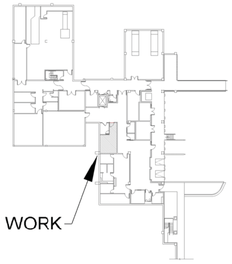


SITE MAP
N.T.S.



KEY PLAN
N.T.S.

GENERAL NOTES

1. THIS PROJECT CONSISTS OF REVISING THE EXISTING FIRE SPRINKLER SYSTEM FOR THE TENANT MODIFICATION. TENANT AREA IS 350 SQ FT.

2. TYPE OF CONSTRUCTION II-B.

3. BUILDING OCCUPANCY CLASSIFICATION PER THE 2015 IBC IS GROUP I.

4. SYSTEM #1 IS A WET PIPE FIRE SPRINKLER SYSTEM DESIGNED TO THE 2013 NFPA 13 EDITION.

5. ALL BRANCH LINE PIPING TO BE DYNATHREAD OR SIMILAR PIPE.

6. ALL MAIN PIPING TO BE DYNAFLOW OR SIMILAR PIPE.

7. ALL FITTINGS 1" THROUGH 2" TO BE DUCTILE IRON THREADED FITTINGS.

8. ALL FITTINGS 2½" AND LARGER TO BE GROOVED TYPE FITTINGS.

9. ALL HANGERS TO BE IN ACCORDANCE WITH ~~2007~~ NFPA 13 EDITION.

10. ALL MATERIAL TO MEET 2013 NFPA 13 EDITION.

11. MAXIMUM SQUARE FOOTAGE PER HEAD IS 225 SQ.FT.

12. SPRINKLER HEADS ARE NOT REQUIRED TO BE LOCATED IN THE CENTER OF CEILING TILES ALTHOUGH THE INTENT IS TO LOCATE AS CLOSE TO CENTER OR QUARTER POINT AS POSSIBLE.

13. THE AUTHORITY HAVING JURISDICTION IS THE AURORA BUILDING DIVISION/LIFE SAFETY.

14. SCOPE OF WORK, REVISE THE EXISTING LIGHT HAZARD FIRE SPRINKLER SYSTEM TO ACCOMMODATE THE NEW TENANT SPACE. A TOTAL OF 4 PENDENT HEADS ARE TO BE RELOCATED TO UPRIGHTS, 1 PENDENT TO BE RELOCATED WITH A NEW DRY PENDENT IN THE NEW BODY COOLER AND 1 UPRIGHT TO BE ADDED. THERE WILL BE NO CHANGE TO THE EXISTING DESING AREA AND DUE TO THERE ONLY BEING 1 HEAD ADDED TO THE OVERALL SYSTEM, NO HYDRAULIC CALCULATION SHALL BE REQUIRED. EVERYTHING WILL BE INSTALLED AS REQUIRED IN ACCORDANCE WITH THE 2015 IFC AND THE 2013 NFPA 13 EDITION.



DRY PENDENT
N.T.S.



PENDENT
N.T.S.



UPRIGHT
N.T.S.

AURORA NOTES

1. OWNER IS RESPONSIBLE FOR PROVIDING HEAT, ABOVE 40 DEGREES FAHRENHEIT, ADEQUATE ENOUGH TO PREVENT FREEZING OF THE WET PIPE SPRINKLER PIPING.

2. ALL VALVES CONTROLLING THE WATER SUPPLY TO 20 OR MORE SPRINKLER HEADS MUST BE SUPERVISED. AT THE TIME OF FINAL INSPECTION, FIRE SAFETY SYSTEMS MUST BE SUPERVISED BY AN APPROVED UL-LISTED MONITORING AGENCY.

3. THE CONTRACTOR MUST PROVIDE ALL NESSESSARY TESTING EQUIPMENT AND PERFORM ALL TESTING REQUIRED BY THE LIFE SAFETY INSPECTOR.

4. ALL NEW OR EXISTING FIRE ALARM SYSTEMS MUST BE INTERCONNECTED WITH THE FLOW SWITCH OF THE FIRE SPRINKLER SYSTEMS OUTSIDE HORN & STROBE.

5. INSTALLATION OF THE INTERIOR ALARMS ACTIVATED BY THE FIRE SPRINKLER WATER FLOW WILL BE REQUIRED PER 2015 IFC, 903.4.2. APPROVED AUDIBLE DEVICES SHALL BE CONNECTED TO EVERY AUTOMATIC FIRE SPINKLER SYSTEM.

6. IMPORTANT: IN THE EVENT THAT A CONCEALED SPACE IS NOT SHOWN ON THE PLAN SUBMITTAL AND IS DISCOVERED IN THE FIELD, THE INSTALLING CONTRACTOR MUST COMPLY WTH 2013 NFPA 13, SECTION 8.15.1.

7. ALL WATER SUPPLY VALVES AND WATER FLOW SWITCHES SHALL BE ELECTRICALLY SUPERVISED, IFC 2015, 903.4.

8. ELECTRICAL EXTERIOR HORN AND STROBE SHALL BE LISTED FOR OUTDOOR USE, IFC 2015 903.4.2. OUTSIDE HORN AND STROBE WILL ACTIVATE UPON BOTH GENERAL ALARM AND FLOW SWITCH ACTIVATION. WHEN FIRE ALARM PANEL IS SILENCED, THE INTERIOR AND EXTERIOR STROBES WILL CONTINUE UNTIL FIRE ALARM PANEL IS RESET.

9. ALL CONTROL VALVE(S) WITHIN THE RISER ROOM MUST BE ACCESSIBLE, 2013 NFPA 13 SECTION 8.16.1.1.7.

10. PRESSURE GAUGES ARE REQUIRED ON THE SYSTEM SIDE OF THE MAIN VALVE AND ON THE SUPPLY SIDE OF THE BACKFLOW PREVENTOR.

11. BOTH NEW AND EXISTING FIRE SPRINKLER SYSTEMS MUST BE EQUIPPED WITH APPROVED KNOX CAPS.

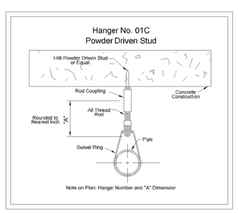
12. THE FIRE DEPARTMENT CONNECTION MUST BE LOCATED NOT LESS THAN 18 IN. AND NOT MORE THAN 4 FT ABOVE THE LEVEL OF THE ADJACENT GRADE OR ACCESS LEVEL. 2013 NFPA 13, SECTION A.8.17.2.

STEEL PIPE HANGER SPACING OVER 100 PSI					
PIPE SIZE	BETWEEN HGRS	TO END OF LINE		ARM OVER LENGTH	
1"	12'-0"	(SSP) 1'-0"	(SSU) 3'-0"	(SSP) 1'-0"	**(SSU) 2'-0"**
1¼"	12'-0"	(SSP) 1'-0"	(SSU) 4'-0"	(SSP) 1'-0"	(SSU) 2'-0"
1½"	12'-0"	(SSP) 1'-0"	(SSU) 5'-0"	(SSP) 1'-0"	(SSU) 2'-0"
2"	12'-0"	(SSP) 1'-0"	(SSU) 5'-0"	(SSP) 1'-0"	(SSU) 2'-0"
2½"	15'-0"	(SSP) 1'-0"	(SSU) 5'-0"	(SSP) 1'-0"	(SSU) 2'-0"
3"	15'-0"	(SSP) 1'-0"	(SSU) 5'-0"	(SSP) 1'-0"	(SSU) 2'-0"
4"	15'-0"	(SSP) 1'-0"	(SSU) 5'-0"	(SSP) 1'-0"	(SSU) 2'-0"

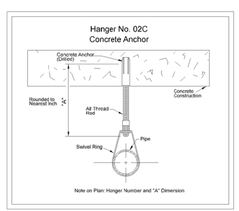
** NOTE: This table is based upon threadable thinwall pipe 1"-2", and 2½" and larger pipe is other steel pipe.

NOTE:

HANGERS MUST BE PLACED WITHIN 1'-0" OF THE LAST SPRINKLER ON A LINE AND ALL ARM OVERS THAT EXCEED 12" IN CUMULATIVE HORIZONTAL LENGTH. THESE HANGERS ARE TO BE RESTRAINED AGAINST UPWARD MOVEMENT. EXTEND HANGER ROD TO PIPE FOR RESTRAINT.



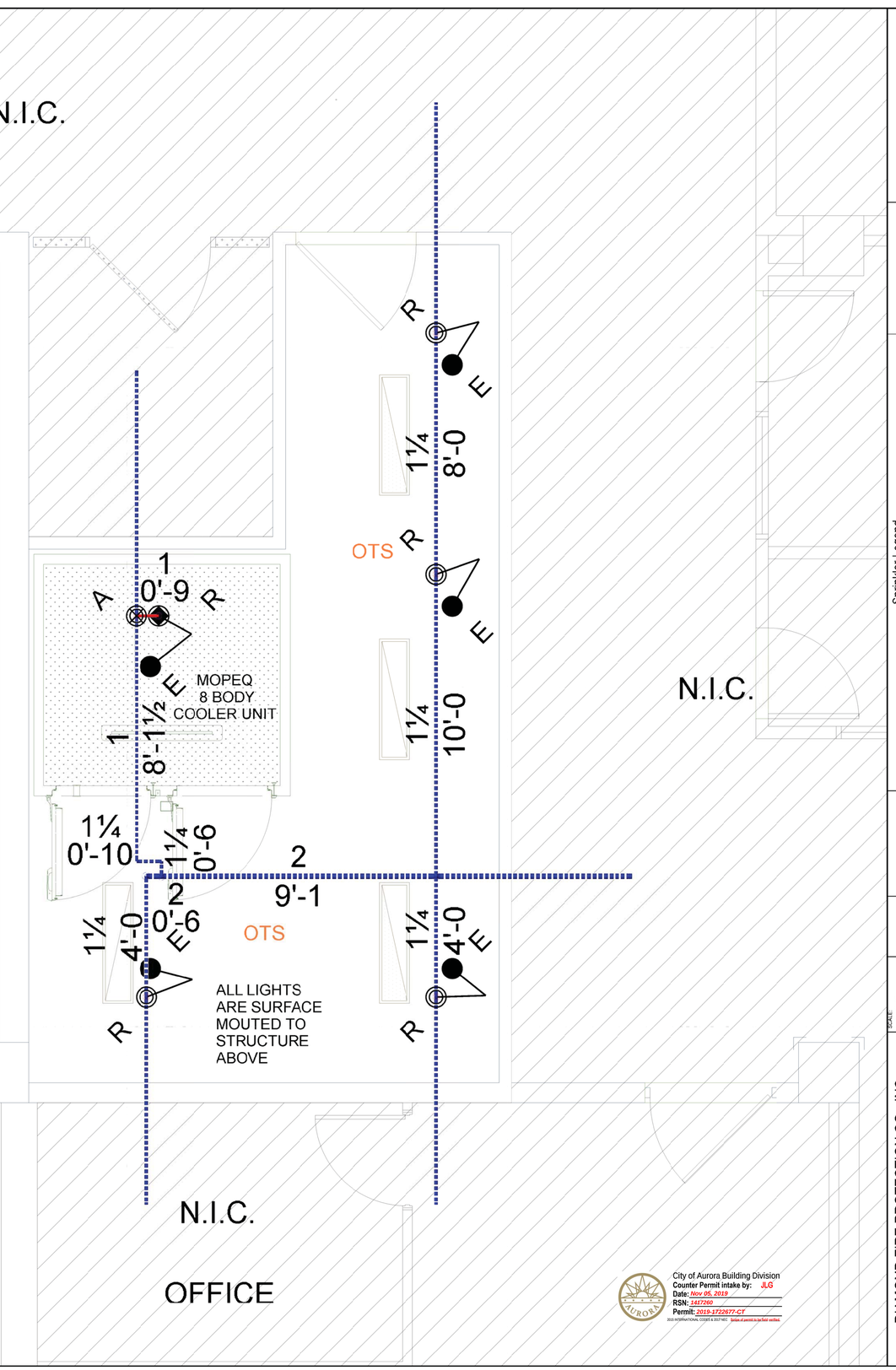
N.T.S.



N.T.S.

THIS SET OF FIRE SPRINKLER SHOP DRAWINGS HAVE BEEN REVIEW AND FOUND TO BE ACCEPTABLE – NICET IV # 125946
SENIOR ENGINEERING TECHNICIAN – FIRE PROTECTION

Bryan A. Echelberger — 11/1/2019
BRYAN A. ECHELBERGER; SET — DATE



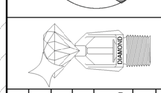
City of Aurora Building Division
Counter Permit intake by: JLG
Date: Nov 05, 2019
RSN: 1417260
Permit: 2019-1722677-CT
2015 INTERNATIONAL CODES & 2017 NEC — Issue of permit to be field verified

IMPORTANT
In localities subject to freezing conditions, it is the owner's responsibility to provide heat throughout wet pipe sprinkler systems areas and between outside doors and sprinkler valves on dry pipe systems or valves controlling water supplies to sprinkler systems.
This drawing and the information and design application herein contained are the property of Diamond Fire Protection, Inc. Reproduction thereof in whole or in part is forbidden. The same shall be returned to Diamond upon request, all information herein contained shall be treated as secret and confidential.
No reproduction of this drawing or any part thereof shall be made without the express written consent of Diamond Fire Protection, Inc.

