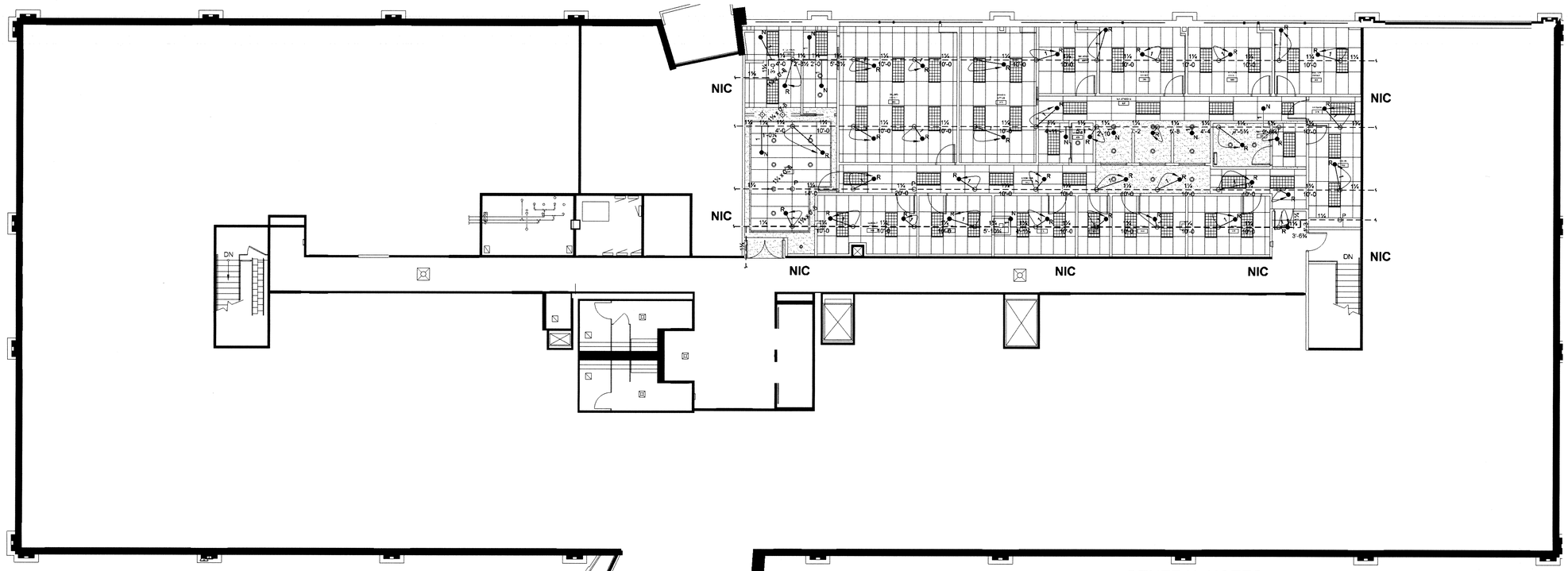
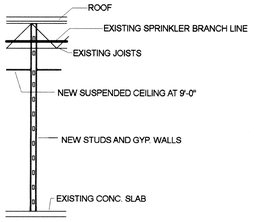
RSN: *943290*
Permit #: *2014-893047-LT*



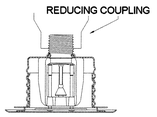
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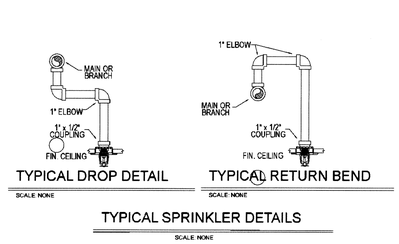
THIRD FLOOR FIRE SPRINKLER DRAWING

NTS



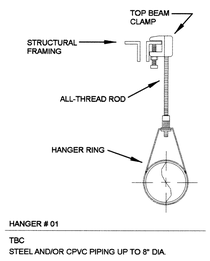
BLDG SECTION





TYPICAL SPRINKLER DETAILS

SCALE: NONE

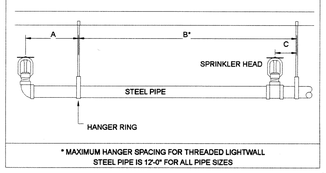


HANGER # 01

TBC
STEEL AND/OR CPVC PIPING UP TO 8" DIA.

HANGER LOCATION DETAIL

PIPE SIZE	A	B*	C
1"	3'-0" MAX.	12'-0" MAX.	3" MIN.
1-1/4"	4'-0" MAX.	12'-0" MAX.	3" MIN.
1-1/2"-8"	5'-0" MAX.	15'-0" MAX.	3" MIN.



* MAXIMUM HANGER SPACING FOR THREADED LIGHTWALL STEEL PIPE IS 12'-0" FOR ALL PIPE SIZES

CITY OF AURORA STANDARD FIRE SPRINKLER NOTES

- OWNER IS RESPONSIBLE FOR PROVIDING HEAT, ABOVE 40 DEGREES Fahrenheit, ADEQUATE ENOUGH TO PREVENT FREEZING OF THE SPRINKLER PIPING.
- 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.
- THE CONTRACTOR (OR DESIGNEE) MUST PROVIDE ALL NESSESSARY TESTING EQUIPEMENT AND PERFORM ALL TESTING REQUIRED BY THE LIFE SAFETY INSPECTOR.
- ALL NEW OR EXISTING FIRE ALARM SYSTEMS MUST BE INTERCONNECTED WITH THE FLOW SWITCH OF THE FIRE SPRINKLER SYSTEMS OUTSIDE HORN AND STROBE.
- INSTALLATION OF INTERIOR ALARMS ACTIVATED BY THE FIRE SPRINKLER WATER FLOW WILL BE REQUIRED PER 2009 IFC, 903.4.2. APPROVED AUDIBLE DEVICES SHALL BE CONNECTED TO EVERY AUTOMATIC FIRE SPRINKLER SYSTEM.
- 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 WITH 2007 NFPA 13, SECTION 8.15.1.
- ALL WATER SUPPLY VALVES AND WATER FLOW SWITCHES SHALL BE ELECTRICALLY SUPERVISED, IFC 2007, 903.4.
- ELECTRICAL EXTERIOR HORN AND STROBE SHALL BE LISTED FOR OUTDOOR USE, IFC 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.
- ALL CONTROL VALVE(S) WITHIN THE RISER ROOM MUST BE ACCESSIBLE, 2007 NFPA SECTION 8.16.1.1.7.
- PRESSURE GAUGES ARE REQUIRED ON THE SYSTEM SIDE OF THE MAIN VALVE AND ON THE SUPPLY SIDE OF THE BACKFLOW PREVENTOR.
- BOTH NEW AND EXISTING FIRE SPRINKLER SYSTEMS MUST EQUIPPED WITH APPROVED KNOX CAPS.
- THE FIRE DEPARTMENT CONNECTION(S) MUST BE LOCATED IN THE AREA SHOWN ON THE APPROVED SITE PLAN.
- 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, 2007 NFPA 13, SECTION A.8.17.2.
- ALL FIRE LINES AND COMMERCIAL WATER SERVICE LINES WILL REQUIRE REDUCED PRESSURE BACK FLOW PREVENTER OR DOUBLE CHECK VALVES AS REQUIRED BY THE CITY OF AURORA UTILITY DEPARTMENT. CONTACT THE BUILDING DIVISION AT 303-739-7420 TO SCHEDULE FLOW TEST FOR PRIVATE FIRE LINES PRIOR TO THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY.
- ALL FIRE SERVICE LINES SHALL BE INSTALLED, IN THEIR ENTIRETY, BY A STATE LICENSED CONTRACTOR. LICENSING CAN BE OBTAINED FROM THE COLORADO DIVISION OF FIRE SAFETY, LOCATED AT 690 KIPLING STREET, LAKEWOOD, CO 80215 (303-239-4600). IN ADDITION, APPROVED CIVIL PLANS FROM THE CITY OF AURORA WATER DEPARTMENT ARE REQUIRED FOR ALL FIRE SERVICE LINE CONNECTIONS. THE CONTRACTOR MUST PRESENT LICENSE AND APPROVED CIVIL PLANS TO THE PUBLIC IMPROVEMENTS DIVISION OF THE PUBLIC WORKS DEPARTMENT BEFORE PERMITS ARE ISSUED. ONCE THE PERMIT HAS BEEN ISSUED CONTACT THE CITY OF AURORA BUILDING CODES DIVISION AT 303-739-7420 TO SCHEDULE A FLUSH INSPECTION WITH A LIFE SAFETY INSPECTOR. FIRE SERVICE LINES SHALL BE RESTRAINED FOR THEIR ENTIRE LENGTH. REFER TO THE CITY OF AURORA PUBLIC UTILITY IMPROVEMENTS RULES AND REGULATIONS REGARDING STANDARDS AND SPECIFICATIONS, SECTION 15.00.

