

Fire Hydrant and Valve Maintenance

December 10th 2014

Jeff Shivers CLOW VALVE COMPANY

Table of Contents

- History of Fire Hydrants
- Uses of Fire Hydrants
- Types of Fire Hydrants
- Fire Hydrant Terminology
- Fire Hydrant Components

Table of Contents

- Pre-Installation Instructions
- Installation Instructions
- Routine Maintenance
- Common Errors
- Troubleshooting
- Questions

History of Fire Hydrants

- 1600's- 1st Water Dist. System in London & Boston
- 1803- 1st Above Ground Hydrant in USA was in Philadelphia
- 1812- 1st "Dry Barrel" Fire Hydrant
- 1874- Rochester, NY Used Separate Water Mains for Fire Fighting Purposes
- 1930's- "Traffic Hydrants" Introduced

History of Fire Hydrants

- Bored out Wooden Logs for Water Mains

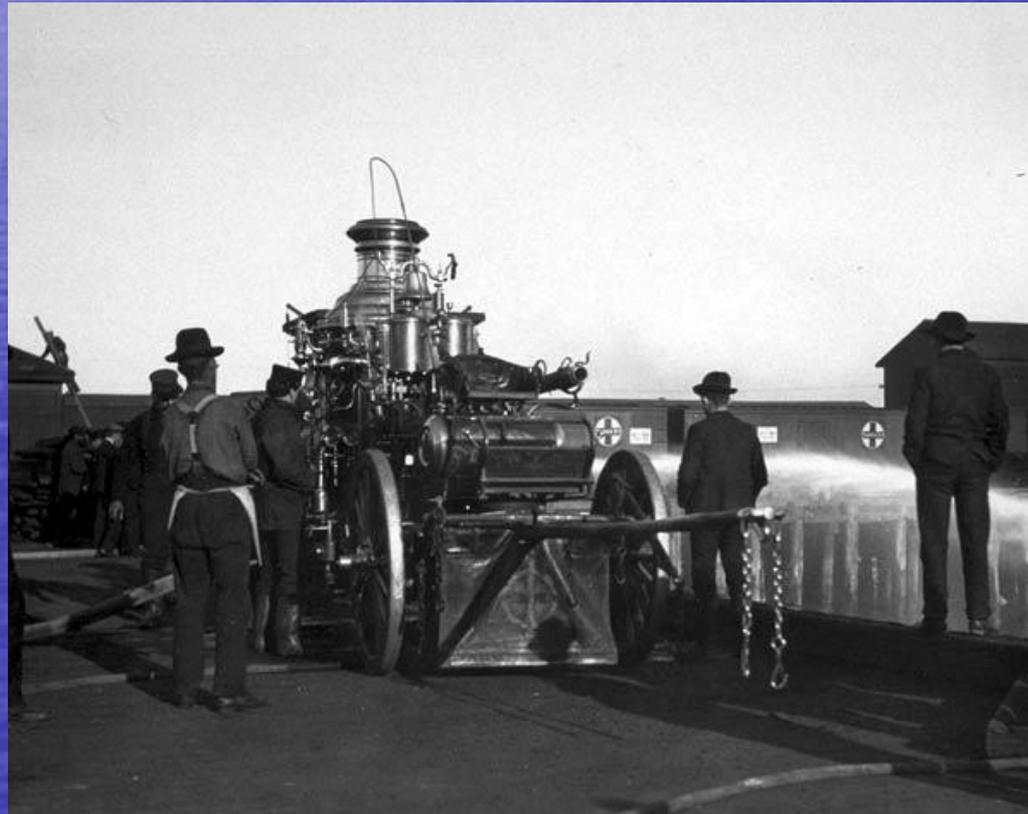


History of Fire Hydrants

- Use of “Fire Plugs”
- Bucket Brigades
- Hand Pumped Fire Engines

History of Fire Hydrants

- Hand Pumped Fire Engines



History of Fire Hydrants

- 19th Century Hydrants



Plueger & Henger
(St. Louis)



Boston
Machine
Mfg. Co.



