	1.110
	3-1/4	6-1/4	9-3/4	6	132	246	400	209	215	187	199	283	346
5/8	2-3/4	11-1/4	8-1/4	5	260	474	764	399	416	366	381	540	661
	4	9-1/2	12	6	213	445	811	413	374	301	404	573	701
3/4	3-1/4	10	9-3/4	5-1/2	374	713	1181	613	623	527	588	834	1022
	4-3/4	7-3/4	14-1/4	8	275	553	952	489	480	387	474	672	823
					440	793	1268	664	698	621	632	896	1098

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF700 seismic brace								
					A 30°-44°	B 45°-59°	C 60°-90°	D 30°-44°	E 45°-59°	F 60°-90°	G 30°-44°	H 45°-59°	I 60°-90°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
in	in	in	in	in	2.550	1.090	0.910	1.410	1.450	2.000	1.830	1.290	1.060
1/2	2	6-1/4	6	5	204	371	412	253	309	276	206	291	355
	3-1/4	6-1/4	9-3/4	6	395	710	787	482	593	535	392	556	678
5/8	2-3/4	11-1/4	8-1/4	5	349	738	843	526	591	445	420	595	725
	4	9-1/2	12	6	590	1091	1219	751	902	781	608	861	1050
3/4	3-1/4	10	9-3/4	5-1/2	450	873	986	611	711	573	491	696	849
	4-3/4	7-3/4	14-1/4	8	662	1180	1306	799	989	900	651	922	1126

¹ Refer to Figure 3 for flat slab concrete installation.

Maximum allowable pipe horizontal load, F_{pw} (lb) carbon steel
Hilti KB1 in 4,000 psi normal weight cracked concrete¹

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"																	
					A		B		C		D		E		F		G		H		I	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	2	6-1/4	6	5	4.100	1.580	0.870	1.850	1.520	2.320	2.900	3.440	3.710	2.620	2.140	1.920						
	3-1/4	5-1/2	9-3/4	6	156	336	488	300	281	254	220	185	150	212	260	290						
					282	585	835	526	480	446	399	337	262	371	455	507						

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 909 seismic brace											
					A	B	C		D	E	F		G	H	I	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°
in	in	in	in	in	Pr 2.490	Pr 1.080	Pr 0.950	Pr 1.360	Pr 1.650	Pr 1.400	Pr 1.830	Pr 2.220	Pr 2.710	Pr 1.920	Pr 1.570	Pr 1.400
3/8	1-1/2	8	8	5	156	280	302	242	174	237	223	187	121	171	209	234
	2	3-1/2	6	5	226	387	415	339	239	333	326	287	170	240	294	329
1/2	2	6-1/4	6	5	240	431	465	372	268	365	343	287	186	263	322	361
	3-1/4	5-1/2	9-3/4	6	423	742	797	645	459	633	607	522	323	457	559	625
5/8	2-3/4	9-3/4	8-1/4	5	413	826	905	696	521	680	562	463	349	493	603	675
	4	8-1/4	12	6	673	1199	1292	1038	745	1019	962	812	520	735	899	1007
3/4	3-1/4	9-1/2	9-3/4	5-1/2	521	968	1052	827	606	810	723	596	415	586	716	802
	4-3/4	6-3/4	14-1/4	8	751	1287	1377	1127	794	1107	1084	955	565	798	976	1092

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 910/980 seismic brace											
					A	B	C		D	E	F		G	H	I	
					30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr
in	in	in	in	in	2.930	1.290	0.750	0.960	1.310	1.670	1.970	2.250	1.920	1.360	1.110	0.990
3/8	1-1/2	8	8	5	137	250	344	300	197	210	209	184	150	212	260	290
	2	3-1/2	6	5	200	350	465	412	267	298	308	283	206	291	357	399
1/2	2	6-1/4	6	5	211	385	529	462	304	323	323	283	231	326	400	447
	3-1/4	5-1/2	9-3/4	6	373	667	900	792	518	564	572	515	396	560	686	767
5/8	2-3/4	9-3/4	8-1/4	5	351	724	1061	898	609	592	522	457	449	634	777	870
	4	8-1/4	12	6	592	1074	1468	1285	844	904	906	801	642	908	1112	1244
3/4	3-1/4	9-1/2	9-3/4	5-1/2	452	858	1212	1045	696	712	672	588	522	738	904	1011
	4-3/4	6-3/4	14-1/4	8	665	1163	1544	1370	888	991	1023	943	685	968	1185	1326

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF075/AF076/AF077 seismic brace					
					A	B	C	D	E	F
					30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr
1/2	2	6-1/4	6	5	2.520	1.070	1.380	1.620	1.420	2.250
	3-1/4	5-1/2	9-3/4	6	238	433	369	271	362	283
					419	746	639	464	628	513

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF771 seismic brace					
					A	B	C	D	E	F
					30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr
1/2	2	6-1/4	6	5	4.170	2.000	0.960	1.970	2.380	2.960
	3-1/4	5-1/2	9-3/4	6	153	284	462	241	249	215
5/8	2-3/4	9-3/4	8-1/4	5	278	497	792	415	438	391
	4	8-1/4	12	6	246	511	898	459	432	347
3/4	3-1/4	9-1/2	9-3/4	5-1/2	432	794	1285	671	697	609
	4-3/4	6-3/4	14-1/4	8	317	620	1045	540	540	447
					502	878	1370	722	776	716

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF700 seismic brace					
					A	B	C	D	E	F
					30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr
1/2	2	6-1/4	6	5	2.550	1.090	0.910	1.410	1.450	2.000
	3-1/4	5-1/2	9-3/4	6	236	428	476	292	356	319
5/8	2-3/4	9-3/4	8-1/4	5	416	738	816	499	619	565
	4	8-1/4	12	6	403	821	932	580	662	514
3/4	3-1/4	9-1/2	9-3/4	5-1/2	661	1193	1324	812	995	895
	4-3/4	6-3/4	14-1/4	8	511	962	1080	667	790	662
					738	1280	1408	858	1084	1011

¹ Refer to Figure 3 for flat slab concrete installation.

Maximum allowable pipe horizontal load, F_{pw} (lb) carbon steel
Hilti KB1 in 5,000 psi normal weight cracked concrete¹

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"															
					A		B	C		D	E		F	G	H	I				
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°				
in	in	in	in	in	Pr	1.580	Pr	1.850	Pr	2.320	Pr	2.900	Pr	3.710	Pr	2.620	Pr	2.140	Pr	1.920
1/2	2	6-1/4	6	5	174	376	546	336	314	283	246	207	168	237	290	324				
	3-1/4	5	9-3/4	6	296	606	858	545	493	464	420	354	272	385	471	525				

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 909 seismic brace											
					A	B	C		D	E	F		G	H	I	
					30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr
in	in	in	in	in	2.490	1.080	0.950	1.360	1.650	1.400	1.830	2.220	2.710	1.920	1.570	1.400
3/8	1-1/2	8	8	5	174	313	337	270	195	265	249	209	135	191	234	262
	2	3-1/4	6	5	245	411	438	362	253	356	355	321	181	256	314	351
1/2	2	6-1/4	6	5	268	481	519	416	299	408	383	321	208	294	360	403
	3-1/4	5	9-3/4	6	440	764	819	666	472	654	633	549	334	472	577	646
5/8	2-3/4	8-3/4	8-1/4	5	461	894	977	757	563	741	628	518	380	536	656	734
	4	7-1/2	12	6	733	1280	1375	1115	793	1095	1053	908	559	789	966	1081
3/4	3-1/4	9-1/2	9-3/4	5-1/2	570	1041	1126	894	649	876	809	667	448	633	774	867
	4-3/4	6	14-1/4	8	814	1365	1456	1204	840	1184	1181	1068	603	852	1042	1166

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 910/980 seismic brace											
					A	B	C		D	E	F		G	H	I	
					30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr
in	in	in	in	in	2.930	1.290	0.750	0.960	1.310	1.670	1.970	2.250	1.920	1.360	1.110	0.990
3/8	1-1/2	8	8	5	153	280	384	335	221	235	234	206	168	237	290	325
	2	3-1/4	6	5	217	373	488	436	281	320	336	317	218	308	377	422
1/2	2	6-1/4	6	5	236	430	591	516	340	361	360	317	258	365	447	500
	3-1/4	5	9-3/4	6	388	688	923	815	531	584	596	542	407	576	705	789
5/8	2-3/4	8-3/4	8-1/4	5	392	787	1138	970	654	647	583	511	485	685	839	939
	4	7-1/2	12	6	647	1152	1551	1367	892	976	992	896	684	966	1183	1323
3/4	3-1/4	9-1/2	9-3/4	5-1/2	499	927	1290	1119	741	773	751	658	560	791	969	1084
	4-3/4	6	14-1/4	8	723	1240	1622	1449	933	1064	1116	1054	724	1024	1254	1402

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace								
					A	B	C	D	E	F	G	H	I
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	2	6-1/4	6	5	266	484	412	303	404	317	206	292	357
	3-1/4	5	9-3/4	6	436	768	660	477	649	535	331	469	573

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace								
					A 30°-44°	B 45°-59°	C 60°-90°	D 30°-44°	E 45°-59°	F 60°-90°	G 30°-44°	H 45°-59°	I 60°-90°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
in	in	in	in	in	4.170	2.000	0.960	1.970	2.380	2.960	1.930	1.360	1.110
1/2	2	6-1/4	6	5	171	317	516	269	278	241	257	365	447
	3-1/4	5	9-3/4	6	292	516	815	428	455	412	406	576	705
5/8	2-3/4	8-3/4	8-1/4	5	276	560	970	498	483	388	483	685	839
	4	7-1/2	12	6	483	861	1367	717	758	681	682	966	1183
3/4	3-1/4	9-1/2	9-3/4	5-1/2	355	676	1119	581	591	500	558	791	969
	4-3/4	6	14-1/4	8	550	947	1449	767	841	801	723	1024	1254

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF700 seismic brace								
					A	B	C	D	E	F	G	H	I
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	2.550	1.090	0.910	1.410	1.450	2.000	1.830	1.290	1.060
1/2	2	6-1/4	6	5	263	479	532	327	398	356	265	376	459
	3-1/4	5	9-3/4	6	432	760	838	512	640	589	418	592	722
5/8	2-3/4	8-3/4	8-1/4	5	451	889	1005	624	721	574	501	710	866
	4	7-1/2	12	6	720	1273	1407	860	1071	980	701	993	1213
3/4	3-1/4	9-1/2	9-3/4	5-1/2	559	1035	1156	712	855	740	576	816	996
	4-3/4	6	14-1/4	8	801	1359	1487	904	1159	1103	741	1050	1282

¹ Refer to Figure 3 for flat slab concrete installation.

Maximum allowable pipe horizontal load, F_{pw} (lb) carbon steel
Hilti KB1 in 6,000 psi normal weight cracked concrete¹

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"																							
					A		B		C		D		E		F		G		H		I							
					30°-44°		45°-59°		60°-74°		75°-90°		30°-44°		45°-59°		60°-74°		75°-90°		30°-44°		45°-59°		60°-74°		75°-90°	
					Pr	4.100	Pr	1.580	Pr	0.870	Pr	1.850	Pr	1.520	Pr	2.320	Pr	2.900	Pr	3.440	Pr	3.710	Pr	2.620	Pr	2.140	Pr	1.920
in	in	in	in	in																								
1/2	2	6-1/4	6	5	190	412	598	368	344	311	269	227	184	260	318	355												
	3-1/4	5	9-3/4	6	307	622	876	561	504	478	438	369	280	396	485	541												

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 909 seismic brace											
					A	B	C		D	E	F		G	H	I	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
3/8	1-1/2	8	8	5	190	339	366	294	211	288	271	228	147	208	254	285
	2	3	6	5	261	430	458	381	264	375	380	352	191	270	330	370
1/2	2	6-1/4	6	5	294	527	569	456	328	447	420	352	228	323	395	442
	3-1/4	5	9-3/4	6	454	782	838	684	483	672	654	573	343	484	592	663
5/8	2-3/4	8	8-1/4	5	504	953	1038	810	598	793	688	567	406	573	701	785
	4	6-3/4	12	6	785	1347	1443	1179	832	1159	1132	995	591	835	1022	1143
3/4	3-1/4	9-1/2	9-3/4	5-1/2	612	1101	1189	951	685	932	874	730	476	673	823	922
	4-3/4	5-1/2	14-1/4	8	868	1430	1521	1267	877	1247	1264	1170	635	897	1098	1228

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 910/980 seismic brace											
					A	B	C		D	E	F		G	H	I	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°
in	in	in	in	in	Pr 2.930	Pr 1.290	Pr 0.750	Pr 0.960	Pr 1.310	Pr 1.670	Pr 1.970	Pr 2.250	Pr 1.920	Pr 1.360	Pr 1.110	Pr 0.990
3/8	1-1/2	8	8	5	167	304	416	364	239	255	255	225	182	257	315	352
	2	3	6	5	233	393	507	455	292	339	360	347	228	322	394	441
1/2	2	6-1/4	6	5	258	472	648	566	372	396	395	347	283	400	489	548
	3-1/4	5	9-3/4	6	401	706	941	833	541	600	617	565	417	588	721	806
5/8	2-3/4	8	8-1/4	5	430	841	1203	1031	691	694	639	560	515	728	892	998
	4	6-3/4	12	6	694	1217	1619	1435	931	1036	1068	982	717	1014	1242	1389
3/4	3-1/4	9-1/2	9-3/4	5-1/2	538	984	1354	1182	778	826	822	721	591	835	1022	1144
	4-3/4	5-1/2	14-1/4	8	773	1304	1685	1513	969	1125	1197	1154	757	1069	1310	1464

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace									
					A	B	C	D	E	F	G	H	I	
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
					2.520	1.070	1.380	1.620	1.420	2.250	2.750	1.940	1.590	
1/2	2	6-1/4	6	5	291	530	451	332	443	347	226	320	391	
	3-1/4	5	9-3/4	6	450	786	678	488	666	554	340	481	588	

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace								
					A 30°-44°	B 45°-59°	C 60°-90°	D 30°-44°	E 45°-59°	F 60°-90°	G 30°-44°	H 45°-59°	I 60°-90°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
in	in	in	in	in	4.170	2.000	0.960	1.970	2.380	2.960	1.930	1.360	1.110
1/2	2	6-1/4	6	5	187	347	566	295	305	264	282	400	489
	3-1/4	5	9-3/4	6	303	531	833	438	469	429	415	588	721
5/8	2-3/4	8	8-1/4	5	302	603	1031	531	524	425	514	728	892
	4	6-3/4	12	6	524	918	1435	756	811	746	716	1014	1242
3/4	3-1/4	9-1/2	9-3/4	5-1/2	389	724	1182	616	634	548	589	835	1022
	4-3/4	5-1/2	14-1/4	8	591	1006	1513	804	896	867	755	1069	1310

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF700 seismic brace								
					A 30°-44°	B 45°-59°	C 60°-90°	D 30°-44°	E 45°-59°	F 60°-90°	G 30°-44°	H 45°-59°	I 60°-90°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
in	in	in	in	in	2.550	1.090	0.910	1.410	1.450	2.000	1.830	1.290	1.060
1/2	2	6-1/4	6	5	289	524	583	358	437	390	291	412	503
	3-1/4	5	9-3/4	6	446	778	856	523	657	609	427	605	738
5/8	2-3/4	8	8-1/4	5	494	947	1067	661	773	630	532	754	919
	4	6-3/4	12	6	771	1341	1475	900	1134	1055	735	1042	1272
3/4	3-1/4	9-1/2	9-3/4	5-1/2	601	1095	1219	749	911	811	607	861	1050
	4-3/4	5-1/2	14-1/4	8	854	1423	1551	940	1222	1183	773	1095	1338

¹ Refer to Figure 3 for flat slab concrete installation.

Maximum allowable pipe horizontal load, F_{pw} (lb) carbon steel Hilti KB1
in the soffit of 3,000 psi or 4,000 psi lightweight concrete over metal deck — 2-in and 3-in W-deck profiles^{1,2}

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2" ¹							
					3,000 psi				4,000 psi			
					A	B	C		A	B	C	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	2	1 1/4	6	2-1/2	4.100	1.580	0.870	1.850	4.100	1.580	0.870	1.850
	3-1/4	1 1/4	9-3/4	2-1/2	83	194	292	172	89	204	304	181
					152	340	503	303	162	357	523	318

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 909 seismic brace							
					3,000 psi				4,000 psi			
					A	B	C		A	B	C	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
3/8	1-1/2	1-1/4	8	2-1/2	2.490	1.100	1.050	1.360	2.490	1.100	1.050	1.360
	2	1-1/4	6	2-1/2	84	145	148	128	87	148	152	131
1/2	2	1-1/4	6	2-1/2	150	270	278	235	155	278	286	242
	3-1/4	1-1/4	9-3/4	2-1/2	136	251	259	216	143	262	270	227
5/8	2-3/4	1-1/4	8-1/4	2-1/2	241	436	449	378	254	454	468	396
	4	1-1/4	12	2-1/2	239	430	443	374	268	470	484	412
3/4	3-1/4	1-1/4	9-3/4	2-1/2	310	564	581	489	348	617	635	539
					248	447	461	389	278	489	503	428

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 910/980 seismic brace							
					3,000 psi				4,000 psi			
					A	B	C		A	B	C	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
3/8	1-1/2	1-1/4	8	2-1/2	3.070	1.320	0.960	1.070	3.070	1.320	0.960	1.070
	2	1-1/4	6	2-1/2	72	130	156	147	74	133	160	151
1/2	2	1-1/4	6	2-1/2	126	240	294	275	131	247	302	283
	3-1/4	1-1/4	9-3/4	2-1/2	111	221	274	255	119	231	286	267
5/8	2-3/4	1-1/4	8-1/4	2-1/2	203	386	474	443	214	404	494	462
	4	1-1/4	12	2-1/2	202	382	468	438	227	420	509	478
3/4	3-1/4	1-1/4	9-3/4	2-1/2	261	499	614	574	294	550	669	627
					209	397	487	455	235	436	529	497

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace					
					3,000 psi			4,000 psi		
					A	B	C	A	B	C
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr
1/2	2	1-1/4	6	2-1/2	2.520	1.160	1.380	2.520	1.160	1.380
	3-1/4	1-1/4	9-3/4	2-1/2	134	242	214	142	253	224
					238	421	374	251	439	392

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace					
					3,000 psi			4,000 psi		
					A	B	C	A	B	C
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr
1/2	2	1-1/4	6	2-1/2	4.170	2.000	0.960	4.170	2.000	0.960
	3-1/4	1-1/4	9-3/4	2-1/2	82	162	274	88	170	286
5/8	2-3/4	1-1/4	8-1/4	2-1/2	149	286	474	160	300	494
	4	1-1/4	12	2-1/2	149	283	468	172	316	509
3/4	3-1/4	1-1/4	9-3/4	2-1/2	192	369	614	222	411	669
					155	294	487	179	328	529

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF700 seismic brace					
					3,000 psi			4,000 psi		
					A	B	C	A	B	C
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr
1/2	2	1-1/4	6	2-1/2	2.750	1.110	1.140	2.750	1.110	1.140
	3-1/4	1-1/4	9-3/4	2-1/2	124	249	245	132	260	256
5/8	2-3/4	1-1/4	8-1/4	2-1/2	222	433	426	234	452	444
	4	1-1/4	12	2-1/2	221	428	421	248	468	460
3/4	3-1/4	1-1/4	9-3/4	2-1/2	286	560	551	322	613	603
					229	445	437	257	486	478

¹ Anchor may be placed in upper or lower flute.

² Refer to Figure 4 for lightweight concrete on metal deck installations.

Maximum allowable pipe horizontal load, F_{pw} (lb)
Hilti KCM-WF and KCM-PD in 3,000 psi normal weight cracked concrete^{1,2}

Anchor size in	Nominal rod diameter in	Anchor rod	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"									
						A	B	C		D	E	F		G	H
						30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr
						4.100	1.580	0.870	1.850	1.520	2.320	2.900	3.440	3.710	2.620
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	151	318	457	285	263	241	213	180	142	201
	1/2	Gr.105	4-1/4	5	5	151	318	457	285	263	241	213	180	142	201
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5-1/4	6-1/4	5	211	445	641	399	368	338	298	251	199	282
3/8 - 1/2 - 5/8 - 3/4	1/2 ⁽¹⁾	Gr.105	7-1/2	9	5	376	777	1107	698	636	593	532	448	348	493

Anchor size in	Nominal rod diameter in	Anchor rod	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 909 seismic brace									
						A	B	C		D	E	F		G	H
						30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr
						2.490	1.080	0.950	1.360	1.650	1.400	1.830	2.220	2.710	1.920
1/4 - 3/8	3/8	Gr.36	3	3-1/2	5	130	231	248	200	143	196	187	158	100	142
	3/8	Gr.105	3	3-1/2	5	130	231	248	200	143	196	187	158	100	142
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	229	405	436	351	251	345	327	278	176	249
	1/2	Gr.105	4-1/4	5	5	229	405	436	351	251	345	327	278	176	249
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5-1/4	6-1/4	5	320	567	610	492	352	483	459	390	246	348
	5/8	Gr.36	5-1/4	6-1/4	5	320	567	610	492	352	483	459	390	246	348
	5/8	Gr.105	5-1/4	6-1/4	5	320	567	610	492	352	483	459	390	246	348
3/8 - 1/2 - 5/8 - 3/4	1/2 ⁽¹⁾	Gr.105	7-1/2	9	5	562	984	1057	856	609	841	807	695	429	606
	5/8 ⁽¹⁾	Gr.105	11-3/4	9	5	618	1169	1273	993	734	972	843	695	498	703
	3/4	Gr.36	16-1/2	9	5	574	1021	1100	884	634	868	821	695	443	626
	3/4	Gr.105	16-1/2	9	5	619	1272	1397	1067	805	1042	843	695	535	755

Anchor size in	Nominal rod diameter in	Anchor rod	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 910/980 seismic brace									
						A	B	C		D	E	F		G	H
						30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr
						2.930	1.290	0.750	0.960	1.310	1.670	1.970	2.250	1.920	1.360
1/4 - 3/8	3/8	Gr.36	3	3-1/2	5	115	207	281	247	162	174	176	156	123	174
	3/8	Gr.105	3	3-1/2	5	115	207	281	247	162	174	176	156	123	174
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	201	363	494	433	284	306	308	274	217	306
	1/2	Gr.105	4-1/4	5	5	201	363	494	433	284	306	308	274	217	306
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5-1/4	6-1/4	5	282	509	692	607	398	429	432	384	303	429
	5/8	Gr.36	5-1/4	6-1/4	5	282	509	692	607	398	429	432	384	303	429
	5/8	Gr.105	5-1/4	6-1/4	5	282	509	692	607	398	429	432	384	303	429
3/8 - 1/2 - 5/8 - 3/4	1/2 ⁽¹⁾	Gr.105	7-1/2	9	5	496	885	1193	1051	686	749	761	685	525	742
	5/8 ⁽¹⁾	Gr.105	11-3/4	9	5	526	1032	1476	1264	848	851	783	685	632	893
	3/4	Gr.36	16-1/2	9	5	505	915	1248	1094	718	770	773	685	547	772
	3/4	Gr.105	16-1/2	9	5	526	1111	1645	1386	944	905	783	685	693	979

Anchor size	Nominal rod diameter	Anchor rod	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace								
						A	B	C	D	E	F	G	H	I
						30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in		in	in	in	2.520	1.070	1.380	1.620	1.420	2.250	2.750	1.940	1.590
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	227	407	348	254	341	274	174	247	302
	1/2	Gr.105	4-1/4	5	5	227	407	348	254	341	274	174	247	302
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5-1/4	6-1/4	5	317	570	487	355	478	384	244	346	422
3/8 - 1/2 - 5/8 - 3/4	1/2 ⁽¹⁾	Gr.105	7-1/2	9	5	557	989	848	615	833	682	425	602	736

Anchor size	Nominal rod diameter	Anchor rod	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace								
						A 30°-44°	B 45°-59°	C 60°-90°	D 30°-44°	E 45°-59°	F 60°-90°	G 30°-44°	H 45°-59°	I 60°-90°
						Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
in	in		in	in	in	4.170	2.000	0.960	1.970	2.380	2.960	1.930	1.360	1.110
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	148	269	433	227	237	209	216	306	375
	1/2	Gr.105	4-1/4	5	5	148	269	433	227	237	209	216	306	375
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5-1/4	6-1/4	5	207	377	607	317	332	292	303	429	525
	5/8	Gr.36	5-1/4	6-1/4	5	207	377	607	317	332	292	303	429	525
	5/8	Gr.105	5-1/4	6-1/4	5	207	377	607	317	332	292	303	429	525
3/8 - 1/2 - 5/8 - 3/4	1/2 ⁽¹⁾	Gr.105	7-1/2	9	5	370	661	1051	551	582	521	524	742	909
	5/8 ⁽¹⁾	Gr.105	11-3/4	9	5	370	739	1264	651	642	521	630	893	1094
	3/4	Gr.36	16-1/2	9	5	370	677	1094	571	595	521	545	772	946
	3/4	Gr.105	16-1/2	9	5	370	771	1386	706	648	521	690	979	1199

Anchor size	Nominal rod diameter	Anchor rod	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF700 seismic brace										
						A	B	C	D	E	F	G	H	I		
						30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°		
in	in		in	in		Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	2.550	1.090	0.910	1.410	1.450	2.000	1.830	1.290	1.060		
	1/2	Gr.105	4-1/4	5	5	225	403	446	274	337	305	223	315	385		
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5-1/4	6-1/4	5	314	564	625	383	472	426	312	441	539		
	5/8	Gr.36	5-1/4	6-1/4	5	314	564	625	383	472	426	312	441	539		
	5/8	Gr.105	5-1/4	6-1/4	5	314	564	625	383	472	426	312	441	539		
3/8 - 1/2 - 5/8 - 3/4	1/2 ⁽¹⁾	Gr.105	7-1/2	9	5	552	978	1081	661	822	751	539	764	932		
	5/8 ⁽¹⁾	Gr.105	11-3/4	9	5	605	1161	1309	811	947	771	652	924	1127		
	3/4	Gr.36	16-1/2	9	5	564	1015	1127	691	848	764	562	796	971		
	3/4	Gr.105	16-1/2	9	5	605	1263	1440	898	1014	771	717	1017	1239		

1 Only ASTM A193 Grade B7, ASTM A325, or ASTM F1554 Grade 105 threaded rod is permitted with smaller interior thread diameter. A36 threaded rod (or stronger) can be used with largest thread diameter per insert.