City of Aurora Building Division
Project: *Cardiothoracic Surgery-Sprklr*
Address: *1444 S POTOMAC ST Unit 360*
Occupancy Group: *IBC B / 3824 SF*
Construction Type: *IBC II-B, SPK*
RSN: *943290*
Permit: *2014-893047-LT*

City of Aurora Building Division
Reviewed for Code Compliance
Approved as Noted: *N Wiegert*
Date: *Nov 19, 2014*
2009 INTERNATIONAL CODES & 2011 NEC
07-575

REMODEL LEGEND

- - - - -	EXISTING SPRINKLER PIPE	
———	NEW SPRINKLER PIPE	
○	EXISTING OUTLET	40
○P	PLUG	3
⊕N	NEW SPRINKLER	9
⊕R	RELOCATED SPRINKLER	37
NIC	NOT IN CONTRACT	

GENERAL NOTES:

01. SEE THE FIRE PROTECTION EQUIPMENT DATA FOR ALL APPLICABLE MATERIALS AND EQUIPMENT INSTALLED UNDER THIS CONTRACT.

02. THIS SET OF FIRE PROTECTION PLANS HAVE BEEN DESIGNED BY ARAPAHOE FIRE PROTECTION IN THEIR ENTIRETY, AND HAVE BEEN SEALED BY A PROFESSIONAL ENGINEER OR MINIMUM NICET LEVEL III ENGINEER AS REQUIRED BY THE STATE OF COLORADO.

03. THESE FIRE PROTECTION PLANS HAVE BEEN DESIGNED PER NFPA 13, 2007, PROJECT SPECIFICATIONS, AND APPLICABLE STATE CODES AND REGULATIONS.

04. ALL MATERIALS AND DEVICES INSTALLED UNDER THIS CONTRACT SHALL BE UL LISTED AND/OR FACTORY MUTUAL APPROVED.

05. ALL MATERIALS, DEVICES, AND HANGERS SHALL BE INSTALLED IN ACCORDANCE WITH THEIR LISTINGS AND MINIMUM APPLICABLE NFPA 13, 2007 ENGINEERING STANDARDS.

06. UNDER THIS CONTRACT ARAPAHOE FIRE PROTECTION SHALL PERFORM ITS WORK INSIDE THE NEW TENANT SPACE. WE WILL DESIGN AND RELOCATE SPRINKLER HEAD LOCATIONS FOR A NEW WET SPRINKLER SYSTEM IN THE NEW TENANT SPACE.

07. VALVES CONTROLLING WATER SUPPLY TO 20 OR MORE SPRINKLERS SHALL BE ELECTRICALLY SUPERVISED AND SHALL BE MONITORED BY AN APPROVED MONITORING AGENCY. ANY AND ALL ELECTRICAL AND/OR ALARM WIRING, CONNECTIONS AND TERMINATIONS, OR HORN AND STROBE(S) SHALL BE BY OTHERS. FIRE ALARM SYSTEMS (BY OTHERS) SHALL BE INTERCONNECTED WITH FIRE SPRINKLER SYSTEMS FLOW SWITCH AND HORN AND STROBE(S).

08. IT IS THE RESPONSIBILITY OF THE OWNER OR OTHERS TO PROVIDE, INSTALL AND MAINTAIN AN APPROVED MONITORING SYSTEM OF ALL FIRE PROTECTION SYSTEM COMPONENTS ELECTRICAL OR OTHERWISE INSTALLED UNDER THIS CONTRACT.

09. IT SHALL BE THE SOLE RESPONSIBILITY OF THE OWNER TO PROVIDE ADEQUATE HEAT THROUGHOUT THE FACILITY WHERE WET PIPE SPRINKLER SYSTEMS ARE PRESENT TO PREVENT FREEZING OF SPRINKLER SYSTEM COMPONENTS (MIN 40° F).

10. THE OWNER SHALL MAINTAIN A CLEAR SPACE OF 18" BETWEEN THE TOP OF STORAGE AND STANDARD SPRAY SPRINKLERS.

11. ALL SPRINKLER PIPING PENETRATIONS THROUGH FIRE RATED ASSEMBLIES SHALL BE SEALED WITH AN APPROVED MATERIAL EQUAL TO THE RATING OF SUCH ASSEMBLY PENETRATED.

12. ALL NEW SPRINKLER PIPING UNDER THIS CONTRACT SHALL BE HYDROSTATICALLY TESTED IN ACCORDANCE WITH ALL APPLICABLE NFPA ENGINEERING STANDARDS AND STATE AND LOCAL CODES.

13. UPON SUCCESSFUL INSTALLATION AND COMPLETION:
-A SPARE SPRINKLER HEAD BOX WITH SPRINKLERS AND WRENCHES AS NOTED WILL BE INSTALLED PER MINIMUM NFPA 13, 2007 REQUIREMENTS.
-HYDRAULIC PLACARDS, CARE AND MAINTENANCE CARDS, AND 24 HOUR EMERGENCY PHONE NUMBER SHALL BE POSTED.
-OPERATIONS AND MAINTENANCE MANUALS SHALL BE PROVIDED.
-CONTRACTORS MATERIALS AND TEST CERTIFICATES SHALL BE PROVIDED.
-ALL SYSTEM CONTROL VALVES SHALL BE ACCESSIBLE, LEFT OPEN, AND IN SERVICE.
-ALL SYSTEM DEVICES SHALL BE IDENTIFIED PER MINIMUM NFPA 13 REQUIREMENTS.

14. ADEQUATE DRAINAGE OF FIRE PROTECTION PIPING SHALL BE PROVIDED PER MINIMUM NFPA 13 REQUIREMENTS.

15. SEISMIC BRACING IS NOT PART OF THIS CONTRACT.

16. CHLORINATION OF FIRE PROTECTION PIPING IS NOT PART OF THIS CONTRACT.

17. PAINTING OF FIRE PROTECTION PIPING IS NOT PART OF THIS CONTRACT.

18. FIRE EXTINGUISHERS AND CABINETS ARE NOT PART OF THIS CONTRACT.

19. FIRE PROTECTION IDENTIFICATION, IS NOT PART OF THIS CONTRACT.

20. ALIGNMENT OF SPRINKLER HEADS WITH OTHER SPRINKLERS OR CEILING FIXTURES/DEVICES IS NOT PART OF THIS CONTRACT.

21. PROTECTION OF ELECTRICAL DEVICES, SUCH AS CIRCUIT BREAKER PANELS FROM WATER DISCHARGE, SHALL BE BY OTHERS.

22. ARAPAHOE FIRE PROTECTION, INC. SHALL NOT BE HELD RESPONSIBLE SHOULD THE NOTED WATER MODEL RESULTS NOT BE SUPPLIED AT THE POINT OF CONNECTION NOW, OR IN THE FUTURE, DUE TO THE POSSIBILITY OF DETERIORATING WATER SUPPLIES. SEE HYDRAULIC SOURCE NODE LOCATION.

23. ALL KNOX EQUIPMENT IS NOT PART OF THIS CONTRACT AND SHALL BE PROVIDED AND INSTALLED BY OTHERS.

24. ALL REQUIRED SIGNAGE NOT PER MINIMUM NFPA 13 REQUIREMENTS SHALL BE PROVIDED AND INSTALLED BY OTHERS.

25. PROVISIONS FOR FLUSHING FIRE SPRINKLER PIPING INSTALLED UNDER THIS CONTRACT WILL BE MADE BY ARAPAHOE FIRE PROTECTION, INC. ARAPAHOE FIRE PROTECTION WILL PERFORM ALL TESTING AND PROVIDE ALL REQUIRED TESTING EQUIPMENT REQUIRED BY THE LIFE SAFETY INSPECTOR.

26. ALL UNDERGROUND PIPING SHALL BE TESTED AND FLUSHED BY THE INSTALLING CONTRACTOR. UNDERGROUND TESTING CERTIFICATIONS SHALL BE PROVIDED TO ARAPAHOE FIRE PROTECTION, INC. PRIOR TO ANY ABOVEGROUND PIPING BEING CONNECTED TO THE UNDERGROUND FIRE LINE LEAD IN FLANGE.

27. PIPE AND FITTING NOTES:
-ALL PIPING SHALL BE IN ACCORDANCE WITH NFPA STANDARDS.
-ALL THREADABLE PIPING SHALL BE EDDYTHREAD 40 BLACK STEEL PIPING PER ASTM A135/A795 WITH COMPATIBLE DUCTILE IRON FITTINGS, UNLESS NOTED OTHERWISE.
-ALL GROOVABLE PIPING SHALL BE EDDYFLOW BLACK STEEL PIPING PER ASTM A135/A795 WITH WELDED OUTLET FITTINGS, AND ROLL GROOVED JOINTS, COMPATIBLE WITH FITTINGS USED.
-ALL SCREWED FITTINGS SHALL MEET ANSI B.16.4 REQUIREMENTS.
-ALL FLANGED FITTINGS SHALL MEET ANSI B.16.1 REQUIREMENTS.
-ALL GROOVED FITTINGS SHALL MEET ASTM A536 REQUIREMENTS.
-ALL METHODS OF JOINING PIPE SHALL BE IN ACCORDANCE WITH NFPA 13 SECTIONS 2-5.