Sprinkler Legend										
Symbol	Manufacturer	SIN	Model	Quantity	K-Factor	Type	Size	Response	Finish	Temperature	Note
	Tyco	TY313	TY-FRB	4	5.6	Upright	½	Quick	Brass	155° F	RELOCATE
	Tyco	TY313	TY-HRB	1	5.6	Upright	½	Quick	Brass	155° F	ADD
	Tyco	TY3235	DS-1	1	5.6	Pendent	1	Quick	Chrome	200° F	RELOCATE
	Tyco	TY3531	RFII	5	5.6	Pendent	½	Quick	White	155° F	EXISTING
				Total = 11							

AFF	CENTER OF PIPE ABOVE FLOOR	
	CENTER OF PIPE BELOW DECK	
(X'-X")	CEILING HEIGHT	
(XX'-X")	TOP OF STEEL ELEVATION	

N



SCALE: 1/2"=1'-0"
DRAWN BY: BD
CHECKED BY: DE
DATE: 10-25-2019
STATE REGISTRATION NO. 19-S-09259
DRAWING NO: FP-1 OF 1
CONTRACT NO: 19-1006

DIAMOND FIRE PROTECTION CO., INC.
3390 S. PLATTE RIVER DRIVE - UNIT 101
ENGLEWOOD, CO 80110
PHONE 303.762.7570 FAX 303.762.7518

MEDICAL CENTER OF AURORA BODY HOLDING
1501 S. POTOMAC ST.
AURORA, CO 80012

DESCRIPTION: BASEMENT
CONTRACT WITH: VERTIX

PLOTE DATE 10/25/19



DIAMOND FIRE PROTECTION COMPANY, INC.
3360 S. Platte River Drive – Unit 101
Englewood, CO 80110-1216
Telephone 303-762-7570 Fax 303-762-7518

FIRE SPRINKLER MATERIAL DATA

FOR

MEDICAL CENTER OF AURORA BODY HOLDING
1501 S. POTOMAC ST.
AURORA, CO

EQUIPMENT SUBMITTAL

MATERIAL INDEX

Description	Mfg
Pipe	BMT
Fittings	Anvil
Sprinklers	Tyco
Hangers	Caddy, Hilti

The Eddy Pipe Family - Metric Conversions

Bull Moose Tube Company's "Eddy Pipe" brand sprinkler pipe is produced to meet sprinkler pipe standards & applications. Here are just a few advantages of Eddy Pipe:

- All pipe products are UL Listed (for U.S. and Canada), and have been Approved by Factory Mutual.
- Excellent Production & coating capabilities, tighter tolerances, and our unique steel properties make our pipe excellent for roll grooving, welding, threading, and plain end fittings.
- All products are dual certified to ASTM A-135 and A-795.
- Available in specific cut to order lengths from regular mill rollings.
- More popular sizes roll every two weeks.
- Floor stock available in various lengths.
- Available with coating or bare.
- Ultra Eddy, Eddy Flow, Eddylite, and Eddythread 40 offer cost savings along with superior hydraulics without compromising service life.



- **Schedule 10 and Schedule 40:** FM Approved Sprinkler Pipe
- **Eddy Flow:** Cost effective replacement for Schedule 10
- **Eddylite:** Lightwall threadable with standard outside diameter
- **Eddythread 40:** Lightwall threadable Schedule 40 replacement with Corrosion Resistance Ratio of 1.0
- **Ultra Eddy:** Lightwall roll groovable pipe

BULL MOOSE TUBE COMPANY
A CAPARO company

1819 Clarkson Road
Chesterfield, MO 63017
(800) 325-4467
FAX: (636) 537-2645
www.bullmoosetube.com
e-mail:sales@bullmoosetube.com

For additional information, contact your salesperson today at (800) 325-4467 or (636) 537-2600 in the USA, or from Canada call (800) 882-4666

All information contained herein is accurate as known at the time of publication. Bull Moose Tube reserves the right to change product specifications without notice and without incurring obligation.

"BMT – Eddy Pipe" Sizes Available – Metric Conversions

	NPS (in)	1	1 1/4	1 1/2	2	2 1/2	3	4
Ultra Eddy	O.D. (mm)	33.40	42.16	48.26	60.33			
	I.D. (mm)	30.51	39.27	45.36	57.43			
	Empty Weight (kg/m)	1.29	1.65	1.90	2.39			
	Water-Filled Weight (kg/m)	2.02	2.86	3.52	4.98			
	C.R.R.	2.17	1.40	1.11	1.00			
Eddy Flow	O.D. (mm)		42.16	48.26	60.33	73.03	88.90	114.30
	I.D. (mm)		38.86	43.89	55.96	68.71	84.68	109.47
	Empty Weight (kg/m)		1.82	2.75	3.47	4.19	5.01	7.40
	Water-Filled Weight (kg/m)		3.01	4.26	5.93	7.90	10.58	16.73
	C.R.R.		1.98	3.44	2.78	1.66	1.00	1.00
Schedule 10	O.D. (mm)	33.40	42.16	48.26	60.33	73.03	88.90	114.30
	I.D. (mm)	27.86	36.63	42.72	54.79	66.93	82.80	108.20
	Empty Weight (kg/m)	2.10	2.70	3.11	3.93	5.26	6.47	8.37
	Water-Filled Weight (kg/m)	2.71	3.75	4.55	6.29	8.78	11.86	17.58
	C.R.R.	15.27	9.91	7.76	6.27	4.92	3.54	2.50
Eddylite	O.D. (mm)	33.40	42.16	48.26	60.33			
	I.D. (mm)	28.88	37.64	43.48	55.30			
	Empty Weight (kg/m)	1.88	2.41	2.93	3.90			
	Water-Filled Weight (kg/m)	2.53	3.52	4.42	6.26			
	C.R.R.	0.13	0.08	0.12	0.16			
Eddythread 40	O.D. (mm)	32.89	41.91	48.26	60.33			
	I.D. (mm)	27.51	36.02	41.78	53.92			
	Empty Weight (kg/m)	2.18	3.08	3.80	4.93			
	Water-Filled Weight (kg/m)	2.75	4.10	5.17	7.16			
	C.R.R.	1.00	1.00	1.00	1.00			
Schedule 40	O.D. (mm)	33.40	42.16	48.26	60.33	73.03	88.90	114.30
	I.D. (mm)	26.64	35.05	40.89	52.50	62.69	77.93	102.26
	Empty Weight (kg/m)	2.50	3.38	4.05	5.45	8.64	11.29	16.09
	Water-Filled Weight (kg/m)	3.06	4.35	5.37	7.62	11.73	16.08	24.31
	C.R.R.	1.00	1.00	1.00	1.00	1.00	1.00	1.00

** All Weights are Nominal*
N/A: Not Applicable

PIPE PREPARATION

For proper operation, all pipe surfaces should be cleaned prior to installation. In order to provide a leak-tight seat for the gasket, pipe surfaces should be free from indentations and projections from the end of the pipe to the groove. All loose paint, scale, dirt, chips, grease, and rust must be removed prior to installation. Failure to take these important steps may result in improper coupling assembly, causing leakage. Also, check the manufacturer's instructions for the specific fitting used.

Ductile Iron Threaded Fittings



SMITH-COOPER®
INTERNATIONAL

Ductile Iron Threaded Fittings

Specifications

- SCI branded ductile iron threaded fittings are UL Listed and FM Approved at 500 psi
- Rated to 300 WSP
- Ductile iron castings conform to ASTM A536
- Fitting dimensions conform to ASME B16.3
- Bushings and plugs conform to ASME B16.14
- Fittings are 100% air tested
- NPT threads on all fittings conform to ASME B1.20.1
- Independent lab verification that fittings meet applicable chemical & physical properties
- Manufacturing facilities are ISO 9001:2008 and ISO 14001

c UL us LISTED

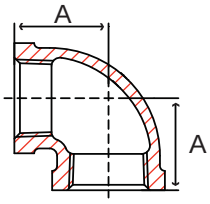
FM APPROVED

Temperature Degrees F	Working Pressure, Nonshock psiG 300# Class Threaded Fittings
-20 to 100	500
150	500
200	480
250	460
300	440
350	420
400	400
450	380
500	360
550	340
600	320
650	300

Permit: 2019-1722677-CT
RSN: 1417260

Fig. 35E 3 – 90° Elbow

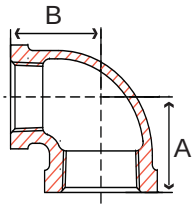




Size in	Part Number	A in	Packing Inner	Packing Master	Weight lb
1/2	35E 3004	1.13	100	200	0.2
3/4	35E 3006	1.31	70	140	0.3
1	35E 3010	1.50	40	80	0.5
1-1/4	35E 3012	1.75	25	50	0.8
1-1/2	35E 3014	1.94	18	36	1.1
2	35E 3020	2.25	10	20	1.8
2-1/2	35E 3024	2.70	4	8	3.2

Fig. 35RE3 – 90° Reducing Elbow

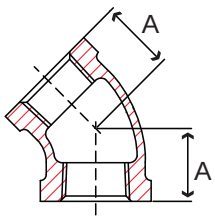




Size in	Part Number	A in	B in	Packing Inner	Packing Master	Weight lb
3/4 x 1/2	35RE3006004	1.20	1.22	80	160	0.3
1 x 1/2	35RE3010004	1.26	1.36	70	140	0.4
1 x 3/4	35RE3010006	1.38	1.45	50	100	0.4
1-1/4 x 1/2	35RE3012004	1.34	1.53	35	70	0.5
1-1/4 x 3/4	35RE3012006	1.45	1.63	35	70	0.6
1-1/4 x 1	35RE3012010	1.58	1.67	30	60	0.7
1-1/2 x 1/2	35RE3014004	1.52	1.75	30	60	0.6
1-1/2 x 3/4	35RE3014006	1.52	1.75	25	50	0.7
1-1/2 x 1	35RE3014010	1.65	1.80	20	40	0.8
1-1/2 x 1-1/4	35RE3014012	1.82	1.88	18	36	1.0
2 x 1/2	35RE3020004	1.60	1.97	18	36	1.0
2 x 3/4	35RE3020006	1.60	1.97	18	36	1.0
2 x 1	35RE3020010	1.73	2.02	16	32	1.2
2 x 1-1/4	35RE3020012	1.90	2.10	12	24	1.3
2 x 1-1/2	35RE3020014	2.02	2.16	10	20	1.5
2-1/2 x 1-1/2	35RE3024014	2.16	2.51	6	12	2.2
2-1/2 x 2	35RE3024020	2.39	2.60	6	12	2.5

Fig. 35F 3 – 45° Elbow

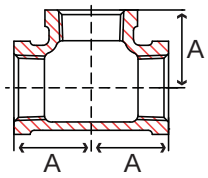




Size in	Part Number	A in	Packing Inner	Packing Master	Weight lb
1/2	35F 3004	0.88	150	300	0.2
3/4	35F 3006	0.98	80	160	0.3
1	35F 3010	1.13	40	80	0.5
1-1/4	35F 3012	1.29	25	50	0.7
1-1/2	35F 3014	1.44	20	40	1.0
2	35F 3020	1.69	10	20	1.6
2-1/2	35F 3024	1.95	4	8	2.7

Fig. 35T 3 – Tee

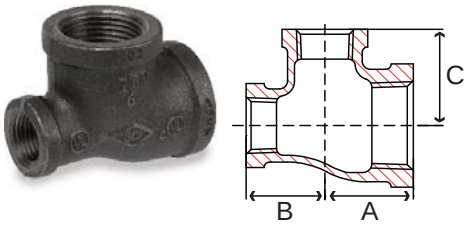




Size in	Part Number	A in	Packing Inner	Packing Master	Weight lb
1/2	35T 3004	1.13	80	160	0.3
3/4	35T 3006	1.31	30	60	0.5
1	35T 3010	1.50	25	50	0.7
1-1/4	35T 3012	1.75	10	20	1.1
1-1/2	35T 3014	1.94	10	20	1.5
2	35T 3020	2.25	6	12	2.4
2-1/2	35T 3024	2.70	4	8	4.3