2 Refer to Figure 3 for flat slab concrete installation.

Maximum allowable pipe horizontal load, F_{pw} (lb)
Hilti KCM-WF and KCM-PD in 4,000 psi normal weight cracked concrete^{1,2}

Anchor size in	Nominal rod diameter in	Anchor rod	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"											
						A	B	C		D	E	F		G	H	I	
						30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr
						4.100	1.580	0.870	1.850	1.520	2.320	2.900	3.440	3.710	2.620	2.140	1.920
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	174	360	513	323	295	274	246	207	161	228	279	312
	1/2	Gr.105	4-1/4	5	5	174	367	528	329	304	279	246	207	164	232	285	317
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5	6-1/4	5	244	514	740	461	425	390	344	290	230	326	399	444
3/8 - 1/2 - 5/8 - 3/4	1/2 ⁽¹⁾	Gr.105	6-1/2	9	5	425	853	1190	770	684	658	614	518	384	544	666	742

Anchor size in	Nominal rod diameter in	Anchor rod	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 909 seismic brace											
						A	B	C		D	E	F		G	H	I	
						30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr
						2.490	1.080	0.950	1.360	1.650	1.400	1.830	2.220	2.710	1.920	1.570	1.400
1/4 - 3/8	3/8	Gr.36	3	3-1/2	5	147	255	274	223	158	219	211	183	112	158	193	216
	3/8	Gr.105	3	3-1/2	5	150	266	287	231	165	227	215	183	116	164	200	224
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	260	455	489	396	282	389	373	321	199	281	343	384
	1/2	Gr.105	4-1/4	5	5	264	468	503	405	290	398	378	321	203	287	351	393
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5	6-1/4	5	370	655	705	568	406	557	529	450	285	402	492	551
	5/8	Gr.36	5	6-1/4	5	370	655	705	568	406	557	529	450	285	402	492	551
3/8 - 1/2 - 5/8 - 3/4	5/8	Gr.105	5	6-1/4	5	370	655	705	568	406	557	529	450	285	402	492	551
	1/2 ⁽¹⁾	Gr.105	6-1/2	9	5	626	1066	1139	935	657	919	904	802	469	662	810	906
	5/8 ⁽¹⁾	Gr.105	10-1/4	9	5	696	1286	1395	1101	804	1078	973	802	552	779	953	1067
	3/4	Gr.36	16-1/2	9	5	641	1110	1190	969	686	952	922	802	486	686	839	939
	3/4	Gr.105	16-1/2	9	5	715	1469	1613	1232	929	1204	973	802	618	872	1067	1195
	3/4	Gr.105	16-1/2	9	5	715	1469	1613	1232	929	1204	973	802	618	872	1067	1195

Anchor size in	Nominal rod diameter in	Anchor rod	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 910/980 seismic brace											
						A	B	C		D	E	F		G	H	I	
						30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr
						2.930	1.290	0.750	0.960	1.310	1.670	1.970	2.250	1.920	1.360	1.110	0.990
1/4 - 3/8	3/8	Gr.36	3	3-1/2	5	130	230	309	273	178	195	199	181	136	193	236	264
	3/8	Gr.105	3	3-1/2	5	132	239	325	285	187	201	203	181	143	201	247	276
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	229	410	553	487	318	347	352	317	243	344	421	471
	1/2	Gr.105	4-1/4	5	5	232	419	570	500	328	354	356	317	250	353	433	484
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5	6-1/4	5	326	587	799	701	459	495	499	444	350	495	606	678
	5/8	Gr.36	5	6-1/4	5	326	587	799	701	459	495	499	444	350	495	606	678
3/8 - 1/2 - 5/8 - 3/4	5/8	Gr.105	5	6-1/4	5	326	587	799	701	459	495	499	444	350	495	606	678
	1/2 ⁽¹⁾	Gr.105	6-1/2	9	5	554	965	1275	1133	734	823	853	791	567	801	981	1097
	5/8 ⁽¹⁾	Gr.105	10-1/4	9	5	608	1142	1605	1386	922	949	904	791	693	979	1199	1342
	3/4	Gr.36	16-1/2	9	5	566	1001	1339	1184	770	849	869	791	592	836	1024	1146
	3/4	Gr.105	16-1/2	9	5	608	1283	1899	1601	1090	1045	904	791	800	1130	1385	1550
	3/4	Gr.105	16-1/2	9	5	608	1283	1899	1601	1090	1045	904	791	800	1130	1385	1550

Anchor size	Nominal rod diameter	Anchor rod	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afccon™ AF075/AF076/AF077 seismic brace								
						A 30°-44°	B 45°-59°	C 60°-90°	D 30°-44°	E 45°-59°	F 60°-90°	G 30°-44°	H 45°-59°	I 60°-90°
						Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
in	in		in	in	in	2.520	1.070	1.380	1.620	1.420	2.250	2.750	1.940	1.590
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	258	458	393	285	386	316	197	279	341
	1/2	Gr.105	4-1/4	5	5	262	470	402	293	394	317	201	285	348
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5	6-1/4	5	366	658	563	410	552	444	282	399	488
3/8 - 1/2 - 5/8 - 3/4	1/2 ⁽¹⁾	Gr.105	6-1/2	9	5	620	1071	927	663	911	767	464	658	804

Anchor size	Nominal rod diameter	Anchor rod	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afccon™ AF771 seismic brace								
						A 30°-44°	B 45°-59°	C 60°-90°	D 30°-44°	E 45°-59°	F 60°-90°	G 30°-44°	H 45°-59°	I 60°-90°
						Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
in	in		in	in	in	4.170	2.000	0.960	1.970	2.380	2.960	1.930	1.360	1.110
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	171	306	487	255	269	241	243	344	421
	1/2	Gr.105	4-1/4	5	5	171	311	500	262	273	241	249	353	433
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5	6-1/4	5	239	436	701	367	383	337	349	495	606
	5/8	Gr.36	5	6-1/4	5	239	436	701	367	383	337	349	495	606
	5/8	Gr.105	5	6-1/4	5	239	436	701	367	383	337	349	495	606
3/8 - 1/2 - 5/8 - 3/4	1/2 ⁽¹⁾	Gr.105	6-1/2	9	5	419	730	1133	598	646	602	565	801	981
	5/8 ⁽¹⁾	Gr.105	10-1/4	9	5	427	828	1386	718	722	602	691	979	1199
	3/4	Gr.36	16-1/2	9	5	426	751	1184	622	662	602	590	836	1024
	3/4	Gr.105	16-1/2	9	5	427	890	1601	816	748	602	797	1130	1385

Anchor size	Nominal rod diameter	Anchor rod	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afccon™ AF700 seismic brace										
						A	B	C	D	E	F	G	H	I		
						30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°		
in	in		in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	256	453	501	306	381	348	250	354	432		
	1/2	Gr.105	4-1/4	5	5	259	465	515	316	389	352	257	364	444		
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5	6-1/4	5	363	651	722	442	545	492	360	510	622		
	5/8	Gr.36	5	6-1/4	5	363	651	722	442	545	492	360	510	622		
	5/8	Gr.105	5	6-1/4	5	363	651	722	442	545	492	360	510	622		
3/8 - 1/2 - 5/8 - 3/4	1/2 ⁽¹⁾	Gr.105	6-1/2	9	5	615	1060	1164	709	900	843	581	822	1004		
	5/8 ⁽¹⁾	Gr.105	10-1/4	9	5	682	1278	1433	884	1052	890	714	1012	1234		
	3/4	Gr.36	16-1/2	9	5	629	1104	1217	743	931	859	607	860	1049		
	3/4	Gr.105	16-1/2	9	5	698	1459	1663	1037	1171	890	828	1174	1431		

Maximum allowable pipe horizontal load, F_{pw} (lb)
Hilti KCM-WF and KCM-PD in 5,000 psi normal weight cracked concrete^{1,2}

Anchor size in	Nominal rod diameter in	Anchor rod	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"								30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr
						A	B	C		D	E	F	G	H	I		
						30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	192	387	543	349	312	298	275	232	174	246	302	336
	1/2	Gr.105	4-1/4	5	5	194	411	591	368	339	312	275	232	184	260	318	355
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5	6-1/4	5	272	575	827	515	475	436	385	325	257	364	446	497
3/8 - 1/2 - 5/8 - 3/4	1/2 ⁽¹⁾	Gr.105	5-3/4	9	5	465	914	1254	828	721	712	683	579	413	585	716	799

Anchor size in	Nominal rod diameter in	Anchor rod	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 909 seismic brace								30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr
						A	B	C		D	E	F	G	H	I		
						30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr
1/4 - 3/8	3/8	Gr.36	3	3-1/2	5	159	272	290	238	167	234	230	205	119	169	206	231
	3/8	Gr.105	3	3-1/2	5	168	298	321	258	185	253	241	205	129	183	224	250
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	283	485	519	425	299	417	408	359	213	301	368	412
	1/2	Gr.105	4-1/4	5	5	295	523	563	453	324	445	423	359	227	321	393	440
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5	6-1/4	5	413	732	788	635	454	623	592	503	318	449	550	615
	5/8	Gr.36	5	6-1/4	5	409	718	772	624	445	613	587	503	313	442	541	605
	5/8	Gr.105	5	6-1/4	5	413	732	788	635	454	623	592	503	318	449	550	615
3/8 - 1/2 - 5/8 - 3/4	1/2 ⁽¹⁾	Gr.105	5-3/4	9	5	678	1130	1204	998	694	981	984	897	500	706	864	967
	5/8 ⁽¹⁾	Gr.105	9-1/4	9	5	761	1381	1493	1189	861	1165	1083	897	596	841	1029	1152
	3/4	Gr.36	16	9	5	695	1180	1261	1036	727	1019	1006	897	519	734	898	1004
	3/4	Gr.105	16	9	5	800	1598	1750	1346	1008	1316	1088	897	675	953	1166	1305

Anchor size in	Nominal rod diameter in	Anchor rod	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 910/980 seismic brace								30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr
						A	B	C		D	E	F	G	H	I		
						30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr
1/4 - 3/8	3/8	Gr.36	3	3-1/2	5	141	246	325	289	187	210	218	202	144	204	250	280
	3/8	Gr.105	3	3-1/2	5	148	267	363	319	209	225	227	202	159	225	276	308
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	250	438	582	516	335	373	385	354	258	365	447	500
	1/2	Gr.105	4-1/4	5	5	260	469	638	559	367	395	398	354	280	395	484	542
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5	6-1/4	5	364	657	893	783	513	554	557	496	392	553	678	758
	5/8	Gr.36	5	6-1/4	5	361	645	872	767	502	545	553	496	384	542	664	743
	5/8	Gr.105	5	6-1/4	5	364	657	893	783	513	554	557	496	392	553	678	758
3/8 - 1/2 - 5/8 - 3/4	1/2 ⁽¹⁾	Gr.105	5-3/4	9	5	603	1028	1339	1198	770	883	931	885	599	846	1037	1159
	5/8 ⁽¹⁾	Gr.105	9-1/4	9	5	667	1231	1706	1484	981	1030	1011	885	742	1048	1284	1437
	3/4	Gr.36	16	9	5	616	1069	1409	1254	811	914	950	885	627	886	1085	1214
	3/4	Gr.105	16	9	5	679	1401	2050	1737	1177	1146	1011	885	869	1227	1503	1682

Anchor size in	Nominal rod diameter in	Anchor rod	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF075/AF076/AF077 seismic brace								30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr
						A	B	C	D	E	F	G	H						
						30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr						
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	280	487	421	302	414	346	211	299	365					
	1/2	Gr.105	4-1/4	5	5	293	526	449	328	441	354	225	319	390					
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5	6-1/4	5	410	736	629	459	617	496	315	446	545					
3/8 - 1/2 - 5/8 - 3/4	1/2 ⁽¹⁾	Gr.105	5-3/4	9	5	672	1135	989	700	973	839	496	702	858					

Anchor size in	Nominal rod diameter in	Anchor rod	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF771 seismic brace								30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr
						A	B	C	D	E	F	G	H						
						30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr						
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	189	331	516	272	292	269	257	365	447					
	1/2	Gr.105	4-1/4	5	5	191	348	559	293	306	269	279	395	484					
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5	6-1/4	5	268	487	783	410	428	377	391	553	678					
	5/8	Gr.36	5	6-1/4	5	268	481	767	402	423	377	383	542	664					
	5/8	Gr.105	5	6-1/4	5	268	487	783	410	428	377	391	553	678					
3/8 - 1/2 - 5/8 - 3/4	1/2 ⁽¹⁾	Gr.105	5-3/4	9	5	459	787	1198	635	700	672	597	846	1037					
	5/8 ⁽¹⁾	Gr.105	9-1/4	9	5	477	902	1484	772	788	673	740	1048	1284					
	3/4	Gr.36	16	9	5	467	811	1254	662	718	673	625	886	1085					
	3/4	Gr.105	16	9	5	477	989	1737	888	837	673	865	1227	1503					

Anchor size in	Nominal rod diameter in	Anchor rod	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF700 seismic brace								30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr
						A	B	C	D	E	F	G	H						
						30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr						
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	278	483	531	324	408	380	265	375	458					
	1/2	Gr.105	4-1/4	5	5	290	520	576	353	435	393	287	407	497					
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5	6-1/4	5	406	728	807	494	609	551	402	570	695					
	5/8	Gr.36	5	6-1/4	5	402	714	790	483	599	546	394	558	681					
	5/8	Gr.105	5	6-1/4	5	406	728	807	494	609	551	402	570	695					
3/8 - 1/2 - 5/8 - 3/4	1/2 ⁽¹⁾	Gr.105	5-3/4	9	5	666	1124	1229	746	962	920	613	868	1060					
	5/8 ⁽¹⁾	Gr.105	9-1/4	9	5	747	1373	1531	942	1138	995	763	1081	1319					
	3/4	Gr.36	16	9	5	684	1174	1288	784	997	938	642	909	1110					
	3/4	Gr.105	16	9	5	781	1587	1803	1122	1281	995	898	1273	1552					

1 Only ASTM A193 Grade B7, ASTM A325, or ASTM F1554 Grade 105 threaded rod is permitted with smaller interior thread diameter. A36 threaded rod (or stronger) can be used with largest thread diameter per insert.

2 Refer to Figure 3 for flat slab concrete installation.

Maximum allowable pipe horizontal load, F_{pw} (lb)
Hilti KCM-WF and KCM-PD in 6,000 psi normal weight cracked concrete^{1,2}

Anchor size	Nominal rod diameter	Anchor rod	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"																	
						A		B		C		D		E		F		G		H		I	
						30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°		
in	in		in	in	in	4.100	1.580	0.870	1.850	1.520	2.320	2.900	3.440	3.710	2.620	2.140	1.920						
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	206	410	567	371	326	318	301	254	185	262	321	357						
	1/2	Gr.105	4-1/4	5	5	213	450	647	403	372	341	301	254	201	285	349	389						
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5	6-1/4	5	298	630	906	564	521	478	422	356	282	399	488	544						
3/8 - 1/2 - 5/8 - 3/4	1/2 ⁽¹⁾	Gr.105	5-1/4	9	5	500	964	1306	877	751	758	736	634	438	620	759	846						

Anchor size in	Nominal rod diameter in	Anchor rod	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 909 seismic brace											
						A	B	C		D	E	F		G	H	I	
						30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr
						2.490	1.080	0.950	1.360	1.650	1.400	1.830	2.220	2.710	1.920	1.570	1.400
1/4 - 3/8	3/8	Gr.36	3	3-1/2	5	170	285	304	251	175	247	247	224	126	178	218	244
	3/8	Gr.105	3	3-1/2	5	184	326	351	283	202	278	264	224	142	200	245	274
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	302	509	544	448	313	441	438	393	225	317	388	434
	1/2	Gr.105	4-1/4	5	5	323	573	616	497	355	487	463	393	249	352	430	482
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5	6-1/4	5	453	802	863	695	498	683	648	551	349	492	602	674
	5/8	Gr.36	5	6-1/4	5	438	756	810	661	467	649	631	551	331	468	572	641
	5/8	Gr.105	5	6-1/4	5	453	802	863	695	498	683	648	551	349	492	602	674
	1/2 ⁽¹⁾	Gr.105	5-1/4	9	5	722	1182	1256	1050	724	1033	1053	982	526	743	909	1017
3/8 - 1/2 - 5/8 - 3/4	5/8 ⁽¹⁾	Gr.105	8-1/4	9	5	817	1460	1574	1263	908	1239	1168	982	633	894	1094	1224
	3/4	Gr.36	14-1/2	9	5	742	1237	1318	1092	760	1074	1078	982	547	773	946	1059
	3/4	Gr.105	14-1/2	9	5	876	1705	1862	1442	1073	1411	1192	982	723	1021	1249	1399

Anchor size in	Nominal rod diameter in	Anchor rod	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 910/980 seismic brace											
						A	B	C		D	E	F		G	H	I	
						30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr
						2.930	1.290	0.750	0.960	1.310	1.670	1.970	2.250	1.920	1.360	1.110	0.990
1/4 - 3/8	3/8	Gr.36	3	3-1/2	5	151	259	338	302	195	222	234	221	151	214	262	293
	3/8	Gr.105	3	3-1/2	5	162	293	398	349	229	247	248	221	175	247	302	338
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	268	462	607	541	349	396	413	388	270	382	468	523
	1/2	Gr.105	4-1/4	5	5	285	514	699	613	402	433	436	388	306	433	530	593
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5	6-1/4	5	399	719	978	858	562	606	611	544	429	606	743	831
	5/8	Gr.36	5	6-1/4	5	387	682	911	806	524	580	595	544	403	569	698	780
	5/8	Gr.105	5	6-1/4	5	399	719	978	858	562	606	611	544	429	606	743	831
	1/2 ⁽¹⁾	Gr.105	5-1/4	9	5	644	1080	1389	1250	800	933	997	969	625	883	1082	1210
3/8 - 1/2 - 5/8 - 3/4	5/8 ⁽¹⁾	Gr.105	8-1/4	9	5	718	1307	1790	1565	1029	1098	1099	969	782	1105	1354	1515
	3/4	Gr.36	14-1/2	9	5	660	1125	1466	1311	843	967	1019	969	656	927	1135	1269
	3/4	Gr.105	14-1/2	9	5	744	1500	2172	1849	1247	1231	1107	969	925	1306	1600	1791

Anchor size	Nominal rod diameter	Anchor rod	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace								
						A 30°-44°	B 45°-59°	C 60°-90°	D 30°-44°	E 45°-59°	F 60°-90°	G 30°-44°	H 45°-59°	I 60°-90°
						Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
in	in		in	in	in	2.520	1.070	1.380	1.620	1.420	2.250	2.750	1.940	1.590
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	300	512	444	316	437	372	223	315	385
	1/2	Gr.105	4-1/4	5	5	320	576	492	359	483	388	247	349	427
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5	6-1/4	5	449	806	689	503	676	544	345	489	598
3/8 - 1/2 - 5/8 - 3/4	1/2 ⁽¹⁾	Gr.105	5-1/4	9	5	716	1188	1041	730	1025	901	522	739	903

Anchor size	Nominal rod diameter	Anchor rod	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace								
						A	B	C	D	E	F	G	H	I
						30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in		in	in	in	4.170	2.000	0.960	1.970	2.380	2.960	1.930	1.360	1.110
3/8 - 1/2	1/2	Gr.36	4-1/4	5	5	204	352	541	286	312	295	270	382	468
	1/2	Gr.105	4-1/4	5	5	209	381	613	321	335	295	306	433	530
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5	6-1/4	5	293	534	858	449	469	413	428	606	743
	5/8	Gr.36	5	6-1/4	5	292	513	806	424	453	413	402	569	698
	5/8	Gr.105	5	6-1/4	5	293	534	858	449	469	413	428	606	743
3/8 - 1/2 - 5/8 - 3/4	1/2 ⁽¹⁾	Gr.105	5-1/4	9	5	493	835	1250	665	745	724	624	883	1082
	5/8 ⁽¹⁾	Gr.105	8-1/4	9	5	523	965	1565	817	846	737	780	1105	1354
	3/4	Gr.36	14-1/2	9	5	503	862	1311	695	766	735	654	927	1135
	3/4	Gr.105	14-1/2	9	5	523	1066	1849	949	916	737	921	1306	1600

Anchor size	Nominal rod diameter	Anchor rod	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF700 seismic brace										
						A	B	C	D	E	F	G	H	I		
						30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°		
in	in		in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	
3/8 - 1/2	1/2	Gr. 36	4-1/4	5	5	2.550	1.090	0.910	1.410	1.450	2.000	1.830	1.290	1.060		
	1/2	Gr.105	4-1/4	5	5	297	507	555	338	432	409	277	392	479		
3/8 - 1/2 - 5/8	1/2 ⁽¹⁾	Gr.105	5	6-1/4	5	318	570	631	387	476	431	315	446	544		
	5/8	Gr. 36	5	6-1/4	5	445	798	884	542	667	603	441	624	762		
	5/8	Gr. 36	5	6-1/4	5	430	752	829	506	635	588	413	585	714		
3/8 - 1/2 - 5/8 - 3/4	5/8	Gr.105	5	6-1/4	5	445	798	884	542	667	603	441	624	762		
	1/2 ⁽¹⁾	Gr.105	5-1/4	9	5	710	1177	1281	776	1013	986	639	905	1105		
	5/8 ⁽¹⁾	Gr.105	8-1/4	9	5	802	1452	1613	990	1210	1085	804	1139	1390		
	3/4	Gr. 36	14-1/2	9	5	730	1231	1345	817	1053	1007	671	950	1160		
	3/4	Gr.105	14-1/2	9	5	855	1694	1917	1190	1374	1090	955	1353	1651		

1 Only ASTM A193 Grade B7, ASTM A325, or ASTM F1554 Grade 105 threaded rod is permitted with smaller interior thread diameter. A36 threaded rod (or stronger) can be used with largest thread diameter per insert.