Gilbert Hunt Co.
(Walla Walla, WA)



R.D. Wood Co.
(Philadelphia)

Uses of Fire Hydrants



Uses of Fire Hydrants



Uses of Fire Hydrants



Uses of Fire Hydrants





Types of Fire Hydrants

- Dry Barrel Hydrants
- Wet Barrel Hydrants
- Flush Hydrants
- Post Hydrants
- Dry Hydrants

Dry Barrel Hydrants



- Introduced in 1875
- Conforms fully with AWWA C502

ANSI/AWWA C502

- Latest Revision of ANSI/AWWA C502 was in 2005
- 1st Edition of Standard Approved in 1913
- Not a Specification
- Describes Only Minimum Requirements
- Use of AWWA Standards is Voluntary

ANSI/AWWA C502

- “Intended to Represent a Consensus of Water Supply Industry that the Product Described will Provide Satisfactory Service”
- Intended as a Guide to Aid the Manufacturer, Consumer & Public
- Does Not Preclude Anyone from Manufacturing a Product that Does not Conform to Standard

ANSI/AWWA C502

- 2 Consultants/Engineers
- 2 Underwriters Laboratories (UL) Reps
- 1 Insurance Rep
- 1 Factory Mutual (FM) Rep
- 8 Manufacturer Reps (Clow, AFC, Waterous, US Pipe, Mueller, East Jordan & AVK)
- 6 Municipal Reps

ANSI/AWWA C502

- Required to Meet a Test of 200 lbf.ft Torque Applied at Op Nut in Both Opening & Closing Directions
- Designed to be Operated by 1 Person Using a 15" Wrench
- 2 Hydrostatic Tests Twice the Working Pressure
 - Interior of Hydrant with Main Valve Open
 - Against Main Valve Rubber

Dry Barrel Hydrants



Mueller Super Centurion

Dry Barrel Hydrants



Kennedy K81-D

Dry Barrel Hydrants



AFC Darling B84B

Dry Barrel Hydrants



AFC Waterous WB67-250 Pacer

Dry Barrel Hydrants



U.S. Pipe Met 250

Dry Barrel Hydrants



M&H 929 "Reliant"

CLOW

WET BARREL FIRE HYDRANTS



*THE ONLY COMPLETE LINE IN THE INDUSTRY...
CAST IRON AND BRONZE HYDRANTS MEETING
AWWA C503 SPECIFICATIONS*

CLOW VALVE CO.
1375 Magnolia Avenue
Corona, California 91719
Phone 909-735-5555
FAX 909-735-0837
1-888-889-2411

CLOW

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A Division of McWane, Incorporated

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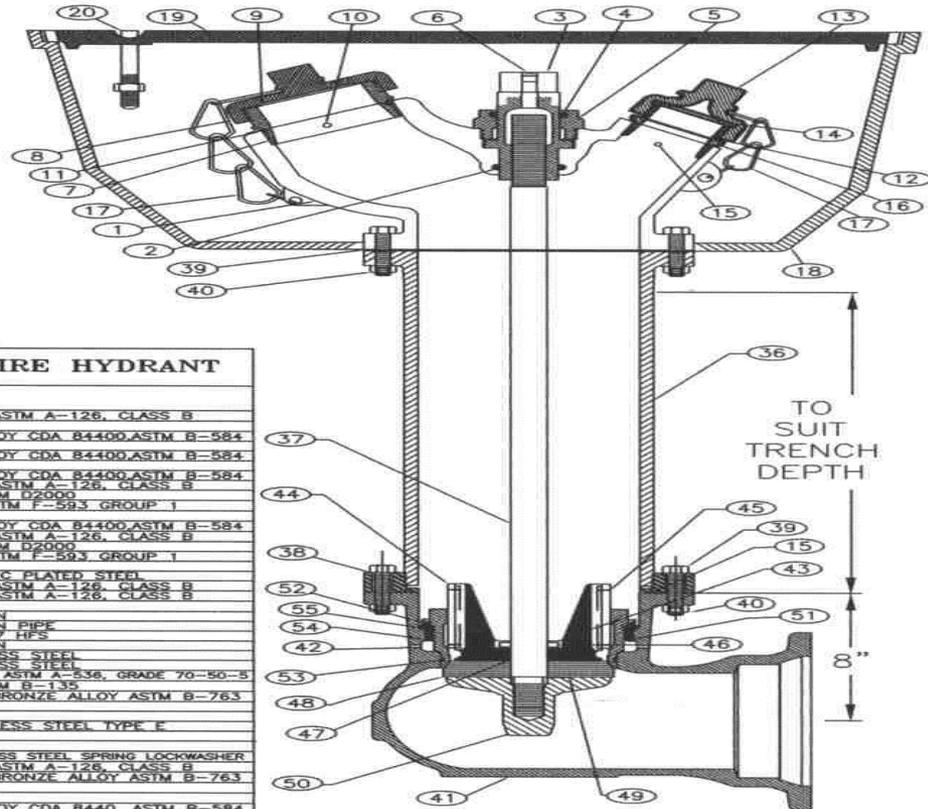
Wet Barrel Hydrants