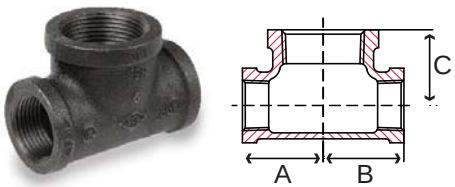
Ductile Iron Fittings - Class 300 UL/FM

Fig. 35RT3 – Reducing Tee



Size in	Part Number	A in	B in	C in	Packing Inner	Packing Master	Weight lb
3/4 x 1/2	35RT3006004	1.20	1.20	1.22	60	120	0.4
1 x 1/2	35RT3010004	1.26	1.26	1.36	30	60	0.6
1 x 1/2 x 1	35RT3010004010	1.50	1.36	1.50	30	60	0.6
1 x 3/4	35RT3010006	1.38	1.38	1.45	25	50	0.6
1 x 3/4 x 3/4	35RT3010006006	1.38	1.31	1.45	35	70	0.6
1 x 3/4 x 1	35RT3010006010	1.50	1.45	1.50	25	50	0.7
1-1/4 x 1/2	35RT3012004	1.34	1.34	1.53	20	40	0.8
1-1/4 x 1/2 x 1-1/4	35RT3012004012	1.75	1.53	1.75	25	50	0.9
1-1/4 x 3/4	35RT3012006	1.45	1.45	1.62	15	30	0.9
1-1/4 x 3/4 x 1-1/4	35RT3012006012	1.75	1.62	1.75	20	40	1.0
1-1/4 x 1	35RT3012010	1.58	1.58	1.67	15	30	1.0
1-1/4 x 1 x 1/2	35RT3012010004	1.34	1.26	1.53	25	50	0.7
1-1/4 x 1 x 3/4	35RT3012010006	1.45	1.38	1.63	20	40	0.8
1-1/4 x 1 x 1	35RT3012010010	1.58	1.50	1.69	20	40	0.9
1-1/4 x 1 x 1-1/4	35RT3012010012	1.75	1.69	1.75	15	30	1.0
1-1/2 x 1/2	35RT3014004	1.41	1.41	1.66	16	32	1.0
1-1/2 x 1/2 x 1-1/4	35RT3014004012	1.81	1.56	1.88	24	48	1.1
1-1/2 x 1/2 x 1-1/2	35RT3014004014	1.94	1.66	1.94	12	24	1.2
1-1/2 x 3/4	35RT3014006	1.52	1.52	1.75	16	32	1.1
1-1/2 x 3/4 x 1-1/4	35RT3014006012	1.94	1.66	1.88	20	40	1.1
1-1/2 x 3/4 x 1-1/2	35RT3014006014	1.94	1.75	1.94	18	36	1.2
1-1/2 x 1	35RT3014010	1.65	1.65	1.80	12	24	1.2
1-1/2 x 1 x 1/2	35RT3014010004	1.44	1.25	1.69	20	40	0.8
1-1/2 x 1 x 3/4	35RT3014010006	1.50	1.44	1.75	16	32	0.9
1-1/2 x 1 x 1	35RT3014010010	1.65	1.50	1.80	16	32	1.0
1-1/2 x 1 x 1-1/4	35RT3014010012	1.82	1.67	1.88	12	24	1.2
1-1/2 x 1 x 1-1/2	35RT3014010014	1.94	1.80	1.94	12	24	1.3
1-1/2 x 1-1/4	35RT3014012	1.82	1.82	1.88	12	24	1.4
1-1/2 x 1-1/4 x 1/2	35RT3014012004	1.41	1.34	1.66	16	32	0.9
1-1/2 x 1-1/4 x 3/4	35RT3014012006	1.52	1.45	1.75	16	32	1.0
1-1/2 x 1-1/4 x 1	35RT3014012010	1.65	1.58	1.80	16	32	1.1
1-1/2 x 1-1/4 x 1-1/4	35RT3014012012	1.82	1.75	1.88	14	28	1.3
1-1/2 x 1-1/4 x 1-1/2	35RT3014012014	1.94	1.88	1.94	14	28	1.4
2 x 1/2	35RT3020004	1.49	1.49	1.88	10	20	1.5
2 x 3/4	35RT3020006	1.60	1.60	1.97	10	20	1.6
2 x 1	35RT3020010	1.73	1.73	2.02	8	16	1.7
2 x 1 x 2	35RT3020010020	2.25	2.02	2.25	8	16	1.9
2 x 1-1/4	35RT3020012	1.90	1.90	2.10	8	16	1.9
2 x 1-1/4 x 2	35RT3020012020	2.25	2.10	2.25	8	16	2.0
2 x 1-1/2	35RT3020014	2.02	2.02	2.16	8	16	2.1
2 x 1-1/2 x 1/2	35RT3020014004	1.49	1.41	1.88	10	20	1.3
2 x 1-1/2 x 3/4	35RT3020014006	1.60	1.52	1.97	10	20	1.4
2 x 1-1/2 x 1	35RT3020014010	1.73	1.65	2.02	8	16	1.5
2 x 1-1/2 x 1-1/4	35RT3020014012	1.90	1.82	2.10	8	16	1.7
2 x 1-1/2 x 1-1/2	35RT3020014014	2.02	1.94	2.16	8	16	1.8

Fig. 35BT3 – Bull Head Tee

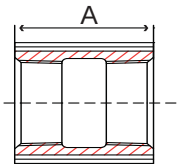


Size in	Part Number	A in	B in	C in	Packing Inner	Packing Master	Weight lb
3/4 x 1	35BT3006010	1.45	1.45	1.37	30	60	0.6
1 x 1-1/4	35BT3010012	1.67	1.67	1.58	20	40	0.9
1 x 1-1/2	35BT3010014	1.80	1.80	1.65	15	30	1.0
1-1/4 x 1 x 1-1/2	35BT3012010014	1.88	1.80	1.82	15	30	1.2
1-1/4 x 1-1/2	35BT3012014	1.88	1.88	1.82	15	30	1.3
1-1/4 x 2	35BT3012020	2.10	2.10	1.90	10	20	1.6
1-1/2 x 1-1/4 x 2	35BT3014012020	2.16	2.10	2.02	10	20	1.8
1-1/2 x 2	35BT3014020	2.16	2.16	2.02	8	16	1.8

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Fig. 35CP3 – Straight Coupling with Ribs

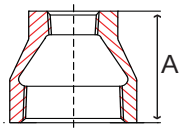




Size in	Part Number	A in	Packing Inner	Packing Master	Weight lb
1/2	35CP3004	1.38	200	400	0.1
3/4	35CP3006	1.63	100	200	0.2
1	35CP3010	1.75	60	120	0.4
1-1/4	35CP3012	2.00	35	70	0.5
1-1/2	35CP3014	2.19	25	50	0.7
2	35CP3020	2.62	15	30	1.2
2-1/2	35CP3024	3.00	9	18	2.2

Fig. 35RC3 – Hex Reducing Coupling

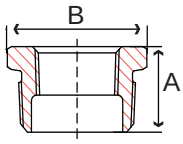




Size in	Part Number	A in	Packing Inner	Packing Master	Weight lb
1 x 1/2	35RC3010004	1.69	80	160	0.3
1 x 3/4	35RC3010006	1.69	60	120	0.4
1-1/4 x 3/4	35RC3012006	2.06	40	80	0.6
2 x 1 (not hex)	35RC3020010	2.81	20	40	1.0

Fig. 35HB3 – Hex Bushing

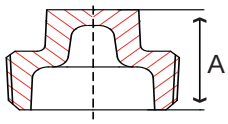




Size in	Part Number	A in	Packing Inner	Packing Master	Weight lb
1 x 1/2	35HB3010004	1.06	180	360	0.2
1 x 3/4	35HB3010006	1.06	180	360	0.1
1-1/4 x 1	35HB3012010	1.19	90	180	0.2
1-1/2 x 1	35HB3014010	1.25	75	150	0.4
1-1/2 x 1-1/4	35HB3014012	1.25	75	150	0.3
2 x 1	35HB3020010	1.38	40	80	0.6
2 x 1-1/4	35HB3020012	1.38	40	80	0.6
2 x 1-1/2	35HB3020014	1.38	40	80	0.6

Fig. 35SP3 – Square Head Plug

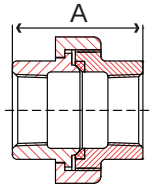




Size in	Part Number	A in	Packing Inner	Packing Master	Weight lb
1/2	35SP3004	0.94	600	1200	0.07
3/4	35SP3006	1.12	350	700	0.1
1	35SP3010	1.25	200	400	0.1
1-1/4	35SP3012	1.37	100	200	0.3
1-1/2	35SP3014	1.44	80	160	0.4
2	35SP3020	1.50	45	90	0.6

Fig. 35U 3 – Union with Brass Seat





Size in	Part Number	A in	Packing Inner	Packing Master	Weight lb
1	35U 3010	2.19	20	40	1.0
1-1/4	35U 3012	2.50	15	30	1.2
1-1/2	35U 3014	2.62	10	20	1.7
2	35U 3020	3.12	6	12	2.4

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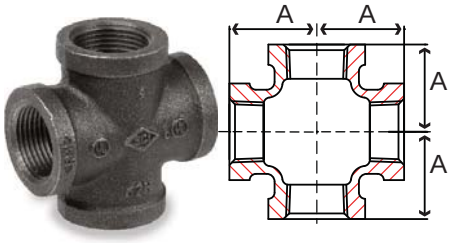


Fig. 35X 3 – Cross

Size in	Part Number	A in	Packing		Weight lb
			Inner	Master	
1	35X 3010	1.50	20	40	0.9
1-1/4	35X 3012	1.75	12	24	1.4
1-1/2	35X 3014	1.94	8	16	1.8
2	35X 3020	2.25	6	12	2.8

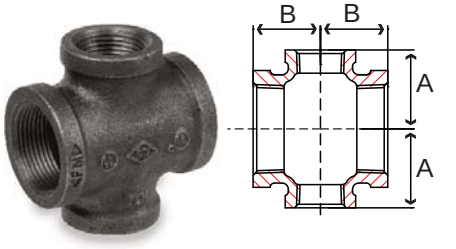


Fig. 35RX3 – Reducing Cross

Size in	Part Number	A in	B in	Packing		Weight lb
				Inner	Master	
1-1/4 x 1	35RX3012010	1.67	1.58	15	30	1.2
1-1/2 x 1	35RX3014010	1.80	1.65	12	24	1.4
2 x 1	35RX3020010	2.02	1.73	8	16	2.0

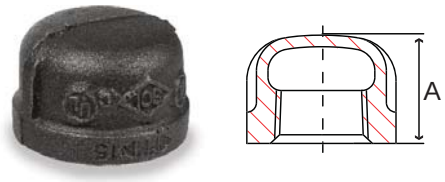


Fig. 35C 3 – Cap

Size in	Part Number	A in	Packing		Weight lb
			Inner	Master	
1/2	35C 3004	0.87	300	600	0.1
3/4	35C 3006	0.97	200	400	0.1
1	35C 3010	1.16	110	220	0.2
1-1/4	35C 3012	1.28	70	140	0.4
1-1/2	35C 3014	1.33	50	100	0.5
2	35C 3020	1.45	25	50	0.8
2-1/2	35C 3024	1.70	18	36	1.6

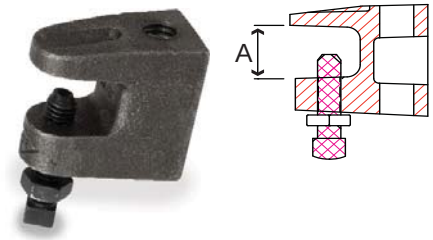


Fig. 35BC3 – Beam Clamp

Size in	Part Number	A in	Packing		Weight lb
			Inner	Master	
3/8	35BC3003	0.75	100	200	0.3
1/2	35BC3004	0.75	80	160	0.5

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Series TY-FRB — 2.8, 4.2, 5.6, and 8.0 K-Factor Upright, Pendent, and Recessed Pendent Sprinklers Quick Response, Standard Coverage

General Description

The TYCO Series TY-FRB, 2.8, 4.2, 5.6, and 8.0 K-factor, Upright, Pendent, and Recessed Pendent Sprinklers described in this data sheet are quick response, standard coverage, decorative 3 mm glass bulb-type spray sprinklers designed for use in light or ordinary hazard, commercial occupancies such as banks, hotels, and shopping malls.

The recessed version of the Series TY-FRB Pendent Sprinkler, where applicable, is intended for use in areas with a finished ceiling. This recessed pendent sprinkler uses one of the following:

- A two-piece Style 10 (1/2 inch NPT) or Style 40 (3/4 inch NPT) Recessed Escutcheon with 1/2 inch (12,7 mm) of recessed adjustment or up to 3/4 inch (19,1 mm) of total adjustment from the flush pendent position, or a
- A two-piece Style 20 (1/2 inch NPT) or Style 30 (3/4 inch NPT) Recessed Escutcheon with 1/4 inch (6,4 mm) of recessed adjustment or up to 1/2 inch (12,7 mm) of total adjustment from the flush pendent position.

The adjustment provided by the Recessed Escutcheon reduces the accuracy to which the fixed pipe drops to the sprinklers must be cut.

Corrosion-resistant coatings, where applicable, are utilized to extend the life of copper alloy sprinklers beyond that which would otherwise be obtained when exposed to corrosive atmospheres. Although corrosion-resistant coated sprinklers have passed the standard corrosion tests of the applicable approval agencies, the testing is not representative of all possible corrosive atmospheres. Consequently, it is recommended that the end user be consulted with respect to the suitability of these coatings for any given corrosive environment. The effects of ambient temperature, concentration of chemicals, and gas/chemical velocity, should be considered, as a minimum, along with the corrosive nature of the chemical to which the sprinklers will be exposed.

An intermediate level of the Series TY-FRB Pendent Sprinklers is detailed in Technical Data Sheet TFP356, and Sprinkler Guards are detailed in Technical Data Sheet TFP780.

NOTICE

The Series TY-FRB, 2.8, 4.2, 5.6, and 8.0 K-factor, Upright, Pendent, and Recessed Pendent Sprinklers described herein must be installed and maintained in compliance with this document and with the applicable standards of the National Fire Protection Association, in addition to the standards of any authorities having jurisdiction. Failure to do so may impair the performance of these devices.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. The installing contractor or sprinkler manufacturer should be contacted with any questions.

IMPORTANT

Always refer to Technical Data Sheet TFP700 for the "INSTALLER WARNING" that provides cautions with respect to handling and installation of sprinkler systems and components. Improper handling and installation can permanently damage a sprinkler system or its components and cause the sprinkler to fail to operate in a fire situation or cause it to operate prematurely.





Sprinkler Identification Number (SIN)

TY1131 - Upright 2.8K, 1/2˝ NPT
TY1231 - Pendent 2.8K, 1/2˝ NPT
TY2131 - Upright 4.2K, 1/2˝ NPT
TY2231 - Pendent 4.2K, 1/2˝ NPT
TY3131 - Upright 5.6K, 1/2˝ NPT
TY3231 - Pendent 5.6K, 1/2˝ NPT
TY4131 - Upright 8.0K, 3/4˝ NPT
TY4231 - Pendent 8.0K, 3/4˝ NPT
TY4831 - Upright 8.0K, 1/2˝ NPT
TY4931 - Pendent 8.0K, 1/2˝ NPT

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* Temperature rating is indicated on Deflector.