2 Refer to Figure 3 for flat slab concrete installation.

Maximum allowable pipe horizontal load, F_{pw} (lb) Hilti KCM-MD in the soffit of 3,000 psi or 4,000 psi lightweight concrete over metal deck 2-in and 3-in W-deck profiles^{1,2,3}

Anchor size in	Nominal rod diameter in	Anchor rod	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"							
						3,000 psi				4,000 psi			
						A 30°-44°	B 45°-59°	C 60°-74°	C 75°-90°	A 30°-44°	B 45°-59°	C 60°-74°	C 75°-90°
						Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
3/8 - 1/2	1/2	Gr.36	1 1/4	6	2-1/2	4.100	1.580	0.870	1.850	4.100	1.580	0.870	1.850
	1/2	Gr.105	1 1/4	6	2-1/2	117	271	408	240	135	301	445	268
3/8 - 1/2 - 5/8	1/2 ⁽²⁾	Gr.105	1 1/4	7-1/2	3-1/4	134	332	517	292	154	372	570	328

Anchor size in	Nominal rod diameter in	Anchor rod	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 909 seismic brace							
						3,000 psi				4,000 psi			
						A 30°-44°	B 45°-59°	C 60°-74°	C 75°-90°	A 30°-44°	B 45°-59°	C 60°-74°	C 75°-90°
						Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/4 - 3/8	3/8	Gr.36	1-1/4	5-1/2	2-1/2	2.490	1.100	1.050	1.360	2.490	1.100	1.050	1.360
	3/8	Gr.105	1-1/4	5-1/2	2-1/2	134	236	243	207	150	257	263	226
3/8 - 1/2	3/8 ⁽²⁾	Gr.105	1-1/4	6	2-1/2	188	346	357	299	211	380	391	330
	1/2	Gr.36	1-1/4	6	2-1/2	190	351	362	303	213	385	397	335
	1/2	Gr.105	1-1/4	6	2-1/2	192	372	384	318	221	411	424	354
3/8 - 1/2 - 5/8	1/2 ⁽²⁾	Gr.105	1-1/4	7-1/2	3-1/4	220	438	453	373	254	486	502	416
	5/8	Gr.36	1-1/4	7-1/2	3-1/4	220	441	456	376	254	490	506	419
	5/8	Gr.105	1-1/4	7-1/2	3-1/4	220	441	456	376	254	490	506	419
5/8 - 3/4	5/8 ⁽²⁾	Gr.105	1-1/4	7-1/2	3-1/4	220	423	438	363	252	468	483	403
	3/4	Gr.36	1-1/4	7-1/2	3-1/4	220	441	456	376	254	490	506	419
	3/4	Gr.105	1-1/4	7-1/2	3-1/4	220	441	456	376	254	490	506	419

Anchor size in	Nominal rod diameter in	Anchor rod	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 910/980 seismic brace							
						3,000 psi				4,000 psi			
						A 30°-44°	B 45°-59°	C 60°-74°	C 75°-90°	A 30°-44°	B 45°-59°	C 60°-74°	C 75°-90°
						Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/4 - 3/8	3/8	Gr.36	1-1/4	6	2-1/2	3.070	1.320	0.960	1.070	3.070	1.320	0.960	1.070
	3/8	Gr.105	1-1/4	6	2-1/2	114	211	255	240	128	231	276	261
3/8 - 1/2	3/8 ⁽²⁾	Gr.105	1-1/4	6	2-1/2	118	251	317	293	136	280	350	325
	1/2	Gr.36	1-1/4	6	2-1/2	156	305	378	352	178	337	413	386
	1/2	Gr.105	1-1/4	6	2-1/2	156	309	383	357	180	342	420	392
3/8 - 1/2 - 5/8	1/2 ⁽²⁾	Gr.105	1-1/4	7-1/2	3-1/4	156	325	409	379	180	362	450	419
	5/8	Gr.36	1-1/4	7-1/2	3-1/4	178	382	483	447	206	426	534	495
	5/8	Gr.105	1-1/4	7-1/2	3-1/4	178	384	487	450	206	429	538	499
5/8 - 3/4	5/8 ⁽²⁾	Gr.105	1-1/4	7-1/2	3-1/4	178	384	487	450	206	429	538	499
	3/4	Gr.36	1-1/4	7-1/2	3-1/4	178	371	465	432	206	412	512	477
	3/4	Gr.105	1-1/4	7-1/2	3-1/4	178	384	487	450	206	429	538	499

Anchor size in	Nominal rod diameter in	Anchor rod	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF075/AF076/AF077 seismic brace					
						3,000 psi			4,000 psi		
						A 30°-44°	B 45°-59°	C 60°-90°	A 30°-44°	B 45°-59°	C 60°-90°
						Pr	Pr	Pr	Pr	Pr	Pr
3/8 - 1/2	1/2	Gr.36	1-1/4	6	2-1/2	2.520	1.160	1.380	2.520	1.160	1.380
	1/2	Gr.105	1-1/4	6	2-1/2	188	338	299	211	372	331
						190	358	315	218	396	350

Anchor size in	Nominal rod diameter in	Anchor rod	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF771 seismic brace					
						3,000 psi			4,000 psi		
						A 30°-44°	B 45°-59°	C 60°-90°	A 30°-44°	B 45°-59°	C 60°-90°
						Pr	Pr	Pr	Pr	Pr	Pr
3/8 - 1/2	1/2	Gr.36	1-1/4	6	2-1/2	4.170	2.000	0.960	4.170	2.000	0.960
	1/2	Gr.105	1-1/4	6	2-1/2	115	226	383	132	253	420
3/8 - 1/2 - 5/8	1/2 ⁽²⁾	Gr.105	1-1/4	7-1/2	3-1/4	115	235	409	132	264	450
	5/8	Gr.36	1-1/4	7-1/2	3-1/4	131	274	483	152	308	534
	5/8	Gr.105	1-1/4	7-1/2	3-1/4	131	274	487	152	310	538
5/8 - 3/4	5/8 ⁽²⁾	Gr.105	1-1/4	7-1/2	3-1/4	131	274	487	152	310	538
	3/4	Gr.36	1-1/4	7-1/2	3-1/4	131	268	465	152	301	512
	3/4	Gr.105	1-1/4	7-1/2	3-1/4	131	274	487	152	310	538

Anchor size in	Nominal rod diameter in	Anchor rod	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF700 seismic brace					
						3,000 psi			4,000 psi		
						A 30°-44°	B 45°-59°	C 60°-90°	A 30°-44°	B 45°-59°	C 60°-90°
						Pr	Pr	Pr	Pr	Pr	Pr
3/8 - 1/2	1/2	Gr. 36	1 1/4	6	2-1/2	2.750	1.110	1.140	2.750	1.110	1.140
	1/2	Gr. 105	1 1/4	6	2-1/2	174	349	342	197	383	377
3/8 - 1/2 - 5/8	1/2 ⁽²⁾	Gr. 105	1 1/4	7-1/2	3-1/4	174	369	362	201	408	401
	5/8	Gr. 36	1 1/4	7-1/2	3-1/4	199	435	427	230	483	474
	5/8	Gr. 105	1 1/4	7-1/2	3-1/4	199	438	430	230	486	477
5/8 - 3/4	5/8 ⁽²⁾	Gr. 105	1 1/4	7-1/2	3-1/4	199	438	430	230	486	477
	3/4	Gr. 36	1 1/4	7-1/2	3-1/4	199	421	413	230	465	457
	3/4	Gr. 105	1 1/4	7-1/2	3-1/4	199	438	430	230	486	477

1 Anchor may be placed in upper or lower flute.

2 Only ASTM A193 Grade B7, ASTM A325, or ASTM F1554 Grade 105 threaded rod is permitted with smaller interior thread diameter. A36 threaded rod (or stronger) can be used with largest thread diameter per insert.

3 Refer to Figure 4 for lightweight concrete on metal deck installations.

Maximum allowable pipe horizontal load, F_{pw} (lb)
Hilti KCC-WF in 3,000 psi normal weight cracked concrete with grade 105 or A193 B7 threaded rod¹

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"															
					C				D		E		F		G		H		I	
					A 30°-44°	B 45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
in	in	in	in	in	4.100	1.580	0.870	1.850	1.520	2.320	2.900	3.440	3.710	2.620	2.140	1.920				
KCC-WF	1/2	5-1/4	6-1/4	5	211	445	641	399	368	338	298	251	199	282	345	385				

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 909 seismic brace													
					A	B	C		D		E		F		G	H	I	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°		
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr		
					2.490	1.080	0.950	1.360	1.650	1.400	1.830	2.220	2.710	1.920	1.570	1.400		
KCC-WF	3/8	4-1/4	5	5	229	405	436	351	251	345	327	278	176	249	304	340		
	1/2	5-1/4	6-1/4	5	320	567	610	492	352	483	459	390	246	348	426	477		

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 910/980 seismic brace																	
					A		B		C		D		E		F		G		H		I	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°		
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr			
					2.930	1.290	0.750	0.960	1.310	1.670	1.970	2.250	1.920	1.360	1.110	0.990						
KCC-WF	3/8	4-1/4	5	5	201	363	494	433	284	306	308	274	217	306	375	420						
	1/2	5-1/4	6-1/4	5	282	509	692	607	398	429	432	384	303	429	525	587						

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace								
					A	B	C	D	E	F	G	H	I
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
KCC-WF	1/2	5-1/4	6-1/4	5	2.520	1.070	1.380	1.620	1.420	2.250	2.750	1.940	1.590
					317	570	487	355	478	384	244	346	422

Anchor in	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace								
					A	B	C	D	E	F	G	H	I
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
KCC-WF	1/2	5-1/4	6-1/4	5	207	377	607	317	332	292	1.930	1.360	1.110

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF700 seismic brace									
					A	B	C	D	E	F	G	H	I	
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
KCC-WF	1/2	5-1/4	6-1/4	5	2.550	1.090	0.910	1.410	1.450	2.000	1.830	1.290	1.060	
					314	564	625	383	472	426	312	441	539	

¹ Refer to Figure 3 for flat slab concrete installation.

Maximum allowable pipe horizontal load, F_{pw} (lb)

Hilti KCC-WF in 4,000 psi normal weight cracked concrete with grade 105 or A193 B7 threaded rod¹

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"													
					C				D		E		F		G	H	I	
					A 30°-44°	B 45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°		
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr		
in	in	in	in	in	4.100	1.580	0.870	1.850	1.520	2.320	2.900	3.440	3.710	2.620	2.140	1.920		
KCC-WF	1/2	5	6-1/4	5	244	514	740	461	425	390	344	290	230	326	399	444		

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 909 seismic brace											
					A	B	C		D	E	F		G	H	I	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
in	in	in	in	in	2,490	1,080	0,950	1,360	1,650	1,400	1,830	2,220	2,710	1,920	1,570	1,400
KCC-WF	3/8	4-1/4	5	5	264	468	503	405	290	398	378	321	203	287	351	393
	1/2	5	6-1/4	5	370	655	705	568	406	557	529	450	285	402	492	551

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 910/980 seismic brace																	
					A		B		C		D		E		F		G		H		I	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°		
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr			
					2.930	1.290	0.750	0.960	1.310	1.670	1.970	2.250	1.920	1.360	1.110	0.990						
KCC-WF	3/8	4-1/4	5	5	232	419	570	500	328	354	356	317	250	353	433	484						
	1/2	5	6-1/4	5	326	587	799	701	459	495	499	444	350	495	606	678						

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace								
					A	B	C	D	E	F	G	H	I
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
KCC-WF	1/2	5	6-1/4	5	366	658	563	410	552	444	282	399	488

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace								
					A	B	C	D	E	F	G	H	I
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
KCC-WF	1/2	5	6-1/4	5	4.170	2.000	0.960	1.970	2.380	2.960	1.930	1.360	1.110
					239	436	701	367	383	337	349	495	606

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF700 seismic brace								
					A	B	C	D	E	F	G	H	I
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
KCC-WF	1/2	5	6-1/4	5	2,550	1,090	0,910	1,410	1,450	2,000	1,830	1,290	1,060
					363	651	722	442	545	492	360	510	622

¹ Refer to Figure 3 for flat slab concrete installation.

Maximum allowable pipe horizontal load, F_{pw} (lb)

Hilti KCC-WF in 5,000 psi normal weight cracked concrete with grade 105 or A193 B7 threaded rod¹

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"																	
					A		B		C		D		E		F		G		H		I	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°		
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr			
					4.100	1.580	0.870	1.850	1.520	2.320	2.900	3.440	3.710	2.620	2.140	1.920						
KCC-WF	1/2	5	6-1/4	5	272	568	813	510	467	432	385	325	254	360	441	492						

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 909 seismic brace											
					A	B	C		D	E	F		G	H	I	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
in	in	in	in	in	2.490	1.080	0.950	1.360	1.650	1.400	1.830	2.220	2.710	1.920	1.570	1.400
KCC-WF	3/8	4-1/4	5	5	295	522	561	452	324	444	422	359	227	320	392	439
	1/2	5	6-1/4	5	410	721	776	627	447	615	588	503	314	444	543	608

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 910/980 seismic brace																	
					A		B		C		D		E		F		G		H		I	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°		
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr			
					2.930	1.290	0.750	0.960	1.310	1.670	1.970	2.250	1.920	1.360	1.110	0.990						
KCC-WF	3/8	4-1/4	5	5	260	468	636	558	366	395	398	354	279	394	483	540						
	1/2	5	6-1/4	5	361	648	877	771	504	547	554	496	386	545	667	746						

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace					
					A	B	C	D	E	F
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr
					2.520	1.070	1.380	1.620	1.420	2.250
KCC-WF	1/2	5	6-1/4	5	406	725	621	452	610	496

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace					
					A	B	C	D	E	F
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr
					4.170	2.000	0.960	1.970	2.380	2.960
KCC-WF	1/2	5	6-1/4	5	268	482	771	404	424	377

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF700 seismic brace					
					A	B	C	D	E	F
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr
					2.550	1.090	0.910	1.410	1.450	2.000
KCC-WF	1/2	5	6-1/4	5	403	717	794	486	601	547

¹ Refer to Figure 3 for flat slab concrete installation.

Maximum allowable pipe horizontal load, F_{pw} (lb)
Hilti KCC-WF in 6,000 psi normal weight cracked concrete with grade 105 or A193 B7 threaded rod¹

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"																	
					A		B		C		D		E		F		G		H		I	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°		
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr				
					4.100	1.580	0.870	1.850	1.520	2.320	2.900	3.440	3.710	2.620	2.140	1.920						
KCC-WF	1/2	4-3/4	6-1/4	5	296	604	852	543	490	463	422	356	271	384	470	524						

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 909 seismic brace											
					A	B	C		D	E	F		G	H	I	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
					2.490	1.080	0.950	1.360	1.650	1.400	1.830	2.220	2.710	1.920	1.570	1.400
KCC-WF	3/8	3-3/4	5	5	316	550	590	479	340	471	454	393	240	339	415	465
	1/2	4-3/4	6-1/4	5	439	760	815	664	470	652	632	551	333	470	575	643

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 910/980 seismic brace																	
					A		B		C		D		E		F		G		H		I	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°		
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr			
					2.930	1.290	0.750	0.960	1.310	1.670	1.970	2.250	1.920	1.360	1.110	0.990						
KCC-WF	3/8	3-3/4	5	5	279	495	665	587	382	420	428	388	293	414	508	568						
	1/2	4-3/4	6-1/4	5	388	685	916	810	527	582	596	544	405	572	701	784						

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace								
					A 30°-44°	B 45°-59°	C 60°-90°	D 30°-44°	E 45°-59°	F 60°-90°	G 30°-44°	H 45°-59°	I 60°-90°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
in	in	in	in	in	2.520	1.070	1.380	1.620	1.420	2.250	2.750	1.940	1.590
KCC-WF	1/2	4-3/4	6-1/4	5	435	764	658	474	646	535	330	467	570

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace								
					A	B	C	D	E	F	G	H	I
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
KCC-WF	1/2	4-3/4	6-1/4	5	4.170	2.000	0.960	1.970	2.380	2.960	1.930	1.360	1.110
					292	515	810	426	454	413	404	572	701

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF700 seismic brace								
					A	B	C	D	E	F	G	H	I
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
KCC-WF	1/2	4-3/4	6-1/4	5	2,550	1,090	0,910	1,410	1,450	2,000	1,830	1,290	1,060
					431	756	833	509	638	589	415	588	718

¹ Refer to Figure 3 for flat slab concrete installation.

Maximum allowable pipe horizontal load, F_{pw} (lb) Hilti KCC-MD in the soffit of 3,000 psi or 4,000 psi lightweight concrete over metal deck 2-in and 3-in W-deck profiles with grade 105 or A193 B7 threaded rod^{1,2}

Anchor type	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MGS-SP-L-1/2" and MGS-SP-T-1/2"							
					3,000 psi				4,000 psi			
					A 30°-44°	B 45°-59°	C 60°-74°	C 75°-90°	A 30°-44°	B 45°-59°	C 60°-74°	C 75°-90°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
KCC-MD-SP	1/2	1-1/4	7-1/2	3-1/4	4.100	1.580	0.870	1.850	4.100	1.580	0.870	1.850
KCC-MD-LP	1/2	1-1/4	7-1/2	3-1/4	352	689	944	625	352	689	944	625

Anchor type	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 909 seismic brace							
					3,000 psi				4,000 psi			
					A 30°-44°	B 45°-59°	C 60°-74°	C 75°-90°	A 30°-44°	B 45°-59°	C 60°-74°	C 75°-90°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
KCC-MD-SP	3/8	1-1/4	6	2-1/2	2.490	1.100	1.050	1.360	2.490	1.100	1.050	1.360
	1/2	1-1/4	7-1/2	3-1/4	189	350	361	302	213	384	396	334
KCC-MD-LP	3/8	1-1/4	6	2-1/2	219	409	422	352	247	450	464	390
	1/2	1-1/4	7-1/2	3-1/4	381	625	640	558	381	625	640	558
	1/2	1-1/4	7-1/2	3-1/4	512	843	863	752	512	843	863	752

Anchor type	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 910/980 seismic brace							
					3,000 psi				4,000 psi			
					A 30°-44°	B 45°-59°	C 60°-74°	C 75°-90°	A 30°-44°	B 45°-59°	C 60°-74°	C 75°-90°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
KCC-MD-SP	3/8	1-1/4	6	2-1/2	3.070	1.320	0.960	1.070	3.070	1.320	0.960	1.070
	1/2	1-1/4	7-1/2	3-1/4	156	308	382	356	179	341	418	391
KCC-MD-LP	3/8	1-1/4	6	2-1/2	178	360	448	417	206	398	491	458
	1/2	1-1/4	7-1/2	3-1/4	328	567	668	634	328	567	668	634
	1/2	1-1/4	7-1/2	3-1/4	440	765	902	855	440	765	902	855

Anchor type	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace					
					3,000 psi			4,000 psi		
					A 30°-44°	B 45°-59°	C 60°-90°	A 30°-44°	B 45°-59°	C 60°-90°
					Pr	Pr	Pr	Pr	Pr	Pr
KCC-MD-SP	1/2	1-1/4	7-1/2	3-1/4	2.520	1.160	1.380	2.520	1.160	1.380
KCC-MD-LP	1/2	1-1/4	7-1/2	3-1/4	217	394	348	244	435	386
	1/2	1-1/4	7-1/2	3-1/4	508	820	746	508	820	746

Anchor type	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace					
					3,000 psi			4,000 psi		
					A 30°-44°	B 45°-59°	C 60°-90°	A 30°-44°	B 45°-59°	C 60°-90°
					Pr	Pr	Pr	Pr	Pr	Pr
KCC-MD-SP	1/2	1-1/4	7-1/2	3-1/4	4.170	2.000	0.960	4.170	2.000	0.960
KCC-MD-LP	1/2	1-1/4	7-1/2	3-1/4	131	262	448	152	294	491
	1/2	1-1/4	7-1/2	3-1/4	348	595	902	348	595	902

Anchor type	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF700 seismic brace					
					3,000 psi			4,000 psi		
					A 30°-44°	B 45°-59°	C 60°-90°	A 30°-44°	B 45°-59°	C 60°-90°
					Pr	Pr	Pr	Pr	Pr	Pr
KCC-MD-SP	1/2	1-1/4	7-1/2	3-1/4	2.750	1.110	1.140	2.750	1.110	1.140
KCC-MD-LP	1/2	1-1/4	7-1/2	3-1/4	199	407	399	228	448	440
	1/2	1-1/4	7-1/2	3-1/4	477	839	828	477	839	828

1 Anchor may be placed in upper or lower flute.

2 Refer to Figure 4 for lightweight concrete on metal deck installations.



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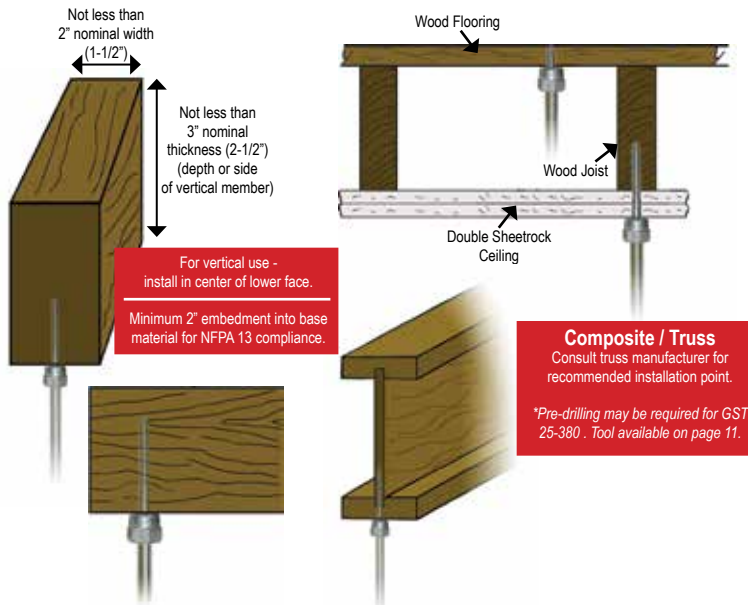
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The data contained in this literature was current as of the date of publication. Updates and changes may be made based on later testing. If verification is needed that the data is still current, please contact the Hilti Technical Support Specialists at 1-800-879-8000. All published load values contained in this literature represent the results of testing by Hilti or test organizations. Because of variations in materials, on-site testing may be necessary to determine performance at any specific site. Printed in the United States.

SAMMYS® FOR WOOD - Vertical Application



Application



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Approvals	Rod Size	Part Number	Model	Screw Descriptions	Ultimate Pullout (lbs)	UL Test Load (lbs)	FM Test Load (lbs)	Box Qty	Case Qty
VERTICAL MOUNT									
	1/4"	8002957	GST 100	1/4 x 1"	210 (7/16" OSB) 670 (3/4" Ply)			25	125
	1/4"	8003957	GST 200	1/4 x 2"	1760 (Fir)			25	125
	3/8"	8007957	GST 10	1/4 x 1"	210 (7/16" OSB) 670 (3/4" Ply)	300		25	125
	3/8"	8008957	GST 20	1/4 x 2"	1760 (Fir)	850	1475	25	125
	3/8"	8068925	GST 20-SS	1/4 x 2"	1760 (Fir)	850		25	125
	3/8"	8009925	GST 25-380	3/8 x 2-1/2"	2113 (Fir)	1500		25	125
	3/8"	8010957	GST 30	1/4 x 3"	2060 (Fir)	1500	1475	25	125
	1/2"	8013925	GST 2	1/4 x 2"	1760 (Fir)			25	125
	1/2"	8015925	GST 3	1/4 x 3"	2275 (Fir)			25	125



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Borusan Mannesmann is the first manufacturer in Europe and Turkey who has been UL listed and FM approved according to EN standards since 2015 and UL listed and FM approved according to ASTM standards since 2007.

In recent years, the importance of fire protections systems has increased significantly due to regulations and legislations in Occupational Health and Safety area. Fire protection systems have been disseminating in houses, shopping malls, airports and industrial facilities. In Europe over 4.000 and in the U.S over 3.500 lives are lost annually as a result of fire injuries. Consequently, fire protection measures have become an increasingly vital matter.

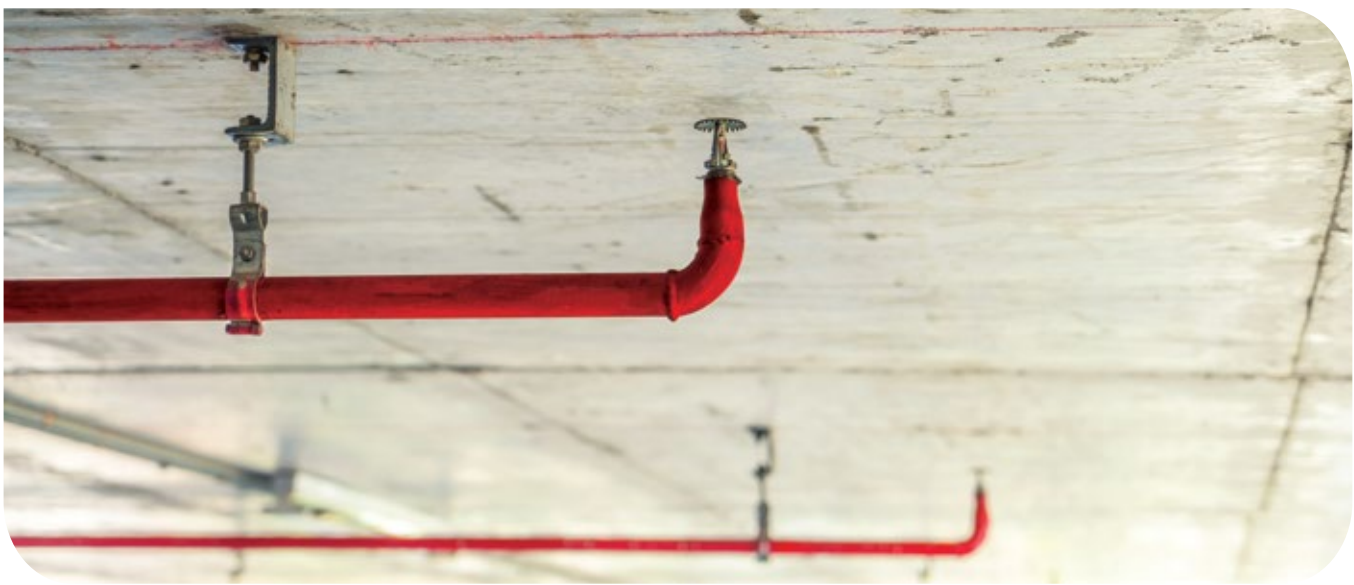
Borusan Mannesmann, a solution partner of its customers in the areas of black, galvanized and grooved pipes, is proud to be the avant-garde of fire protection pipes.

Easy Flow fire sprinkler pipes can be used in wet extinguishing systems including fire cabinet, hydrant and sprinkler systems. Alternatively, BM pipes have applications in sparkling, gas and dry chemical extinguishing systems for fire protection purposes.