Jones J3700 Model

Flush Hydrants

M&H Flush Type Hydrants are for use where traffic model hydrants protruding above ground might interfere with traffic in such places as airport runways and industrial areas. May be set in vaults or can be supplied with cast iron box and cover. This flush type hydrant sits completely underground and is accessible by simply lifting the box cover. Internal parts of the hydrant are exactly the same as the M&H 129 hydrant.



M&H MODEL 229 "FLUSH TYPE" FIRE HYDRANT

ITEM#	QTY	DESCRIPTION	MATERIAL
1	1	NOZZLE SECTION	CAST IRON ASTM A-126, CLASS B
2	1	OP NUT O-RING SEAL	RUBBER
3	1	OPERATING NUT	BRONZE ALLOY CDA B4400,ASTM B-584
4	1	WELD DOWN NUT "O" RING	BRONZE ALLOY CDA B4400,ASTM B-584
5	1	WELD DOWN NUT	BRONZE ALLOY CDA B4400,ASTM B-584
6	1	LUBRICATING PLUG	BRONZE
7	1	PUMPER NOZZLE 1 1/2	BRONZE ALLOY CDA B4400,ASTM B-584
8	1	PUMPER NOZZLE CAP	CAST IRON ASTM A-126, CLASS B
9	1	PUMPER NOZZLE CAP GASKET	RUBBER ASTM D2000
10	1	PUMPER NOZZLE SET SCREW	18-8 SS ASTM F-593 GROUP 1
11	1	PUMPER NOZZLE O-RING	N.B.R.
12	2	HOSE NOZZLE 2 1/2	BRONZE ALLOY CDA B4400,ASTM B-584
13	2	HOSE NOZZLE CAP	CAST IRON ASTM A-126, CLASS B
14	2	HOSE NOZZLE CAP GASKET	RUBBER ASTM D2000
15	2	HOSE NOZZLE SET SCREW	18-8 SS ASTM F-593 GROUP 1
16	2	HOSE NOZZLE O-RING	N.B.R.
17	2	NOZZLE CAP CHAINS	ELECTRO ZINC PLATED STEEL
18	1	HYDRANT BOX COVER	CAST IRON ASTM A-126, CLASS B
19	1	HYDRANT BOX COVER HANDLE	STEEL
20	*	STAND PIPE UPPER FLANGE	DUCTILE IRON
21	*	STAND PIPE	DUCTILE IRON PIPE
22	*	STAND PIPE LOWER FLANGE	STEEL C1117 HFS
23	16	SHOE NOZZLE BOLTS 5/8-11 X 3 1/2	304 STAINLESS STEEL
24	16	NUTS 5/8-11	304 STAINLESS STEEL
25	2	HYDRANT SHOE ELBOW	DUCTILE IRON ASTM A-536, GRADE 70-50-8
26	2	DRAIN HOLE BUSHINGS	BRONZE ASTM B-135
27	2	HYDRANT MAIN VALVE UPPER VALVE PLATE	ALUMINUM-BRONZE ALLOY ASTM B-763
28	2	DRAIN VALVE FACINGS	BRONZE
29	2	DRAIN VALVE FACING RIVETS	COPPER
30	1	LOCK PIN 1/2 X 1 3/4	304 STAINLESS STEEL TYPE E
31	1	LOWER STEM O-RING SEAL	N.B.R.
32	1	LOWER VALVE RUBBER SEAT	N.B.R.
33	1	LOWER VALVE PLATE LOCKWASHER	N.B.R.
34	1	LOWER VALVE PLATE BOTTOM PLATE	CAST IRON ASTM A-126, CLASS B
35	1	BRONZE MAIN VALVE SEAT RING	BRONZE
36	1	MAIN VALVE SEAT RING UPPER O-RING	ALUMINUM-BRONZE ALLOY ASTM B-763
37	1	MAIN VALVE SEAT RING LOWER O-RING	N.B.R.
38	*	SHOE RETAINER RING	N.B.R.
39	*	SHOE RETAINER RING O-RING	N.B.R.
40	*	SHOE RETAINER RING O-RING	N.B.R.
41	*	SHOE RETAINER RING O-RING	N.B.R.
42	*	SHOE RETAINER RING O-RING	N.B.R.
43	*	SHOE RETAINER RING O-RING	N.B.R.
44	*	SHOE RETAINER RING O-RING	N.B.R.
45	*	SHOE RETAINER RING O-RING	N.B.R.
46	*	SHOE RETAINER RING O-RING	N.B.R.
47	*	SHOE RETAINER RING O-RING	N.B.R.
48	*	SHOE RETAINER RING O-RING	N.B.R.
49	*	SHOE RETAINER RING O-RING	N.B.R.
50	*	SHOE RETAINER RING O-RING	N.B.R.
51	*	SHOE RETAINER RING O-RING	N.B.R.
52	*	SHOE RETAINER RING O-RING	N.B.R.
53	*	SHOE RETAINER RING O-RING	N.B.R.
54	*	SHOE RETAINER RING O-RING	N.B.R.
55	*	SHOE RETAINER RING O-RING	N.B.R.