** Pipe thread connections per ISO 7-1 can be provided on special request.

1 - Frame
2 - Button
3 - Sealing Assembly
4 - Bulb
5 - Compression Screw
6 - Deflector *
7 - Bushing

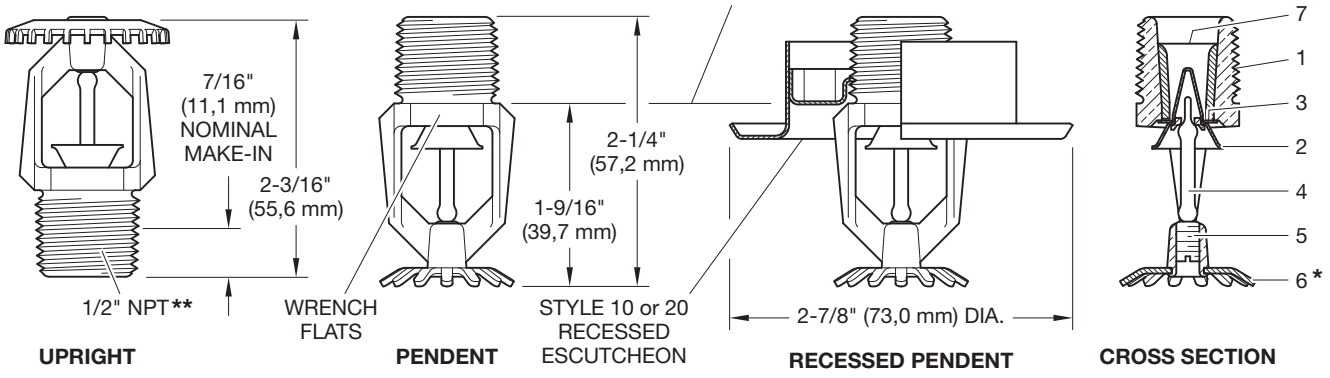


FIGURE 1
QUICK RESPONSE SERIES TY-FRB UPRIGHT (TY1131) AND PENDENT (TY1231) SPRINKLERS
2.8 K-FACTOR, 1/2 INCH NPT

* Temperature rating is indicated on Deflector.

** Pipe thread connections per ISO 7-1 can be provided on special request.

1 - Frame
2 - Button
3 - Sealing Assembly
4 - Bulb
5 - Compression Screw
6 - Deflector *

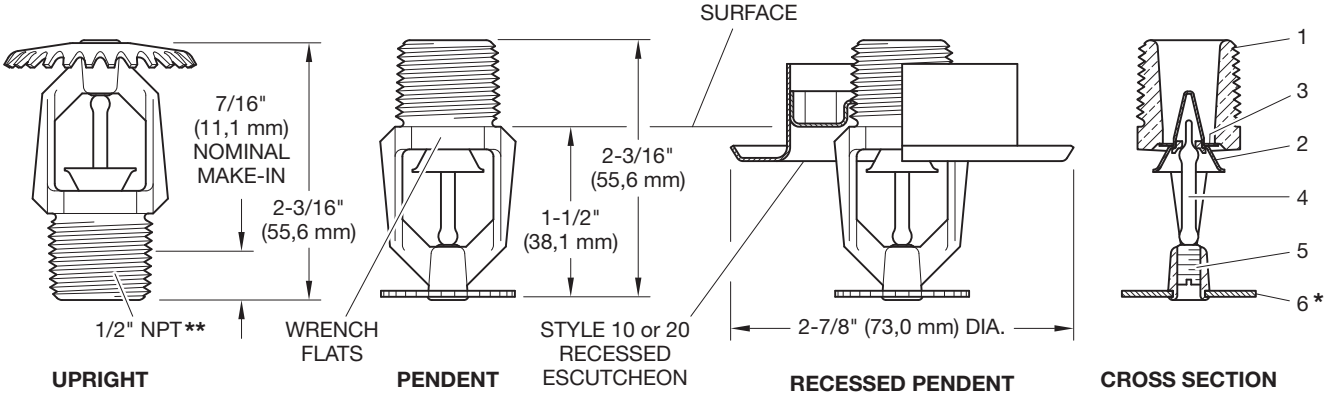


FIGURE 2
QUICK RESPONSE SERIES TY-FRB UPRIGHT (TY2131) AND PENDENT (TY2231) SPRINKLERS
4.2 K-FACTOR, 1/2 INCH NPT

* Temperature rating is indicated on Deflector.

** Pipe thread connections per ISO 7-1 can be provided on special request.

1 - Frame
2 - Button
3 - Sealing Assembly
4 - Bulb
5 - Compression Screw
6 - Deflector *

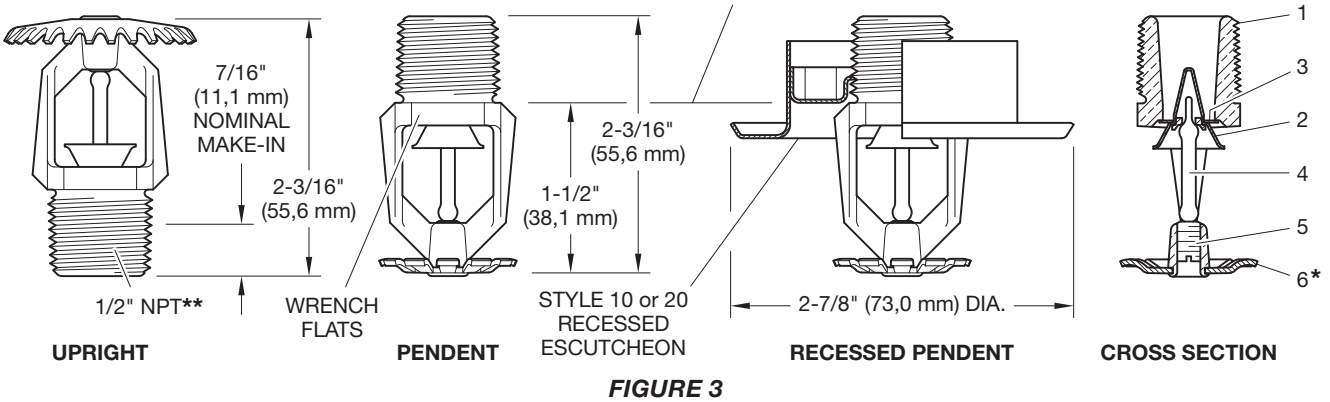


FIGURE 3
QUICK RESPONSE SERIES TY-FRB UPRIGHT (TY3131) AND PENDENT (TY3231) SPRINKLERS
5.6 K-FACTOR, 1/2 INCH NPT

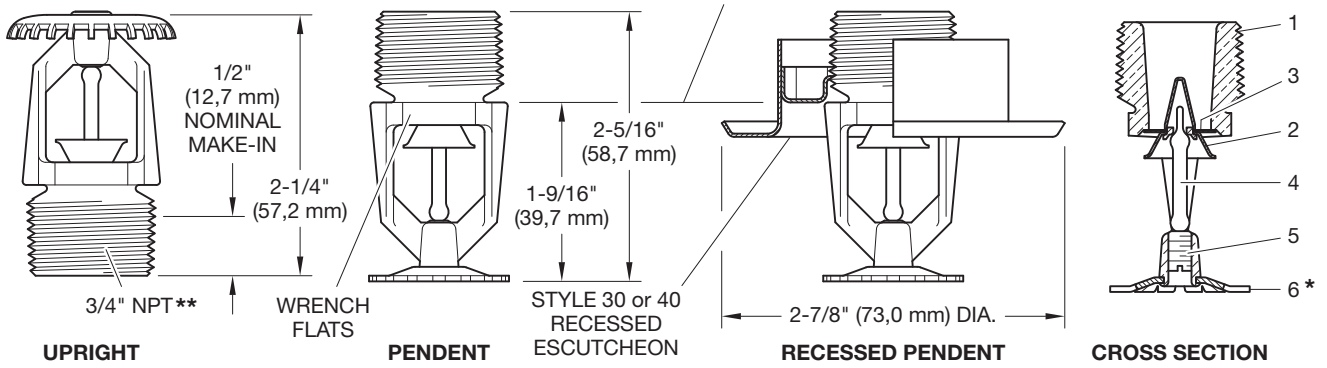


FIGURE 4
QUICK RESPONSE SERIES TY-FRB UPRIGHT (TY4131) AND PENDENT (TY4231) SPRINKLERS
8.0 K-FACTOR, 3/4 INCH NPT

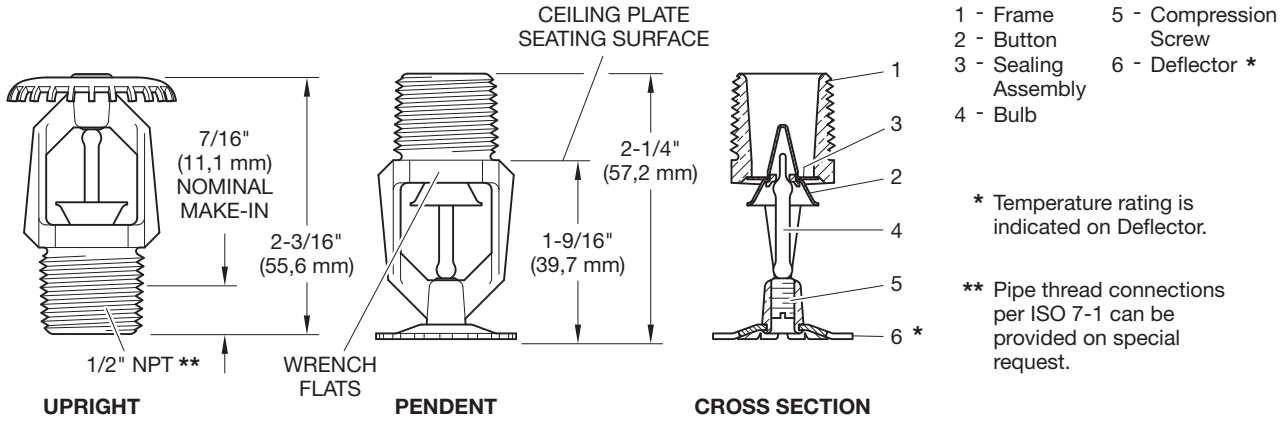


FIGURE 5
QUICK RESPONSE SERIES TY-FRB UPRIGHT (TY4831) AND PENDENT (TY4931) SPRINKLERS
8.0 K-FACTOR, 1/2 INCH NPT

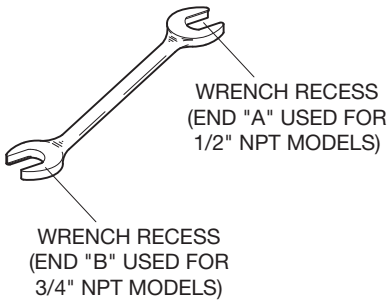


FIGURE 6
W-TYPE 6 SPRINKLER WRENCH

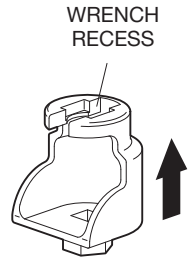


FIGURE 7
W-TYPE 7 RECESSED SPRINKLER WRENCH

Technical Data

Approvals
UL and C-UL Listed
FM, LPCB, and NYC Approved
Refer to Table A and B for complete approval information including corrosion-resistant status.

Maximum Working Pressure
Refer to Table C.

Discharge Coefficient
K=2.8 gpm/psi½ (40,3 lpm/bar½)
K=4.2 gpm/psi½ (60,5 lpm/bar½)
K=5.6 gpm/psi½ (80,6 lpm/bar½)
K=8.0 gpm/psi½ (115,2 lpm/bar½)

Temperature Rating
Refer to Table A and B.

Finishes
Sprinkler: Refer to Table D.

Recessed Escutcheon: Signal or Pure White, Jet Black, Chrome Plated, or Natural Brass

Physical Characteristics

Frame	Bronze
Button	Brass/Copper
Sealing Assembly	Beryllium Nickel w/TEFLON
Bulb	Glass
Compression Screw	Bronze
Deflector	Copper/Bronze
Bushing (K=2.8)	Bronze

Operation

The glass bulb contains a fluid that expands when exposed to heat. When the rated temperature is reached, the fluid expands sufficiently to shatter the glass bulb, allowing the sprinkler to activate and water to flow.

Design Criteria

The TYCO Series TY-FRB, 2.8, 4.2, 5.6, and 8.0 K-factor, Upright, Pendent, and Recessed Pendent Sprinklers are intended for fire protection systems designed in accordance with the standard installation rules recognized by the applicable Listing or Approval agency (such as, UL Listing is based on the requirements of NFPA 13, and FM Approval is based on the requirements of FM's Loss Prevention Data Sheets). Only the Style 10, 20, 30, or 40 Recessed Escutcheon, as applicable, is to be used for recessed pendent installations.

Installation

The TYCO Series TY-FRB, 2.8, 4.2, 5.6, and 8.0 K-factor, Upright, Pendent, and Recessed Pendent Sprinklers must be installed in accordance with this section.

General Instructions
Do not install any bulb-type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontally, a small air bubble should be present. The diameter of the air bubble is approximately 1/16 inch (1,6 mm) for the 135°F (57°C) and 3/32 inch (2,4 mm) for the 286°F (141°C) temperature ratings.

A leak-tight 1/2 inch NPT sprinkler joint should be obtained by applying a minimum to maximum torque of 7 to 14 ft.-lbs. (9,5 to 19,0 Nm). A leak tight 3/4 inch NPT sprinkler joint should be obtained with a torque of 10 to 20 ft.-lbs. (13,4 to 26,8 Nm). Higher levels of torque can distort the sprinkler Inlet with consequent leakage or impairment of the sprinkler.