Prepared Under Supervision Of:
Ronald Lumsden
NICET Level IV
Registration # 118272
OCT 16 2014
Signature

SPRINKLER SCHEDULE & LEGEND

Symbol	Sin/Model	Quantity	K-Factor	Type	Finish	Temperature	Note
●	VK462	46	5.6	pendent	Brass	155° F	
		Total = 46					

PROJECT CONTACTS

OWNER

AUTHORITY HAVING JURISDICTION #1
AURORA FIRE DEPARTMENT

AUTHORITY HAVING JURISDICTION #2

GENERAL CONTRACTOR
MEP ENGINEER
15500 W. 6th Ave. #330
Golden, CO 80401

REVISIONS

DESCRIPTION	BY
DATE	
10/16/14 RELEASED FOR SUBMITTAL	JS

Arapahoe FIRE PROTECTION, INC.
15351 E. 1st Ave.
Aurora, Colorado 80010
Fax:(303)366-4966
Colorado State Registration #034
Voice:(303)366-4905
Email: office@arapahoefire.com

CARDIOTHORACIC SURGERY ASSOCIATES
1444 S. POTOMAC ST., SUITE 360
AURORA, CO 80012

TENANT IMPROVEMENT
FIRE SPRINKLER

CONTRACT NO	4999
DESIGNED BY	JON SULLIVAN
SUBMIT REVIEW BY	RON LUMSDEN
FAB. REVIEW BY	RON LUMSDEN
SCALE	1/8" = 1'-0"
DATE	10/16/14
REVISED	
PLOTTED	10/16/14

FP1 of 1

RSN: ***943290***
Permit #: ***2014-893047-LT***

NFPA 13 Sprinkler System Acceptance Inspection

2009 IFC and 2007 NFPA 13

Date of Inspection: _____ Permit Number: 2014-893047-LT

Business/Building Name: Cardiothoracic Surgery Address of Project: 1444 S POTOMAC ST Unit 360

Contractor: ARAPAHOE FIRE PROTECTION INC Contractor's Phone: (303) 366-4905

Reference numbers following worksheet statements represent an NFPA code section unless otherwise specified.

	Pass	Fail	NA	
1.	____	____	____	Approved drawing and above-ground piping certification documents are on site.
2.	____	____	____	Underground supply testing and flushing is witnessed and underground piping certification is provided. Flushing requirements shall be 880 GPM for 6 in., 1,560 GPM for 8 in., 2,440 GPM for 10 in., 3,520 for 12 in., have them pitot and calculate that flow and confirm the velocity is at least 10 ft/sec.
3.	____	____	____	Hydrostatic test: wet system, 200 PSI for 2 hours and it should include the FDC piping.
4.	____	____	____	Hydrostatic test: dry and double interlock system: 200 PSI for 2 hours and a 40 PSI air leak test for 24 hours with less than 1.5 PSI loss, 24.2.2.
5.	____	____	____	Back flow prevention device is installed in accordance with the approved set of plans and forward flow tested, 24.2.5.
6.	____	____	____	Systems subject to pressures greater than 150 PSI shall be hydrostatically tested at 50 PSI above system working pressure, 24.2.1.2.
7.	____	____	____	Operational test of the dry-pipe valve is performed and the quick opening device (500+ gallon systems) is tested, 750+ gallon system must trip within 60 seconds.
8.	____	____	____	Pressure reducing valves are tested at maximum and normal inlet pressures or as specified by the manufacturer, the supply pressure is recorded on the certificate, a relief valve is on the discharge side and gauges on each side of the valve, 24.2.4.
Riser				
9.	____	____	____	The main drain is routed to the exterior with a turned down elbow or an inside drain capable of handling the water flow. A flow test is performed. The main drain pipe is ¾ in. or greater for a riser up to 2 in., 1¼ in. or greater for a riser 2½ in. to 3½ in., 2 in. for a riser 4 in. or greater, 8.16.2.4.2, 24.2.3.4.
10.	____	____	____	Water control valves and flow switches are electronically supervised and tested, IFC 903.4.
11.	____	____	____	Paddle-type water flow is not allowed for dry, preaction or deluge systems.
12.	____	____	____	24-hour monitoring service agency or remote supervising station or proprietary supervising station received signals, 903.4.1.
13.	____	____	____	Water flow alarm is tested and initiates an alarm within 5 minutes, located in accordance with the approved set of plans, and it is properly signed, 24.2.3.1.
14.	____	____	____	High-rise: each floor system shall have water flow device with a test connection and be connected to the fire alarm system.
15.	____	____	____	Permanent system identification signs for each control valve and what portion of the building each valve serves is provided, 6.7.4.
16.	____	____	____	A permanent hydraulic nameplate is attached to the riser, 24.5.1. A general information sign that indicates the design capabilities and limitations of the automatic sprinkler system shall be provided at each system riser, antifreeze loop and auxiliary system control valve. The sign shall contain the required information specified in Sections 24.6.2, 24.6.1
17.	____	____	____	Riser is supported by hanger or attachment, for multistory at the lowest level, each alternate level, above and below offsets, and at the top, 9.2.5.4.
18.	____	____	____	Gauges are above and below riser check valve, 7.1.1.2.
FDC				
19.	____	____	____	FDC capped and permanently signed with system type, the required pressure to support the system if the pressure demand is equal to or greater than 150 PSI, and area or building served, 8.17.2.4.7.
20.	____	____	____	FDC has check valve and drip valve, 8.17.2.5.
21.	____	____	____	FDC for wet single riser system connects to the system side, 8.17.2.4.
22.	____	____	____	FDC for wet multiriser system connects after the main system shut off valve, 8.17.2.4.

23. ____ |_____| ____ FDC for dry system connects between the indicating and dry-pipe valves.
24. ____ |_____| ____ FDC pipe complies with the size indicated on the plans, 18 in. to 48 in. above grade, and properly supported, 8.17.2, A.8.17.2. Ensure that the minimum clearance to the sides, front, and height is provided in accordance with IFC 912.3.2.

Sprinklers

25. ____ |_____| ____ Spare sprinklers – Provide at least 6 spare sprinklers for systems designed with 300 or less sprinklers; 12 spare sprinklers for systems designed using 300 to 1,000 sprinklers, and 24 spare sprinklers for systems designed using more than 1,000 sprinklers, 6.2.9.
26. ____ |_____| ____ Replacement wrench(s) are provided, 6.2.9.
27. ____ |_____| ____ Sprinklers shall be a minimum of 4 in. from the wall and be properly spaced, 8.6.3.3.
28. ____ |_____| ____ Sprinkler heads have a guard if subject to damage.
29. ____ |_____| ____ Sprinkler heads are not painted or covered.
30. ____ |_____| ____ ESFR upright deflectors are a minimum 7 in. above the top of the pipe, 8.12.5.3.2.1.
31. ____ |_____| ____ EFSR sprinklers are at least 1 ft. horizontally from the bottom edge of bar joist or open truss and at least 3 ft. above the top of the storage level, 8.12.6.
32. ____ |_____| ____ Proper type and temperature sprinklers are used and match plans.
33. ____ |_____| ____ Escutcheon plates are installed.
34. ____ |_____| ____ Sprinklers are not obstructed, 8.5.5-8.12.5.

Pipe: Hangers, Seismic, and Penetrations

35. ____ |_____| ____ Piping layout and size are the same as on the approved set of plans.
36. ____ |_____| ____ Pipe penetrations have proper clearance 2 in. for pipe 1 in. to 3½ in., 4 in. for pipe 4 in. and larger, 9.3.
37. ____ |_____| ____ When flexible couplings are used in risers, above and below floor penetrations of multistory structures, near penetrations of concrete or masonry walls, and near expansion joints, their location is in accordance with Sections 9.3.2.1– 9.3.2.4
38. ____ |_____| ____ Minimum clearance around pipes penetrating construction elements listed in 9.3.4.1 is in accordance with 9.3.4.2 unless the requirements of 9.3.4.3 – 9.3.4.7 are met.
39. ____ |_____| ____ A seismic separation assembly is provided at building seismic joints, 9.3.3.
40. ____ |_____| ____ Lateral sway bracing is provided and spaced in accordance with the approved set of plans for all mains, cross mains, and branch lines 2½ in. and larger.
41. ____ |_____| ____ Longitudinal sway bracing is provided and spaced in accordance with the approved set of plans for feed mains and cross mains, 9.3.5.4.
42. ____ |_____| ____ A 4-way sway brace is provided at least every 25 ft. and at the top of each riser, 9.3.5.5.
43. ____ |_____| ____ Longitudinal and lateral bracing is provided for each run of pipe between the change of pipe direction unless the pipe run is less than 12 ft., 9.3.5.11.3.
44. ____ |_____| ____ Riser nipples greater than 4 ft. are restrained from lateral movement, 9.3.6.6.
45. ____ |_____| ____ Seismic bracing wire, wrap-around u-hooks, or lateral sway bracing shall not exceed 30 ft. spacing and is used to restrict sprinkler movement that could impact the building, equipment or finishing materials, 9.3.6.
46. ____ |_____| ____ Restraining straps are on all C-clamps and the strap is bolted through if there is not a lip on the beam, 9.3.7.1.
47. ____ |_____| ____ Branch lines have one hanger per section of pipe, 9.2.3.2.
48. ____ |_____| ____ Mains and cross mains have one hanger between each branch line and at the end of the main, 9.2.4.
49. ____ |_____| ____ The maximum distance between the end sprinkler and hanger is 36 in. for 1 in. pipe, 48 in. for 1¼ in., and 60 in. for 1½ in. pipe and greater, 9.2.3.4.
50. ____ |_____| ____ Risers in multistory buildings have supports at the lowest level, at each alternate level, below offsets, and at the top, 9.2.5.4.
51. ____ |_____| ____ Hangers are not within 3 in. of upright sprinklers, 9.2.3.3.

Dry and Preaction Systems

52. ____ |_____| ____ Dry system compressor, fill line, pressure gauges, check valve and shutoff valve and relief valve are installed in accordance with the approved set of plans and 7.2.6.2. The system must pressurize the sprinkler pipe within 30 minutes, 7.2.6.2.2.
53. ____ |_____| ____ Preaction and deluge systems operate upon activation of the detection system.
54. ____ |_____| ____ Riser room is heated, 7.2.5.
55. ____ |_____| ____ Air pressure is set according to the manufacturer's instructions or at least 20 PSI above the trip pressure, 16.2.2.