* NOT FIELD REPLACEABLE - PERMANENTLY INSTALLED
MAIN VALVE SIZES AVAILABLE: 5 1/4"

150 PSI WORKING PRESSURE
300 PSI HYDROSTATIC TEST PRESSURE

HYDRANT SHOE STYLES AVAILABLE:
6" - MECHANICAL JOINT
6" - FLANGED

M&H VALVE COMPANY
ANNISTON, ALABAMA
A DIVISION OF MCWANE INC.

DWN: TRIJ

DATE: 7/1/05

DWG. NO.

FH-229

Post Hydrants

- Special Purpose Hydrant for Use Where Firefighting is Not the Primary Function
- Smaller in Size than AWWA Standard
- MVO Size Usually 2 1/2"
- Most Often for Wash Down Service at Treatment Plants
- Other Uses: Flush or Bleed Air Pockets, or Fill Tanks in Non-Emergency Service

Post Hydrants



Dry Hydrants



Fire Hydrant Terminology

- Direction of Opening
- Hose Connection
- Pumper (Steamer) Connection
- MVO 4.5" or 5.25"
- Draining or Non-Draining (Plugged)
- Traffic Model
- Depth of Bury

Fire Hydrant Components

- Operating Nut
- Packing Nut
- Cover (Bonnet)
- Nozzle Section
- Pumper Nozzle & Cap
- Hose Nozzles & Caps
- Break Flanges

Fire Hydrant Components

- Standpipe
- Bottom (Shoe/Boot)
- Upper Stem
- Middle Stem
- Lower Stem
- Stem Nut
- Break (Traffic) Coupling
- Break-Away Bolts



Use only the manufacturers repair parts!!!



BURK

AD 1/4

2.0



CLW

IOWA 52577
641 673-8611

FIRE HYDRANT

IMPORTANT INFORMATION

1. Prior to installation, direction of opening operating nuts, hose nozzle threads, and steamer nozzle threads must be checked to make certain they comply with the other hydrants in your city. We will not be responsible if advised of incorrect operating nuts and nozzle threads after installation.
2. This hydrant should be opened and closed at least twice per year to insure proper operation and drainage.
3. Store hydrant bottom (shoe) inlet downward to prevent freezing.
4. When rotating Eddy nozzle section, do not rotate part (7) drain support ring. Vertical alignment of drain rod with drain must be maintained.
5. Check all bolts and nuts for tightness. All bolts and nuts should be tightened evenly. Care should be taken to avoid over tightening the bolts.
6. For maximum corrosion protection, we recommend wrapping all buried hydrants with polyethylene wrap.
7. Failure to comply with AWWA M-17 and the above requirements may cause the hydrant to fail resulting in property damage, personal injury and/or death.