Do not attempt to compensate for insufficient adjustment in the Escutcheon Plate by under- or over-tightening the sprinkler. Re-adjust the position of the sprinkler fitting to suit.

Series TY-FRB Upright and Pendent Sprinklers
The Series TY-FRB Pendent and Upright Sprinklers must be installed in accordance with the following instructions.

Step 1. Install Pendent sprinklers in the pendent position. Install upright sprinklers in the upright position.

Step 2. With pipe-thread sealant applied to the pipe threads, hand-tighten the sprinkler into the sprinkler fitting.

Step 3. Tighten the sprinkler into the sprinkler fitting using only the W-Type 6 Sprinkler Wrench (Figure 6). With reference to Figures 1 through 5, apply the W-Type 6 Sprinkler Wrench to the sprinkler wrench flats.

Series TY-FRB Recessed Pendent Sprinklers
The Series TY-FRB Recessed Pendent Sprinklers must be installed in accordance with the following instructions.

Step A. After installing the Style 10, 20, 30, or 40 Mounting Plate, as applicable, over the sprinkler threads and with pipe-thread sealant applied to the pipe threads, hand-tighten the sprinkler into the sprinkler fitting.

Step B. Tighten the sprinkler into the sprinkler fitting using only the W-Type 7 Recessed Sprinkler Wrench (Figure 7). With reference to Figures 1 to 4, apply the W-Type 7 Recessed Sprinkler Wrench to the sprinkler wrench flats.

Step C. After ceiling installation and finishing, slide on the Style 10, 20, 30, or 40 Closure over the Series TY-FRB Sprinkler and push the Closure over the Mounting Plate until its flange comes in contact with the ceiling.

K FACTOR	TYPE	TEMPERATURE	SPRINKLER FINISH (See Note 5) BULB LIQUID COLOR	NATURAL BRASS	CHROME PLATED	POLYESTER***
2.8 1/2" NPT	PENDENT (TY1231) and UPRIGHT (TY1131)	135°F (57°C)	Orange	1, 2, 3, 4		
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
		286°F (141°C)	Blue			
	RECESSED PENDENT (TY1231)* Figure 8	135°F (57°C)	Orange	1, 2, 4		
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
	RECESSED PENDENT (TY1231)** Figure 9	135°F (57°C)	Orange			
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
4.2 1/2" NPT	PENDENT (TY2231) and UPRIGHT (TY2131)	135°F (57°C)	Orange	1, 2		
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
		286°F (141°C)	Blue			
	RECESSED PENDENT (TY2231)* Figure 10	135°F (57°C)	Orange			
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
	RECESSED PENDENT (TY2231)** Figure 11	135°F (57°C)	Orange			
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			

NOTES:
1. Listed by Underwriters Laboratories, Inc., (UL) as Quick Response Sprinklers.
2. Listed by Underwriters Laboratories, Inc., for use in Canada (C-UL) as Quick Response Sprinklers.
3. Approved by Factory Mutual Research Corporation (FM) as Quick Response Sprinklers.
4. Approved by the City of New York under MEA 354-01-E.
5. Where Polyester Coated Sprinklers are noted to be UL and C-UL Listed, the sprinklers are UL and C-UL Listed as Corrosion-Resistant Sprinklers.

* Installed with Style 10 (1/2" NPT) or Style 40 (3/4" NPT) 3/4" Total Adjustment Recessed Escutcheon, as applicable.
** Installed with Style 20 (1/2" NPT) or Style 30 (3/4" NPT) 1/2" Total Adjustment Recessed Escutcheon, as applicable.
*** Frame and Deflector only.
N/A: Not Available

TABLE A
LABORATORY LISTINGS AND APPROVALS FOR
2.8 AND 4.2 K-FACTOR SPRINKLERS

K FACTOR	TYPE	TEMPERATURE	SPRINKLER FINISH (See Note 8)				
			BULB LIQUID COLOR	NATURAL BRASS	CHROME PLATED	POLYESTER***	LEAD COATED
5.6 1/2" NPT	PENDENT (TY3231) and UPRIGHT (TY3131)	135°F (57°C)	Orange	1, 2, 3, 4, 5, 6, 7			1, 2, 3, 5
		155°F (68°C)	Red				
		175°F (79°C)	Yellow				
		200°F (93°C)	Green				
		286°F (141°C)	Blue				
	RECESSED PENDENT (TY3231)* Figure 12	135°F (57°C)	Orange	1, 2, 4, 5			N/A
		155°F (68°C)	Red				
		175°F (79°C)	Yellow				
		200°F (93°C)	Green				
		286°F (141°C)	Blue				
	RECESSED PENDENT (TY3231)** Figure 13	135°F (57°C)	Orange	1, 2, 3, 4, 5			N/A
		155°F (68°C)	Red				
		175°F (79°C)	Yellow				
		200°F (93°C)	Green				
		286°F (141°C)	Blue				
8.0 3/4" NPT	PENDENT (TY4231) and UPRIGHT (TY4131)	135°F (57°C)	Orange	1, 2, 3, 4, 5, 6, 7			1, 2, 5
		155°F (68°C)	Red				
		175°F (79°C)	Yellow				
		200°F (93°C)	Green				
		286°F (141°C)	Blue				
	RECESSED PENDENT (TY4231)* Figure 14	135°F (57°C)	Orange	1, 2, 5			N/A
		155°F (68°C)	Red				
		175°F (79°C)	Yellow				
		200°F (93°C)	Green				
		286°F (141°C)	Blue				
	RECESSED PENDENT (TY4231)** Figure 15	135°F (57°C)	Orange	1, 2, 3, 5			N/A
		155°F (68°C)	Red				
		175°F (79°C)	Yellow				
		200°F (93°C)	Green				
		286°F (141°C)	Blue				
8.0 1/2" NPT	PENDENT (TY4931) and UPRIGHT (TY4831)	135°F (57°C)	Orange	1, 2, 4, 5, 6			1, 2, 5
		155°F (68°C)	Red				
		175°F (79°C)	Yellow				
		200°F (93°C)	Green				
		286°F (141°C)	Blue				

NOTES:
1. Listed by Underwriters Laboratories, Inc., (UL) as Quick Response Sprinklers.
2. Listed by Underwriters Laboratories, Inc., for use in Canada (C-UL) as Quick Response Sprinklers.
3. Approved by Factory Mutual Research Corporation (FM) as Quick Response Sprinklers.
4. Approved by the Loss Prevention Certification Board (LPCB Ref. No. 007k/04) as Quick Response Sprinklers. However, LPCB does not rate the thermal sensitivity of recessed sprinklers.
5. Approved by the City of New York under MEA 354-01-E.
6. VdS Approved (For details, contact Tyco Fire Suppression & Building Products, Enschede, Netherlands, Tel. 31-53-428-4444/Fax 31-53-428-3377.)
7. Approved by the Loss Prevention Certification Board (LPCB Ref. No. 094a/06) as Quick Response Sprinklers.
8. Where Polyester Coated and Lead-Coated Sprinklers are noted to be UL and C-UL Listed, the sprinklers are UL and C-UL Listed as Corrosion-Resistant Sprinklers. Where Lead-Coated Sprinklers are noted to be FM Approved, the sprinklers are FM Approved as a Corrosion-Resistant Sprinklers.

* Installed with Style 10 (1/2" NPT) or Style 40 (3/4" NPT) 3/4" Total Adjustment Recessed Escutcheon, as applicable.
** Installed with Style 20 (1/2" NPT) or Style 30 (3/4" NPT) 1/2" Total Adjustment Recessed Escutcheon, as applicable.
*** Frame and Deflector only.
N/A: Not Available

TABLE B
LABORATORY LISTINGS AND APPROVALS FOR
5.6 AND 8.0 K-FACTOR SPRINKLERS

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K FACTOR	TYPE	SPRINKLER FINISH			
		NATURAL BRASS	CHROME PLATED	POLYESTER	LEAD COATED
2.8 1/2" NPT	PENDENT (TY1231) and UPRIGHT (TY1131)	175 PSI (12,1 BAR)			N/A
	RECESSED PENDENT (TY1231)				
4.2 1/2" NPT	PENDENT (TY2231) and UPRIGHT (TY2131)	175 PSI (12,1 BAR)			N/A
	RECESSED PENDENT (TY2231)				
5.6 1/2" NPT	PENDENT (TY3231) and UPRIGHT (TY3131)	250 PSI (17,2 BAR) OR 175 PSI (12,1 BAR) (SEE NOTE 1)			
	RECESSED PENDENT (TY3231)				
8.0 3/4" NPT	PENDENT (TY4231) and UPRIGHT (TY4131)	175 PSI (12,1 BAR)			175 PSI (12,1 BAR)
	RECESSED PENDENT (TY4231)				N/A
8.0 1/2" NPT	PENDENT (TY4931) and UPRIGHT (TY4831)	175 PSI (12,1 BAR)			175 PSI (12,1 BAR)

NOTES:
1. The maximum working pressure of 250 psi (17,2 bar) only applies to the Listing by Underwriters Laboratories Inc. (UL); the Listing by Underwriters Laboratories, Inc. for use in Canada (C-UL); and, the Approval by the City of New York.

TABLE C
MAXIMUM WORKING PRESSURE

Care and Maintenance

The TYCO Series TY-FRB must be maintained and serviced in accordance with this section.

Before closing a fire protection system main control valve for maintenance work on the fire protection system that it controls, obtain permission to shut down the affected fire protection systems from the proper authorities and notify all personnel who may be affected by this action.

Absence of the outer piece of an escutcheon, which is used to cover a clearance hole, can delay sprinkler operation in a fire situation.

Sprinklers which are found to be leaking or exhibiting visible signs of corrosion must be replaced.

Automatic sprinklers must never be painted, plated, coated, or otherwise altered after leaving the factory. Modified sprinklers must be replaced. Sprinklers that have been exposed to corrosive products of combustion, but have not operated, should be replaced if they cannot be completely cleaned by wiping the sprinkler with a cloth or by brushing it with a soft bristle brush.

Care must be exercised to avoid damage to the sprinklers before, during, and after installation. Sprinklers damaged by dropping, striking, wrench twist/slippage, or the like, must be replaced. Also, replace any sprinkler that has a cracked bulb or that has lost liquid from its bulb. (Ref. Installation Section.)

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the National Fire Protection Association (e.g., NFPA 25), in addition to the standards of any other authorities having jurisdiction. Contact the installing contractor or sprinkler manufacturer regarding any questions.

Automatic sprinkler systems are recommended to be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.

Care must be exercised to avoid damage to the sprinklers -before, during, and after installation. Sprinklers damaged by dropping, striking, wrench twist/slippage, or the like, must be replaced. Also, replace any sprinkler that has a cracked bulb or that has lost liquid from its bulb. (Ref. Installation Section).

Initial and frequent visual inspections of random samples are recommended for corrosion-resistant sprinklers to verify the integrity of the corrosion-resistant material of construction. Thereafter, annual inspections per NFPA 25 should suffice.

Inspections of corrosion-resistant sprinklers are recommended at close range, instead of from the floor level per NFPA. Inspection at close range can better determine the exact sprinkler condition and the long-term integrity of the corrosion-resistant material, which can be affected by the corrosive conditions present.

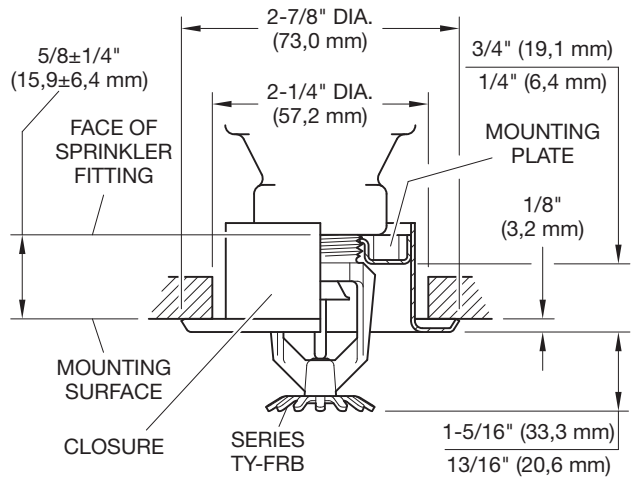


FIGURE 8
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 3/4 INCH TOTAL ADJUSTMENT
STYLE 10 RECESSED ESCUTCHEON
2.8 K-FACTOR, 1/2 INCH NPT

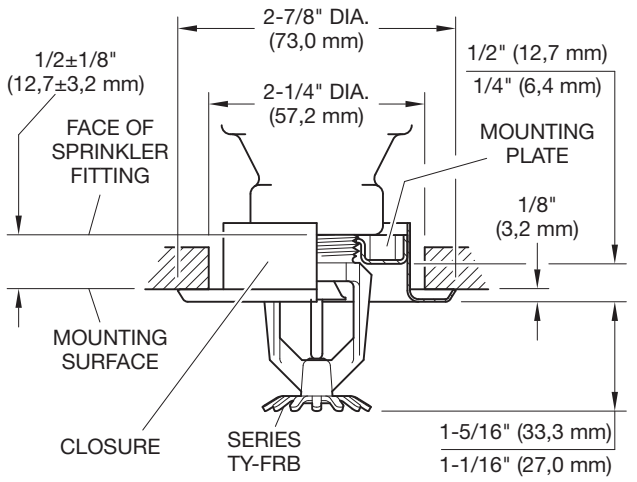


FIGURE 9
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 1/2 INCH TOTAL ADJUSTMENT
STYLE 20 RECESSED ESCUTCHEON
2.8 K-FACTOR, 1/2 INCH NPT