56. ____|____ | ____ Dry and preaction systems are supervised and water reaches furthest point within the time period provided on the plans or water delivery calculations in accordance with Table 7.2.3.6.1.

57. ____|____ | ____ Preaction systems exceeding 20 sprinklers automatically supervise (constant monitoring) pipe pressure (maintain at least 7 PSI) and detection devices, 7.3.2.4.

Additional Comments:

RSN: ~~-~~ ***943290***

Permit #: ***2014-893047-LT***

Inspection Date: _____ Approved or Disapproved FD Inspector: _____

Inspection Date: _____ Approved or Disapproved FD Inspector: _____

Inspection Date: _____ Approved or Disapproved FD Inspector: _____

NFPA 13 Sprinkler Installation Certification

Permit #: 2014-893047-LT Date: _____

	Property Protected	System Installer	System Supplier
Business Name:	Cardiothoracic Surgery	ARAPAHOE FIRE	
Address:	1444 S POTOMAC ST		
	Unit 360		
Representative:			
Telephone:			

Location of Plans: _____

Location of Owner's Manual: _____

1. Certification of System Installation: Complete this section after system is installed, but prior to conducting operational acceptance tests.

This system installation was inspected and found to comply with the installation requirements of:

_____ NFPA 13
_____ IFC and IBC
_____ Manufacturer's Instructions
_____ Other (specify: FM, UL, etc.) _____

Print Name: _____

Signed: _____ Date: _____

Organization: _____

2. Certification of System Operation: All operational features and functions of this system were tested and found to be operating properly in accordance with the requirements of:

_____ NFPA 13
_____ IFC and IBC
_____ Manufacturer's Instructions
_____ Other (specify) _____

Print Name: _____

Signed: _____ Date: _____

Organization: _____

RSN: *943290*
Permit #: *2014-893047-LT*

MATERIAL SUBMITTAL

Arapahoe FIRE PROTECTION INC
11901 East 14th Avenue
Aurora, Colorado 80010
Phone: (303) 366-4905
Fax:(303) 366-4966

FOR

CARDIOTHORACIC SURGERY ASSOCIATES
1444 S. POTOMAC ST., SUITE 360
AURORA, CO

JOB 4355

JON SULLIVAN

RSN: ***943290***
Permit #: ***2014-893047-LT***

SPRINKLERS

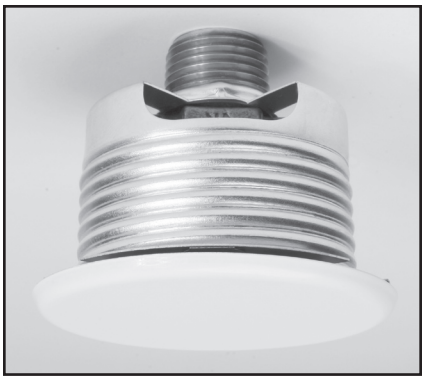
VIKING®

TECHNICAL DATA

MIRAGE® STANDARD AND QR CONCEALED PENDENT SPRINKLER VK462 AND HP SPRINKLER VK463 (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

1. DESCRIPTION



Viking Mirage® Standard and Quick Response Concealed Pendent Sprinkler VK462 and HP Sprinkler VK463 are thermosensitive glass-bulb spray sprinklers designed for installation on concealed pipe systems where the appearance of a smooth ceiling is desired.

The sprinkler is pre-assembled with a threaded adapter for installation with a low-profile cover assembly that provides up to ½" (12.7 mm) of vertical adjustment. The two-piece design allows installation and testing of the sprinkler prior to installation of the cover plate. The "push-on", "thread-off" design of the concealed cover plate assembly allows easy installation of the cover plate after the system has been tested and the ceiling finish has been applied. The cover assembly can be removed and reinstalled, allowing temporary removal of ceiling panels without taking the sprinkler system out of service or removing the sprinkler.

2. LISTINGS AND APPROVALS

cULus Listed: Category VNIV

FM Approval: Class 2015

NYC Approved: MEA 89-92-E, Volume 32

VdS Approved: Certificate G4080021

LPCB Approved: Ref. No. 096e/12

CE Certified: Standard EN 12259-1, EC-certificate of conformity 0832-CPD-2032

Refer to Approval Chart 1 on page 54c and Design Criteria on page 54d for cULus Listing requirements, and refer to Approval Chart 2 and Design Criteria on page 54e for FM Approval requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Available since 2006.

Minimum Operating Pressure: 7 psi (0.5 bar)*

Maximum Working Pressure: Sprinkler VK463 is rated for use with water working pressures ranging from the minimum 7 psi (0.5 bar) up to 250 psi (17.2 bar) for high-pressure systems. High-pressure (HP) sprinklers can be identified by locating "250" stamped on the deflector. Sprinkler VK462 is rated to a maximum 175 psi (12 bar) wwp.

Factory tested hydrostatically to 500 psi (34.5 bar)

Thread size: 1/2" (15 mm) NPT

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

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

Patents Pending

*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).

†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.

Material Standards:

Sprinkler Body: Brass UNS-C84400

Deflector: Copper UNS-C19500 for Sprinkler VK462
Phosphor Bronze UNS-C51000 for Sprinkler VK463

Deflector Pins: Stainless Steel Alloy

Bulb: Glass, nominal 3 mm diameter

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

Button: Brass UNS-C36000

Screws: 18-8 Stainless Steel

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

Yoke: Phosphor Bronze UNS-C51000

Cover Adapter: Cold Rolled Steel UNS-G10080, Finish: Clear Chromate over Zinc Plating

Viking Technical Data may be found on The Viking Corporation's Web site at http://www.vikinggroupinc.com. The Web site may include a more recent edition of this Technical Data Page.

VIKING®

TECHNICAL DATA

MIRAGE® STANDARD AND QR CONCEALED PENDENT SPRINKLER VK462 AND HP SPRINKLER VK463 (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

Cover Assembly Materials:
Cover: Copper UNS-C11000
Base: Brass UNS-C26000 or UNS-C26800
Springs: Nickel Alloy
Solder: Eutectic

Ordering Information: (Also refer to the current Viking price list.)
Viking Mirage® Standard and Quick Response Concealed Pendent Sprinklers and Cover Plate Assemblies must be ordered separately:
Sprinkler: Base Part No. 13503A or HP Base Part No. 13667A
Specify sprinkler temperature rating by adding the appropriate suffix for the temperature rating to the base part number:
Temperature Suffix: 155 °F (68 °C) = B, 175 °F (79 °C) = D, 200 °F (93 °C) = E
For example, sprinkler VK463 with a 155 °F (68 °C) temperature rating = 13667AB.
Cover Plate Assembly: Base Part No. 13504 (2-3/4" diameter), Base Part No. 13642 (3-5/16" diameter), or Base Part No. 15394 (square cover plate, 3-5/16" diameter)
Specify finish and temperature rating of the cover plate assembly by adding the appropriate suffixes for the finish and the cover temperature rating to the base part number:
Finish Suffix: Polished Chrome = F, Brushed Chrome = F-/B, Bright Brass = B, Antique Brass = B-/A, Brushed Brass = B-/B, Brushed Copper = E-/B, Painted White = M-/W, Painted Ivory = M-/I, Painted Black = M-/B
Temperature Suffix: 135 °F (57 °C) UL (139 °F (59 °C) FM and LPCB) = A, 165 °F (74 °C) = C
For example, cover 13504 with a Polished Chrome finish and a 165 °F (74 °C) temperature rating = 13504FC.

Note: Square cover plate 15394 cULus Listing is for the 135 °F (57 °C) temperature rated cover plate only. Refer to the Approval Chart.

Available Finishes And Temperature Ratings: Refer to Table 1.

Accessories: (Also refer to the "Sprinkler Accessories" section of the Viking data book.)
Sprinkler Wrenches:**
A. Heavy Duty Wrench Part No. 14047W/B (available since 2006), or
B. Head Cabinet Wrench Part No. 14031*** (available since 2006)
C. Optional Concealed Cover Plate Installer Tool Part No. 14412 for cover 13504, or Part No. 14867 for the large diameter cover (available since 2007)

**Requires a ½" ratchet (not available from Viking). ***Optional for removal of the protective cap. Ideal for sprinkler cabinets.

Sprinkler Cabinet: Part No. 01731A (available since 1971)

4. INSTALLATION
Refer to appropriate NFPA Installation Standards.

5. OPERATION
During fire conditions, when the temperature around the sprinkler approaches its operating temperature, the cover plate detaches. Continued heating of the exposed sprinkler causes the heat-sensitive liquid in the glass bulb to expand and the bulb to shatter, releasing the yoke, 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
Viking Sprinklers VK462 and VK463 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.

MIRAGE® STANDARD AND QR CONCEALED PENDENT SPRINKLER VK462 AND HP SPRINKLER VK463 (K5.6)

TECHNICAL DATA

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

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating[1]	Maximum Ambient Ceiling Temperature[2]	Temperature Rating of Cover Assembly (Required)	Bulb Color
Ordinary	155 °F (68° C)	100 °F (38 °C)	135 °F (57 °C) cULus 139 °F (59 °C) FM and LPCB	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	165 °F (74 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	165 °F (74 °C)	Green

Cover Plate Finishes: Polished Chrome, Brushed Chrome, Bright Brass, Antique Brass, Brushed Brass, Brushed Copper, Painted White, Painted Ivory, or Painted Black

Footnotes

[1] The sprinkler temperature rating is stamped on the sprinkler 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.