Underwriters Laboratories (UL); is an international independent engineering and security company that tests the compliance of fire-safety systems with fire safety standards for the building elements of the system. UL is headquartered in the USA and serves in 6 continents; it operates in five main strategic areas including product safety, environment, health, university and verification services. Thousands of types of products, materials, and systems are scientifically assessed, tested, and approved by UL in compliance with the risks of electricity, fire, and injury. On the other hand, FM (Factory Mutual); is an independent technical unit of the FMI Company that insures great risks such as fire, natural disasters and it certifies the performance of the materials and systems. FM performs risk and insurance calculations through engineering analysis, which is different from the analysis prepared by insurance statisticians for many years.

Fire protection systems designed by using UL and FM approved system elements (pipe, valve, pump, sprinkler, etc.) avoids, life and property losses and provide economic advantages in insuring buildings against fire.

Borusan Mannesmann is the first steel pipe manufacturer which have UL and FM certificates according to EN standards in Europe.



Why EASY FLOW fire sprinkler pipes?

Easy Flow fire sprinkler pipes are UL and FM certified according to EN and ASTM standards. Due to having high product quality and accredited by international institutions, the use of Easy Flow fire sprinkler pipes provides economic advantages in terms of insuring the buildings against fire.

Easy Flow fire sprinkler pipes have 1 layer (up to 30 micron) of sand blasted varnish coating.

1- Provides corrosion protection for 6 months until the final layer is coated. In order to reuse the corroded pipe, sandblasting and painting processes are necessary. In some cases, pipes may not be used where atmospheric rust has progressed and deep corrosion has occurred. Easy Flow provides long lasting fire protection system, provides low overhead costs and saves time, labor and scrap.

2- The priming process applied to Easy Flow products is done immediately after the production of pipes. The primer is applied to the adherence surface without contamination of foreign matter such as dirt, dust, etc. before the atmospheric rust is formed. Therefore, Easy Flow fire sprinkler pipes are better quality and long lasting and provide savings from costs of maintenance/repair.

Inside weld bead is removed for grooved Easy Flow fire sprinkler pipes.

During grooving process, the weld bead causes measurement deviations and errors in grooved area. Such deflections may cause the seal not to be fully seated, the clamps not being fully tightened, or even leakages. Easy Flow grooved fire sprinkler pipes provide perfect connection and combination during assembly and also fully compatible with Victaulic and Atusa standards.



Easy Flow fire sprinkler pipes have perfect roundness.

When all pipes are connected to each other, perfect alignment occurs and there is no weld gap to be filled. Fast, comfortable and secure pre-weld preparation is done. It is easy to make butt-welding and it saves labor, time and cost.



Special Procedures Applied On Request

- Customized pipe length
- Production of special steel grades/qualities
- Inner / Outer Epoxy Coating
- Sandblasting and Primer Coating
- Outer PE (polyethylene) Coating
- Galvanization
- Grooving

Advantages Of Easy Flow Fire Sprinkler Pipes

- UL and FM approved in EN standards
- UL and FM approved in ASTM A53 and A795 standards.
- It can be produced as black bare, primer coated (black, gray and red colors) and galvanized.
- The red primer has high adhesion and it is resistant to corrosion, water and oil.
- With options of Plain End, Threaded & Coupled or Grooved.
- Weld bead can be removed upon request. CE certified.

About Borusan Mannesmann

- 6 World-Class Plants in Turkey, US and Italy
- Perfect Product Quality with Lean 6 Sigma Production Technique
- Wide Product Range with High Quality
- Exceeding Limits with Continuous R&D
- Excellent Service with Voice Of Customer Process
- Well established sales organization
- Export to more than 35 countries
- UL and C-UL listed, FM approved, NSF and DVGW certified
- Integrated Delivery Services



ASTM FM & UL

	Nominal Sizes (inch)	OD (mm)	Wall Thickness (inch)	Wall Thickness (mm)	Weight (lb/ft)	Weight (kg/mt PE)	FM	UL
Easy Flow Light Wall	1	33,4	0.102	2,60	1,34	1,99	✓	
	1 1/4	42,2	0.091	2,30	1,53	2,27	✓	
	1 1/4	42,2	0.102	2,60	1,71	2,55	✓	
	1 1/2	48,3	0.102	2,60	1,97	2,93	✓	
	2	60,3	0.114	2,90	2,76	4,10	✓	
	2 1/2	73	0.114	2,90	3,52	5,23	✓	
	3	88,9	0.126	3,20	4,54	6,76	✓	
	4	114,3	0.142	3,60	6,60	9,83	✓	
SCH 7	5	141,3	0.134	3,40	7,68	11,43	✓	
	1	33,4	0.079	2,00	1,05	1,56	✓	
	1 1/4	42,2	0.079	2,00	1,34	1,99	✓	
	1 1/2	48,3	0.084	2,13	1,53	2,28	✓	
	2	60,3	0.084	2,13	1,93	2,88	✓	
	2 1/2	73	0.086	2,18	2,67	3,97	✓	
	3	88,9	0.093	2,36	3,38	5,04	✓	
	4	114,3	0.108	2,60	4,81	7,16	✓	
SCH 10	3/4"	26,7	0.083	2,11	0,86	1,28		✓
	1"	33,4	0.109	2,77	1,41	2,09	✓	
	1 1/4"	42,2	0.109	2,77	1,81	2,69	✓	✓
	1 1/2"	48,3	0.109	2,77	2,09	3,11	✓	✓
	2"	60,3	0.109	2,77	2,64	3,93	✓	✓
	2 1/2"	73	0.120	3,05	3,53	5,26	✓	✓
	3"	88,9	0.120	3,05	4,34	6,46	✓	✓
	3 1/2"	101,6	0.120	3,05	4,98	7,41	✓	✓
	4"	114,3	0.120	3,05	5,62	8,37	✓	✓
	5"	141,3	0.134	3,4	7,78	11,58	✓	✓
	6"	168,3	0.134	3,4	9,30	13,85	✓	✓
	8"	219,1	0.188	4,78	16,96	25,26	✓	✓
SCH 30	10"	273,1	0.188	4,78	21,23	31,62	✓	✓
	12"	323,8	0.188	4,78	25,28	37,61		
	1"	33,4	0.114	2,9	1,46	2,18	✓	
	1 1/4"	42,2	0.117	2,97	1,93	2,87	✓	
	1 1/2"	48,3	0.125	3,18	2,37	3,53	✓	
	2"	60,3	0.125	3,18	3,00	4,48	✓	
	2 1/2"	73	0.188	4,78	5,40	8,04	✓	
	3"	88,9	0.188	4,78	6,65	9,92	✓	
	3 1/2"	101,6	0.188	4,78	7,65	11,41	✓	
	4"	114,3	0.188	4,78	8,66	12,91	✓	
	8"	219,1	0.277	7,04	24,70	36,81	✓	
	10"	273,1	0.307	7,8	34,24	51,03	✓	
SCH 40	12"	323,8	0.33	8,38	43,77	65,20		
	1/2"	21,3	0.109	2,77	0,85	1,27	✓	✓
	3/4"	26,7	0.113	2,87	1,13	1,69	✓	
	1"	33,4	0.133	3,38	1,68	2,50	✓	✓
	1 1/4"	42,2	0.140	3,56	2,27	3,39	✓	✓
	1 1/2"	48,3	0.145	3,68	2,72	4,05	✓	✓
	2"	60,3	0.154	3,91	3,66	5,45	✓	✓
	2 1/2"	73	0.203	5,16	5,80	8,64	✓	✓
	3"	88,9	0.216	5,49	7,58	11,29	✓	✓
	3 1/2"	101,6	0.226	5,74	9,12	13,58	✓	✓
	4"	114,3	0.237	6,02	10,80	16,09	✓	✓
	5"	141,3	0.258	6,55	14,63	21,79	✓	✓
SCH 80	6"	168,3	0.280	7,11	18,99	28,29	✓	✓
	8"	219,1	0.322	8,18	30,45	45,34	✓	✓
	10"	273,1	0.365	9,27	40,52	60,29	✓	✓
	1/2"	21,3	0.147	3,73	1,09	1,62	✓	
	3/4"	26,7	0.154	3,91	1,47	2,20	✓	
	1"	33,4	0.179	4,55	2,19	3,25	✓	
	1 1/4"	42,2	0.191	4,85	3,03	4,49	✓	
	1 1/2"	48,3	0.200	5,08	3,65	5,39	✓	
	2"	60,3	0.218	5,54	5,08	7,55	✓	
	2 1/2"	73	0.276	7,01	7,75	11,52	✓	
	3"	88,9	0.300	7,62	10,35	15,39	✓	
	3 1/2"	101,6	0.318	8,08	12,67	18,82	✓	
SCH 80	4"	114,3	0.337	8,56	15,20	22,60	✓	
	5"	141,3	0.375	9,52	21,04	31,42	✓	
	6"	168,3	0.432	10,97	28,88	43,05	✓	
	8"	219,1	0.500	12,70	44,00	65,41	✓	

EN FM & UL

	OD (mm)	Wall Thickness (mm)	FM	UL
Easy Flow Light Wall	33,7	2,0	✓	
	33,7	2,6	✓	
	42,4	2,0	✓	
	42,4	2,3	✓	
	42,4	2,6	✓	
	48,3	2,0	✓	
	48,3	2,6	✓	
	60,3	2,0	✓	
	60,3	2,9	✓	
	76,1	2,18	✓	
	76,1	2,9	✓	
	88,9	2,36	✓	
EN 10255 Medium	88,9	3,2	✓	
	114,3	2,6	✓	
	114,3	3,6	✓	
	139,7	3,4	✓	

	OD (mm)	Wall Thickness (mm)	FM	UL
EN 10255 Medium	33,7	3,2	✓	
	42,4	3,2	✓	✓
	48,3	3,2	✓	✓
	60,3	3,6	✓	✓
	76,1	3,6	✓	✓
	88,9	4,0	✓	✓
	114,3	4,5	✓	✓
	139,7	5,0	✓	✓
EN 10255 Heavy	165,1	5,0	✓	✓

	OD (mm)	Wall Thickness (mm)	FM	UL
EN 10255 Heavy	21,3	3,2	✓	
	26,9	3,2	✓	
	33,7	4,0	✓	
	42,4	4,0	✓	
	48,3	4,0	✓	
	60,3	4,5	✓	
	76,1	4,5	✓	
	88,9	5,0	✓	
	114,3	5,4	✓	
	139,7	5,4	✓	
	165,1	5,4	✓	

Technical Specifications

- Roll Grooved
- FM Approved
- UL/C-UL Listed
- NFS Certified
- Custom Length Availability
- ASTM A53 / A795 and EN production standards
- Tight tolerances
- Consistent roundness
- Consistent wall thickness
- Consistent straightness
- Weldable
- Pressure Tested
- Reliable high steel quality
- Galvanised or shop primer coated black, red (RAL 3000, RAL 3002 and Ral 3009) or grey (RAL 7012)
- CE, PED Certified

EASY FLOW
FIRE SPRINKLER
PIPES



A leading European producer of steel pipes, Borusan Mannesmann is the choice of customers across Europe, the US and Canada for industrial and residential fire protection sprinkler system pipes.

Factory Mutual approved, Underwriters Laboratories & Canadian UL listed, ASTM A53 / A795 and EN production standard Borusan Mannesmann sprinkler pipes... To enhance the safety of your projects with the professional service and high quality assurance of Borusan Mannesmann, known all over the world.





1.0 PRODUCT DESCRIPTION

Available Sizes

- 1 ¼ – 12"/DN32 – DN300

Maximum Working Pressure

- Pressure ratings for Victaulic FireLock™ Fittings conform to the ratings of Victaulic FireLock Installation-Ready™ Style 009N couplings (refer to [publication 10.64](#) for more information).

Application

- FireLock™ fittings are designed for use exclusively with Victaulic couplings that have been Listed or Approved for Fire Protection Services. Use of other couplings or flange adapters may result in bolt pad interference.
- Connects pipe, provides change in direction and adapts sizes or components

Pipe Materials

- Carbon steel

2.0 CERTIFICATION/LISTINGS



EN 10311
CPR (EU)
No. 305/2011



BS EN 10311
CPR (UK)
2019 No. 465



3.0 SPECIFICATIONS – MATERIAL

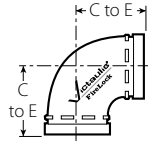
Fitting: Ductile iron conforming to ASTM A536, Grade 65-45-12.

Fitting Coating: (specify choice)

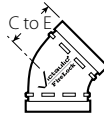
- ☐ Orange coating.
- ☐ Red coating (standard for EMEA-I and Asia Pacific).
- ☐ Optional: Hot dipped galvanized.

ALWAYS REFER TO ANY NOTIFICATIONS AT THE END OF THIS DOCUMENT REGARDING PRODUCT INSTALLATION, MAINTENANCE OR SUPPORT.

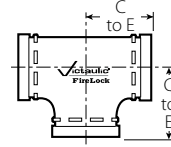
4.0 DIMENSIONS



No. 001



No. 003



No. 002



No. 006

Nominal Size inches DN	Actual Outside Diameter inches mm	No. 001 90° Elbow		No. 003 45° Elbow		No. 002 Straight Tee		No. 006 Cap	
		C to E inches mm	Approximate Weight Each lb kg	C to E inches mm	Approximate Weight Each lb kg	C to E inches mm	Approximate Weight Each lb kg	T inches mm	Approximate Weight Each lb kg
1 ¼ DN32	1.660 42.4	2.75 70	1.0 0.5	1.75 45	0.7 0.3	2.75 70	1.4 0.6	0.82 21	0.3 0.1
1 ½ DN40	1.900 48.3	2.75 70	1.2 0.5	1.75 45	0.8 0.4	2.75 70	1.8 0.8	0.82 21	0.4 0.2
2 DN50	2.375 60.3	2.75 70	1.6 0.7	2.00 51	1.4 0.6	2.75 70	2.4 1.1	0.88 22	0.6 0.3
2 ½ DN65	2.875 73.0	3.00 76	2.1 1.0	2.25 57	2.2 1.0	3.00 76	3.4 1.5	0.88 22	1.0 0.5
3 DN80	3.000 76.1	3.00 76	2.5 1.1	2.25 57	2.4 1.1	3.00 76	3.8 1.7	—	—
	3.500 88.9	3.38 86	3.4 1.5	2.50 64	3.1 1.4	3.38 86	5.1 2.3	0.88 22	1.2 0.5
	4.250 108.0	4.00 102	5.7 2.6	3.00 76	5.1 2.3	4.00 102	7.5 3.4	—	—
4 DN100	4.500 114.3	4.00 102	5.9 2.7	3.00 76	4.9 2.2	4.00 102	6.8 3.1	1.00 25	2.4 1.1
DN125	5.500 139.7	4.88 124	12.4 5.6	3.25 83	8.2 3.7	4.88 124	15.4 7.0	—	—
5	5.563 141.3	4.88 124	7.8 3.5	3.25 83	8.3 3.8	4.88 124	15.3 6.9	1.00 25	4.1 1.9
	6.250 159.0	5.50 140	12.6 5.7	3.50 89	9.2 4.2	5.50 140	17.9 8.1	—	—
	6.500 165.1	5.43 138	13.0 5.9	3.50 89	9.4 4.2	5.50 140	19.7 8.9	—	—
6 DN150	6.625 168.3	5.50 140	13.7 6.2	3.50 89	10.4 4.7	5.50 140	20.2 9.2	1.00 25	5.9 2.7
	8.515 216.3	6.81 173	23.1 10.5	—	—	6.94 176	33.6 15.0	—	—
8 DN200	8.625 219.1	6.81 173	25.4 11.5	4.25 108	18.9 8.6	6.94 176	36.9 16.8	1.13 29	12.7 5.8
10 DN250	10.750 273.0	8.25 210	43.2 19.6	4.00 102	25.0 11.3	8.25 210	63.6 28.9	1.06 27	14.2 6.4
12 DN300	12.750 323.9	9.38 238	66.7 30.3	4.50 114	36.1 16.4	9.38 238	80.7 36.6	1.06 27	22.6 10.3

5.0 PERFORMANCE

Flow Data

Size		Flow Data Frictional Resistance			
Nominal inches DN	Actual Outside Diameter inches mm	No. 001 90° Elbow feet meters	No. 003 45° Elbow feet meters	No. 002 Straight Tee Branch feet meters	No. 002 Straight Tee Run feet meters
1 ¼ DN32	1.660 42.4	2.00 0.6	2.13 0.6	7.50 2.3	0.50 0.2
1 ½ DN40	1.900 48.3	2.63 0.8	2.75 0.8	6.63 2.0	1.00 0.3
2 DN50	2.375 60.3	3.50 1.1	1.88 0.6	8.50 2.6	3.50 1.1
2 ½	2.875 73.0	4.38 1.3	2.25 0.7	10.88 3.3	4.38 1.3
DN65	3.000 76.1	4.50 1.4	2.38 0.7	11.00 3.4	4.50 1.4
3 DN80	3.500 88.9	5.00 1.5	2.63 0.8	13.00 4.0	5.00 1.5
	4.250 108.0	6.50 2.0	3.25 1.0	15.38 4.7	6.50 2.0
4 DN100	4.500 114.3	6.88 2.1	3.50 1.1	16.00 4.9	6.88 2.1
DN125	5.500 139.7	8.38 2.6	4.13 1.3	20.63 6.3	8.38 2.6
5	5.563 141.3	8.50 2.6	4.25 1.3	21.00 6.4	8.50 2.6
	6.250 159.0	9.50 2.9	5.00 1.5	25.00 7.6	9.63 2.9
	6.500 165.1	9.88 3.0	5.00 1.5	24.50 7.5	9.88 3.0
6 DN150	6.625 168.3	10.00 3.0	5.00 1.5	25.00 7.6	10.00 3.0
216 DN200	8.515 216.3	13.00 4.0	-	33.00 10.1	13.00 4.0
8 DN200	8.625 219.1	13.00 4.0	6.50 2.0	33.00 12.5	13.00 5.2
10 DN250	10.750 273.0	17.00 5.2	8.30 2.50	41.00 12.5	17.00 5.2
12 DN300	12.750 323.9	20.00 6.1	10.00 3.0	50.00 15.2	20.00 6.1

¹ The flow data listed is based upon the pressure drop of Schedule 40 pipe.

6.0 NOTIFICATIONS

General Notes

NOTE: When assembling FireLock EZ™ couplings onto end caps, take additional care to make certain the end cap is fully seated against the gasket end stop. For FireLock EZ™ Style 009N/009H couplings, use FireLock™ No. 006 end caps containing the “EZ” marking on the inside face or No. 60 end caps containing the “QV EZ” marking on the inside face. Non-Victaulic end cap products shall not be used with Style 009/009V/009H/009N couplings.

7.0 REFERENCE MATERIALS

[10.64: Victaulic® FireLock™ Rigid Coupling Style 009N](#)

[10.02: Victaulic® FireLock™ Rigid Coupling Style 005H with Vic-Plus™ Gasket System](#)

[29.01: Victaulic® Terms and Conditions of Sale](#)

User Responsibility for Product Selection and Suitability

Each user bears final responsibility for making a determination as to the suitability of Victaulic products for a particular end-use application, in accordance with industry standards and project specifications, and the applicable building codes and related regulations as well as Victaulic performance, maintenance, safety, and warning instructions. Nothing in this or any other document, nor any verbal recommendation, advice, or opinion from any Victaulic employee, shall be deemed to alter, vary, supersede, or waive any provision of Victaulic Company's standard conditions of sale, installation guide, or this disclaimer.

Intellectual Property Rights

No statement contained herein concerning a possible or suggested use of any material, product, service, or design is intended, or should be construed, to grant any license under any patent or other intellectual property right of Victaulic or any of its subsidiaries or affiliates covering such use or design, or as a recommendation for the use of such material, product, service, or design in the infringement of any patent or other intellectual property right. The terms “Patented” or “Patent Pending” refer to design or utility patents or patent applications for articles and/or methods of use in the United States and/or other countries.

Note

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

Installation

Reference should always be made to the Victaulic installation handbook or installation instructions of the product you are installing. Handbooks are included with each shipment of Victaulic products, providing complete installation and assembly data, and are available in PDF format on our website at www.victaulic.com.

Warranty

Refer to the Warranty section of the current Price List or contact Victaulic for details.

Trademarks

Victaulic and all other Victaulic marks are the trademarks or registered trademarks of Victaulic Company, and/or its affiliated entities, in the U.S. and/or other countries.

FireLock™ Installation-Ready™ Rigid Couplings

Style 009V, Style 009N and Style 109



Style 009V
Patented



Style 009N
Patented



Style 109
Patented

1.0 PRODUCT DESCRIPTION

Available Sizes

- Style 009V: 1 ¼ – 12"/DN32 – DN300
- Style 009N: 1 ¼ – 12"/DN32 – DN300
- Style 109: 1 ¼ – 4"/DN32 – DN100

Pipe Material

- Schedule 10, Schedule 40 or specialty carbon steel pipe listed in Section 5. For use with alternative materials and wall thicknesses please contact Victaulic
- For exceptions reference section 6.0 Notifications

Maximum Working Pressure

- Accommodates pressures ranging from full vacuum (29.9 in Hg/760 mm Hg) to 365 psi/2517 kPa
- Working pressure dependent on material, wall thickness and size of pipe

Function

- Joins carbon steel pipe with grooved ends conforming to [publication 25.01](#)
- Provides a rigid pipe joint designed to restrict axial or angular movement

Pipe Preparation

- Cut or roll grooved in accordance with [publication 25.01](#): Victaulic Standard Groove Specifications.

2.0 CERTIFICATION/LISTINGS



009N: G4090023
109: G421013



EN 10311
CPR (EU)
No. 305/2011



BS EN 10311
CPR (UK)
2019 No. 465

ALWAYS REFER TO ANY NOTIFICATIONS AT THE END OF THIS DOCUMENT REGARDING PRODUCT INSTALLATION, MAINTENANCE OR SUPPORT.

3.0 SPECIFICATIONS – MATERIAL

Housing: Ductile iron conforming to ASTM A 536, Grade 65-45-12. Ductile iron conforming to ASTM A 395, Grade 65-45-15, is available upon special request.

Housing Coating: (specify choice)

- ☐ Orange coating
- ☐ Red coating (standard for EMEA-I and Asia Pacific)
- ☐ Optional for Style 009N and 009V: Galvanized per ASTM A123 (Hot Dipped) or ASTM A1059 (Thermo-Diffusion)
- ☐ Optional for Style 109: Mechanically Galvanized per ASTM B695 (available only in North America and Latin America).

Gasket: (specify choice)

☐ **Grade “E” EPDM (Type A) Vic-Plus™ Pre-lubricated Gasket**

EPDM (Violet Color Code). Applicable for wet and dry (oil-free air) fire protection systems only. Listed/Approved for continuous use in wet and dry systems. Listed/Approved for dry systems at -40°F/-40°C and above. Not compatible for use with hot water services or steam services.

NOTES

- Reference should always be made to [publication I-100](#), Victaulic Field Installation Handbook for gasket lubrication instructions.
- Services listed are General Service Guidelines only. It should be noted that there are services for which these gaskets are not compatible. Reference should always be made to [publication 05.01](#), Victaulic Gasket Selection Guide for specific gasket service guidelines and for a listing of services which are not compatible.
- The gasket pre-lubrication will appear white to slightly amber in color. The color will not impact gasket or coupling performance.

Bolts/Nuts: (specify choice)

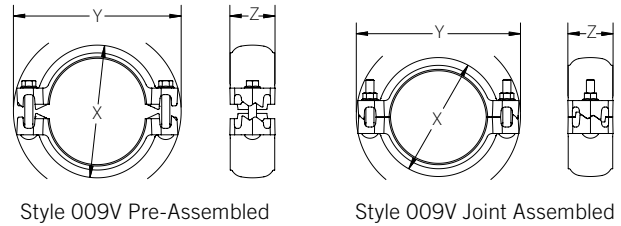
- ☐ Standard: Carbon steel oval neck track bolts meeting the mechanical property requirements of (imperial) ASTM A449 or (metric) ISO 898-1 Class 9.8 (M10-M16) or Class 8.8 (M20 and greater). Carbon steel hex nuts meeting the mechanical property requirements of (imperial hex nuts) ASTM A563 Grade B or (metric hex nuts) ISO 898-2 Class 10 (M12-M16) or Class 8 (M20 and greater). Track bolts and hex nuts are zinc electroplated per ASTM B633 Fe/Zn5 finish (imperial) Type III or (metric) Type II.
- ☐ Optional for Style 009N: Stainless steel oval neck track bolts meeting the requirements of ASTM F593, Group 2 (316 stainless steel), condition CW. Stainless steel Heavy Hex nuts meeting the requirements of ASTM F594, Group 2 (316 stainless steel), condition CW, with galling-resistant coating.¹

¹ Optional bolts/nuts are available in imperial size only.

Coupling Linkage (Style 109 only): High Strength Steel with comparable physical properties to that of the Track Bolt (ASTM A449). Linkage is zinc electroplated per ASTM B633 Fe/Zn 5, Type III Finish.