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Baan100112
0000025



EDDY 5"X6" MJ PLG DRN ORNG SSBN NO CHN OL
2H/STR 5'0" 75228-A-5" STORZ YEL(LIMA, OH)

515 lbs/pc

LOC-HYD AREA

MOB#006473



Pre-Installation Instructions

- Manufacturer & Model of Hydrant
- Size & Shape of Operating Nut & Nozzle Caps
- Size & Number of Pumper & Hose Connections
- Nozzles Thread Specification
- Direction of Opening
- Depth of Bury

Pre-Installation Instructions

- Size & Type of Inlet Connection (4", 6", 8"; MJ, Flanged, Tyton)
- Size of Main Valve (4.5" or 5.25")
- Retighten Nuts & Bolts
- Check for Damage That Might Have Occurred During Shipment

Installation Instructions

- Install Hydrants At Least 2' Away from Curb
- Face Pumper (Steamer) Nozzle Toward Street
- Nozzles Should be At Least 18" Above Ground Line
- Eliminate any Obstructions That Prevent Easy Removal of Nozzle Caps

Installation Instructions

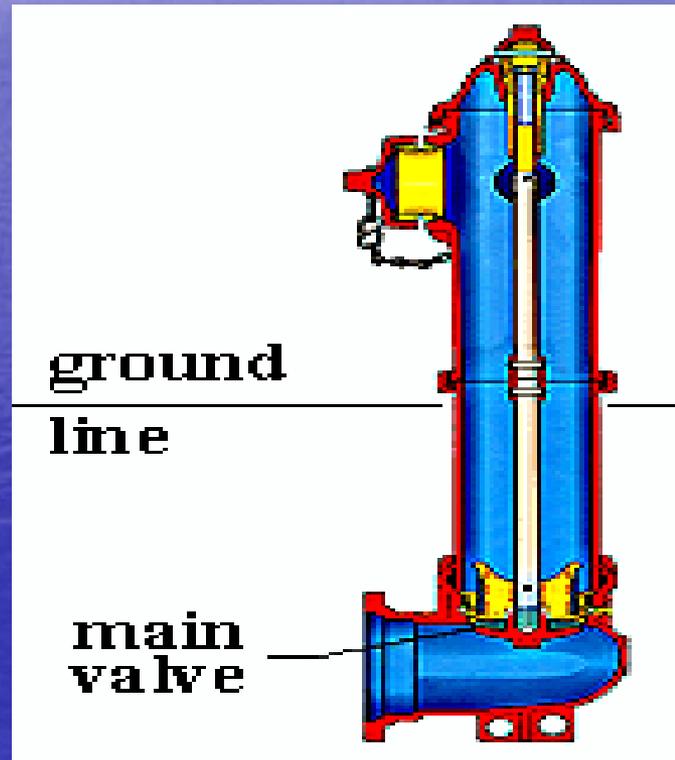
- Auxiliary Gate Valve Should be Installed At Least 4' Away from Hydrant
- Restrain Hydrant by Using an Approved Joint Restraint or Thrust Block
- If Pouring a Thrust Block, Be Careful Not to Plug Drain Holes (Draining Hydrants Only)

Installation Instructions

- Adopt a Flow Color Scheme

- >1500 GPM Light Blue
- 1000-1500 GPM Green
- 500-999 GPM Orange
- <500 GPM Red

Installation Instructions



Depth of Bury is Very Important

Depth of Bury

- AWWA Defines it as the “Distance Measured to the Nearest 1/2 foot from the Bottom of the Connecting Pipe to the Groundline of the Hydrant”

Installation Instructions



Safety First

- 400 U.S. Workers Die in Trench Related Accidents Each Year
- About 6400 Workers are Seriously Injured

Routine Maintenance

- Fall & Spring Flushing & Inspection
- Open Hydrant Fully
- Check Hydrants for Leakage Past the Seat
- Look for Leakage at the Flanges
- Check to See if Hydrants Need Extensions
- Check Nozzles/Caps & Apply "Never-Seez"
(if Desired)

Routine Maintenance

- Check Chains for Free Action
- Lubricate Operating Mechanism with Oil or Grease (if Applicable)
- Update Record Keeping
- Location
- Identification
- Manufacturer & Model
- Cast Date