Approval Chart 1 (UL)

Mirage® Concealed Pendent Sprinklers VK462 and VK463

Sprinkler Temperature Rating
Cover Plate Temperature Rating
AW1 ← Cover Plate Finish KEY

Sprinkler Base Part No.[1]	SIN	NPT Thread Size		Nominal K-Factor		Maximum Water Working Pressure	Listings and Approvals[4] (Refer also to Design Criteria on page 54d.)				
		Inch	mm	U.S.	metric[2]		cULus[5]	NYC	VdS[7]	LPCB	CE
Standard Response Applications											
13503A	VK462	1/2"	15	5.6	80.6	175 psi (12 bar)	--	--	AY1, CZ1	AY1, BZ1	AY1, CZ1[8]
Quick Response Applications											
13503A	VK462	1/2"	15	5.6	80.6	175 psi (12 bar)	AV1, BX1	AV1, BW1[6]	–	–	--
13667A	VK463	1/2"	15	5.6	80.6	250 psi (17.2 bar)[3]	AV1, BX1	AV1, BW1[6]	--	--	--

Sprinkler Temperature Ratings

A - 155 °F (68 °C)
B - 175 °F (79 °C) and 200 °F (93 °C)
C - 200 °F (93 °C)

Cover Plate Assembly Temperature Ratings[9]

V - 135 °F (57 °C) cULus Listed cover 13504[1], 13642[1] (large diameter), or 15394[1] (square cover plate)
W - 165 °F (74 °C) cover 13504[1] or 13642[1] (large diameter)
X - 165 °F (74 °C) cover 13504[1], or 13642[1] (large diameter)
Y - 135 °F (57 °C) cover 13504[1] *LPCB Approved as 139 °F (59 °C)*
Z - 165 °F (74 °C) cover 13504[1]

Cover Plate Assembly Finishes[10]

1 - Polished Chrome, Brushed Chrome, Bright Brass, Antique Brass, Brushed Brass, Brushed Copper, Painted White, Painted Ivory, or Painted Black

Footnotes

[1] Part number shown is the base part number. For complete part number, refer to current Viking price list 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] The Water Working Pressure rating is stamped on the deflector.

[4] This chart shows the listings and approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals.

[5] Listed by Underwriter's Laboratories for use in the U.S. and Canada.

[6] Accepted for use, City of New York Department of Buildings, MEA Number 89-92-E, Vol. 32.

[7] VdS Approved, standards VdS 2344:2005-12, VdS 2100-25:2008-01, and EN 12259-1:1999 + A1:2001 + A2:2004 + A3:2006, Certificate G4080021.

[8] CE Certified, Standard EN 12259-1, EC-certificate of conformity 0832-CPD-2032.

[9] The 135/139 °F cover has an orange label. The 165 °F (74 °C) cover has a white label.

[10] Painted finish consists of Polyester Baked Enamel. Other paint colors are available on request with the same listings as the standard paint colors. Listings and approvals apply for any paint manufacturer. Contact Viking for additional information.

NOTE: Custom colors are indicated on a label inside the cover assembly. Refer to Figure 1.

MIRAGE® STANDARD AND QR CONCEALED PENDENT SPRINKLER VK462 AND HP SPRINKLER VK463 (K5.6)

TECHNICAL DATA

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

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1 on page 54c.)

cULus Listing Requirements:

Mirage® Concealed Pendent Sprinklers VK462 and VK463 are cULus Listed as quick response for installation in accordance with the latest edition of NFPA 13 for standard coverage pendent spray sprinklers as indicated below.

- For hazard occupancies up to and including Ordinary Hazard, Group II.
- Protection areas and maximum spacing shall be in accordance with the tables provided in NFPA 13. Maximum spacing allowed is 15 ft. (4.6 m).
- Minimum spacing allowed is 6 ft. (1.8 m) unless baffles are installed in accordance with NFPA 13.
- Minimum distance from walls is 4 in. (102 mm).
- Maximum distance from 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 obstruction rules contained in NFPA 13 for standard coverage pendent spray sprinklers must be followed.

NOTE: Concealed sprinklers must be installed in neutral or negative pressure plenums only.

VdS Approval Requirements:

a) The sprinkler can be installed in a concrete ceiling (massive ceiling) or in a false ceiling made of light materials.

b) This sprinkler is deflector fixed type and can be only activated by heat. The housing is not tight.

c) Follow installation guidelines of current standards, CEA4001VdS and EN12845. These sprinklers can only be installed in LH and OH occupancies, except in OH4.

NOTES: Due to the design the sprinkler type 'Domed-CCP' shall not be installed in false ceilings in which the false ceiling space is protected by a water extinguishing system.

Due to the design the sprinkler type 'Domed-CCP' shall not be installed in false ceilings in which during a fire the pressure above the false ceiling may be assumed to be higher than the pressure below the false ceiling.

The criterion for the dropping of the cover relevant for this approval is heat.

Steps of installation:

1. Prepare the sprinkler key.
2. Remove the plastic cover.
3. Hold the sprinkler with the wrench and fasten it.
4. Replace the plastic cover and do not remove until the cover is installed.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page SR1-3 or QR1-3 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.



Identification of Custom Paint Color:
All custom color painted cover plates will have an identifying label affixed to the inside of the cover that indicates custom color and will have a representative sample (a paint dot) of the paint on the label.

Figure 1: Identification of Custom Paint Color for Concealed Covers

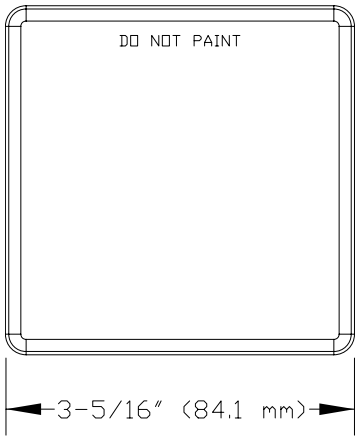


Figure 2: Square Cover Assembly 15394

VIKING®

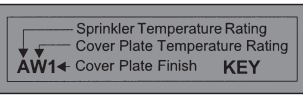
TECHNICAL DATA

MIRAGE® STANDARD AND QR CONCEALED PENDENT SPRINKLER VK462 AND HP SPRINKLER VK463 (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

Approval Chart 2 (FM)

Mirage® Standard Response Concealed Pendent Sprinkler VK462



Sprinkler Base Part No.[1]	SIN	NPT Thread Size		Nominal K-Factor		Maximum Water Working Pressure	FM Approvals[3] (Refer also to Design Criteria below.)
		Inch	mm	U.S.	metric[2]		
13503A	VK462	1/2”	15	5.6	80.6	175 psi (12 bar)	AW1, BX1

Sprinkler Temperature Ratings

A - 155 °F (68 °C)
B - 175 °F (79 °C) and 200 °F (93 °C)

Cover Plate Assembly Temperature Ratings[4]

W - 139 °F (59 °C) cover 13504[1], 13642[1] (large diameter), or 15394[1] (square cover plate)
X - 165 °F (74 °C) cover 13504[1], 13642[1] (large diameter), or 15394[1] (square cover plate)

Cover Plate Assembly Finishes[5]

1 - Polished Chrome, Brushed Chrome, Bright Brass, Antique Brass, Brushed Brass, Brushed Copper, Painted White, Painted Ivory, or Painted Black

Footnotes

[1] Part number shown is the base part number. For complete part number, refer to current Viking price list 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 chart shows the FM Approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals.

[4] The 139 °F (59 °C) cover has an orange label. The 165 °F (74 °C) cover has a white label.

[5] Painted finish consists of Polyester Baked Enamel. Other paint colors are available on request with the same listings as the standard paint colors. Listings and approvals apply for any paint manufacturer. Contact Viking for additional information.

NOTE: Custom colors are indicated on a label inside the cover assembly. Refer to Figure 1.

DESIGN CRITERIA - FM

(Also refer to Approval Chart 2 above.)

FM Approval Requirements:

Viking Concealed Pendent Sprinkler VK462 is FM Approved as a standard response **Non-Storage** concealed pendent 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 page SR1-3 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.