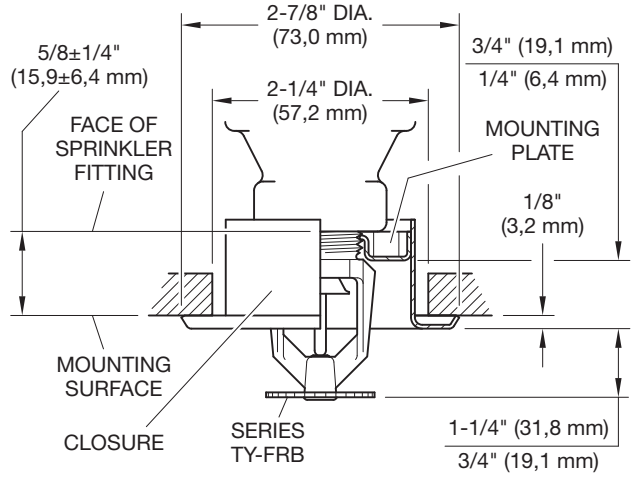


FIGURE 10
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 3/4 INCH TOTAL ADJUSTMENT
STYLE 10 RECESSED ESCUTCHEON
4.2 K-FACTOR, 1/2 INCH NPT

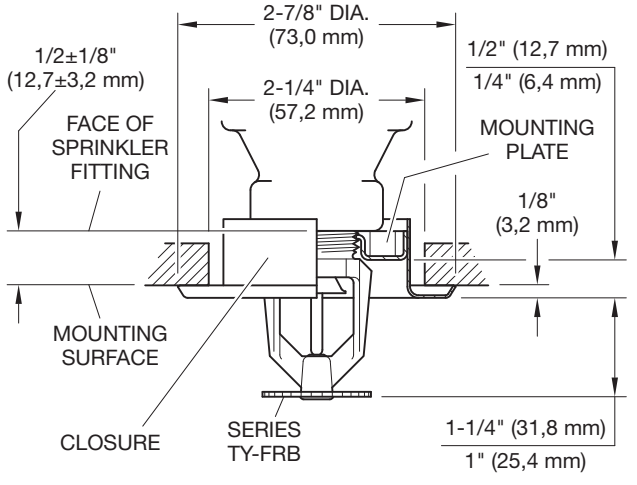


FIGURE 11
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 1/2 INCH TOTAL ADJUSTMENT
STYLE 20 RECESSED ESCUTCHEON
4.2 K-FACTOR, 1/2 INCH NPT

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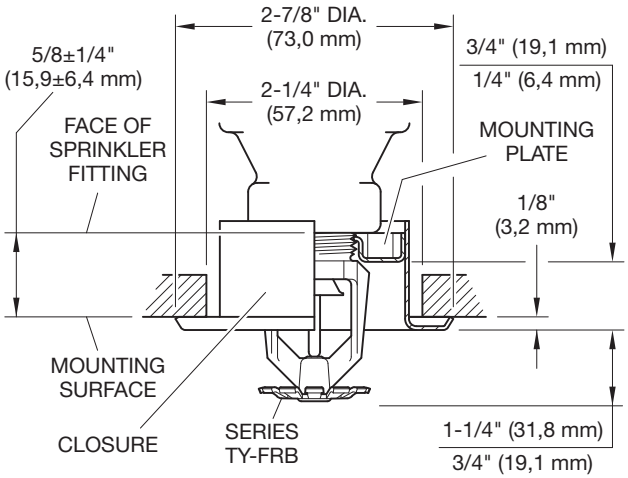


FIGURE 12
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 3/4 INCH TOTAL ADJUSTMENT
STYLE 10 RECESSED ESCUTCHEON
5.6 K-FACTOR, 1/2 INCH NPT

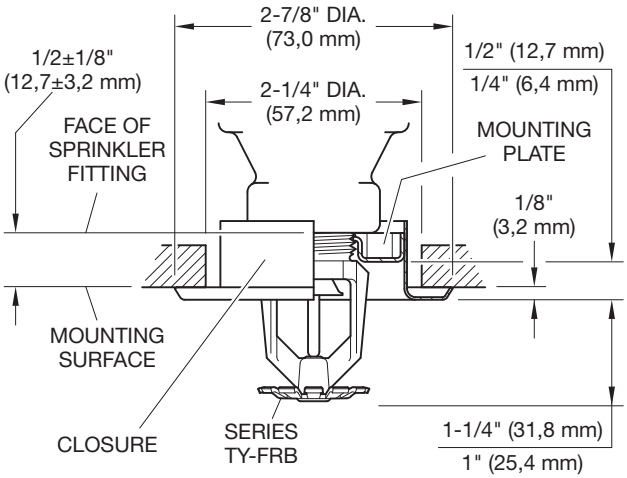


FIGURE 13
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 1/2 INCH TOTAL ADJUSTMENT
STYLE 20 RECESSED ESCUTCHEON
5.6 K-FACTOR, 1/2 INCH NPT

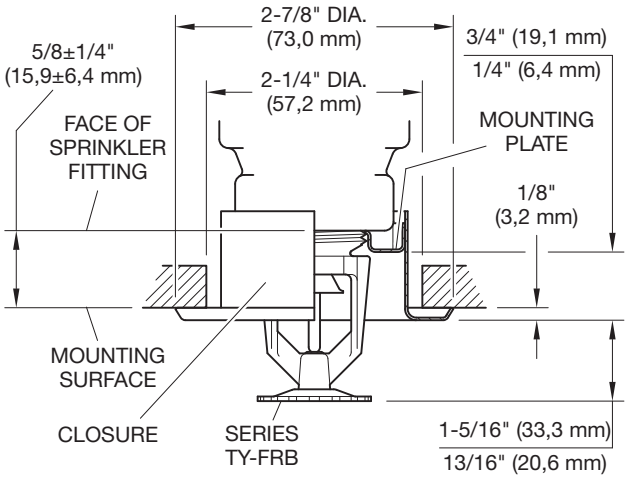


FIGURE 14
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 3/4 INCH TOTAL ADJUSTMENT
STYLE 40 RECESSED ESCUTCHEON
8.0 K-FACTOR, 3/4 INCH NPT

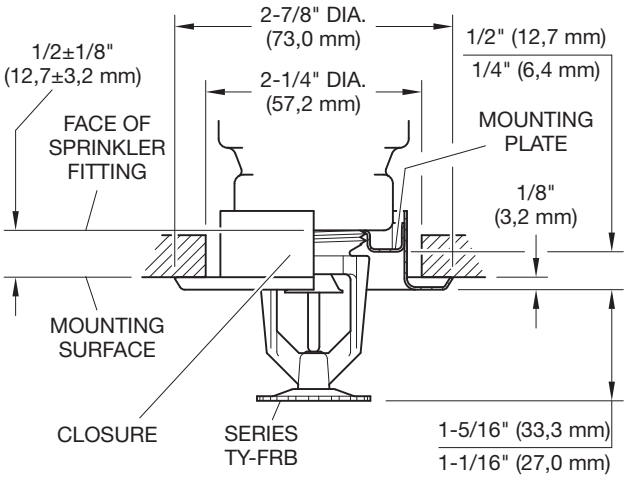


FIGURE 15
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 1/2 INCH TOTAL ADJUSTMENT
STYLE 30 RECESSED ESCUTCHEON
8.0 K-FACTOR, 3/4 INCH NPT

P/N 57 – XXX – X – XXX

		SIN
330	2.8K UPRIGHT (1/2”NPT)	TY1131
331	2.8K PENDENT (1/2”NPT)	TY1231
340	4.2K UPRIGHT (1/2”NPT)	TY2131
341	4.2K PENDENT (1/2”NPT)	TY2231
370	5.6K UPRIGHT (1/2”NPT)	TY3131
371	5.6K PENDENT (1/2”NPT)	TY3231
390	8.0K UPRIGHT (3/4”NPT)	TY4131
391	8.0K PENDENT (3/4”NPT)	TY4231
360	8.0K UPRIGHT (1/2”NPT)	TY4831*
361	8.0K PENDENT (1/2”NPT)	TY4931*

	SPRINKLER FINISH
1	NATURAL BRASS
3	PURE WHITE POLYESTER (RAL9010)[1]
4	SIGNAL WHITE POLYESTER (RAL9003)
5	JET BLACK POLYESTER (RAL9005)[2]
7	LEAD COATED
9	CHROME PLATED

	TEMPERATURE RATINGS
135	135°F (57°C)
155	155°F (68°C)
175	175°F (79°C)
200	200°F (93°C)
286	286°F (141°C)

NOTES:
1. Eastern Hemisphere sales only.
2. Available in only 2.8K, 4.2K, and 8.0K, 155°F (68°C) and 200°F (93°C); requires lead time to manufacture.

TABLE D
SERIES TY-FRB PENDENT AND UPRIGHT SPRINKLERS
PART NUMBER SELECTION

Limited Warranty

For warranty terms and conditions, visit www.tyco-fire.com.

Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name and Part Number (P/N).

Sprinkler Assemblies with NPT Thread Connections
Specify: Series TY-FRB (Specify SIN), (specify K-factor), (specify Pendent or Upright) Sprinkler (specify) temperature rating, (specify) finish or coating, P/N (specify from Table D)

Recessed Escutcheon
Specify: Style (10, 20, 30, or 40) Recessed Escutcheon with (specify*) finish, P/N (specify*)

Sprinkler Wrench
Specify: W-Type 6 Sprinkler Wrench, P/N 56-000-6-387

Specify: W-Type 7 Sprinkler Wrench, P/N 56-850-4-001

* Refer to Technical Data Sheet TFP770

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tyco Fire Protection Products

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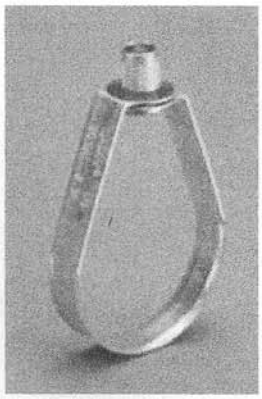
CADDY®

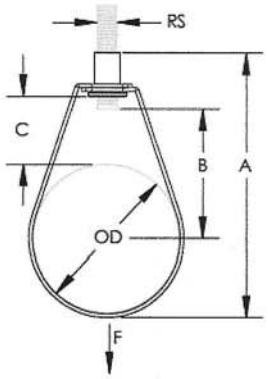
115 Standard Duty Loop Hanger

Features

- Flared edges help prevent any sharp surfaces from coming into contact with the pipe (1/2" to 4" sizes)
- Retained insert nut helps ensure the loop hanger and insert nut stay together
- Recommended for the suspension of stationary non-insulated pipe lines
- Manufactured to use the minimum rod size permitted by NFPA® for fire sprinkler piping
- Conforms with Federal Specification WW-H-171 (Type 10), Manufacturers Standardization Society (MSS) SP-58 and SP-69 (Type 10)

The 115 Standard Duty Loop Hanger, part of the CADDY® line of fasteners and supports from ERICO, is ideal for suspending stationary, non-insulated pipe lines, including CPVC pipes, in fire sprinkler systems. A knurled insert nut helps simplify vertical adjustments and flared edges on the base (1/2" to 4" sizes) help protect pipes from coming into contact with any sharp edges of the hanger.





Material: Steel
Finish: Pre-galvanized

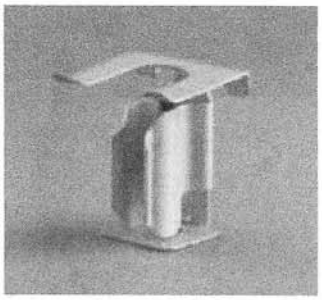
FM APPROVED c UL us

Part Number	Pipe Size	Outer Diameter OD	Rod Size RS	A	B	C	Static Load F
1150050EG	1/2"	0.840"	3/8"	2 13/16"	1 1/8"	1"	300 lb
1150075EG	3/4"	1.050"	3/8"	3"	1 3/16"	15/16"	300 lb
1150100EG	1"	1.315"	3/8"	3 1/4"	1 3/8"	15/16"	300 lb
1150125EG	1 1/4"	1.660"	3/8"	3 9/16"	1 1/2"	15/16"	300 lb
1150150EG	1 1/2"	1.900"	3/8"	3 13/16"	1 5/8"	15/16"	300 lb
1150200EG	2"	2 3/8"	3/8"	4 1/4"	1 7/8"	15/16"	300 lb
1150250EG	2 1/2"	2 7/8"	3/8"	5 9/16"	2 13/16"	1 9/16"	525 lb
1150300EG	3"	3 1/2"	3/8"	6 9/16"	3 1/2"	1 15/16"	525 lb
1150350EG	3 1/2"	4"	3/8"	7 1/16"	3 3/4"	1 15/16"	585 lb
1150400EG	4"	4 1/2"	3/8"	7 9/16"	4"	1 15/16"	650 lb
1150500EG	5"	5 9/16"	1/2"	9 13/16"	4 3/4"	2 1/4"	1,000 lb
1150600EG	6"	6 5/8"	1/2"	11 5/16"	6 5/16"	3 5/16"	1,000 lb
1150800EG	8"	8 5/8"	1/2"	12 7/8"	6 7/8"	2 7/8"	1,000 lb

Surge Restraint

Features

- Surge restraint for 115 standard duty loop hangers



Specifications

Material: Steel
Finish: CADDY® ARMOUR

UL

Part Number	Pipe Size
SR6	1/2" – 2"



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WARNING
ERICO products shall be installed and used only as indicated in ERICO's product instruction sheets and training materials. Instruction sheets are available at www.erico.com and from your ERICO customer service representative. Improper installation, misuse, misapplication or other failure to completely follow ERICO's instructions and warnings may cause product malfunction, property damage, serious bodily injury and death.