Common Errors With Fire Hydrants



Extension Needed

Common Errors With Fire Hydrants

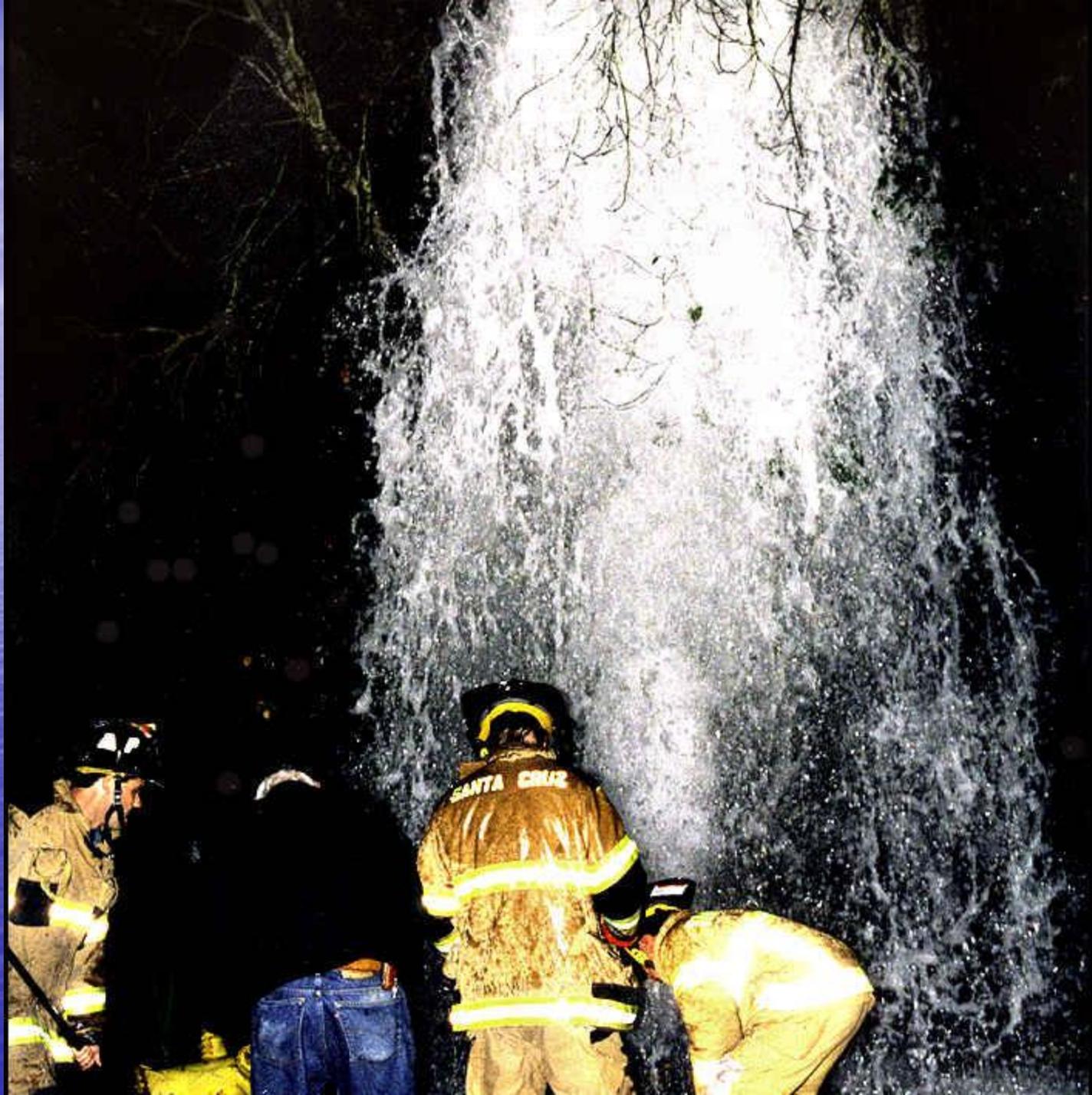


Hydrants Buried Too Low May Not Break-Off Correctly if Struck

Common Errors With Fire Hydrants



Hydrants Buried Too High May Not Break-Off Correctly if Struck



Troubleshooting

- Hydrant Leaks Past Seat (Most Common)
- Hydrant Spins Freely When Operated
- Hydrant is Hard to Open
- Hydrant Didn't Break off Properly
- Hydrant Leaks at One of the Flanges
- Hydrant Chatters When Operated
- Ground around hydrant is saturated with water