MIRAGE® STANDARD AND QR CONCEALED PENDENT SPRINKLER VK462 AND HP SPRINKLER VK463 (K5.6)

TECHNICAL DATA

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

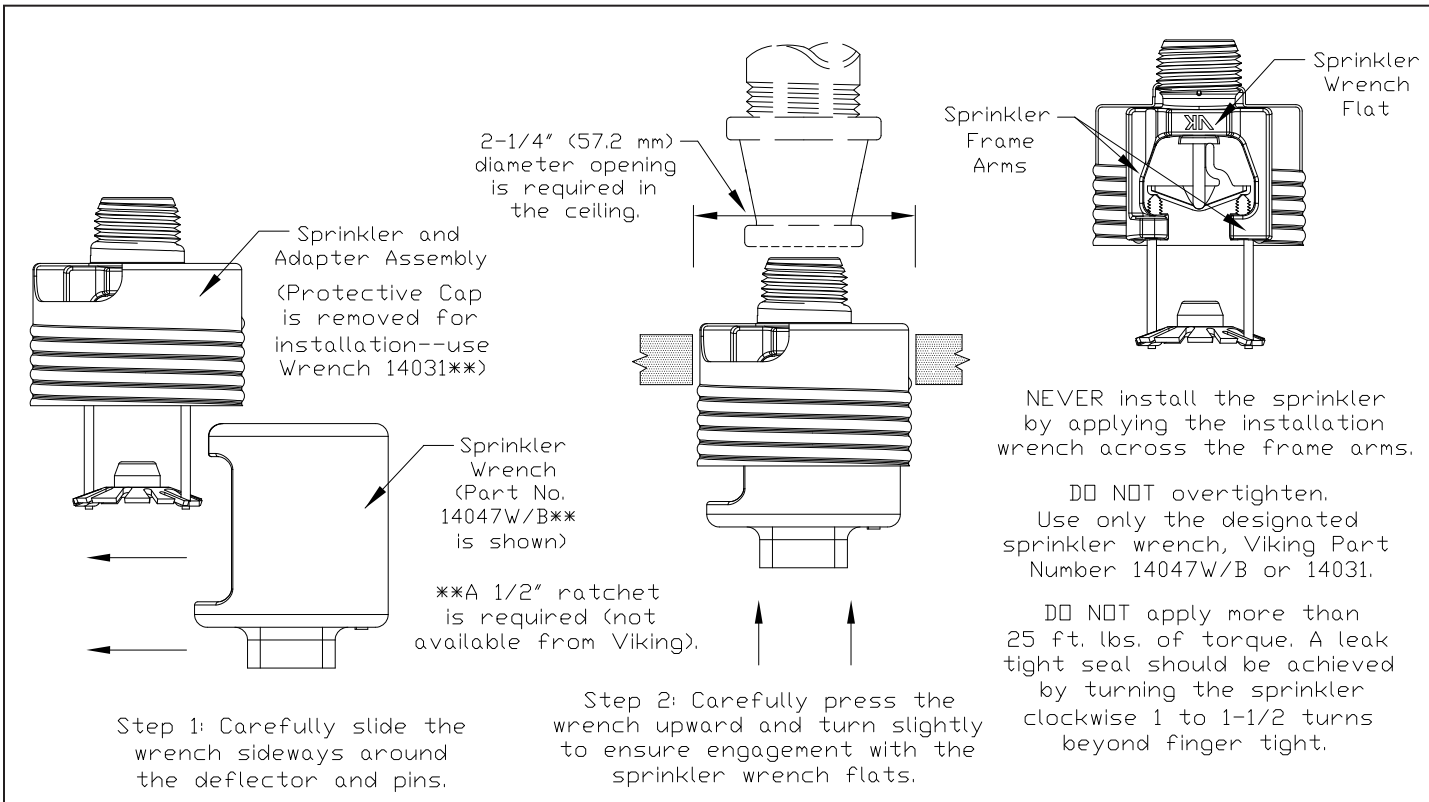


Figure 3: Sprinkler Installation and Correct Use of Wrenches

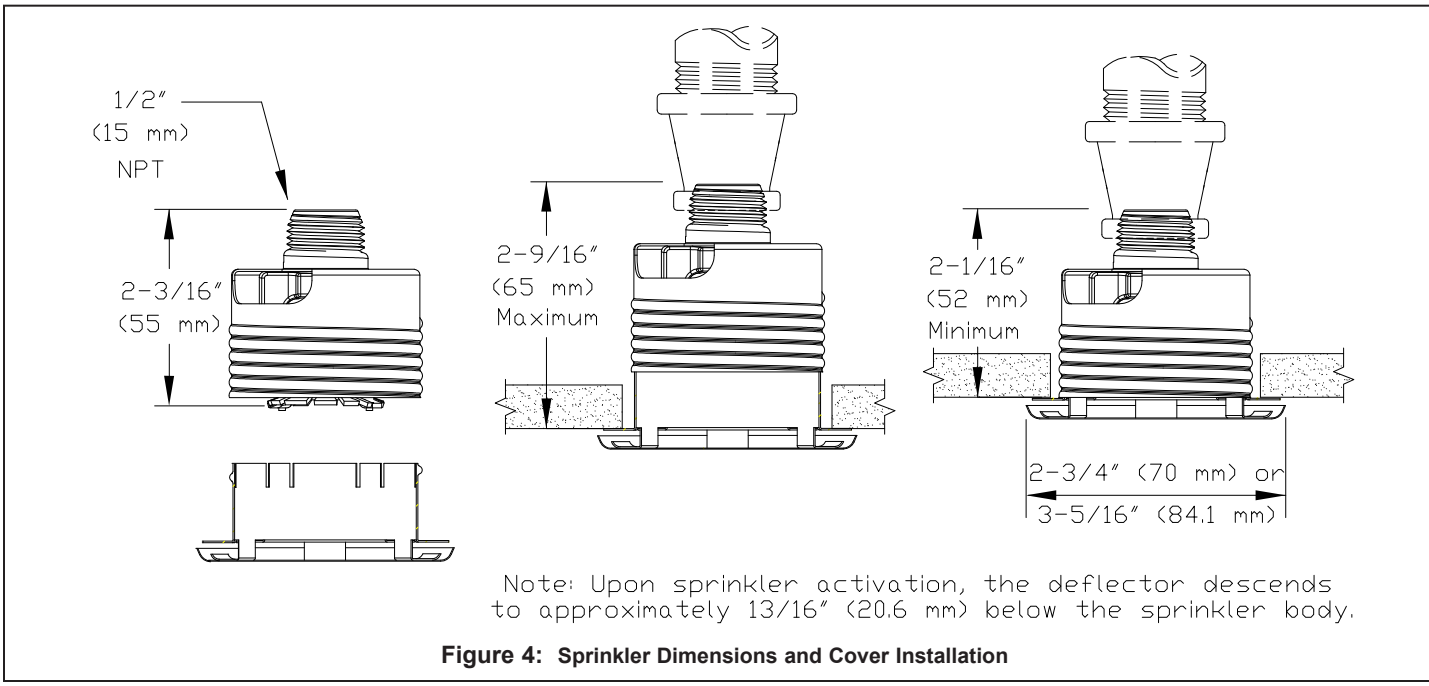


Figure 4: Sprinkler Dimensions and Cover Installation

RSN: ***943290***
Permit #: ***2014-893047-LT***

PIPE

Eddythread 40

RSN: ***943290***
Permit #: ***2014-893047-LT***

A Lightweight Schedule 40 Replacement Pipe That Has a Corrosion Resistance Ratio of 1.0

Bull Moose Tube Company has been making pipe for a long time and is recognized as a producer of quality pipe products. Eddythread 40 is designed with the same thoroughness as our other fine pipe products and now our customers have an option to buy a carefully designed replacement for Schedule 40 that:

- Has a Corrosion Resistance Ratio of 1.0
- Has a Pressure Rating of 300 psi
- Is Lighter Weight Than Schedule 40
- Is Approved by Factory Mutual and Listed by Underwriters Laboratories
- Is Produced in Accordance to ASTM A-135 and A-795
- Can be Used With Standard Schedule 40 Threaded Fittings, Couplings and Valves
- Is Produced From Steel With Excellent Properties of Strength and Threadability
- Can be Used in Wet, Dry, Preaction, and Deluge Type Sprinkler Systems*
- Offers Lower Freight Costs

EDDYTHREAD 40 SPECIFICATIONS

NOMINAL PIPE SIZE (in)	WEIGHT (lbs/ft)	I.D. (in)	BUNDLE SIZE
1	1.461	1.083	70
1 1/4	2.070	1.418	51
1 1/2	2.547	1.654	44
2	3.308	2.123	30

CORROSION RESISTANCE RATIOS

NOMINAL PIPE SIZE (in)	SCHEDULE 40	EDDYTHREAD 40
1	1.00	1.00
1 1/4	1.00	1.00
1 1/2	1.00	1.00
2	1.00	1.00

** Eddythread 40 can be hot dipped galvanized to meet FM's requirement for dry systems*

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

c UL us LISTED

FM APPROVED

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.

RSN: ***943290***
Permit #: ***2014-893047-LT***

PIPE FITTINGS

Anvil® Cast Iron & Malleable Iron Threaded Fittings

RSN: ***943290***
Permit #: ***2014-893047-LT***



Manufactured in Columbia, PA USA, Anvil offers the most complete line of Cast Iron and Malleable Iron Threaded Fittings in the industry. Our versatile range of fittings is designed to provide connection options for different applications and environments.

Cast Iron (Gray Iron) Threaded Fittings are manufactured in accordance with ASME/ANSI B14.4 and are UL/ULC listed and FM approved.

Malleable Iron Fittings are manufactured in accordance with ASME/ANSI B16.3 and Unions ASME/ANSI B16.39 and are available in Class 150, Class 250, and Class 300 UL/ULC listed and FM approved. In both classes, all Elbows and Tees ⅜" and larger are 100% air tested at a minimum of 100 psi (6.9 bar).

Cast Iron Flanged Fittings are manufactured in accordance with ASME B16.1 and are available in both Class 125 and Class 250.

Anvil® Steel Pipe Nipples & Steel Pipe Couplings

Anvil offers a variety of Steel Pipe Nipples and Steel Pipe Couplings for the fire protection industry.

Anvil's Steel Pipe Nipples are manufactured in accordance with ASTM/ANSI A 733 welded and seamless carbon steel pipe nipples. Materials include black and hot-dipped galvanized finishes. Anvil manufactures a wide range of stock pipe nipples in ⅛" diameter through 8" diameter close through 72" inch length in half-inch increments. We also offer standard nipple packs ranging from one each (close to 6") and standard six packs which offer multiple counts of each. Cartons are packed with handles for easy carrying.