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HDI / HDI-L Drop-In Anchor

4.3.4.1 PRODUCT DESCRIPTION

The Hilti HDI/HDI-L Drop-In anchor is an internally threaded, flush mounted expansion anchor for use in concrete.



Product Features

HDI

- Anchor, setting tool & Hilti drill bit form a matched tolerance system to provide reliable fastenings
- Below surface setting for easy patchwork
- Allows for shallow embedment without sacrificing performance

HDI-L

- Lip provides flush installation, consistent anchor depth, and easy rod alignment
- Lip allows accurate flush surface setting, independent of hole depth & ideal for repetitive fastenings with threaded rods of equal length
- Intelligent expansion section adapts to the base material & reduces number of hammer blows up to 50%
- Easy to read brand & size identification (red laser print)

Guide Specifications

Expansion Anchors: Expansion anchors shall be flush or shell type which meet the description in Federal Specification FF-S-325, Group VIII, Type 1, for expansion shield anchors. Anchors to be zinc plated in accordance with ASTM B633, Sc. 1, Type III. Anchors shall be Hilti HDI/HDI-L anchors as supplied by Hilti, Inc., P.O. Box 21148, Tulsa, OK 74121.

Installation: Shell or flush type anchors to be installed in holes drilled with Hilti carbide tipped drill bits. Anchors shall be installed per manufacturer's recommendations.

Approvals/Listings

- City of Los Angeles (COLA): Research Report No. 23709 (HDI Only)
- Factory Mutual (FM): Serial No. 22765 "Sprinkler Hangar Components—Expansion Shields." (HDI and HDI-L)
- Conforms to the description in Federal Specification FF-S-325, Group VIII, Type 1 for expansion shield anchors. (HDI and HDI-L)
- Underwriters Laboratory (UL), "Pipe Hangers" (3/8"–3/4" diameter) (HDI and HDI-L)
- International Conference of Building Officials (ICBO ES): Evaluation Report No. 2895 (HDI Only)
- Southern Building Code Congress (SBCCI): Report No. 9930 (HDI Only)

4.3.5.2 MATERIAL SPECIFICATIONS

	MECHANICAL PROPERTIES	
	f_y ksi (MPa)	min. f_u ksi (MPa)
HDI/HDI-L Carbon Steel material meets the requirements of AISI 1010M for the 1/4", 3/8" & 1/2"	44 (303)	53 (365)
HDI Carbon Steel material meets the requirements of AISI 12L14 for the 5/8" and 3/4" sizes	60 (415)	78 (540)
HDI Stainless Steel material meets the requirements of AISI 303	60 (414)	100 (689)

Carbon Steel HDI/HDI-L plated with a dull zinc finish for corrosion protection in accordance with ASTM B633, Sc. 1, Type III

4.3.5.3 TECHNICAL DATA

HDI/HDI-L Specification Table

Details / Anchor Size		HDI/HDI-L	HDI/HDI-L	HDI/HDI-L	HDI	HDI
	in. (mm)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)	5/8 (15.9)	3/4 (19.1)
d_{bit}: bit diameter[1]	in.	3/8	1/2	5/8	27/32	1
h_{nom}: std. depth of embed.	in.	1	1 9/16	2	2 9/16	3 3/16
ℓ: anchor length h_1: hole depth	(mm)	(25)	(40)	(51)	(65)	(81)
ℓ_{th}: useable thread length	in.	7/16	5/8	11/16	7/8	1 3/8
	(mm)	(11)	(15)	(17)	(22)	(34)
Threads per in.		20	16	13	11	10
h: min. base material thickness	in.	3	3 1/8	4	5 1/8	6 3/8
	(mm)	(76)	(79)	(102)	(130)	(162)
T_{inst}: max. tightening torque	ft lb	4	11	22	37	80
	(Nm)	(5.4)	(14.9)	(29.8)	(50.2)	(108.5)

1. For Hilti matched tolerance carbide tipped drill bits, see section 10.4.1.

Combined Shear and Tension Loading

$$\left(\frac{N_d}{N_{rec}}\right)^{5/3} + \left(\frac{V_d}{V_{rec}}\right)^{5/3} \leq 10$$

(Ref. Section 4.1.3)

Attached are page(s) from the 2013 Hilti North American Product Technical Guide Volume 1 Direct Fastening. For complete details on this product, including data development, product specifications, general suitability, installation, corrosion, and spacing and edge distance guidelines, please refer to the full Product Technical Guide, or contact Hilti.

Hilti, Inc.
5400 South 122nd East Avenue
Tulsa, OK 74146
1-800-879-8000
www.hilti.com

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Mechanical/Electrical Clips and Hangers

3.2.11.1 Product Description
3.2.11.2 Material Specifications
3.2.11.3 Technical Data
3.2.11.4 Installation Instructions
3.2.11.5 Ordering Information

Listings/Approvals

ICC-ES (International Code Council)
ESR-2795 (X-HS)

COLA (City of Los Angeles)
RR 25826 (X-HS)

FM (Factory Mutual)
W10-30-27P10, W10-30-32P10 and W10-30-42P10 fasteners for sprinkler pipe hangers in concrete

EW10-30-15P10, X-EW10H, X-EW6H and X-HS U19 fasteners for sprinkler pipe hangers in steel

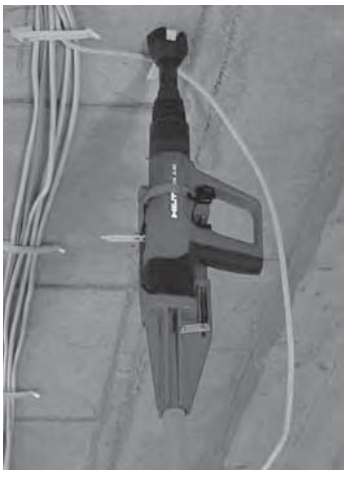
UL (Underwriters Laboratories)
X-ECH, X-EKB and X-ECT hangers for wire positioning devices

W10-30-32P10, W10-30-42P10, EW10-30-15P10, X-EW10H and X-EW6H fasteners for sprinkler pipe hangers

Cable and Conduit Hardware Hangers X-HS W6, X-HS W10 and X-RH



Threaded and Smooth Rod Hangers



Cable and Conduit Attachment

3.2.11.1 Product Description

X-HS and X-HS MX Hangers
Threaded rod hangers available with pre-mounted fasteners (X-HS W6 and X-HS W10) or without pre-mounted fasteners (X-HS W6 MX) for use with magazine tools. For attachment of 1/4" (W6) or 3/8" (W10) threaded rods to concrete or steel.



X-HS and X-HS MX Threaded Rod Hangers

Threaded Studs with Couplers
For attachment of 1/4" (X-W6) or 3/8" (W10) threaded rods to concrete or steel. More information on Threaded Studs can be found in Sections 3.2.8 and 3.2.9.



X-W6, W10, X-EW6H or X-EW10H with Coupler

X-RH Rod Hanger
For suspending telecommunications, electrical cable or conduit from concrete ceilings or steel members. It may be used to support smooth or threaded 1/4" diameter rod. The product is UL/cUL listed and plenum rated per NEC requirements.It meets ANSI/TIA/EIA-568-A/-569-A and UL 2239 standards for cable and conduit support devices, which limits center-to-center spacing for hangers to 5'-0" or less.



X-RH Rod Hanger

X-ECH Cable Holder
For suspending telecommunication or electrical cable from concrete or steel. UL/cUL listed, plenum rated (for air handling spaces) per the requirements of UL1565, CAN/CSA C22.2 No. 18.5-02, and National Electric Code Sec. 300-22 (c)(d).



X-ECH Cable Holder

X-EKB MX Cable Clamps
For telecommunications and premise wiring applications. Cable clamp attached directly to base material designed to support multiple cables approximately 1/4" in diameter. UL/cUL listed.



X-EKB MX Cable Clamp

X-ECT Cable Tie Fastener
For telecommunications and premise wiring applications. Cable or conduit support using an adjustable cable tie to secure cable or pipe. UL/cUL listed.



X-ECT MX Cable Tie Fastener

X-BX/EMTC and X-BX/EMTC MX Thin Wall Conduit Clips
Thin wall conduit clips available in thicker premium grade (BX/EMTC) or in thinner standard grade (X-BX/EMTC) with pre-mounted fasteners. Also available without pre-mounted fastener (X-BX/EMTC MX) for use with magazine tools. For fastening thin wall conduit.



X-BX/EMTC and X-BX/EMTC MX Conduit Clips

X-EMTSC MX Stand-Off Conduit Clips
Similar to EMTC clips to hold conduits away from base material and align conduit to knockouts on junction boxes.



X-EMTSC MX Stand-Off Conduit Clip

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3.2.11.2 Material Specifications

Clip/Hanger Designation	Powder-Actuated Fastener Material	Powder-Actuated Fastener Plating[1]	Clip/Hanger Material	Clip/Hanger Plating[1]
X-HS W10/W6	Carbon Steel	5 μm Zinc	Carbon Steel	5 μm Zinc
X-HS W6 MX	Carbon Steel[1]	5 μm Zinc[2]	Carbon Steel	5 μm Zinc
X-ECH	Carbon Steel	5 μm Zinc	Nylon Plastic	N/A
X-RH	Carbon Steel	5 μm Zinc	Carbon Steel	5 μm Zinc
X-EKB MX	Carbon Steel[1]	5 μm Zinc[2]	Plastic	N/A
X-ECT MX	Carbon Steel[1]	5 μm Zinc[2]	Plastic	N/A
X-BX/EMTC	Carbon Steel	5 μm Zinc	Carbon Steel	5 μm Zinc
X-BX/EMTC MX	Carbon Steel[1]	5 μm Zinc[2]	Carbon Steel	5 μm Zinc
X-EMTSC MX	Carbon Steel[1]	5 μm Zinc[2]	Carbon Steel	5 μm Zinc

1 The 5 μm coating is in accordance with ASTM B633, SC1, Type III. Reference Section 2.3.3.1 for more information.

2 Noted clips/hangers do not come with a pre-mounted powder-actuated fastener. Material and plating information provided for the powder-actuated fasteners commonly used with these clips.

3.2.11.3 Technical Data

Allowable Loads in Normal Weight Concrete[3]

Description	Fastener	Shank Diameter		Concrete Compressive Strength									
				2000 psi						4000 psi			
				Tension		Shear		45 Degree		Tension		Shear		45 Degree	
		in.	(mm)	lb	(kN)	lb	(kN)	lb	(kN)	lb	(kN)	lb	(kN)	lb	(kN)
Threaded Rod Hanger with pre-mounted fastener	X-HS U32[1]	**0.157**	(4.0)	**75**	(0.33)	**100**	(0.44)	**60**	(0.27)	**85**	(0.38)	**150**	(0.67)	**120**	(0.53)
	X-HS U22[2]	**0.157**	(4.0)	**50**	(0.22)	–		–		**50**	(0.22)	–		–	
X-RH 1/4" Rod Hanger	X-RH 1/4 U27[2]	**0.157**	(4.0)	–		–		–		**50**	(0.22)	–		–	

1 The tabulated allowable load values are for the low-velocity fasteners only, using a safety factor that is greater than or equal to 5.0, calculated in accordance with ICC-ES AC70.

2 The tabulated allowable load values for X-RH and X-HS U22 are per UL 2239 with a minimum embedment of 3/4" for X-RH.

3 Multiple fasteners are recommended for any attachment. Threaded or smooth rod must be investigated in accordance with accepted design criteria.

Allowable Loads in Minimum f'_c = 3000 psi Structural Lightweight Concrete[1,4,5]

Fastener	Shank Diameter	Fastener Location														
		Installed into Concrete			Installed Through 3" Deep Metal Deck into Concrete[2]						Installed Through 1-1/2" Deep Metal Deck into Concrete[3]					
					Upper Flute			Lower Flute			Upper Flute			Lower Flute		
		Tension	Shear	45-Degree	Tension	Shear	45-Degree	Tension	Shear	45-Degree	Tension	Shear	45-Degree	Tension	Shear	45-Degree
X-HS U32	**0.157** (4.0)	**95** (0.42)	**115** (0.51)	**105**[6] (0.47)	**125** (0.56)	**220** (0.98)	**175**[6] (0.78)	**95** (0.42)	**220** (0.98)	**135**[6] (0.60)	**95** (0.42)	**220** (0.98)	**135**[6] (0.60)	**95** (0.42)	**220** (0.98)	**135**[6] (0.60)

1 The tabulated allowable load values are for the X-HS threaded rod hanger assembly with an X-U fastener only, using a safety factor that is greater than or equal to 5.0, calculated in accordance with ICC-ES AC70. Threaded rod must be investigated in accordance with accepted design criteria.

2 The steel deck profile for the 3" deep composite floor deck has a minimum thickness of 20 gauge (0.0358") and a minimum F_y of 33 ksi. Lower and upper flute width must be a minimum of 4-1/2". Figure 1 in Section 3.2.1.1.6 shows the nominal flute dimensions, fastener locations and load orientations for the deck profile. Structural lightweight concrete fill above top of steel deck must be minimum 3-1/4".

3 The steel deck profile for the 1-1/2" deep composite floor deck has a minimum thickness of 20 gauge (0.0358") and a minimum F_y of 33 ksi. Lower flute and upper flute widths must be a minimum of 1-3/4" and 3-1/2", respectively. This deck may also be inverted as shown in Figure 3 in Section 3.2.1.1.6. Figures 2 and 3 in Section 3.2.1.1.6 show the nominal flute dimensions, fastener locations and load orientations for the deck profile. Structural lightweight concrete fill above top of steel deck must be minimum 2-1/2".

4 Nailhead Standoff, h_{NVS}, must be less than or equal to 3/8" for the X-HS U32 hanger assembly. Reference Section 3.2.11.4.