4.0 DIMENSIONS

Style 009V Two-Bolt Installation-Ready Coupling



Size		Maximum Working Pressure ²	Maximum End Load ²	Allow. Pipe End Separation ³	Bolt/Nut		Dimensions					Approx. Weight (Each)
Nominal	Actual Outside Diameter				Qty.	Size	Pre-Assembled		Joint Assembled		Z	
							X	Y	X	Y		
inches DN	inches mm	Lbs. N	inches mm	psi kPa		inches mm	inches mm	inches mm	inches mm	inches mm	lb kg	
1 ¼ DN32	1.660 42.4	365 2517	790 3514	0.10 2.54	2	¾ x 2 M10 x 51	3.25 82	4.81 122	2.88 74	4.75 120	2.13 54	1.7 0.8
1 ½ DN40	1.900 48.3	365 2517	1035 4604	0.10 2.54	2	¾ x 2 M10 x 51	3.50 88	5.06 128	3.13 80	5.00 128	2.13 54	1.7 0.8
2 DN50	2.375 60.3	365 2517	1617 7192	0.12 3.05	2	¾ x 2 ½ M10 x 63	4.06 104	5.63 142	3.63 92	5.63 142	2.13 54	2.1 1.0
2 ½	2.875 73.0	365 2517	2370 10542	0.12 3.05	2	¾ x 2 ½	4.56 116	6.06 154	4.06 104	6.06 154	2.13 54	2.2 1.0
3 DN80	3.500 88.9	365 2517	3512 15622	0.12 3.05	2	¾ x 2 ½ M10 x 63	5.19 132	6.81 174	4.63 118	6.69 170	2.19 56	2.6 1.2
4 DN100	4.500 114.3	365 2517	5805 25822	0.17 4.32	2	¾ x 2 ½ M10 x 63	6.38 162	7.94 202	5.75 146	7.75 196	2.25 58	3.5 1.6
6 DN150	6.625 168.3	365 2517	12582 55968	0.17 4.32	2	½ x 3 M12 x 76	9.00 228	10.69 272	8.31 212	10.56 268	2.31 58	6.3 2.9
8 DN200	8.625 219.1	365 2517	21326 94862	0.17 4.32	2	⅝ x 3 ⅝ M16 x 92	11.31 288	13.75 350	10.56 268	13.63 346	2.81 72	13.0 5.9
10 DN250	10.750 273.0	365 2517	33127 147358	0.25 6.4	2	⅞ x 6 M22 x 152	14.13 358	17.50 444	13.25 336	17.13 434	2.94 74	25.0 11.5
12 DN300	12.750 323.9	365 2517	46600 207290	0.25 6.4	2	⅞ x 6 M22 x 152	16.38 416	19.50 496	15.63 396	19.25 488	2.94 74	30.0 13.5

² Working Pressure and End Load are total, from all internal and external loads, based on standard weight (ANSI) steel pipe, standard roll or cut grooved in accordance with Victaulic specifications. See the Listings/Approvals section of this publication for ratings on other pipe.

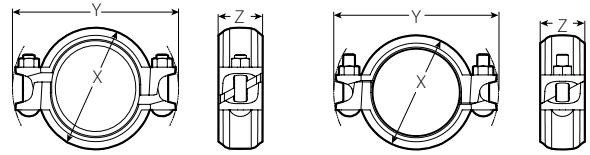
³ The allowable pipe separation dimension shown is for system layout purposes only. Style 009V couplings are considered rigid connections and will not accommodate expansion or contraction of the piping system.

NOTES

- When assembling Style 009V, Style 009N or Style 109 couplings onto end caps, take additional care to make certain the end cap is fully seated against the gasket end stop. For Style 009V, Style 009N couplings, use FireLock No. 006 end caps containing the "EZ" marking on the inside face or No. 60 end caps containing the "QV EZ" marking on the inside face. Non-Victaulic end cap products shall not be used with Style 009V, Style 009N or Style 109 couplings. **IMPORTANT:** Gaskets intended for the Style 009 or Style 009V couplings cannot be used with the Style 009N or Style 109 coupling. There is no interchanging of gaskets or housings between coupling styles.
- Use Of FlushSeal Gaskets For Dry Pipe Systems** Style 009V, Style 009N or Style 109 couplings are supplied with Grade "E" Type A gaskets. These gaskets include an integral pipe stop, that once installed provides the similar benefits as a FlushSeal gasket for dry pipe systems. It should be noted that standard Victaulic FlushSeal gaskets cannot be used with the Style 009V, Style 009N or Style 109 couplings.
- The Allowable Pipe End Separation dimension shown is for system layout purposes only. Style 009V, Style 009N or Style 109 Installation-Ready rigid couplings are considered rigid connections and will not accommodate expansion/contraction or angular movement of the piping system. Contact Victaulic for torsional resistance information.

4.1 DIMENSIONS

Style 009N Two-Bolt Installation-Ready Coupling



Style 009N Pre-Assembled

Style 009N Joint Assembled

Size		Maximum Working Pressure ²	Maximum End Load ²	Allow. Pipe End Separation ³	Bolt/Nut		Dimensions					Approx. Weight (Each)
Nominal	Actual Outside Diameter				Qty.	Size	Pre-assembled		Joint Assembled		Z	
							X	Y	X	Y		
inches DN	inches mm	psi kPa	lb N	inches mm		inches mm	inches mm	inches mm	inches mm	inches mm	lb kg	
1 ¼ DN32	1.660 42.4	365 2517	790 3514	0.10 2.54	2	¾ × 2 M10 × 51	3.13 79	5.00 127	2.75 70	5.00 127	2.00 51	1.4 0.6
1 ½ DN40	1.900 48.3	365 2517	1035 4604	0.10 2.54	2	¾ × 2 M10 × 51	3.38 86	5.13 130	3.00 76	5.13 130	2.00 51	1.5 0.7
2 DN50	2.375 60.3	365 2517	1617 7193	0.12 3.05	2	¾ × 2 ½ M10 × 63	4.00 102	5.63 143	3.50 89	5.63 143	2.00 51	1.9 0.9
2 ½	2.875 73.0	365 2517	2370 10542	0.12 3.05	2	¾ × 2 ½ M10 × 63	4.50 114	6.13 156	4.00 102	6.13 156	2.00 51	2.1 1.0
DN65	3.000 76.1	365 2517	2580 11476	0.12 3.05	2	¾ × 2 ½ M10 × 63	4.63 118	6.00 152	4.13 105	6.13 156	2.00 51	2.1 1.0
3 DN80	3.500 88.9	365 2517	3512 15622	0.12 3.05	2	¾ × 2 ½ M10 × 63	5.13 130	6.75 171	4.63 117	6.75 171	2.00 51	2.3 1.0
4 DN100	4.500 114.3	365 2517	5805 25822	0.17 4.32	2	¾ × 2 ½ M10 × 63	6.00 152	7.88 200	5.63 143	7.50 191	2.13 54	2.9 1.3
	4.250 108.0	365 2517	5178 23020	0.17 4.32	2	¾ × 2 ½ M10 × 63	5.63 152	7.38 187	5.38 137	7.38 187	2.13 54	3.1 1.4
5	5.563 141.3	365 2517	8872 39456	0.17 4.32	2	½ × 3 M12 × 76	7.25 184	9.25 235	6.75 171	9.13 232	2.25 57	5.0 2.3
	5.250 133.0	365 2517	7901 35106	0.17 4.32	2	½ × 3 M12 × 76	6.63 168	9.00 229	6.38 162	9.00 229	2.25 57	4.8 2.2
DN125	5.500 139.7	365 2517	8672 38529	0.17 4.32	2	½ × 3 M12 × 76	6.88 175	9.25 235	6.75 171	9.13 232	2.25 57	4.9 2.2
6 DN150	6.625 168.3	365 2517	12582 44469	0.17 4.32	2	½ × 3 ¼ M12 × 83	8.38 213	10.38 264	7.88 200	10.13 257	2.25 57	6.0 2.7
	6.250 159.0	365 2517	11198 49753	0.17 4.32	2	½ × 3 ¼ M12 × 83	7.88 200	10.00 254	7.38 187	9.88 251	2.25 57	5.6 2.5
	6.500 165.1	365 2517	12112 53813	0.17 4.32	2	½ × 3 ¼ M12 × 83	8.00 203	10.25 260	7.75 197	10.13 257	2.25 57	6.0 2.7
8 DN200	8.625 219.1	365 2517	21326 94863	0.17 4.32	2	⅝ × 4 M16 × 101	10.88 276	13.38 340	10.25 260	13.13 333	2.50 64	11.4 5.2
	8.515 216.3	365 2517	20712 55968	0.17 4.32	2	⅝ × 4 M16 × 101	10.63 270	13.25 337	10.25 260	10.13 257	2.63 67	11.4 5.2
10 DN250	10.750 273.0	300 2068	27229 121121	0.25 6.4	2	⅞ × 6 ½ M22 × 165	13.75 349	17.00 432	13.25 337	17.13 435	2.75 70	22.6 10.3
12 DN300	12.750 323.9	300 2068	38303 170380	0.25 6.4	2	⅞ × 6 ½ M22 × 165	16.00 406	19.00 483	15.50 394	19.13 486	2.75 70	27.6 12.5

² Working Pressure and End Load are total, from all internal and external loads, based on standard weight (ANSI) steel pipe, standard roll or cut grooved in accordance with Victaulic specifications. See the Listings/Approvals section of this publication for ratings on other pipe.

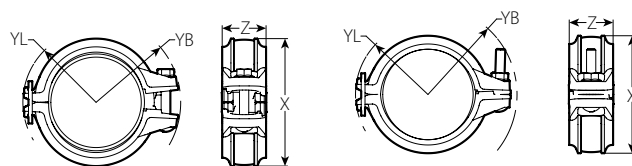
³ The allowable pipe separation dimension shown is for system layout purposes only. Style 009N couplings are considered rigid connections and will not accommodate expansion or contraction of the piping system.

NOTES

- When assembling Style 009V, Style 009N or Style 109 couplings onto end caps, take additional care to make certain the end cap is fully seated against the gasket end stop. For Style 009V, Style 009N couplings, use FireLock No. 006 end caps containing the "EZ" marking on the inside face or No. 60 end caps containing the "QV EZ" marking on the inside face. Non-Victaulic end cap products shall not be used with Style 009V, Style 009N or Style 109 couplings. IMPORTANT: Gaskets intended for the Style 009 or Style 009V couplings cannot be used with the Style 009N or Style 109 coupling. There is no interchanging of gaskets or housings between coupling styles.
- Use Of FlushSeal Gaskets For Dry Pipe Systems** Style 009V, Style 009N or Style 109 couplings are supplied with Grade "E" Type A gaskets. These gaskets include an integral pipe stop, that once installed provides the similar benefits as a FlushSeal gasket for dry pipe systems. It should be noted that standard Victaulic FlushSeal gaskets cannot be used with the Style 009V, Style 009N or Style 109 couplings.
- The Allowable Pipe End Separation dimension shown is for system layout purposes only. Style 009V, Style 009N or Style 109 Installation-Ready rigid couplings are considered rigid connections and will not accommodate expansion/contraction or angular movement of the piping system. Contact Victaulic for torsional resistance information.

4.2 DIMENSIONS

Style 109 One-Bolt *Installation-Ready* Coupling



Style 109 Pre-Assembled

Style 109 Joint Assembled

Size		Max. Working Pressure	Max. End Load	Allow. Pipe End Sep. Maximum	Bolt/Nut		Dimensions								Weight
Nominal	Actual Outside Diameter				Qty.	Size	Pre-Assembled				Assembled				Approx (Each)
							YL	YB	X	Z	YL	YB	X	Z	
inches DN	inches mm	psi kPa	Lbs. N	inches mm		inches mm	inches mm	inches mm	inches m m	inches mm	inches mm	inches mm	inches mm	lb kg	
1 ¼ DN32	1.660 42.4	365 2517	790 3514	0.10 2.54	1	¾ x 2 ¼ M10 x 57	1.97 50	2.49 63	3.17 81	1.95 50	1.93 49	2.59 66	2.84 72	1.95 50	1.5 0.7
1 ½ DN40	1.900 48.3	365 2517	1035 4603	0.10 2.54	1	¾ x 2 ¼ M10 x 57	2.13 54	2.60 66	3.41 87	1.95 50	2.1 53	2.68 68	3.07 78	1.95 50	1.6 0.7
2 DN50	2.375 60.3	365 2517	1617 7192	0.12 3.048	1	¾ x 2 ¼ M10 x 57	2.32 59	2.85 72	3.76 96	1.98 50	2.29 58	2.95 75	3.45 88	1.98 50	1.9 0.9
2 ½	2.875 73.0	365 2517	2370 10540	0.12 3.048	1	¾ x 2 ¼ M10 x 57	2.63 67	3.09 78	4.29 109	1.99 51	2.61 66	3.15 80	3.93 100	1.99 51	2.1 1.0
DN65	3.000 76.1	365 2517	2580 11476	0.12 3.048	1	7/16 x 2 ¾ M11 x 69	2.68 68	3.22 82	4.56 116	2.03 52	2.64 67	3.45 88	4.22 107	2.03 52	2.4 1.1
3 DN80	3.500 88.9	365 2517	3512 15620	0.12 3.048	1	7/16 x 2 ¾ M11 x 69	2.93 74	3.53 90	5.13 130	2.07 53	2.89 73	3.78 96	4.67 119	2.07 53	2.7 1.2
4 DN100	4.500 114.3	300 2068	4771 21223	0.17 4.318	1	7/16 x 2 ¾ M11 x 69	3.47 88	4.01 102	6.03 153	2.08 53	3.43 87	4.22 107	5.56 141	2.08 53	3.5 1.6

⁴ Working Pressure and End Load are total, from all internal and external loads, based on standard weight (ANSI) steel pipe, standard roll or cut grooved in accordance with Victaulic specifications. See the Listings/Approvals section of this publication for ratings on other pipe.

⁵ The allowable pipe separation dimension shown is for system layout purposes only. Style 109 couplings are considered rigid connections and will not accommodate expansion or contraction of the piping system.

NOTES

- When assembling Style 009V, Style 009N or Style 109 couplings onto end caps, take additional care to make certain the end cap is fully seated against the gasket end stop. For Style 009V, Style 009N couplings, use FireLock No. 006 end caps containing the "EZ" marking on the inside face or No. 60 end caps containing the "QV EZ" marking on the inside face. Non-Victaulic end cap products shall not be used with Style 009V, Style 009N or Style 109 couplings. IMPORTANT: Gaskets intended for the Style 009 or Style 009V couplings cannot be used with the Style 009N or Style 109 coupling. There is no interchanging of gaskets or housings between coupling styles.
- Use Of FlushSeal Gaskets For Dry Pipe Systems** Style 009V, Style 009N or Style 109 couplings are supplied with Grade "E" Type A gaskets. These gaskets include an integral pipe stop, that once installed provides the similar benefits as a FlushSeal gasket for dry pipe systems. It should be noted that standard Victaulic FlushSeal gaskets cannot be used with the Style 009V, Style 009N or Style 109 couplings.
- The Allowable Pipe End Separation dimension shown is for system layout purposes only. Style 009V, Style 009N or Style 109 Installation-Ready rigid couplings are considered rigid connections and will not accommodate expansion/contraction or angular movement of the piping system. Contact Victaulic for torsional resistance information.

5.0 PERFORMANCE

Style 009V Two-Bolt Installation-Ready Coupling Listings/Approvals

Size		cULus		FM	
Nominal	Actual Outside Diameter	Sch. 10	Sch. 40	Sch. 10	Sch. 40
inches DN	inches mm	psi kPa bar	psi kPa bar	psi kPa bar	psi kPa bar
1 ¼ DN32	1.660 42.4	365 2516 25	365 2516 25	365 2515 25	365 2515 25
1 ½ DN40	1.900 48.3	365 2516 25	365 2516 25	365 2515 25	365 2515 25
2 DN50	2.375 60.3	365 2516 25	365 2516 25	365 2515 25	365 2515 25
2 ½	2.875 73.0	365 2516 25	365 2516 25	365 2515 25	365 2515 25
3 DN80	3.500 88.9	365 2516 25	365 2516 25	365 2515 25	365 2515 25
4 DN100	4.500 114.3	365 2516 25	365 2516 25	365 2515 25	365 2515 25
6 DN150	6.625 168.3	300 2068 20	365 2516 25	300 2065 20	365 2515 25
8 DN200	8.625 219.1	300 ¹⁴ 2068 ¹⁴ 20 ¹⁴	365 2516 25	300 ¹³ 2065 ¹³ 20 ¹³	365 2515 25
10 DN250	10.750 273.0	300 ¹⁴ 2068 ¹⁴ 20 ¹⁴	365 2516 25	300 ¹³ 2065 ¹³ 20 ¹³	365 2515 25
12 DN300	12.750 323.9	300 ¹⁴ 2068 ¹⁴ 20 ¹⁴	365 2516 25	300 ¹³ 2065 ¹³ 20 ¹³	365 2515 25

⁶ Listed/Approved for continuous use in wet and dry systems. Listed/Approved for dry systems -40° F/C and above. Please see the Victaulic Installation Manual I-009V for details concerning when supplemental lubrication is required.

⁸ FM approved for BS 1387 (EN 10255) Medium 3.6 mm pipe wall.

⁹ cULus listed for EN 10220 4.0 mm pipe wall.

¹⁰ cULus listed for EN 10255 4.5 mm pipe wall.

¹³ FM approved for 0.188" pipe wall.

¹⁴ cULus listed for 0.188" pipe wall.

¹⁵ cULus listed for JIS G3452 5.8mm pipe wall.

5.1 PERFORMANCE

Specialty Pipe

Style 009V Two-Bolt Installation-Ready Coupling Listings/Approvals

Pipe Type	Size	Pressure Rating	Pressure Rating
	inches DN	UL psi kPa bar	FM psi kPa bar
EF	1 ¼ – 4 DN32 – DN100	300 2068 20	300 2065 20
EL	1 ¼ – 2 DN32 – DN50	–	300 2065 20
MF	1 ¼ – 6 DN32 – DN150	300 2068 20	300 2065 20
FF	1 ½ – 4 DN40 – DN100	300 2068 20	300 2065 20
HF	1 ¼ – 4 DN32 – DN100	–	300 2065 20
	2 – 4 DN50 – DN100	300 2068 20	– – –
ET40	1 ¼ – 2 DN32 – DN50	300 2068 20	300 2065 20
EZT	1 ¼ – 2 DN32 – DN50	300 2068 20	300 2065 20
MT	1 ¼ – 2 DN32 – DN50	300 2068 20	300 2065 20
MLT	1 ¼ – 2 DN32 – DN50	300 2068 20	300 2065 20
Easy-Flow	1 ¼ – 4 DN32 – DN100	175 1206 12	300 2065 20
WG5, WG5E, WF5, WL7	1 ¼ – 4 DN32 – DN100	175 1206 12	–
WG7, WG7E	1 ¼ – 4 DN32 – DN100	175 1206 12	300 2065 20
WLS	1 ¼ – 2 DN32 – DN50	–	300 2065 20
GL	1 ¼ – 2 DN32 – DN50	–	300 2065 20

NOTES

- Easy Flow = Steel pipe manufactured by Borusan Mannesmann Boru
- EF = EDDY FLOW steel pipe manufactured by Bull Moose Tube Co.
- EL = EDDYLITE steel pipe manufactured by Bull Moose Tube Co.
- ET40 = Eddythread 40 steel pipe manufactured by Bull Moose Tube Co.
- EZF = EZ-Flow steel pipe manufactured by Northwest Pipe Co.
- EZT = EZ-Thread steel pipe manufactured by Youngstown Tube Co.
- FF = Fire-Flo steel pipe manufactured by Youngstown Tube Co.
- GL = GL steel pipe manufactured by Wheatland Tube Co.
- HF = Hydroflow sch 7 steel pipe manufactured by Nucor Tubular Products Inc.
- MF = Mega-Flow steel pipe manufactured by Wheatland Tube Co.
- MT = Mega-Thread steel pipe manufactured by Wheatland Tube Co.
- MLT = MLT steel pipe manufactured by Wheatland Tube Co.
- WG5, WG5E, WF5 = WGalweld 5, WGalweld 5E, WFlow 5 steel pipe manufactured by Wuppermann Stahl GmbH.
- WG7, WG7E, WL7 = WGalweld 7, Wgalweld 7E, WLight 7 steel pipe manufactured by Wuppermann Stahl GmbH.
- WLS = WLS steel pipe manufactured by Wheatland Tube Co.

5.2 PERFORMANCE

Style 009N Two-Bolt *Installation-Ready* Coupling Listings/Approvals⁶

The information provided below is based on the latest listing and approval data at the time of publication. Listings/Approvals are subject to change and/or additions by the approval agencies. Contact Victaulic for performance on other pipe and the latest listings and approvals.

Size		cULus		FM		VdS	LPCB
Nominal	Actual Outside Diameter	Sch. 10	Sch. 40	Sch. 10	Sch. 40		
inches DN	inches mm	psi kPa bar	psi kPa bar	psi kPa bar	psi kPa bar	psi kPa bar	psi kPa bar
1 ¼ DN32	1.660 42.4	365 2516 25	365 2516 25	363 2503 25	363 2503 25	363 2503 25	363 2503 25
1 ½ DN40	1.900 48.3	365 2516 25	365 2516 25	363 2503 25	363 2503 25	363 2503 25	363 2503 25
2 DN50	2.375 60.3	365 2516 25	365 2516 25	363 2503 25	363 2503 25	363 2503 25	363 2503 25
2 ½	2.875 73.0	365 2516 25	365 2516 25	363 2503 25	363 2503 25	–	363 2503 25
DN65	3.000 76.1	365 ⁷ 2516 ⁷ 25 ⁷	–	363 ⁸ 2503 ⁸ 25 ⁸	–	363 2503 25	363 2503 25
3 DN80	3.500 88.9	365 2516 25	365 2516 25	363 2503 25	363 2503 25	363 2503 25	363 2503 25
4 DN100	4.500 114.3	365 2516 25	365 2516 25	363 2503 25	363 2503 25	363 2503 25	363 2503 25
	4.250 108.0	–	–	363 2503 25	363 2503 25	–	–
5	5.563 141.3	365 2516 25	365 2516 25	363 2503 25	363 2503 25	232 1600 16	363 2503 25
	5.250 133.0	–	–	363 ⁸ 2503 ⁸ 25 ⁸	–	–	–
DN125	5.500 139.7	290 ⁹ 1999 ⁹ 20 ⁹	–	363 ⁸ 2503 ⁸ 25 ⁸	–	232 1600 16	363 2503 25
6 DN150	6.625 168.3	300 2068 20	365 2516 25	300 2068 20	363 2503 25	232 1600 16	363 2503 25
	6.250 159	–	–	363 ⁸ 2503 ⁸ 25 ⁸	–	–	–

⁶ Listed/Approved for continuous use in wet and dry systems. Listed/Approved for dry systems -40° F/C and above. Please see the Victaulic Installation Manual I-109 for details concerning when supplemental lubrication is required.

⁷ cULus listed for DIN 2458 (EN 10220) 2.6 mm pipe wall.

⁸ FM approved for BS 1387 (EN 10255) Medium 3.6 mm pipe wall.

⁹ cULus listed for EN 10220 4.0 mm pipe wall.

¹⁰ cULus listed for EN 10255 4.5 mm pipe wall.

¹¹ With optional stainless steel fasteners, cULus Listed to 175psi/1207 kPa/12 bar and FM Approved to the FM ratings shown in the above table. The stainless steel fasteners have a marking designation of "316" on the end face of the bolt.

¹² cUL listed to 250 psi/1720 kPa /17 bar.

¹³ FM approved for 0.188" pipe wall.

¹⁴ cULus listed for 0.188" pipe wall.

¹⁵ cULus Listed for JIS G3452 pipe.

5.2 PERFORMANCE (CONTINUED)

Style 009N Two-Bolt *Installation-Ready* Coupling Listings/Approvals⁶

The information provided below is based on the latest listing and approval data at the time of publication. Listings/Approvals are subject to change and/or additions by the approval agencies. Contact Victaulic for performance on other pipe and the latest listings and approvals.

Size		cULus		FM		VdS	LPCB
Nominal inches DN	Actual Outside Diameter inches mm	Sch. 10 psi kPa bar	Sch. 40 psi kPa bar	Sch. 10 psi kPa bar	Sch. 40 psi kPa bar	psi kPa bar	psi kPa bar
	6.500 165.1	290 ¹⁰ 1999 ¹⁰ 20 ¹⁰	–	363 ⁸ 2503 ⁸ 25 ⁸	–	–	363 2503 25
8 DN200	8.625 219.1	300 ¹⁴ 2068 ¹⁴ 20 ¹⁴	365 2516 25	300 ¹³ 2068 ¹³ 20 ¹³	363 2503 25	232 1600 16	363 2503 25
	8.515 216.3	290 1999 20	–	363 ⁸ 2503 ⁸ 25 ⁸	–	–	–
10 DN250	10.750 273.0	300 ¹⁴ 2068 ¹⁴ 20 ¹⁴	300 2068 20	300 ¹³ 2068 ¹³ 20 ¹³	300 2068 20	–	290 2000 20
12 DN300	12.750 323.9	300 ^{12 14} 2068 ^{12 14} 20 ^{12 14}	300 2068 20	250 ¹³ 1720 ¹³ 17 ¹³	300 2068 20	–	290 2000 20

⁶ Listed/Approved for continuous use in wet and dry systems. Listed/Approved for dry systems -40° F/C and above. Please see the Victaulic Installation Manual I-109 for details concerning when supplemental lubrication is required.