Steel Pipe Couplings are manufactured in accordance with ASTM specification A 865. Straight-tapped couplings range in size from ⅛" NPS through 2" NPS, while 2½" NPS and larger are taper tapped.

SPF™ Ductile Iron & Cast Iron Threaded Fittings

SPF Ductile Iron Threaded Fittings are UL/ULC Listed and FM Approved for 500 psi service. These fittings provide a dependable threaded connection and are available in a range of styles and specifications. All SPF Ductile Iron Threaded Fittings dimensions conform to ANSI B16.3 Class 150 requirements, and threads are NPT per ANSI/ASME B1.20.1.

SPF Cast Iron Threaded Fittings are UL/ULC Listed and FM Approved for 300 psi service. These fittings are available in a range of styles and specifications. All SPF Cast Iron Threaded Fittings dimensions conform to ANSI B16.4 requirements, and threads are NPT per ANSI/ASME B1.20.1.



RSN: *943290*
Permit #: *2014-893047-LT*

FIG. MT-30 Threaded Mechanical Branch Tee

AnvilStar™ Fire Products Division of Anvil® International

SPF/ANVIL

Submittal Sheet

Model MT-30 mechanical tee serves the same function as MT-1 & MT-8 but uses a steel electro-plated U-Bolt to save space and for easier installation in tight places. It is ideal for direct connections with sprinkler heads and drop nipples.

UL ULC FM
APPROVED
For Listing / Approval details contact your AnvilStar™ Representative.





⚠ WARNING

For dry pipe systems and freezer applications lubrication of the gasket is required, Gruvlok® Xtreme™ Lubricant is recommended.

MATERIAL SPECIFICATIONS

HOUSING:
Ductile Iron conforming to ASTM A-536, Grade 65-45-12.

U-BOLT & NUTS:
U-bolt is carbon steel SAE Grade 2, Zinc Plated with plated hex nuts carbon steel ASTM A-194, Zinc Plated.

THREADS:
MT-30 NPT per ANSI/ASME B1.20.1

COATINGS:
❑ Zinc Electroplated
❑ Other (Specify): _____ Example: RAL3000 or RAL9000 Series
For other Coating requirements contact an AnvilStar Representative.

GASKETS: Materials
Properties as designated in accordance with ASTM D-2000.
❑ **Grade "E" EPDM** (Green color code)
-40°F to 230°F (Service Temperature Range) (-40°C to 110°C)
Recommended for water service, diluted acids, alkalies solutions, salts, oil-free air and many chemical services not involving hydrocarbons, oils or gases.
NOT FOR USE WITH HYDROCARBONS.
❑ Other_____

Project Information:		Approval Stamp:
Project:		
Date:	**Phone:**	
Architect / Engineer:		
Contractor:		
Address:		
Notes 1:		
Notes 2:		

For the latest UL/ULC Listed and FM Approved pressure ratings, versus pipe schedule, go to **www.anvilstar.com** or contact your local AnvilStar representative

ANVIL INTERNATIONAL, INC.

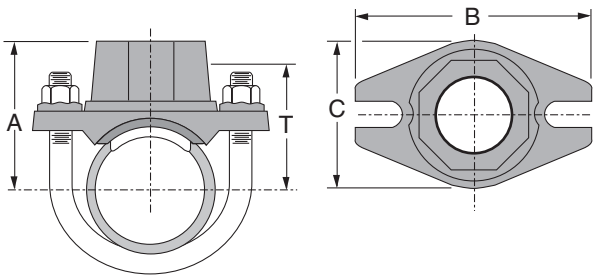
RSN: *943290*
Permit #: *2014-893047-LT*

FIG. MT-30 Threaded Mechanical Branch Tee

AnvilStar™ Fire Products Division of Anvil® International

SPF/ANVIL™

Submittal Sheet



MT-30 MECHANICAL TEES

Nominal Size	O.D.	Hole Diameter		Max. Wk. Pressure	Dimensions				Approx. Wt. Ea.
		Min. Diameter	Max. Diameter		A	B	C	T Take-Out	
In./DN(mm)	*In./mm*	*In./mm*	*In./mm*	*PSI/bar*	*In./mm*	*In./mm*	*In./mm*	*In./mm*	*Lbs./kg*
1¼ x ½	1.660 x 0.840	1 3/16	1 5/16	300	2⅛	3½	2¼	1⅝	0.8
32 x 12	*42.4 x 21.3*	*30*	*33*	*20.7*	*54*	*89*	*57.2*	*42*	*0.4*
1¼ x ¾	1.660 x 1.050	1 3/16	1 5/16	300	2⅛	3½	2¼	1⅝	0.8
32 x 19	*42.4 x 26.7*	*30*	*33*	*20.7*	*54*	*89*	*57.2*	*42*	*0.4*
1¼ x 1	1.660 x 1.315	1 3/16	1 5/16	300	2¼	3½	2¼	1⅝	1.1
32 x 25	*42.4 x 33.7*	*30*	*33*	*20.7*	*58*	*89*	*57.2*	*41*	*0.5*
1½ x ½	1.900 x 0.840	1 3/16	1 5/16	300	2¼	3½	2¼	1¾	0.8
40 x 12	*48.3 x 21.3*	*30*	*33*	*20.7*	*57*	*89*	*57.2*	*48*	*0.4*
1½ x ¾	1.900 x 1.050	1 3/16	1 5/16	300	2¼	3½	2¼	1¾	0.9
40 x 19	*48.3 x 26.7*	*30*	*33*	*20.7*	*57*	*89*	*57.2*	*48*	*0.4*
1½ x 1	1.900 x 1.315	1 3/16	1 5/16	300	2⅜	3½	2¼	1¾	1.1
40 x 25	*48.3 x 33.7*	*30*	*33*	*20.7*	*61*	*89*	*57.2*	*44*	*0.5*
2 x ½	2.375 x 0.840	1 3/16	1 5/16	300	2½	3¾	2¼	2	0.9
50 x 12	*60.3 x 21.3*	*30*	*33*	*20.7*	*64*	*95*	*57.2*	*51*	*0.4*
2 x ¾	2.375 x 1.050	1 3/16	1 5/16	300	2½	3¾	2¼	2	0.9
50 x 19	*60.3 x 26.7*	*30*	*33*	*20.7*	*64*	*95*	*57.2*	*51*	*0.4*
2 x 1	2.375 x 1.315	1 3/16	1 5/16	300	2⅝	3¾	2¼	2	1.1
50 x 25	*60.3 x 33.7*	*30*	*33*	*20.7*	*67*	*95*	*57.2*	*50*	*0.5*
2½ x ½	2.875 x 0.840	1 3/16	1 5/16	300	2¾	4¼	2¼	2¼	0.9
65 x 12	*73.0 x 21.3*	*30*	*33*	*20.7*	*70*	*108*	*57.2*	*57*	*0.4*
2½ x ¾	2.875 x 1.050	1 3/16	1 5/16	300	2¾	4¼	2¼	2¼	0.9
65 x 19	*73.0 x 26.7*	*30*	*33*	*20.7*	*70*	*108*	*57.2*	*57*	*0.4*
2½ x 1	2.875 x 1.315	1 3/16	1 5/16	300	2⅞	4¼	2¼	2¼	1.1
65 x 25	*73.0 x 33.7*	*30*	*33*	*20.7*	*73*	*108*	*57.2*	*56*	*0.5*

BSP equivalent is available as a MT-90.

NOTE: Tighten nuts alternatively to a recommended torque of 18 -22 ft-lbs (25 - 30 N-m) on pipe wall less than schedule 10 or 23 -27 ft-lbs (31 - 37 N-m) on pipe walls schedule 10 and above.

For the latest UL/ULC Listed and FM Approved pressure ratings, versus pipe schedule, go to **www.anvilstar.com** or contact your local AnvilStar representative

ANVIL INTERNATIONAL, INC.

RSN: ***943290***
Permit #: ***2014-893047-LT***

HANGERS

RSN: ***943290***
Permit #: ***2014-893047-LT***

Fig. 65 and Fig. 66
Reversible C-Type Beam Clamps 3/4" and 1¼" Throat Openings

Component of State of California OSHPD Approved Seismic Restraints System

Size Range — (Fig. 65 and Fig. 66) 3/8", 1/2" and 5/8" rod

Material — Carbon Steel with hardened cup point set screw and jam nut

Function — Recommended for hanging from steel beam where flange thickness does not exceed 3/4" (Fig. 65) or 1¼" (Fig. 66).

Features — All steel construction eliminates structural deficiencies associated with casting type beam clamps. May be used on top or bottom flange of the beam. (Beveled lip allows hanging from top flange where clearance is limited.) May be installed with the set screw in up or down position. Offset design permits unlimited rod adjustment by allowing the rod to be threaded completely through the clamp. Open design permits inspection of thread engagement.

Approvals — Underwriters' Laboratories Listed in the USA **(UL)** and Canada **(cUL)**. Exceeds requirements of the National Fire Protection Association (NFPA), Pamphlet 13, 3/8" rod will support 1/2" thru 4" pipe, 1/2" rod will support 1/2" thru 8" pipe. 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 relating to OSHPD projects, please refer to the TOLCO Seismic Restraint Systems Guidelines.

Finish — Plain

Note — Available in Electro-Galvanized and HDG finish.