5 Allowable loads apply to X-HS threaded rod hanger assemblies with either the 1/4" or 3/8" diameter internally threaded hole.

6 Allowable loads for 45-degree applications are based on testing. For allowable loads at other angles of installation, refer to Section 3.2.1.1.8.

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Allowable Loads in Minimum ASTM A36 ($F_y \geq 36$ ksi; $F_u \geq 58$ ksi) Steel[1,3,4,5]

Fastener Description	Fastener	Shank Diameter in. (mm)	Steel Thickness in. (mm)											
			3/16 (4.8)			1/4 (6.4)			3/8 (9.5)			1/2 (12.7)		
			Tension lb (kN)	Shear lb (kN)	45-Degree lb (kN)	Tension lb (kN)	Shear lb (kN)	45-Degree lb (kN)	Tension lb (kN)	Shear lb (kN)	45-Degree lb (kN)	Tension lb (kN)	Shear lb (kN)	45-Degree lb (kN)
Threaded Rod Hanger with pre-mounted fastener	X-HS U19	0.157 (4.0)	270 (1.20)	220 (0.98)	275 (1.22)	270 (1.20)	220 (0.98)	275 (1.22)	270 (1.20)	220 (0.98)	275 (1.22)	270 (1.20)	220 (0.98)	275 (1.22)
X-RH 1/4" Rod Hanger	X-RH 1/4 U27[2]	0.157 (4.0)	50 (4.0)	–	–	50 (0.22)	–	–	–	–	–	–	–	–

1 The tabulated allowable load values are for the low-velocity fasteners only, using a safety factor that is greater than or equal to 5.0, calculated in accordance with ICC-ES AC70. Threaded rod must be investigated in accordance with accepted design criteria.

2 The tabulated allowable load values for the X-RH are per UL 2239.

3 Low-velocity fasteners shall be driven to where the point of the fastener penetrates the steel base material in accordance with Section 3.2.1.2.3.

4 Multiple fasteners are recommended for any attachment. Reference Section 3.2.11.4 for installation instructions for X-HS.

5 Allowable loads for 45-degree applications are based on testing. For allowable loads at other angles of installation, refer to Section 3.2.1.2.8.

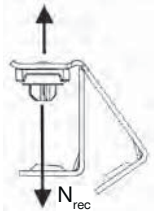
Maximum Load Rating for X-ECH Cable Holder[1]

Fastener Designation	Fastener Size	Maximum Load Rating lb (kN)
X-ECH/FR-S	Small	40 (0.18)
X-ECH/FR-M	Medium	40 (0.18)
X-ECH/FR-L	Large	100 (0.44)

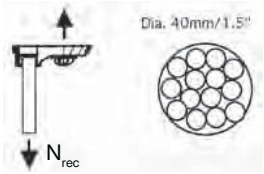
1 Maximum Load Rating per UL listing.

Allowable Loads Values for MX Version Hangers and Clips[1,3,4,5,6]

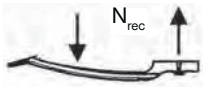
X-HS W6 MX
Allowable Load N_{rec}
Tensile
lb (kN)
15 (0.07)



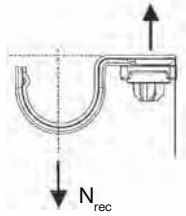
X-ECT MX
Allowable Load N_{rec}
Tensile
lb (kN)
10 (0.04)



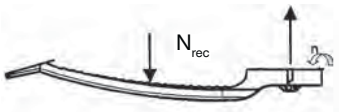
X-EKB 4 MX
Allowable Load N_{rec}
Tensile
lb (kN)
5 (0.02)



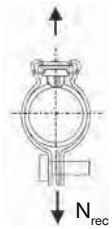
X-BX 3/8" MX[2] X-EMTC 1" MX[2]
Allowable Load N_{rec}
Tensile
lb (kN)
10 (0.04)



X-EKB 8 MX
Allowable Load N_{rec}
Tensile
lb (kN)
10 (0.04)



X-EMTSC 1/2" MX X-EMTSC 1" MX
Allowable Load N_{rec}
Tensile
lb (kN)
15 (0.07)



X-EKB 16 MX
Allowable Load N_{rec}
Tensile
lb (kN)
15 (0.07)



1 The allowable load capacities are based on tests with X-GHP 20, X-GN 27 and X-EGN 14 using a safety factor that is greater than or equal to 5.0.

2 Load capacites are based on armored cable and EMT.

3 X-GHP 20 must be installed at a minimum penetration depth of 9/16" into concrete. X-GN 27 must be installed at a minimum penetration depth of 3/4" into CMU or mortar joint. X-EGN 14 must be installed at a minimum penetration depth of 0.320" through or into steel. Hanger assemblies must be firmly clamped to the base material.

4 Concrete base materials include 2000 to 6000 psi normal weight or lightweight types and also includes attachment through steel deck into concrete.

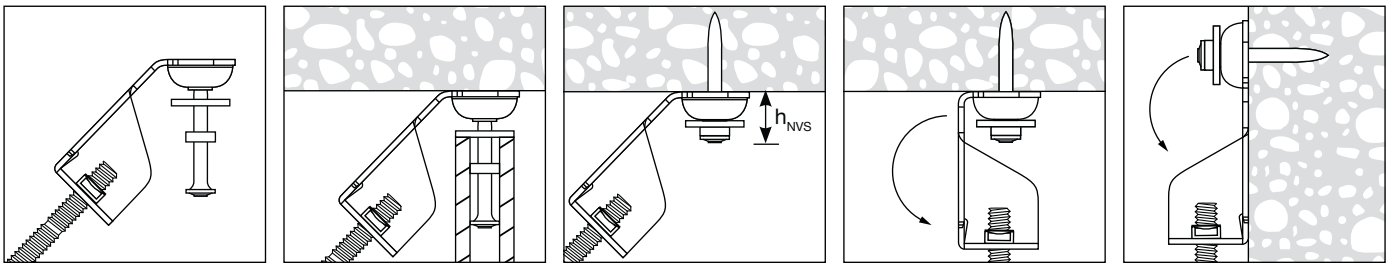
5 Steel base materials include 1/8" or thicker carbon steel base material with minimum yield strengths (F_y) of 36 ksi.

6 CMU base materials include hollow or grout-filled concrete masonry units conforming to ASTM C90.

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3.2.11.4 X-HS Installation Instructions

X-HS Installation Instructions*



1. Insert appropriate sized threaded rod into hanger.

2. Press tip of fastener to concrete/steel base material. Drive with Hilti powder-actuated tool.

3. Ensure proper fastener embedment. h_{NVS} ≤ 3/8" (9.5 mm)

4. Bend fastener until threaded rod is in desired location, vertical or horizontal for ceiling or wall hanger applications, respectively.

* These are abbreviated instructions which may vary by application. **ALWAYS** review/follow the instructions accompanying the product.

3.2.11.5 Ordering Information

X-HS and X-HS MX Threaded Rod Hangers

Fastener Description	Fastener Length in. (mm)	Fastener Shank Ø in. (mm)	Thread Rod Ø
Concrete			
X-HS W6 U32 P8S15	**1-1/4** (32)	**0.157** (4.0)	**UNC 1/4-inch**
X-HS W10 U32 P8S15	**1-1/4** (32)	**0.157** (4.0)	**UNC 3/8-inch**
X-HS W6 U22 P8S15	**7/8** (22)	**0.157** (4.0)	**UNC 1/4-inch**
X-HS W10 U22 P8S15	**7/8** (22)	**0.157** (4.0)	**UNC 3/8-inch**
Steel			
X-HS W10 U19 P8S15	**5/8** (16)	**0.157** (4.0)	**UNC 3/8-inch**
X-HS W6 U19 P8S15	**5/8** (16)	**0.157** (4.0)	**UNC 1/4-inch**
MX Version (without pre-mounted fastener)			
X-HS W6 MX	N/A	N/A	**UNC 1/4-inch**



Threaded Studs

Fastener Description	Shank Length in. (mm)	Fastener Shank Ø in. (mm)	Thread Length in. (mm)	Thread Ø
Concrete and Masonry				
X-W6-11-22 FP8	**7/8** (22)	**0.145** (3.7)	**1/2** (11)	**UNC 1/4-inch**
X-W6-11-27 FP8	**1** (27)	**0.145** (3.7)	**1/2** (11)	**UNC 1/4-inch**
X-W6-20-22 FP8	**7/8** (22)	**0.145** (3.7)	**3/4** (20)	**UNC 1/4-inch**
X-W6-20-27 FP8	**1** (27)	**0.145** (3.7)	**3/4** (20)	**UNC 1/4-inch**
X-W6-38-27 FP8	**1** (27)	**0.145** (3.7)	**1-1/2** (38)	**UNC 1/4-inch**
W10-30-27 P10	**1** (27)	**0.205** (5.2)	**1-3/16** (30)	**UNC 3/8-inch**
W10-30-32 P10	**1-1/4** (32)	**0.205** (5.2)	**1-3/16** (30)	**UNC 3/8-inch**
W10-30-42 P10	**1-5/8** (42)	**0.205** (5.2)	**1-3/16** (30)	**UNC 3/8-inch**
Steel				
X-EW6H-11-9 FP8	**3/8** (9)	**0.145** (3.7)	**1/2** (11)	**UNC 1/4-inch**
X-EW6H-20-9 FP8	**3/8** (9)	**0.145** (3.7)	**3/4** (20)	**UNC 1/4-inch**
X-EW6H-28-9 FP8	**3/8** (9)	**0.145** (3.7)	**1-1/8** (28)	**UNC 1/4-inch**
X-EW6H-38-9 FP8	**3/8** (9)	**0.145** (3.7)	**1-1/2** (38)	**UNC 1/4-inch**
X-EW10H-30-14 P10	**9/16** (14)	**0.205** (5.2)	**1-3/16** (30)	**UNC 3/8-inch**





Couplers

Fastener Description	Overall Length in. (mm)	Thread Ø Stud	Thread Ø Rod
Coupler 1/4-20	**1** (25)	**UNC 1/4-inch**	**UNC 1/4-inch**
Coupler 3/8-16	**1-1/8** (28)	**UNC 3/8-inch**	**UNC 3/8-inch**
Adapter B-1/4x3/8	**7/8** (22)	**UNC 1/4-inch**	**UNC 3/8-inch**



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X-RH Rod Hanger

Fastener Description	Fastener Length in. (mm)	Fastener Shank Ø in. (mm)	Rod Ø
Concrete			
X-RH 1/4 U27	**1** (27)	**0.157** (4.0)	**1/4-inch**



X-RH

X-ECH Cable Holder

Fastener Description	Fastener Length in. (mm)	Fastener Shank Ø in. (mm)	Number of 1/4" Ø cables
Without Pre-Mounted Fastener			
X-ECH-F/R-S	N/A	N/A	**15-22**
X-ECH-F/R-M	N/A	N/A	**30-37**
X-ECH-F/R-L	N/A	N/A	**45-52**
With Pre-Mounted Fastener			
X-ECH-F/R-S U37	**1-1/2** (37)	**0.157** (4.0)	**15-22**
X-ECH-F/R-M U37	**1-1/2** (37)	**0.157** (4.0)	**30-37**
X-ECH-F/R-L U37	**1-1/2** (37)	**0.157** (4.0)	**45-52**
Tool Accessories			
ECH Adapter	For use with DX 351 and DX 460-F8		



X-ECH

X-EKB MX Cable Clamps

Fastener Description	Max Diameter of Cable in. (mm)	Maximum No. of Cables
X-EKB 4 MX	**1/4** (6)	**4**
X-EKB 8 MX	**1/4** (6)	**8**
X-EKB 16 MX	**1/4** (6)	**16**



X-EKB MX

X-ECT MX Cable Tie Fastener*

Fastener Description	Cable Tie* Size in. (mm)
X-ECT MX	**1/2** (12)

*Cable tie is not available through Hilti.



X-ECT
without Cable Tie

X-BX/EMTC and X-BX/EMTC MX Conduit Clips

Fastener Description	Fastener Length in. (mm)	Fastener Shank Ø in. (mm)	Conduit Ø in. (mm)
Premium Grade (with pre-mounted fastener)			
X-EMTC-3/8" U22	**7/8** (22)	**0.157** (4.0)	**3/8** (10)
X-EMTC-1/2" U22	**7/8** (22)	**0.157** (4.0)	**1/2** (13)
X-EMTC-3/4" U22	**7/8** (22)	**0.157** (4.0)	**3/4** (19)
X-EMTC-1" U22	**7/8** (22)	**0.157** (4.0)	**1** (25)
Standard Grade (with pre-mounted fastener)			
X-EMTC-3/8" C27	**1** (27)	**0.138** (3.5)	**3/8** (10)
X-EMTC-1/2" C27	**1** (27)	**0.138** (3.5)	**1/2** (13)
X-EMTC-3/4" C27	**1** (27)	**0.138** (3.5)	**3/4** (19)
X-EMTC-1" C27	**1** (27)	**0.138** (3.5)	**1** (25)
MX Version (without pre-mounted fastener)			
X-BX 3/8" MX	N/A	N/A	**3/8** (10)
X-EMTC 1/2" MX	N/A	N/A	**1/2** (13)
X-EMTC 3/4" MX	N/A	N/A	**3/4** (19)
X-EMTC 1" MX	N/A	N/A	**1** (25)



X-EMTC



X-BX/EMTC MX

X-EMTSC Stand-Off Conduit Clips

Fastener Description	Conduit Ø
MX Version (without pre-mounted fastener)	
X-EMTSC 1/2" MX	**1/2** (13)
X-EMTSC 3/4" MX	**3/4** (19)
X-EMTSC 1" MX	**1** (25)



X-EMTSC MX