⁷ cULus listed for DIN 2458 (EN 10220) 2.6 mm pipe wall.

⁸ FM approved for BS 1387 (EN 10255) Medium 3.6 mm pipe wall.

⁹ cULus listed for EN 10220 4.0 mm pipe wall.

¹⁰ cULus listed for EN 10255 4.5 mm pipe wall.

¹¹ With optional stainless steel fasteners, cULus Listed to 175psi/1207 kPa/12 bar and FM Approved to the FM ratings shown in the above table. The stainless steel fasteners have a marking designation of "316" on the end face of the bolt.

¹² cUL listed to 250 psi/1720 kPa /17 bar.

¹³ FM approved for 0.188" pipe wall.

¹⁴ cULus listed for 0.188" pipe wall.

¹⁵ cULus Listed for JIS G3452 pipe.

5.3 PERFORMANCE

Specialty Pipe

Style 009N Two-Bolt *Installation-Ready* Coupling Listings/Approvals

Pipe Type	Size	Pressure Rating	
	inches DN	UL psi kPa bar	FM psi kPa bar
EF	1 ¼ – 4 DN32 – DN100	300 2068 20	–
EL	1 ¼ – 2 DN32 – DN50	300 2068 20	300 2068 20
EZF	3–4 DN80 – DN100	300 2068 20	–
MF	1 ¼ – 4 DN32 – DN100	300 2068 20	300 2068 20
	6 DN150	175 1206 12	175 1207 12
FF	1 ½ – 4 DN40 – DN100	300 2068 20	–
ET40	1 ¼ – 2 DN32 – DN50	300 2068 20	–
EZT	1 ¼ – 2 DN32 – DN50	300 2068 20	300 2068 20
MT	1 ¼ – 2 DN32 – DN50	300 2068 20	300 2068 20
MLT	1 ¼ – 2 DN32 – DN50	–	300 2068 20
Easy Flow	1 ¼ – 4 DN32 – DN100	–	300 2068 20
WG5, WG5E, WF5, WG7, WG7E, WL7	1 ¼ – 4 DN32 – DN100	300 2068 24	300 2068 20
TF (Tex-Flow)	2 ½ – 4 DN65 – DN100	–	300 2068 20
WLS	1 ¼ – 2 DN32 – DN50	–	300 2068 20
GL	1 ¼ – 2 DN32 – DN50	–	300 2068 20

NOTES

- Easy Flow = Steel pipe manufactured by Borusan Mannesmann Boru
- EF = EDDY FLOW steel pipe manufactured by Bull Moose Tube Co.
- EL = EDDYLITE steel pipe manufactured by Bull Moose Tube Co.
- ET40 = Eddythread 40 steel pipe manufactured by Bull Moose Tube Co.
- EZF = EZ-Flow steel pipe manufactured by Northwest Pipe Co.
- EZT = EZ-Thread steel pipe manufactured by Youngstown Tube Co.
- FF = Fire-Flo steel pipe manufactured by Youngstown Tube Co.
- GL = GL steel pipe manufactured by Wheatland Tube Co.
- MF = Mega-Flow steel pipe manufactured by Wheatland Tube Co.
- MT = Mega-Thread steel pipe manufactured by Wheatland Tube Co.
- MLT = MLT steel pipe manufactured by Wheatland Tube Co.
- TF = Tex-Flow steel pipe manufactured by Tex-Tube Co.
- WG5, WG5E, WF5 = WGalweld 5, WGalweld 5E, WFlow 5 steel pipe manufactured by Wuppermann Stahl GmbH.
- WG7, WG7E, WL7 = WGalweld 7, Wgalweld 7E, WLight 7 steel pipe manufactured by Wuppermann Stahl GmbH
- WLS = WLS steel pipe manufactured by Wheatland Tube Co.

5.4 PERFORMANCE

Style 109 One-Bolt *Installation-Ready* Coupling Listings/Approvals¹⁵

The information provided below is based on the latest listing and approval data at the time of publication. Listings/Approvals are subject to change and/or additions by the approvals agencies. Contact Victaulic for performance on other pipe and the latest listings and approvals.

Size		cULus		FM		VdS	LPCB
Nominal inches DN	Actual Outside Diameter inches mm	Sch. 10 psi kPa bar	Sch. 40 psi kPa bar	Sch. 10 psi kPa bar	Sch. 40 psi kPa bar	psi kPa bar	psi kPa bar
1 ¼ DN32	1.660 42.4	365 2516 25	365 2516 25	365 2517 25	365 2517 25	232 1600 16	363 2503 25
1 ½ DN40	1.900 48.3	365 2516 25	365 2516 25	365 2517 25	365 2517 25	232 1600 16	363 2503 25
2 DN50	2.375 60.3	365 2516 25	365 2516 25	365 2517 25	365 2517 25	232 1600 16	363 2503 25
2 ½	2.875 73.0	365 2516 25	365 2516 25	365 2517 25	365 2517 25	–	–
DN65	3.000 76.1	–	–	365 2517 25	365 2517 25	232 1600 16	363 2503 25
3 DN80	3.500 88.9	365 2516 25	365 2516 25	365 2517 25	365 2517 25	232 1600 16	363 2503 25
4 DN100	4.500 114.3	300 2068 20	300 2068 20	300 2068 20	300 2068 20	–	290 2000 20

¹⁵ Listed/Approved for continuous use in wet and dry systems. Listed/Approved for dry systems -40° F/C and above. Please see the Victaulic [Installation Manual I-109](#) for details concerning when supplemental lubrication is required.

NOTE

- With optional stainless steel fasteners, cULus Listed to 300 psi/2068 kPa/20.6 bar and FM Approved to the FM ratings shown in the above table. The stainless steel fasteners have a marking designation of "316" on the head of the bolt.

5.5 PERFORMANCE

Specialty Pipe

Style 109 One-Bolt *Installation-Ready* Coupling Listings/Approvals

Pipe Type	Size	Pressure Rating	
	inches	cULus psi kPa bar	FM psi kPa bar
	DN		
EF	1 ¼ – 2 ½ DN32 – 73.0 mm	–	300 2068 20
	1 ½ – 2 ½ DN40 – 73.0 mm	300 2068 20	–
	3 – 4 DN80 – DN100	300 2068 20	300 2068 20
Easy Flow	1 ¼ – 2 DN32 – DN50	–	300 2068 20
	3 – 4 DN80 – DN100	–	300 2068 20
EL	1 ¼ – 2 DN32 – DN50	–	300 2068 20
ET40	1 ¼ – 2 DN32 – DN50	300 2068 20	300 2068 20
EZT	1 ¼ – 2 DN32 – DN50	–	300 2068 20
	1 ½ – 2 DN40 – DN50	300 2068 20	–
FF	1 ½ – 4 DN40 – DN100	300 2068 20	300 2068 20
GL	1 ¼ – 2 DN32 – DN50	–	300 2068
MF	1 ¼ – 4 DN32 – DN100	300 2068 20	300 2068 20
MT	1 ¼ – 2 DN32 – DN50	300 2068 20	300 2068 20
MLT	1 ¼ – 2 DN32 – DN50	300 2068 20	300 2068 20

NOTES

- EF = EDDY FLOW steel pipe manufactured by Bull Moose Tube Co.
- Easy Flow = Easy Flow steel pipe manufactured by Borusan Mannesmann Boru.
- EL = EDDYLITE steel pipe manufactured by Bull Moose Tube Co.
- ET40 = Eddythread 40 steel pipe manufactured by Bull Moose Tube Co.
- EZT = EZ-Thread steel pipe manufactured by Youngstown Tube Co.
- FF = Fire-Flo steel pipe manufactured by Youngstown Tube Co.
- GL = GL steel pipe manufactured by Wheatland Tube Co.
- MF = Mega-Flow steel pipe manufactured by Wheatland Tube Co.
- MT = Mega-Thread steel pipe manufactured by Wheatland Tube Co.
- MLT = MLT steel pipe manufactured by Wheatland Tube Co.
- TF = Tex-Flow steel pipe manufactured by Tex-Tube Co.
- WG5, WG5E, WF5 = WGalweld 5, WGalweld 5E, and WFlow 5 steel pipe manufactured by Wuppermann Stahl GmbH
- WG7, WG7E, WL7 = WGalweld 7, WGalweld 7E, and WLight 7 steel pipe manufactured by Wuppermann Stahl GmbH.
- WLS = WLS steel pipe manufactured by Wheatland Tube Co.

5.5 PERFORMANCE (CONTINUED)

Specialty Pipe

Style 109 One-Bolt *Installation-Ready* Coupling Listings/Approvals

Pipe Type	Size	Pressure Rating	
	inches	cULus	FM
	DN	psi kPa bar	psi kPa bar
TF	2 ½ – 4 73.00 mm – DN100	–	300 2068 20
WG5, WG5E, WF5, WL7	1 ¼ – 4 DN32 – DN100	300 2068 20	–
WG7, WG7E	1 ¼ – 4 DN32 – DN100	300 2068 20	300 2068 20
WLS	1 ¼ – 2 DN32 – DN50	–	300 2068 20

NOTES

- EF = EDDY FLOW steel pipe manufactured by Bull Moose Tube Co.
- Easy Flow = Easy Flow steel pipe manufactured by Borusan Mannesmann Boru.
- EL = EDDYLITE steel pipe manufactured by Bull Moose Tube Co.
- ET40 = Eddythread 40 steel pipe manufactured by Bull Moose Tube Co.
- EZT = EZ-Thread steel pipe manufactured by Youngstown Tube Co.
- FF = Fire-Flo steel pipe manufactured by Youngstown Tube Co.
- GL = GL steel pipe manufactured by Wheatland Tube Co.
- MF = Mega-Flow steel pipe manufactured by Wheatland Tube Co.
- MT = Mega-Thread steel pipe manufactured by Wheatland Tube Co.
- MLT = MLT steel pipe manufactured by Wheatland Tube Co.
- TF = Tex-Flow steel pipe manufactured by Tex-Tube Co.
- WG5, WG5E, WF5 = WGalweld 5, WGalweld 5E, and WFlow 5 steel pipe manufactured by Wuppermann Stahl GmbH
- WG7, WG7E, WL7 = WGalweld 7, WGalweld 7E, and WLight 7 steel pipe manufactured by Wuppermann Stahl GmbH.
- WLS = WLS steel pipe manufactured by Wheatland Tube Co.

6.0 NOTIFICATIONS



 **WARNING**

- Read and understand all instructions before attempting to install any Victaulic products.
- Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.
- Wear safety glasses, hardhat, and foot protection.

Failure to follow these instructions could result in death or serious personal injury and property damage.

- These products shall be used only in fire protection systems that are designed and installed in accordance with current, applicable National Fire Protection Association (NFPA 13, 13D, 13R, etc.) standards, or equivalent standards, and in accordance with applicable building and fire codes. These standards and codes contain important information regarding protection of systems from freezing temperatures, corrosion, mechanical damage, etc.
- The installer shall understand the use of this product and why it was specified for the particular application.
- The installer shall understand common industry safety standards and potential consequences of improper product installation.
- It is the system designer's responsibility to verify suitability of materials for use with the intended fluid media within the piping system and external environment.
- The material specifier shall evaluate the effect of chemical composition, pH level, operating temperature, chloride level, oxygen level, and flow rate on materials to confirm system life will be acceptable for the intended service.

Failure to follow installation requirements and local and national codes and standards could compromise system integrity or cause system failure, resulting in death or serious personal injury and property damage.

NOTICE

- Victaulic does not recommend the use of any furnace butt-welded pipe with sizes 2"/DN50 and smaller Victaulic gasketed joint products. This includes, but is not limited to, ASTM A53 Type F pipe.

NOTE

- If using coated pipe, please refer to the installation instructions for pipe preparation details.

7.0 REFERENCE MATERIALS

- [05.01: Seal Selection Guide](#)
- [25.01: Original Groove System \(OGS\) Groove Specifications](#)
- [I-009N: Installation Instructions FireLock EZ™ Rigid Coupling Style 009N](#)
- [I-009V: Installation Instructions FireLock™ Installation-Ready™ Rigid Coupling Style 009V](#)
- [I-100: Victaulic Field Installation Handbook](#)
- [I-109: Installation Instructions FireLock™ One-Bolt Rigid Coupling Style 109](#)
- [I-ENDCAP: Victaulic End Caps Installation Instructions](#)
- [I-IMPACT: Impact Tool Usage Guidelines](#)

User Responsibility for Product Selection and Suitability

Each user bears final responsibility for making a determination as to the suitability of Victaulic products for a particular end-use application, in accordance with industry standards and project specifications, and the applicable building codes and related regulations as well as Victaulic performance, maintenance, safety, and warning instructions. Nothing in this or any other document, nor any verbal recommendation, advice, or opinion from any Victaulic employee, shall be deemed to alter, vary, supersede, or waive any provision of Victaulic Company's standard conditions of sale, installation guide, or this disclaimer.

Intellectual Property Rights

No statement contained herein concerning a possible or suggested use of any material, product, service, or design is intended, or should be constructed, to grant any license under any patent or other intellectual property right of Victaulic or any of its subsidiaries or affiliates covering such use or design, or as a recommendation for the use of such material, product, service, or design in the infringement of any patent or other intellectual property right. The terms "Patented" or "Patent Pending" refer to design or utility patents or patent applications for articles and/or methods of use in the United States and/or other countries.

Note

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

Installation

Reference should always be made to the Victaulic installation handbook or installation instructions of the product you are installing. Handbooks are included with each shipment of Victaulic products, providing complete installation and assembly data, and are available in PDF format on our website at www.victaulic.com.

Warranty

Refer to the Warranty section of the current Price List or contact Victaulic for details.

Trademarks

Victaulic and all other Victaulic marks are the trademarks or registered trademarks of Victaulic Company, and/or its affiliated entities, in the U.S. and/or other countries.



Reliable®

RASCOFLEX® Sprinkler Connections

cULus Listed, FM Approved

Product Description

RASCOFLEX® Sprinkler Connections are intended to connect a branch line to a sprinkler using a flexible stainless steel hose assembly. RASCOFLEX® Sprinkler Connections are suitable for use in suspended and hard ceiling applications such as T-Bar ceiling grids, wood, metal stud, or hat furring channel hard lid ceilings. Every package contains one (1) fully assembled stainless steel flexible sprinkler system complete with hose, branch line connection, and sprinkler connection, as well as the pre-assembled bracket assembly to attach to the ceiling.

RASCOFLEX® Sprinkler Connections are designed for use in hydraulically calculated wet, preaction, or dry sprinkler systems per NFPA 13, 13R, 13D, and FM Global Loss Prevention Data Sheets.

Technical Data

Table A

Maximum Working Pressure		FM: 200 psi (13.8 bar) UL: 175 psi (12.1 bar)
Maximum Working Temperature		300°F (149°C)
Connections	Inlet/Branch Line	1" NPT
	Outlet/Reducer	1/2" or 3/4" NPT
Minimum Allowable Bending Radius		UL: 3" (76 mm) FM: 7" (178 mm)
Maximum Number of Bends		See Friction Loss Chart
Maximum K-Factor	1/2" Outlet	5.6 (80 metric)
	3/4" Outlet	14.0 (200 metric)

Maintenance

RASCOFLEX® Sprinkler Connections should be inspected and the sprinkler system maintained in accordance with NFPA 25, as well as the requirements of any Authorities Having Jurisdiction.

Patents

RASCOFLEX® Sprinkler Connections may be covered by one or more of the following US Patent Nos. 10,173,088 and 10,328,296.

Listings and Approvals

FM Approved Class No. 1637 (FM)
UL Listed and UL Certified for Canada to ANSI/UL 2443 (cULus)



RASCOFLEX® Sprinkler Connections

Ordering Information

Specify:

Model Name

- Model RFB

Nominal Hose Length

- 24" (610 mm)
- 31" (790 mm)
- 40" (1015 mm)
- 48" (1220 mm)
- 60" (1525 mm)
- 72" (1830 mm)

Reducer Outlet: 1/2" NPT or 3/4" NPT

Reducer Type

Standard:

- 6-1/8" (155 mm) straight

Optional:

- 4-5/16" (110 mm) straight
- 5-5/16" (135 mm) straight
- 11-3/4" (300 mm) straight
- 5-5/8" (143 mm) elbow
- 7-3/8" (187 mm) elbow

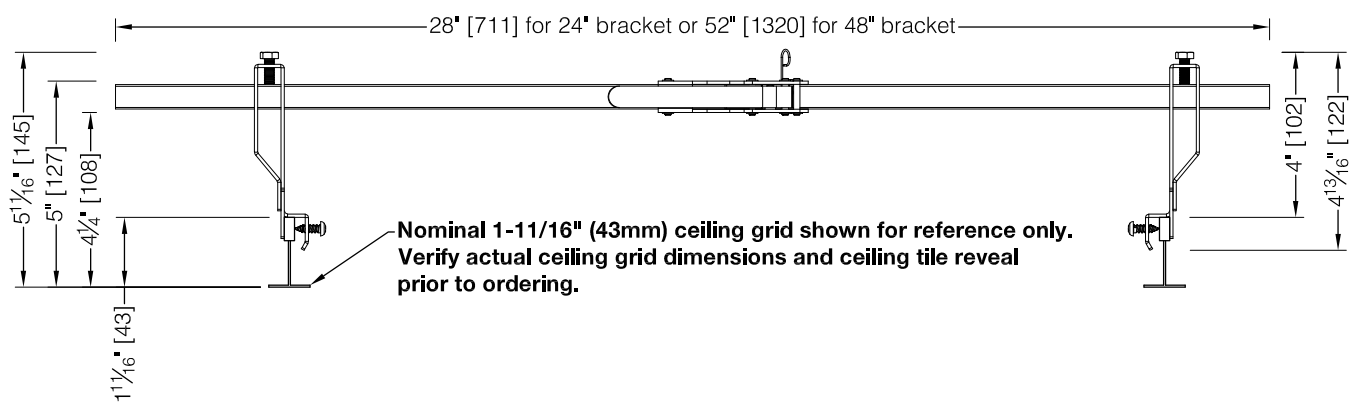
Bracket Assembly Length

- 24" (610 mm) standard
- 48" (1220 mm) optional

Accessories

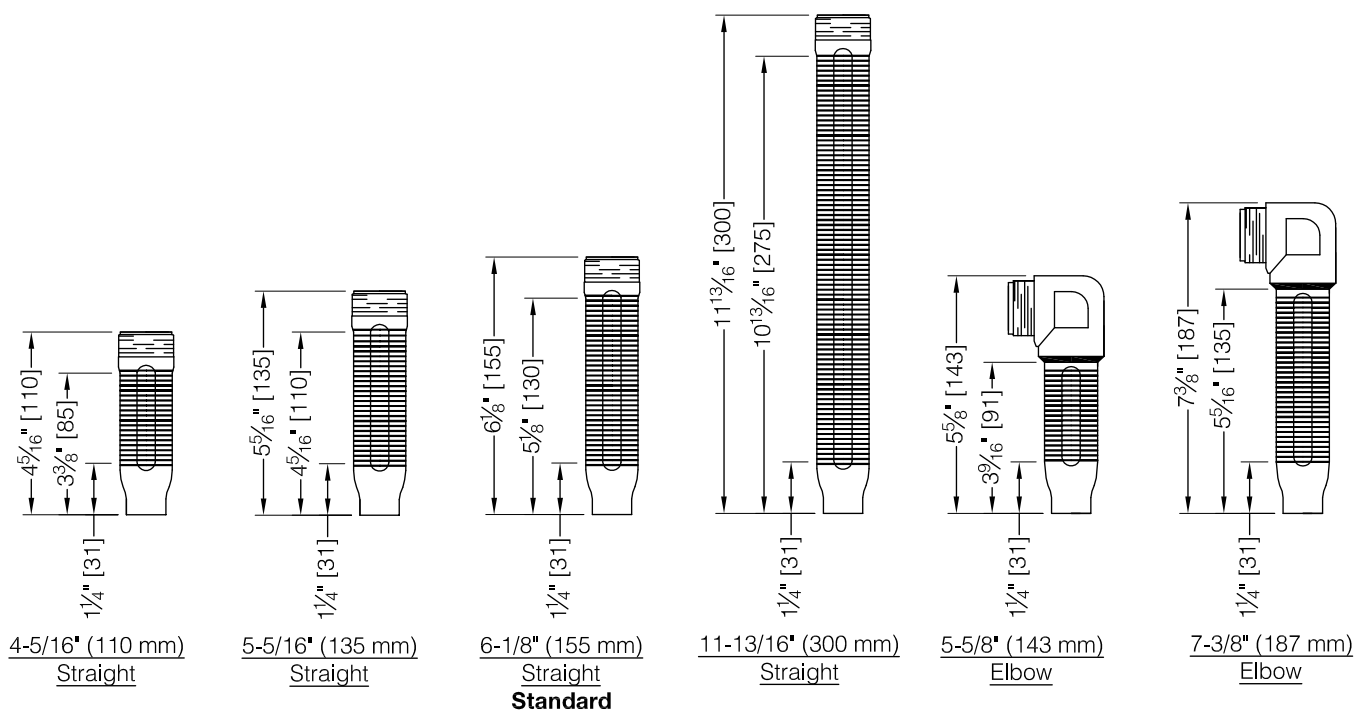
- See Table F

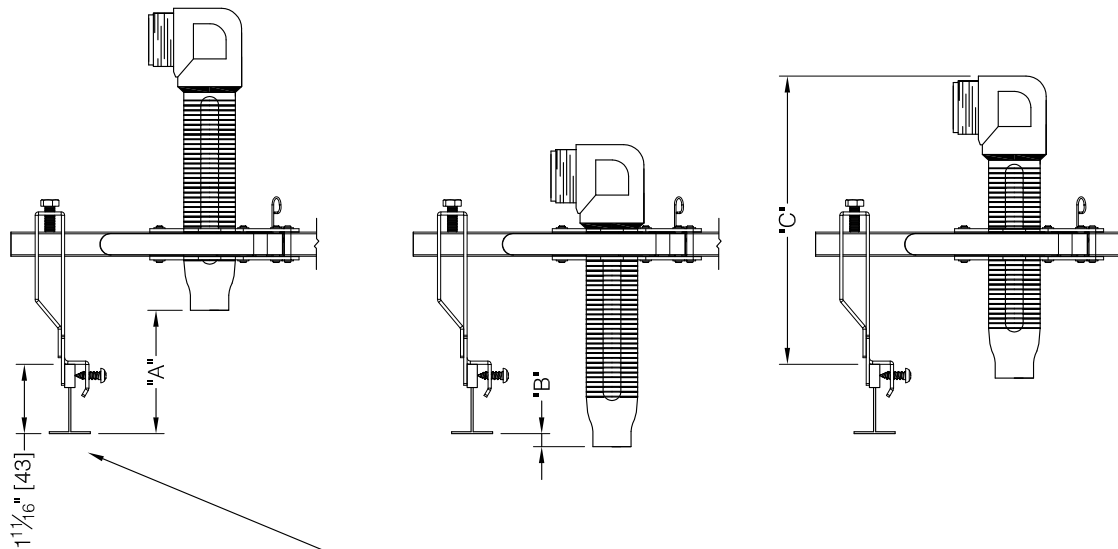
Figure 1



Reducer Dimensions

Figure 2





Nominal 1-11/16" (43mm) ceiling grid shown for reference only.
Verify actual ceiling grid dimensions and ceiling tile reveal prior to ordering.

Minimum and Maximum Face of Fitting to Bottom of Ceiling Grid for Each Reducer

Table B

Fitting Distance	6-1/8" (155mm) Straight Standard	4-5/16" (110mm) Straight	5-5/16" (135mm) Straight	11-13/16" (300mm) Straight	5-5/8" (143mm) Elbow	7-3/8" (187mm) Elbow
Max. Face of Fitting Distance Above Bottom of Ceiling Grid	3" (77mm)	3" (7mm)	3" (7mm)	3" (7mm)	3" (7mm)	3" (7mm)
Max. Face of Fitting Distance from Bottom of Ceiling Grid	1/8" (3mm) below	1-5/8" (42mm) above	11/16" (17mm) above	6-3/8" (148mm) below	1-7/16" (36mm) above	5/16" (60mm) below

Note: Based on 1-11/16" (43mm) tall ceiling grid.