Order By — Figure number, rod size and finish

Fig. 65 Patent #4,570,885

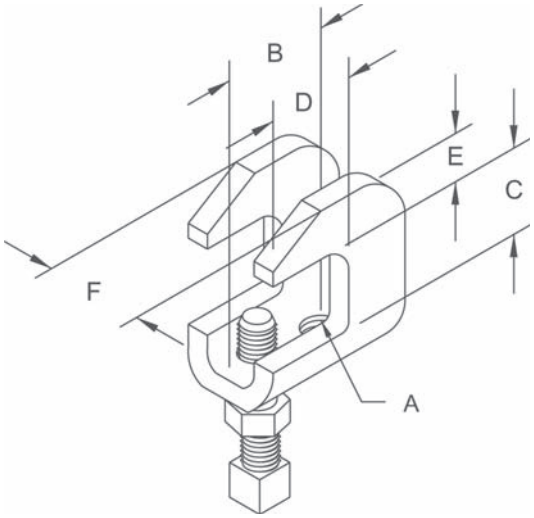


Fig. 65

Dimensions • Weights

Rod Size A	B	C	D	E	F	Max. Rec. Load Lbs.*	Approx. Wt./100
3/8	1 3/16	3/4	1	7/16	1	610	28
1/2	1½	3/4	1	9/16	1¼	1130	55
5/8	1½	3/4	1	9/16	1¼	1130	55

* Max. loads for clamp with set screw in up or down position.

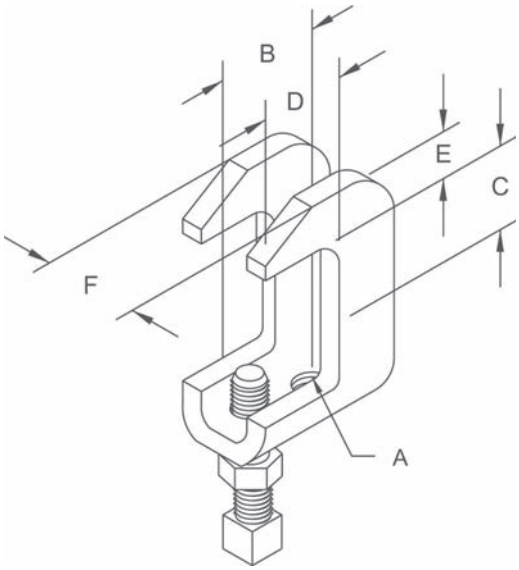


Fig. 66

Dimensions • Weights

Rod Size A	B	C	D	E	F	Max. Rec. Load Lbs.*	Approx. Wt./100
3/8	1 3/16	1¼	1	7/16	1	610	28
1/2	1½	1¼	1	9/16	1¼	1130	55
5/8	1½	1¼	1	9/16	1¼	1130	55

* Max. loads for clamp with set screw in up or down position.

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RSN: ***943290***
Permit #: ***2014-893047-LT***

Fig. 200 - "Trimline" Adjustable Band Hanger
Fig. 200R (Import) - "Trimline" Adjustable Band Hanger w/Retainer Ring

c UL US LISTED
FM APPROVED

Size Range — 1/2" thru 8" pipe

Material — Carbon Steel, Mil. 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" thru 2") 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.
- (2½" thru 8") Spring tension on nut holds it securely in hanger before installation. Adjusting nut is easily removed.

Approvals — Underwriters' Laboratories listed (1/2" thru 8") in the USA **(UL)** and Canada **(cUL)** for steel and CPVC plastic pipe and Factory Mutual Engineering Approved (3/4" thru 8"). Conforms to Federal Specifications WW-H-171E, Type 10 and Manufacturers Standardization Society SP-69, Type 10.

Maximum Temperature — 650°F

Finish — Mil. Galvanized. Stainless Steel materials will be supplied with (2) hex nuts in place of a knurl nub.

Order By — Figure number and pipe size

Note — Figure 200R (import) with retainer ring and non-captured knurl nut.

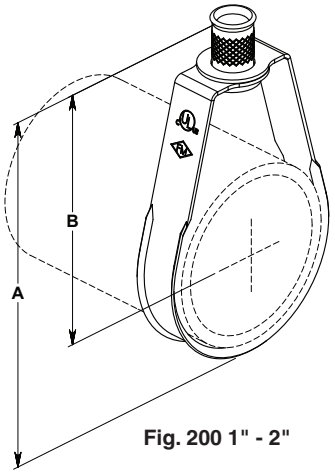


Fig. 200 1" - 2"

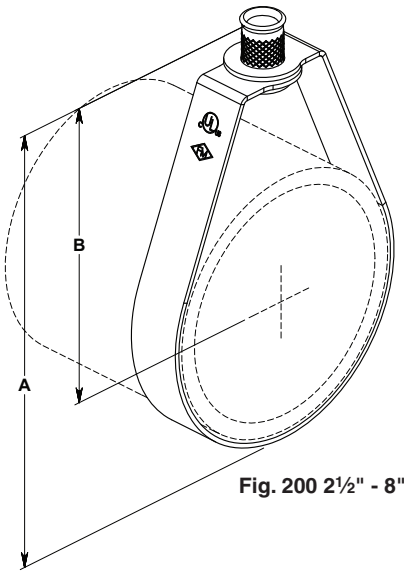


Fig. 200 2½" - 8"

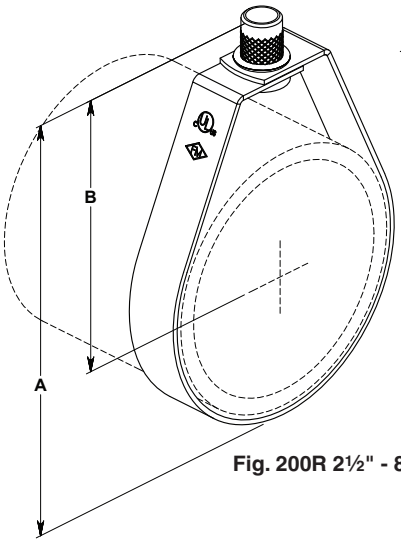


Fig. 200R 2½" - 8"

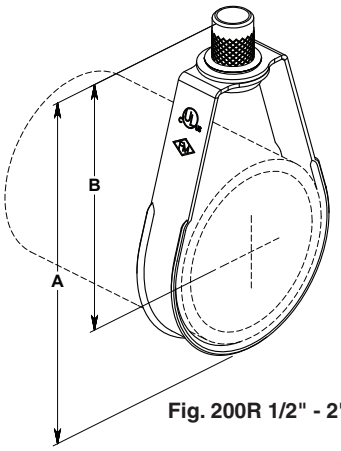


Fig. 200R 1/2" - 2"

Dimensions • Weights

Pipe Size	Rod Size Inch	Rod Size Metric	A	B	Max. Rec. Load Lbs.	Approx. Wt./100
1/2	3/8	8mm or 10mm	3⅛	2⅝	400	11
3/4	3/8	8mm or 10mm	3⅛	2½	400	11
1	3/8	8mm or 10mm	3⅜	2⅝	400	12
1¼	3/8	8mm or 10mm	3¾	2⅞	400	13
1½	3/8	8mm or 10mm	3⅞	2⅞	400	14
2	3/8	8mm or 10mm	4½	3	400	15
2½	3/8	10mm	5⅝	4⅛	600	27
3	3/8	10mm	5⅞	4	600	29
3½	3/8	10mm	7⅜	5¼	600	34
4	3/8	10mm	7⅜	5	1000	35
5	1/2	12mm	9⅛	6¼	1250	66
6	1/2	12mm	10⅛	6¾	1250	73
8	1/2	12mm	13⅛	8¾	1250	136

RSN: *943290*
Permit #: *2014-893047-LT*

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

Component of State of California OSHPD Approved Seismic Restraints System

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

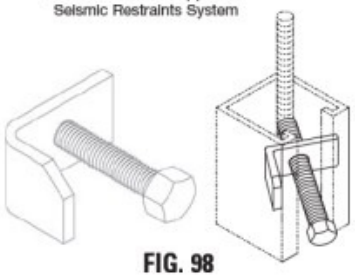


FIG. 98

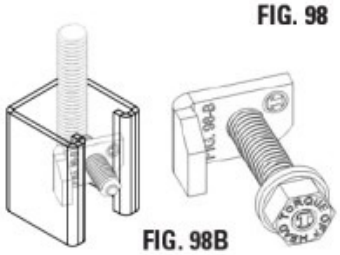
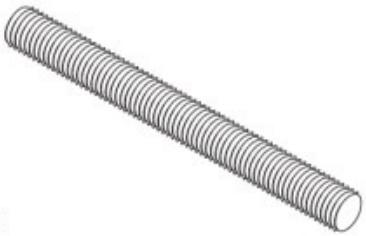


FIG. 98B

Fig. 99 - All Thread Rod Cut to Length

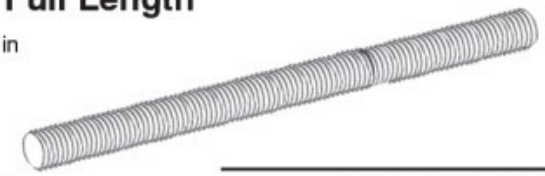
Size Range — Secures 3/8" thru 7/8" rod in 1" increments
Material — Carbon Steel
Maximum Temperature — 750°F
Finish — Plain
Note — Available in Electro-Galvanized and HDG finish or Stainless Steel materials.
Order By — Figure number, rod diameter, rod length and finish



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

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