Troubleshooting

- Hydrant Leaks Past Seat



Troubleshooting

- Hydrant Spins Freely When Operated
- Break Coupling is Broken
- Stem is Broken

Troubleshooting

- Hydrant is Hard to Open
- Grease/Oil is Needed
- Stem is Bent
- Rubber Packing is Worn (Eddy Hydrants)
- Drain Slides are Worn

Troubleshooting

- Hydrant Didn't Break off Properly



Troubleshooting

- Hydrant Didn't Break off Properly
- Hydrant not Installed Properly
- Wrong Coupling Installed at Ground Line
- Inadequate Soil Conditions

Troubleshooting

- Hydrant Leaks at One of the Flanges
- Nuts & Bolts are Loose
- O-ring/Gasket is Damaged or Missing

Troubleshooting

- Hydrant Chatters When Operated
- Break Kit/Extension Installed That Isn't From Manufacturer
- Drain Slides are Damaged or Worn
- Incorrect Length of Stem
- Coupling is Stretched
- Multiple Extensions are Installed

Troubleshooting

- Ground around hydrant is saturated with water
- Hydrant isn't off all the way
- Debris Stuck in Main Valve Rubber

Troubleshooting

- Nozzles are Facing the Wrong Direction

Troubleshooting

- Hydrant Opens the Wrong Direction

Troubleshooting

- High Water Table
- Frozen Hydrants in Winter

Quiz

- The Auxiliary Gate Valve Should be Installed How Many Feet Away from the Hydrant?
- **4**
- Nozzles Should be At Least How Many Inches Above Ground Line When Hydrant is Installed?
- **18**
- When was the 1st "Dry Barrel" Fire Hydrant Introduced?
- **1812**

Valve Maintenance for Resilient Seat Gate Valve

- Installation
- Operation
- Inspection and Maintenance

Installation

- Check that valve ends joints are clean. Again check for damage to the valve. Open and close valve to insure proper operation. Close wedge before placing valve in trench line.
- Handle valve carefully. Do not drop into position. Do not sling through the port opening

Installation

- Prepare pipe ends according to manufacturer's instructions. Install valve per proper methods according to end joint type. All piping should be properly supported to avoid line stress on the valve. Do not use the valve as a jack to force a pipeline into position
- A valve box or vault should be provided for each valve used in a buried service application. These should be installed such

Installation

- That no load is transferred to the valve
- Before pressurization of the pipeline and valve, all pressure containing bolting (cover, follower plate, end connection) should be inspected for adequate tightness. (usually 90 ft lbs)
- Buried valves should be pressurized before backfilling

Installation

- With valve in open position, the entire system should be thoroughly flushed to clean the system. Debris in the valve could prevent valve from closing or possibly damage the resilient material on the wedge.
- Upon completion of installation, gate valve location, size, type, date of installation, number of turns to open, direction of opening should recorded.

Operation

- Do not operate valves in systems that exceed the rated working pressure of the valve. (2-20" 250psi, 24" 200 psi)
- System should be completely flushed before valve is operated in normal cycle
- The R/W valve opens and closes by turning the main valve stem with an operating nut or handwheel

Operation

- The valve closes by compressing the resilient material bonded to the wedge against the valve body.
- If the valve fails to seal after necessary number of turns, open the valve four or five times and reseal.

Inspection and Maintenance

- Frequency of inspection should be based on frequency of operation. Semi annual inspections are minimum recommended.
- Valve should not be disassembled unless a breakdown has occurred.
- During inspection, the valve should be opened and closed with pressure in the pipeline. The valve should function freely with no binding or vibration

Inspection and Maintenance

- Count the number of turns to full closed. This will reveal an obstruction if correct number of turns are not achieved.

RW Valve Operation and Maintenance

All gaskets and joints should be checked for leakage and tightness.

With the valve closed and pressure against the wedge , a check for leakage is possible by 'listening" to the valve for flow. A stethoscope will help this procedure

Inspection and Maintenance

- Attached actuators should be inspected per manufacturer's recommendations provided with those units
- OS&Y Valves should have the exposed stem lubricated at each inspection. Check the stuffing box bolts for tightness.
- A permanent inspection record should be kept for each valve.

Questions????????????????????????????????????

Thanks for coming!

You can reach me at

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