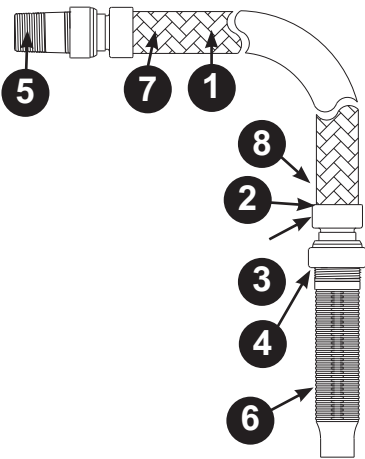
Fig. 3 Dimension C - Clearance Above Ceiling Required at Max. Sprinkler Recess

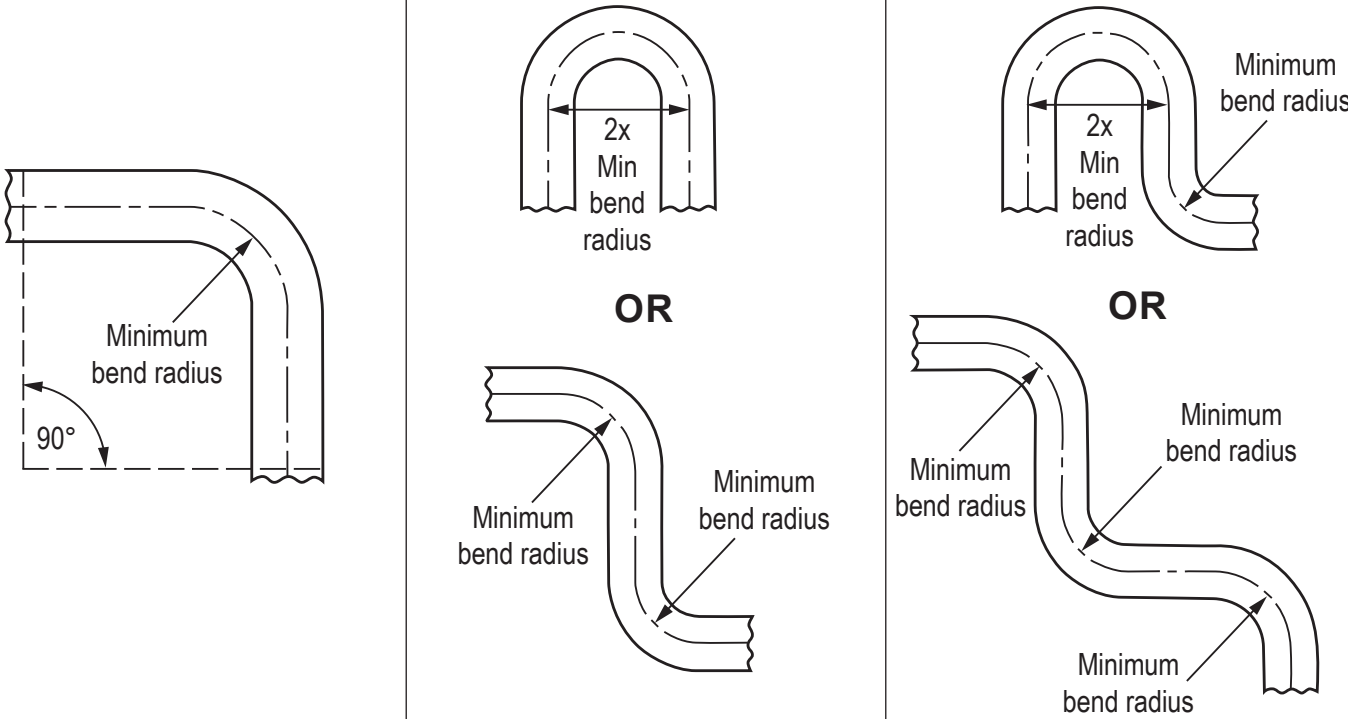
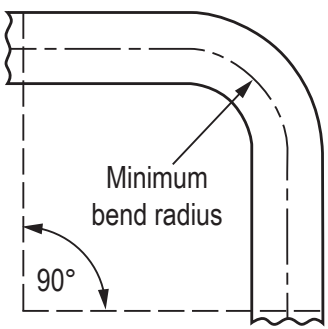
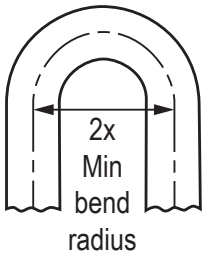
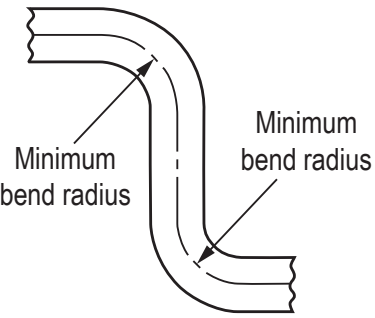
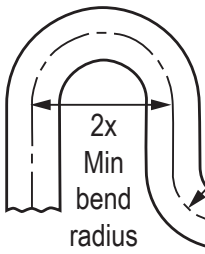
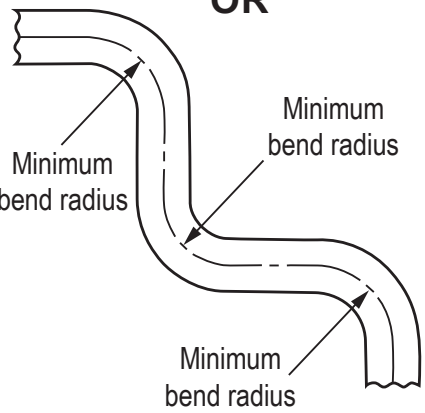
Table C

Recessed Escutcheon or Concealed/Flush Sprinkler	Reducer	
	5-5/8" (143mm) Elbow	7-3/8" (187mm) Elbow
F1 recessed escutcheon	NC	5-5/8" (144mm)
F2 or FV recessed escutcheon	NC	5-3/8" (138mm)
FP recessed escutcheon	NC	6-1/4" (160mm)
CCP conical concealed cover plate	NC	6-1/4" (160mm)
G4 series concealed sprinklers	5-5/8" (144mm)	7-3/8" (188mm)
G5 series concealed sprinklers	5-1/4" (134mm)	7" (179mm)
RFC series concealed sprinklers	5-1/4" (134mm)	7" (179mm)
XL commercial flush sprinkler with flat escutcheon	4-7/8" (125mm)	6-5/8" (169mm)
XL commercial flush sprinkler with conical escutcheon	4-3/8" (112mm)	6-1/8" (157mm)

Note: NC - Reducer not compatible with sprinkler adjustment range.

Based on 1-11/16" (43mm) tall ceiling grid and flush ceiling tile.

Materials			Figure 4
Number	Item Description	Material	
1	Flexible Hose/Bellow	AISI Type 304 Stainless Steel	
2	Isolation Ring	Nylon 66	
3	Gasket	EPDM	
4	Nut	Zinc Plated Carbon Steel	
5	Branch Line Nipple (1")	Zinc Plated Carbon Steel	
6	Reducer	Zinc Plated Carbon Steel	
7	Braid	AISI Type 304 Stainless Steel	
8	Welded Collar Fitting	AISI Type 304 Stainless Steel	
-	Bar Stock	Zinc Plated SGCC Steel	
-	Brackets: Center and Side	Zinc Plated SPCC Steel	

Flexible Hose Number of Bends			Figure 5
One Bend	Two Bends	Three Bends	
	 OR 	 OR 	

Do NOT install the RASCOFLEX™ straight. Some flexibility in the form of an allowable bend (or bends) must be provided.



cULus Friction Loss Data

Table D

Nominal Length of Flexible Hose in (mm)	Reducer		Maximum Sprinkler K-Factor gpm/psi ^{1/2} (lpm/bar ^{1/2})	Maximum Number of 90° Bends at 3" (76mm) Bend Radius	Equivalent Length of 1" (33.7mm) Sch. 40 Pipe (C=120), ft (m)
	NPT Threads	Type			
24 (610)	1/2	Straight	5.6 (80)	2	10 (3)
	3/4	Straight	14.0 (200)	2	13 (4)
31 (790)	1/2	Straight	5.6 (80)	3	14 (4.3)
	3/4	Straight	14.0 (200)	3	16 (4.9)
40 (1015)	1/2	Straight	5.6 (80)	4	21 (6.4)
	3/4	Straight	14.0 (200)	4	23 (7)
48 (1220)	1/2	Straight	5.6 (80)	4	24 (7.3)
	3/4	Straight	14.0 (200)	4	26 (7.9)
60 (1525)	1/2	Straight	5.6 (80)	4	25 (7.6)
	3/4	Straight	14.0 (200)	4	30 (9.1)
72 (1830)	1/2	Straight	5.6 (80)	5	36 (11)
	3/4	Straight	14.0 (200)	5	33 (10.1)

UL Notes:

1. Available data for use with 6.1" straight reducers.
2. Sprinkler K-Factor: 5.6 (80 metric) for 1/2-inch reducer and 14.0 (200 metric) for 3/4-inch reducer.
3. RASCOFLEX® Sprinkler Connections have been tested and approved by Underwriter's Laboratories, Inc. for use in wet, preaction, and dry sprinkler systems per NFPA 13, 13D, 13R and UL2443.



FM Friction Loss Data

Table E

Nominal Length of Flexible Hose in (mm)	Reducer		Maximum Sprinkler K-Factor gpm/psi ^{1/2} (lpm/bar ^{1/2})	Maximum Number of 90° Bends at 7" 178mm) Bend Radius	Equivalent Length of 1" (33.7mm) Sch. 40 Pipe (C=120), ft (m)
	NPT Threads	Type			
24 (610)	1/2	Straight	5.6 (80)	1	9.7 (2.9)
	1/2	90° Elbow	5.6 (80)	0	11.5 (3.5)
	3/4	Straight	8.0 (115)	1	9.9 (3)
			11.2 (160)	1	9.8 (2.9)
			14.0 (200)	1	9.6 (2.9)
	3/4	90° Elbow	8.0 (115)	0	10.2 (3.1)
			11.2 (160)	0	10 (3)
			14.0 (200)	0	9.8 (2.9)
31 (790)	1/2	Straight	5.6 (80)	2	12.4 (3.8)
	1/2	90° Elbow	5.6 (80)	2	15.8 (4.8)
	3/4	Straight	8.0 (115)	2	13.7 (4.1)
			11.2 (160)	2	12.9 (3.9)
			14.0 (200)	2	12.2 (3.7)
	3/4	90° Elbow	8.0 (115)	2	14.5 (4.4)
			11.2 (160)	2	13.7 (4.1)
			14.0 (200)	2	13 (3.9)
40 (1015)	1/2	Straight	5.6 (80)	2	15.9 (4.8)
	1/2	90° Elbow	5.6 (80)	2	21.6 (6.6)
	3/4	Straight	8.0 (115)	2	18.5 (5.6)
			11.2 (160)	2	17.4 (5.3)
			14.0 (200)	2	16.3 (4.9)
	3/4	90° Elbow	8.0 (115)	2	20 (6)
			11.2 (160)	2	18.9 (5.7)
			14.0 (200)	2	20 (6)
48 (1220)	1/2	Straight	5.6 (80)	3	19.0 (5.8)
	1/2	90° Elbow	5.6 (80)	3	25.9 (7.9)
	3/4	Straight	8.0 (115)	3	22.7 (6.9)
			11.2 (160)	3	21.5 (6.5)
			14.0 (200)	3	20.5 (6.2)
	3/4	90° Elbow	8.0 (115)	3	24.8 (7.5)
			11.2 (160)	3	23.6 (7.2)
			14.0 (200)	3	22.6 (6.8)

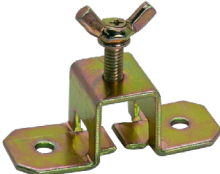
Nominal Length of Flexible Hose in (mm)	Reducer		Maximum Sprinkler K-Factor gpm/psi ^{1/2} (lpm/bar ^{1/2})	Maximum Number of 90° Bends at 7" (178mm) Bend Radius	Equivalent Length of 1" (33.7mm) Sch. 40 Pipe (C=120), ft (m)
	NPT Threads	Type			
60 (1525)	1/2	Straight	5.6 (80)	4	23.7 (7.2)
	1/2	90° Elbow	5.6 (80)	4	33.1 (10)
	3/4	Straight	8.0 (115)	4	29.1 (8.8)
			11.2 (160)	4	28 (8.5)
			14.0 (200)	4	27 (8.2)
	3/4	90° Elbow	8.0 (115)	4	32.2 (9.8)
			11.2 (160)	4	31.1 (9.5)
			14.0 (200)	4	30 (9.1)
72 (1830)	1/2	Straight	5.6 (80)	4	28.4 (8.6)
	1/2	90° Elbow	5.6 (80)	4	40.4 (12.3)
	3/4	Straight	8.0 (115)	4	35.5 (10.8)
			11.2 (160)	4	34.3 (10.4)
			14.0 (200)	4	33.2 (10.1)
	3/4	90° Elbow	8.0 (115)	4	39.5 (12)
			11.2 (160)	4	38.3 (11.6)
			14.0 (200)	4	37.2 (11.3)

FM Notes:

1. RASCOFLEX® Sprinkler Connections have been tested and approved by FM Approvals for use in wet, preaction, and dry sprinkler systems per FM data sheets 2-0, 2-5, and 2-8 per FM1637.
2. Maximum sprinkler K-Factor: 5.6 (80 metric) for 1/2-inch reducer and 14.0 (200 metric) for 3/4-inch reducer.
3. Differences in equivalent lengths are due to varying test methods, per FM 1637 standards.
4. Above data of friction loss for use with 6.1" straight reducers.

Accessories List

Table F

 5-5/8" (143mm) Elbow Reducer-Short 1/2": 7M99003303 3/4": 7M99003305	 7-3/8" (187mm) Elbow Reducer-Long 1/2": 7M99003302 3/4": 7M99003304	 4-5/16" (110mm) Straight Reducer 1/2": 7M99003306 3/4": 7M99003325
 5-5/16" (135mm) Straight Reducer 1/2": 7M99003307 3/4": 7M99003326	 Replacement 6-1/8" (155mm) Standard Straight Reducer 1/2": 7M99003308 3/4": 7M99003327	 11-13/16" (300mm) Straight Reducer 1/2": 7M99003309 3/4": 7M99003328
 Hat Channel End Bracket- Short 3" (76mm) 7M99003310	 Hat Channel End Bracket- Long 3-3/4" (95mm) 7M99003311	 Metal Stud End Bracket-Short 1-1/2" (38mm) 7M99003312
 Metal Stud End Bracket- Long 2-1/16" (53mm) 7M99003313	 T-Bar End Bracket- Short 2-5/8" (68mm) 7M99003314	 T-Bar End Bracket- Long 4-1/8" (105mm) 7M99003316
 Wood Beam Stud End Bracket 7M99003317	 Replacement Center Bracket 7M99003321	 3" (76 mm) Bend Radius Indicator 7M99004179
 Replacement 1" NPT Inlet Adapter 7M99003322	 #2 Square Drive Bit 7M99004539	 Replacement Gasket 7M99004319
 48" (1220mm) Bracket Assembly 7M99003301		

FLOOR CONTROL PAK

MODEL LVFCPAK



FEATURES:

- Preassembled for ease of installation
- All parts are UL Listed and FM Approved
- Can be supplied with test and drain or ball valve as required
- Butterfly valve has built in tamper switch
- Easily field serviced
- Sizes: 2, 2½", 3", 4", 6", 300 PSI
- Test and drain with optional PRV, available nominal K-Factor: 2.8, 4.2, 5.6, 8.0, 11.2, 14.0 (available on 1-1/4" - 2" size units only), and 25.2 (available on 1-1/2" and 2" size units only)

SIZE (In.)	OVERALL LENGTH (In.)	OVERALL DEPTH (In.)
2	18	12
2-1/2	18	13.3
3	18	14
4	18	16
6	19	19.5

PROJECT	APPROVAL STAMP
PROJECT:	☐ APPROVED
ADDRESS:	☐ APPROVED AS NOTED
ENGINEER:	☐ NOT APPROVED
SUBMITTAL DATA:	REMARKS:
NOTES 1:	
NOTES 2:	

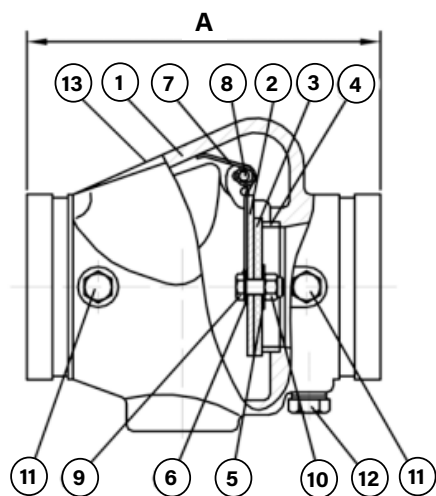
GROOVED SWING CHECK VALVE

MODEL LVCVGG



FEATURES:

- Installed in both Horizontal or Vertical Line with upward Flow
- Easier and faster to maintain and install
- Low pressure drop
- EPDM non-stick leak tight sealing
- All stainless steel wetted parts to provide superior corrosion resistance
- Fusion bonded coating of interior and exterior meet or exceed all applicable AWWA C550 standard
- 350 PSI 1¼", 1½", 2", 2½", 3", 4", 6", 8"
- 300 PSI 5", 10", 12"
- UL/ULC Listed / FM Approved



MATERIAL SPECIFICATION

PART NUMBER	PART	SPECIFICATION
1	Body	Ductile Iron ASTM A395
2	Clapper	Stainless Steel 304
3	Facing Seal	EPDM Rubber
4	Seat	Bronze
5	Clamping Ring	Stainless Steel 304
6	Gasket	EPDM Rubber
7	Spring	Stainless Steel 304
8	Hinge Pin	Stainless Steel 304
9	Bolt	Stainless Steel 304
10	Locknut	Stainless Steel 304
11	Plug 1/4" NPT	Carbon Steel
12	Plug 1/2" NPT	Carbon Steel
13	Nameplate	Stainless Steel

DIMENSIONS

SIZE (IN)	1-1/4	1-1/2	2	2.5	3	4	5	6	8	10	12
L	6.3	6.3	6.7	7.2	7.8	8.6	10.5	10.6	12.8	17.0	19.5
H	2.5	2.5	2.5	3.0	3.5	4.0	4.5	5.5	6.5	8.0	8.5

PROJECT

APPROVAL STAMP

PROJECT:	☐ APPROVED
ADDRESS:	☐ APPROVED AS NOTED
ENGINEER:	☐ NOT APPROVED
SUBMITTAL DATA:	REMARKS:
NOTES 1:	
NOTES 2:	

Stainless Steel Method Fittings Fig. 7050SS, 7051SS, 7060SS, 7061SS, 7072SS, 7073SS, 7074SS, 7084SS, 7788SS



Material Specifications

Fabricated Fittings

304/316L stainless steel conforming to ASTM A 312, Schedule 10 and Schedule 40

Full Flow Fittings

304/316L stainless steel conforming to ASTM A 403 WPW or A 403 CR

Maximum Working Pressure

Maximum working pressure is determined by the lowest rated component in a connected system. Please refer to individual component sheets to determine the appropriate value.

For Listings/Approval Details and Limitations, visit our website at www.asc-es.com or contact an ASC Engineered Solutions™ Sales Representative.

Gruvlok Stainless Steel, Full-Flow Grooved fittings are made of lightweight, corrosion-resistant Type 304 and 316 stainless steel. The assortment of available fittings provides economical and efficient methods to change direction in, add outlets to, reduce, or cap piping systems.

Fittings are available in full-flow and fabricated versions in 304 and 316L S.S. Fabricated fittings are available with Schedule 10 or Schedule 40 wall thickness.

Stainless Steel Method Fittings (Ordering Information)

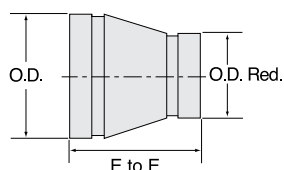
Sample Part Number	2"	7050SS -	40	04
Origin	Size	Item	Schedule	SST
2" 7050SS-4004 A - Global No Letter - Domestic	1 1/4" - 12"	7050SS - 90° Elbow	10 - Sch. 10	04 - Type 304
		7051SS - 45° Elbow	40 - Sch. 40	16 - Type 316
		7060SS - Straight Tee		
		7061SS - Reducing Tee		
		7072SS - Concentric Reducer		
		7073SS - Eccentric Reducer		
		7074SS - Steel Cap		
		7084SS - Flange Adapter		
		7788SS - Flange Adapter		



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

□ **Fig. A7072SS**

Stainless Steel Concentric Reducer



Nominal Size	O.D. 1	O.D. 2	End to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	In./mm	Lbs./kg
1½ x 1 40 x 25	1.900 48.3	1.315 33.4	3.75 95.3	1.4 0.64
1½ x 1¼ 40 x 32	1.900 48.3	1.660 42.2	3.75 95.3	1.4 0.64
2 x 1 50 x 25	2.375 60.3	1.315 33.4	3.75 95.3	1.5 0.68
2 x 1¼ 50 x 32	2.375 60.3	1.660 42.2	3.75 95.3	2.5 1.13
2 x 1½ 50 x 40	2.375 60.3	1.900 48.3	5.00 127.0	2.5 1.13
2½ x 1½ 65 x 40	2.875 73.0	1.900 48.3	5.00 127.0	3.5 1.59
2½ x 2 65 x 50	2.875 73.0	2.375 60.3	5.00 127.0	3.5 1.59
3 x 1 80 x 25	3.500 88.9	1.315 33.4	5.00 127.0	3.5 1.59
3 x 1¼ 80 x 32	3.500 88.9	1.660 42.2	5.00 127.0	4.3 1.95
3 x 1½ 80 x 40	3.500 88.9	1.900 48.3	5.00 127.0	4.4 2.00
3 x 2 80 x 50	3.500 88.9	2.375 60.3	5.00 127.0	4.8 2.18
3 x 2½ 80 x 65	3.500 88.9	2.875 73.0	5.00 127.0	4.8 2.18
4 x 2 100 x 50	4.500 114.3	2.375 60.3	5.00 127.0	4.8 2.18
4 x 2½ 100 x 65	4.500 114.3	2.875 73.0	5.00 127.0	4.8 2.18
4 x 3 100 x 80	4.500 114.3	3.500 88.9	5.00 127.0	5.0 2.27
5 x 3 125 x 80	5.563 141.3	3.500 88.9	9.00 228.6	7.0 3.18
5 x 4 125 x 100	5.563 141.3	4.500 114.3	9.00 228.6	7.0 3.18
6 x 2 150 x 50	6.625 168.3	2.375 60.3	5.50 139.7	4.2 1.91
6 x 2½ 150 x 65	6.625 168.3	2.875 73.0	5.50 139.7	4.2 1.91
6 x 3 150 x 80	6.625 168.3	3.500 88.9	5.50 139.7	4.0 1.81
6 x 4 150 x 100	6.625 168.3	4.500 114.3	5.50 139.7	4.2 1.91
8 x 4 200 x 100	8.625 219.1	4.500 114.3	6.00 152.4	9.6 4.35
8 x 6 200 x 150	8.625 219.1	6.625 168.3	6.00 152.4	9.6 4.35
10 x 4 250 x 100	10.750 273.0	4.500 114.3	7.00 177.8	8.8 3.99
10 x 6 250 x 150	10.750 273.0	6.625 168.3	7.00 177.8	11.5 5.22
10 x 8 250 x 200	10.750 273.0	8.625 219.1	7.00 177.8	11.5 5.22
12 x 6 300 x 150	12.750 323.9	6.625 168.3	8.00 203.2	13.0 5.90
12 x 8 300 x 200	12.750 323.9	8.625 219.1	8.00 203.2	13.0 5.90
12 x 10 300 x 250	12.750 323.9	10.750 273.0	8.00 203.2	17.0 7.71



asc-es.com

Building connections that last™

Engineering Specification

Job Name _____

Contractor _____

Job Location _____

Approval _____

Engineer _____

Contractor's P.O. No. _____

Approval _____

Representative _____

LEAD FREE*

Deringer™ 30 Double Check Detector Assembly DCDA-II

2" – 8"

The Deringer™ 30 Double Check Detector assembly prevents non-health hazard pollutants from entering a potable water supply system when backpressure and/or backsiphonage conditions occur. Used primarily on fire sprinkler systems when monitoring of unauthorized water use is required.

Features

- Integral shutoff valves for indoor or outdoor application
- 100% stainless steel housing
- Tamper-resistant test cocks
- Patented Dual-action™ check modules
 - Poppet action at low flow
 - Swing action at high flow
- Lead Free* Bronze bypass components
- CuFt or gallons bypass meter
- DCDA-II single check bypass
- Silicone elastomer check discs
- Prewired supervisory switches
- Flange adapters available
- IPS grooved ends

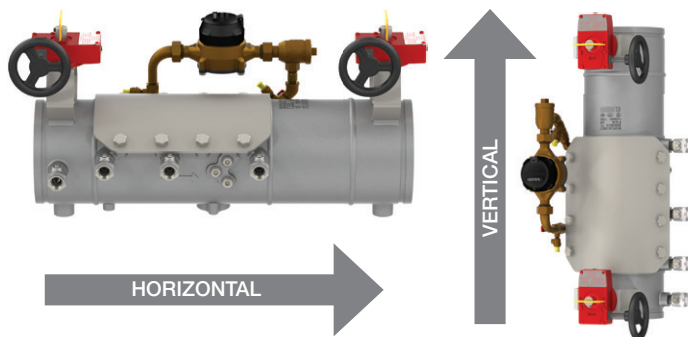
Specification

The Deringer 30 Double Check Detector assembly shall use two independent Dual-action check modules and two integral resiliently seated shutoff valves, all of which shall be contained within a single rigid valve housing constructed entirely of 304 stainless steel. Both integral shutoff valves shall include prewired supervisory tamper switches contained within a weatherproof actuator housing approved for both indoor and outdoor use. The Dual-action check modules shall operate as a "poppet style" check under low flow conditions, operate as a "swing style" check under high flow conditions, and use replaceable silicone elastomer sealing discs. The assembly test cocks shall be handle-less and operate by a tamper resistant actuator. The assembly shall have a single full access service port and cover with an in-line replaceable elastomer seal. The bypass assembly

*The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.

Noryl is a registered trademark of SHPP Global Technologies B.V.

Ames Fire & Waterworks product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Ames Fire & Waterworks Technical Service. Ames Fire & Waterworks reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Ames Fire & Waterworks products previously or subsequently sold.



Approved for Fire Protection, Waterworks, Plumbing, and Irrigation Applications

shall include a meter registering either gallons or cubic feet, a single check valve, and required test cocks. The assembly shall be serviceable without special tools and approved for both horizontal and vertical applications.

Materials

Valve Housing:	304 Stainless Steel
Valve Cover:	304 Stainless Steel
SOV Disks:	EPDM/304SS
SOV Shafts:	304 Stainless Steel
Bypass Spring	302 Stainless Steel
SOV Bearings:	PTFE Fluoropolymer/Bronze
Non-wetted Bolts:	Grade 8 Zinc Plated
Check Disks:	Silicone (NSF)
Wetted Fasteners:	18-8 Stainless Steel
Bypass Components:	Lead Free Bronze
Check Springs:	17-7 Stainless Steel
Check Pins:	17-7/18-8 Stainless Steel
Check Seats:	Noryl® Polymer (NSF)
O-rings:	Buna-N (NSF)
Bypass Internals:	ABS Polymer (NSF)

Pressure — Temperature

Temperature Range: 33°F – 140°F

Working Pressure: 10 – 175 psi

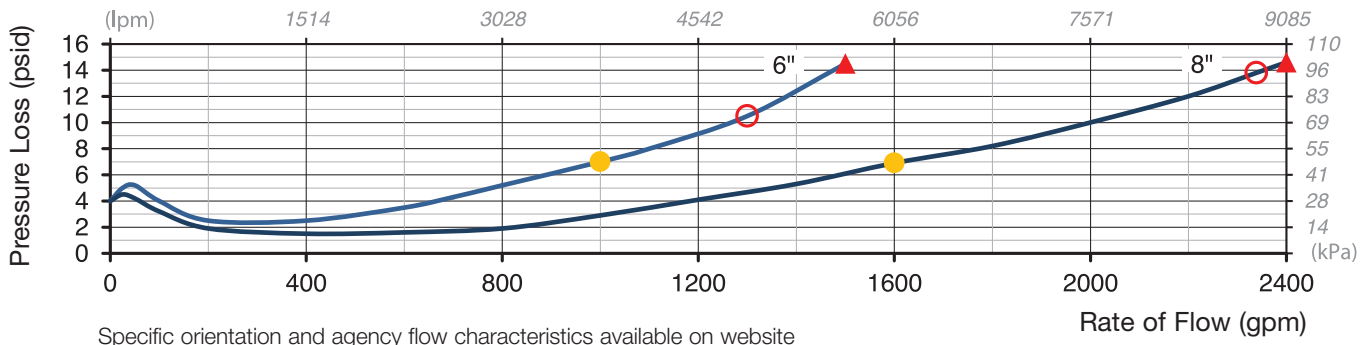
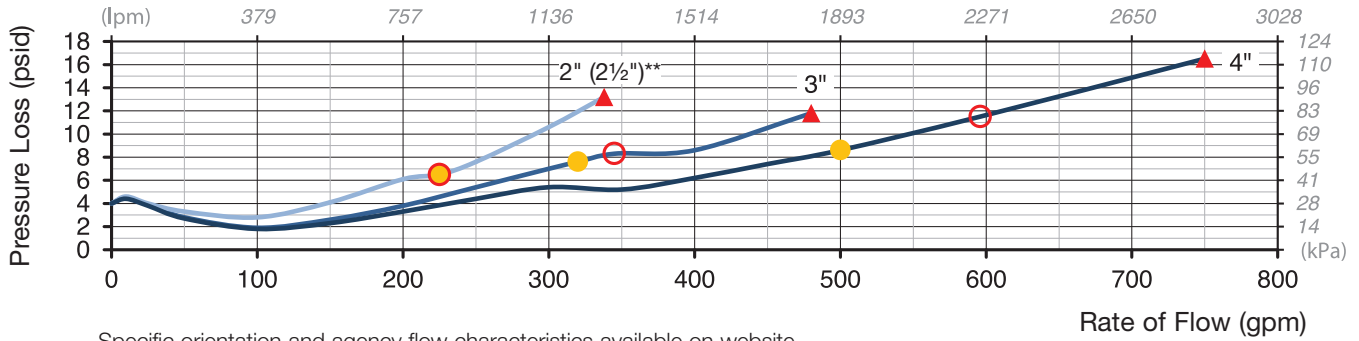
NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.



● = Rated Flow ▲ = UL Tested ○ = 15 fps

Flow Performance



Standards

AWWA C510-07 Compliant

NSF/ANSI/CAN 61

UL Certified Health Effects

UL Certified to NSF/ANSI/CAN 372

LEAD FREE

End Connections

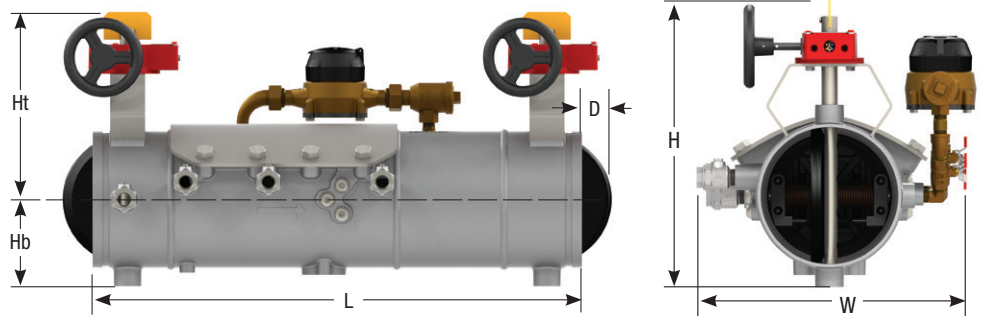
- IPS Groove for Steel Pipe:
AWWA C606

- Flange Adapters:
ANSI B16.1 Class 125



USC
APPROVED

Dimensions — Weights



Size	Model	Ht		Hb		L		D		H		W		Weight	
in.		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lb	kg
2 (2 1/2)**	30	7.1	180	2.9	74	22.3	566	0.0	0	10.0	254	11.0	279	52	24
2 1/2	30	7.1	180	2.9	74	18.7	475	0.0	0	10.0	254	11.0	279	47	21
3	30	7.4	188	2.9	74	18.7	475	0.0	0	10.3	262	11.0	279	49	22
4	30	7.9	201	3.1	79	18.7	475	0.2	5	11.0	279	11.0	279	51	23
6	30	10.1	257	4.5	114	25	726	1.0	25	14.6	370	16.9	429	99	45
8	30	10.4	264	5.4	137	31.0	787	1.8	46	15.8	401	13.8	351	150	68

**2" size uses a 2 1/2" assembly with 2 1/2" groove to 2" female NPT adapter and couplings. Adapter and couplings ship unassembled.



A WATTS Brand

USA: Backflow T: (978) 689-6066 • F: (978) 975-8350 • AmesFireWater.com
USA: Control Valves T: (713) 943-0688 • F: (713) 944-9445 • AmesFireWater.com
Canada: T: (905) 332-4090 • F: (905) 332-7068 • AmesFireWater.ca
Latin America: T: (52) 55-4122-0138 • AmesFireWater.com

NRS RESILIENT SEATED GATE VALVE GROOVE ENDS, 300 PSI

MODEL LVPIVGG



***NOTE:** Available with Indicator plate

DESCRIPTION:

The Lansdale, NRS - Post Indicator Valve, Model - LVPIVGG is a resilient seated, non-rising stem Gate Valve which is used as a control valve for on/off applications. This particular model has grooved ends ensuring a quick and leak-free installation. It is often used as an underground valve and is operated with a 2" operating nut and comes with a universal, "Post Indicator Plate" when used to operate a Post Indicator.

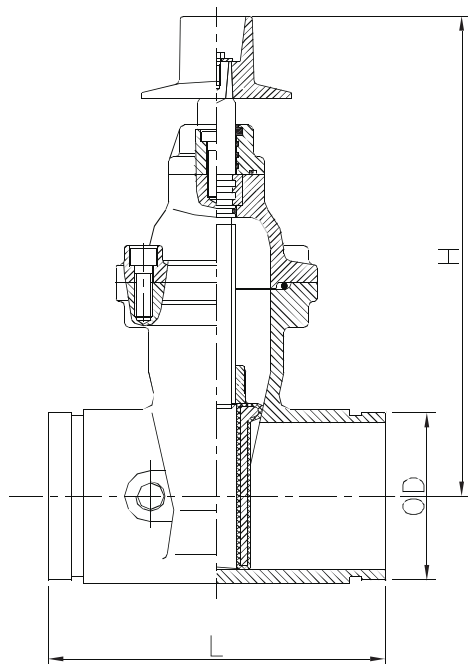
- Manufactured to AWWA C515-15 standard, where applicable
- Non-rising stem
- Triple O-Rings stem seal
- NPT plug on body
- Groove end to AWWA C606 standard
- UL/ULC Listed 2.5"-12"
- Working pressure: 300 PSI; 200 PSI and 250 PSI available on request
- NSF/ANSI/CAN 61 certified as lead-free for use in drinking water systems
- Working temperature: 33° F to 170° F
- Corrosion protection: Fusion bonded epoxy coated interior and exterior to AWWA ANSI/C550 standard
- Available in open left or open right

INSTALLATION:

Prior to installation, a check of the identification plate and body marking must be made to ensure that the correct valve is being installed. Valves are precision manufactured and as such, should not be subjected to misuse such as careless handling, allowing dirt to enter the valve through the end ports, lack of cleaning both valve and piping system before operation and excessive force during bolting and handle operation. All special packaging material must be removed, Valves must be provided with adequate support. Adjoining pipework must be supported to avoid the imposition of pipeline strains on the valve body, which would impair its performance. Valves should not be lifted using the stem. Immediately prior to valve installation, the pipework to which the valve is to be fastened should be checked for cleanliness and free from debris. The grooved connections should be made using a UL/FM approved grooved coupling such as those manufactured by GemLock, following the manufacturers instructions for installation.

NRS RESILIENT SEATED GATE VALVE GROOVE ENDS, 300 PSI

MODEL LVPIVGG



DIMENSIONS (in.)

Size	2	2.5	3	4	5	6	8	10	12
OD	2 ³ / ₈	2 ⁷ / ₈	3 ¹ / ₂	4 ¹ / ₂	5 ¹ / ₂	6 ⁵ / ₈	8 ⁵ / ₈	10 ³ / ₄	12 ³ / ₄
L	7	7 ¹ / ₂	8	9	10	10 ¹ / ₂	11 ¹ / ₂	13	14
H	8 ¹ / ₂	10 ⁵ / ₈	11 ⁵ / ₈	13 ³ / ₄	16 ¹ / ₈	17 ¹⁵ / ₁₆	21 ⁷ / ₁₆	25 ³ / ₈	28 ³ / ₄
Weight	9.5	11.3	13.6	28	36.5	43.5	66	103	144

MATERIAL SPECIFICATIONS

Part Name	Material	ASTM Spec.
Body	Ductile Iron	A536 65-45-12
Wedge	Ductile Iron, EPDM Encapsulated	
Wedge Nut	Bronze	C95200
Stem	Stainless Steel	AISI 304
Bonnet	Ductile Iron	A536 65-45-12
Gasket	Rubber	EPDM
Gland	Ductile Iron A	536 65-45-12
Thrust Collar	Bronze	C95200
O-ring	Rubber	NBR
Post Flange	Ductile Iron	A536 65-45-12
Operating Nut	Ductile Iron	A536 65-45-12
NPT Plug	Malleable Iron	Commercial
Post Flange Bolt	Stainless Steel	AISI 316
Bonnet Bolt	Carbon Steel	A307 B

PROJECT		APPROVAL STAMP
PROJECT:		☐ APPROVED
ADDRESS:		☐ APPROVED AS NOTED
ENGINEER:		☐ NOT APPROVED
SUBMITTAL DATA:		REMARKS:
NOTES 1:		
NOTES 2:		



www.LansdaleValve.com

WALL INDICATOR POST

MODEL LVWP



Specifications:

- Meet or exceed the requirements of NFPA 24 standard
- Indicates if the valve is in the OPEN or SHUT position
- Target nut to allow 13 to 45 turns
- Protected windows
- Telescoping Operating Rod
- Easily adjustable indicator OPEN and SHUT targets
- UL/ULC 789 listed
- GOST certified

Corrosion Protection:

- Spray painted interior and exterior meet or exceed all applicable of AWWA C550 standard
- Standard Barrel: Black Bitumen coated

Options:

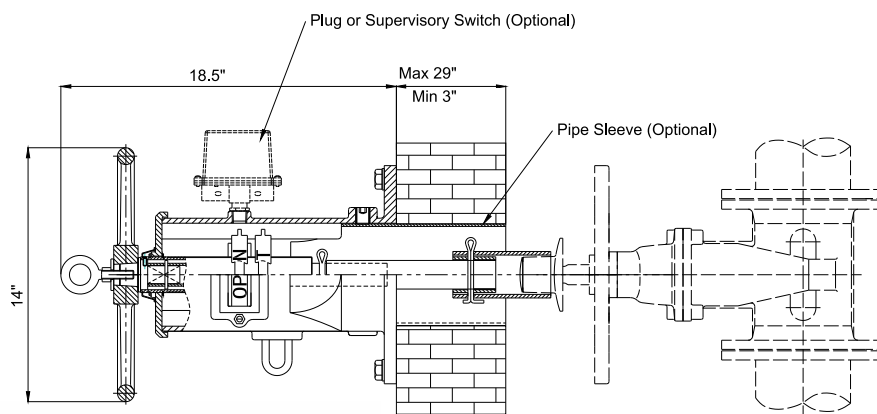
- Fusion bonded coating interior and exterior
- Stainless steel fasteners: A2-70 or A4-70
- Steel pipe optional

Field Adjustments:

- Remove the post head to adjust OPEN and SHUT signs as required
- Adjust telescoping rod and pipe to desired length
- Re-attach the post to the post flange on the valve

Material Specifications

Part	Material	ASTM Specifications
Post Head	Cast Iron	A126 Class B
Operating Wrench	Ductile Iron	A536 Grade 65-45-12
Retaining Ring	Stainless Steel	A276 Type 304
Weather Cap	Polyethylene	Commercial
Threaded Sleeve	Stainless Steel	A276 Type 304
Pipe Plug	Malleable Iron	A47 Grade 22010
Target Plate	Aluminum Alloy	B26
Screw	Carbon Steel	A105
Windows	Pexiglass	Commercial
Gasket	Rubber	D2000 NBR
Upper Rod	Carbon Steel	A53 Type S Grade B
Lower Rod	Carbon Steel	A53 Type S Grade B
Cotter Pin	Stainless Steel	A276 Type 304
Crane Coupling	Carbon Steel	A53 Type S Grade B



PROJECT	APPROVAL STAMP
PROJECT:	☐ APPROVED
ADDRESS:	☐ APPROVED AS NOTED
ENGINEER:	☐ NOT APPROVED
SUBMITTAL DATA:	REMARKS:
NOTES 1:	
NOTES 2:	

For Commercial and Industrial Applications

Job Name _____

Contractor _____

Job Location _____

Approval _____

Engineer _____

Contractor's P.O. No. _____

Approval _____

Representative _____

LEAD FREE*

Series 77F-SS, 77G-SS Stainless Steel Wye-Pattern Flanged and Grooved Strainers

Sizes: 2½" – 12"

Series 77F-SS, 77G-SS Stainless Steel Strainers are lightweight, fabricated wye-pattern strainers designed to remove dirt and other debris from fluid systems. A simple cover and coupling design permits easy cleaning or replacement of the screen.

Features

- 304 stainless steel body exhibits superior corrosion resistance compared to cast iron; eliminates casting porosity problems; complies with NSF 61 and FDA requirements
- 50% lighter than cast iron strainers, reducing handling and installation equipment costs
- Lead Free construction complies with California Prop. 65 and proposed Federal Government lead-free standards
- Single, two-bolt, grooved style cover provides quick and easy access, saving disassembly/assembly time
- Screen retainer cover is tapped for strainer clean out by opening a blow-off valve or removing the standardly furnished closure plug

Materials

Body:	304 stainless steel, ASTM A-312
Flanges:	Zinc-plated, ASTM A – 36 carbon steel
Cover:	304SS sizes 6", 8", 10"; ductile iron sizes 2½" – 5" and 12"; epoxy coated ductile iron sizes 2½" – 5" and 12" on FDA models
Cover Gasket:	EPDM, ambient to 150°F (66°C)
Grooved Coupling:	Ductile iron, ASTM A-536
Bolts:	Heat treated (SAE J-429) steel, ASTM B-633
Nuts:	Heat treated (SAE J-429) steel, ASTM B-633
Plug:	Brass, ASTM B-584
Screen:	304 stainless steel, ASTM A-276

Specifications

Strainer shall be installed where indicated on the plans to remove dirt and other debris from fluid system. Strainer shall be manufactured from 304 stainless steel and be lead free. Strainer shall be Watts Series 77F-SS (flanged ends) or 77G-SS (grooved ends).



77F-SS
(Flanged)



77G-SS
(Grooved)

NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

NOTICE

Inquire with governing authorities for local installation requirements

***The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.**

Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Service. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.



Pressure – Temperature

WOG: 200psi at (13.8 bar) 150°F (66°C)

Standards

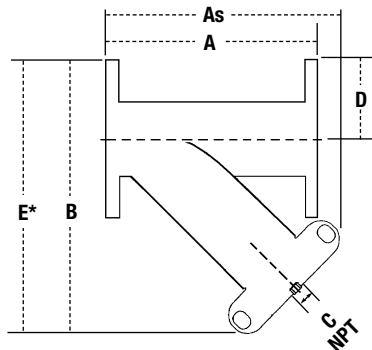
Dimensions and drilled flange holes conform to ANSI B16.1, Class 125 cast iron and Class 150 cast steel flanges.

Standard Screens

SIZE	STANDARD SCREEN OPENINGS
<i>in.</i>	
2½" – 5"	⅛" (2mm) perforation
6" – 8"	⅙" (3mm) perforation
10" – 12"	⅜" (5mm) perforation

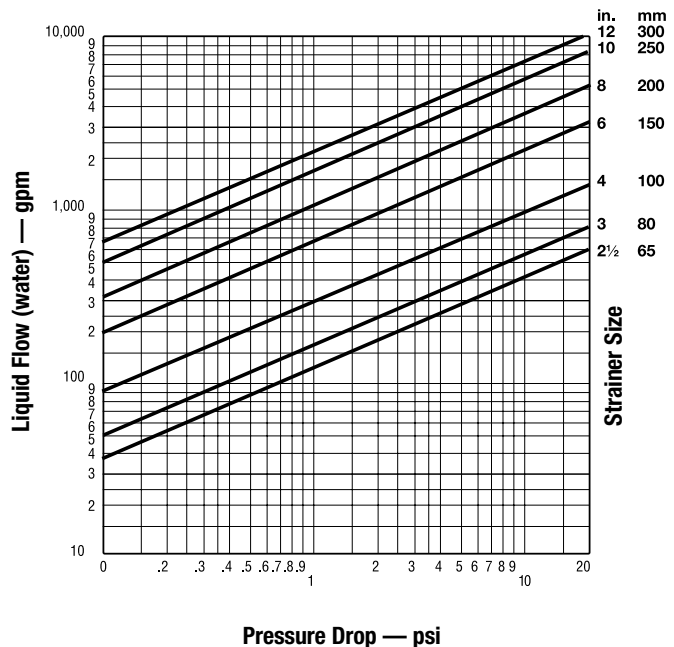
Screen material is stainless steel

Dimensions – Weights



Flow Capacity Flanged and Grooved

The flow coefficient (C_v) is the number of gallons per minute of water flowing through a given size restriction at a pressure drop of 1psi. To obtain the C_v factor for a given size strainer, read capacity at intersection with the 1psi pressure drop.



Note: To convert gpm to lpm, multiply by 3.8
To convert psi to bar, multiply by .069

ORDERING CODE	SIZE	DIMENSIONS (APPROX.)										WEIGHT			
	<i>in.</i>	<i>A</i> <i>in.</i> <i>mm</i>		<i>As</i> <i>in.</i> <i>mm</i>		<i>B</i> <i>in.</i> <i>mm</i>		<i>C (NPT)</i> <i>in.</i> <i>mm</i>		<i>D</i> <i>in.</i> <i>mm</i>		<i>E* Screen Removal</i> <i>in.</i> <i>mm</i>		<i>lbs.</i>	<i>kgs</i>
Flanged															
0821110	2½	10	254	11⅜	284	12⅝	329	½	15	3½	89	17⅞	446	21	9.5
0821111	3	10⅞	257	11⅞	281	13	330	½	15	3¾	95	18½	470	26	11.8
0821112	4	12⅞	308	14⅜	360	15¾	400	½	15	4½	114	23	584	33	15.0
0821114	6	18½	470	20⅜	513	21⅝	541	¾	20	5½	140	31¼	794	70	31.8
0821115	8	21⅝	549	24⅞	624	26⅞	670	¾	20	6¾	171	39⅞	992	91	41.3
0821116	10	26	660	32⅞	818	32⅞	830	¾	20	8	203	49	1245	134	60.8
0821117	12	29⅞	759	35½	902	37⅞	949	¾	20	9½	241	56⅞	1437	225	102.0
Grooved															
0821160	2½	9½	241	11⅜	284	10¼	260	½	15	1½	38	15⅞	395	21	9.5
0821161	3	9⅞	244	11⅞	295	11¼	286	½	15	2⅜	52	16¾	425	26	11.8
0821162	4	11⅞	295	14⅜	360	13⅞	344	½	15	2¼	57	20¾	527	33	15.0
0821164	6	18	457	20⅜	513	19⅜	487	¾	20	3⅞	86	29⅞	740	70	31.8
0821165	8	21⅞	537	24⅞	624	24	610	¾	20	4⅞	111	36⅞	932	91	41.3
0821166	10	25½	648	32⅞	818	30⅞	765	¾	20	5⅞	138	46⅞	1180	134	60.8
0821167	12	29⅞	746	35½	902	30⅞	872	¾	20	6⅞	164	53½	1359	225	102.0

*E dimension is minimum clearance for screen removal.



USA: T: (978) 689-6066 • F: (978) 975-8350 • Watts.com

Canada: T: (905) 332-4090 • F: (905) 332-7068 • Watts.ca

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data sheet

ARGCO



FIRE SPRINKLER SPARE HEADBOXES



Heavy gauge steel construction

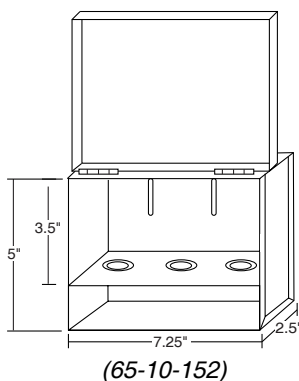
Knockouts and shelf to accommodate any 1/2" or 3/4" sprinkler head

All-welded construction and full length hinge

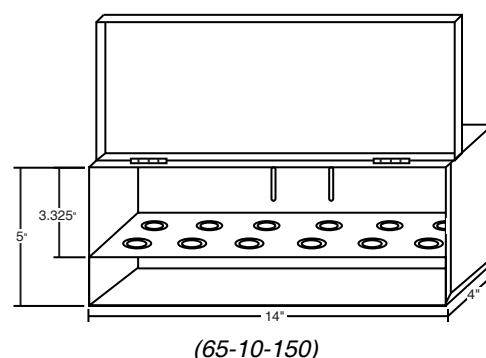
Red powder coated finish

Slotted for easy mounting with screws, rivets or strapping

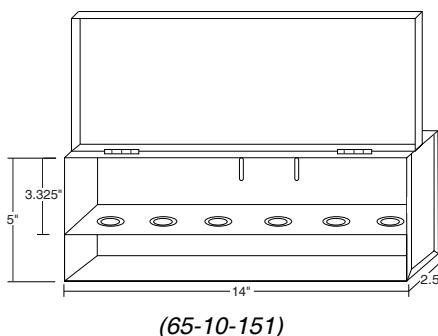
3 Head Box



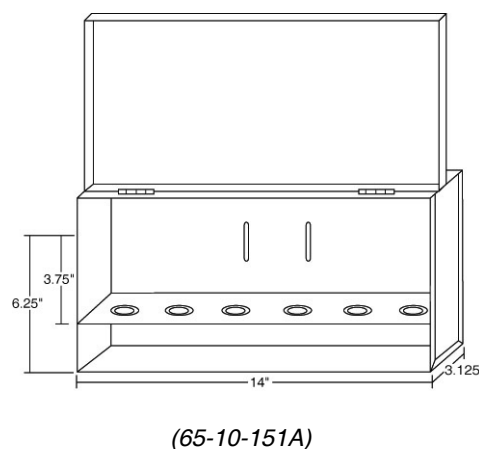
12 Head Box



6 Head Box



6 Large Head Box



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