

FIRE HYDRANT  
SPECIFICATION CHANGE  
SUBMITTAL

PACKAGE CONTENT

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## JUSTIFICATION FOR FIRE HYDRANT SPECIFICATION CHANGE

REASON FOR CHANGE: Fire hydrants on the market today that are installed in communities across the nation have flaws in design and materials that leave them and, by extension the communities where they are installed, vulnerable to higher direct costs and higher risks to public safety and health. The new specification ensures that the fire hydrants purchased will provide solutions to the following problems inherent in conventional fire hydrants, thereby substantially reducing costs and eliminating risks:

### Revenue loss from water leakage

- Water main breaks from improper closure of hydrant after use (water hammer effect)
- Persistent leakage through drain holes where hydrant is not properly closed or main valve seal is damaged
- Persistent leakage through failed gaskets, usually in combination with valve failure
- Fully or partially opened hydrant left unattended without nozzle caps or caps not fully secured.

### Revenue loss from water theft

- One time usage (filling swimming pools, etc.)
- Recurring usage (watering lawns, washing cars, “street-side” water splash park, filling trucks, etc.)

### Public health crisis from malicious intrusion (terrorist-activities) causing sickness or death

- Biological type contaminant – acute or persistent effect (monitor, test, disinfect, flush cycles are costly and time consuming to restore safe drinking water)
- Chemical contaminant – acute or persistent effect (may require prolonged remediation or abandonment of infrastructure)

### Compromising firefighter emergency response – hydrant failures, access/operation difficulty

- Hard to open; breaking during opening
- Missing nozzle caps that prevent or limit hook-up options
- Low pressure caused by leakage, or unauthorized use of a hydrant nearby
- Out of service hydrant in need of repair or replacement
- Frozen hydrant, ice-filled barrel, iced over nozzle and operating nuts

### Costliness of ownership over asset life related to:

- Painting frequency required for exterior corrosion protection
- Maintenance frequency and tasks required to ensure reliable operation
- Repair frequency where parts failed, were damaged, stolen, or compromised by environmental factors (ice, flooding, sand/salt, etc.) and internal corrosion of lower quality materials. Operating nuts, stems, and valve assemblies often fail because of corrosion. Hydrant drain assemblies become clogged.
- Replacement frequency where cost of repairs has exceeded economical basis
- Security: After-market security features (operating nuts and nozzle caps) requiring additional installation and replacement due to vandal damage and theft. Impedes fast firefighter access by requiring an extra task for removal of devices (i.e. lock-out feature) or more than one wrench to access and operate.

### Environmental concerns

- Paint that releases VOCs into atmosphere
- Chlorinated water from uncontrolled running hydrants reaching sensitive habitats

## JUSTIFICATION FOR FIRE HYDRANT SPECIFICATION CHANGE

FEATURE BENEFITS PROVIDED BY CHANGE: Improved design, higher quality materials, and longer warranty periods provide solutions to all problems related to fire hydrants and also ensure more cost-effective ownership over asset life as follows:

Eliminates revenue loss from water leakage

- Single cast upper barrel eliminates bonnet gasket leakage risk
- Tri-arm lower valve assembly eliminates vibration that creates wear and tear on internal components and gasket seals. The smoother opening and closing feature reduces water hammer that causes hydrant and water main leaks. More durable materials withstand abrasive forces that cause leaks to occur at valve sealing points.
- Drain plate and saturation plate prevents clogging and disperses water flow to prevent soil undermining and internal corrosion and ice accumulation from water standing in the barrel
- Recessed nozzles and flush nozzle caps and proprietary wrench prevent unauthorized use which results in hydrant operation that causes hydrant leakage and creates water hammer that causes water main leaks

Eliminates revenue loss from water theft

- Recessed nozzles and flush nozzle caps and proprietary wrench prevent unauthorized access use

Prevents public health crisis from malicious intrusion (terrorist-activities) causing sickness or death

- Recessed nozzles and flush nozzle caps and proprietary wrench prevent unauthorized access use

Ensures reliability during firefighter emergency response – hydrant failures, access/operation difficulty

- Drain plate and saturation plate prevents clogging and disperses water flow to prevent soil undermining and internal corrosion and ice accumulation from water standing in the barrel
- Recessed nozzles and flush nozzle caps and proprietary wrench prevent unauthorized use, parts theft and other tampering activities that can render a hydrant unusable, including debris in nozzles and barrel
- Single wrench provides fast and simple access and operation of hydrant. Wrench also fits conventional hydrant nozzle caps and operating nuts

Reduces costs of ownership over asset life related to:

- Painting: 15-year paint warranty. Painting frequency reduced by durable powder-coated finish. Design shape of upper barrel and recessed caps reduces effects of environmental wear and tear and the materials quantity and labor time for painting necessary after 15-20 years.
- Routine Maintenance: Design and material quality and compatibility reduce and eliminate time and costs of tasks during operational checks. Fully contained self-lubricating stem ensures that hydrant turns easily during every operation and no oil reservoir leakage occurs.
- Repairs: 25-year parts warranty. Repairs eliminated due to higher quality materials and components design. Single cast upper barrel eliminates bonnet gasket leakage risk. Tri-arm lower valve assembly eliminates vibration that creates wear and tear on internal components and gasket seals. The smoother opening and closing feature reduces water hammer that causes hydrant and water main leaks. More durable materials withstand abrasive forces that cause leaks to occur at valve sealing points. Drain plate and saturation plate prevents clogging and disperses water flow to prevent soil undermining and internal corrosion and ice accumulation from water standing in the barrel. Stainless steel upper and lower stems eliminate corrosion.
- Replacement: Less frequent. Design features and materials quality extend useful economic life
- Security: built-in to hydrant design. Hydrant comes fully secured. No added nozzle caps or operating nut devices needed. Single wrench accesses and operates the hydrant and any others.

Eliminates environmental concerns

- Powder coatings do not contain VOCs
- Security features of hydrant prevents unauthorized use

## FIRE HYDRANT SPECIFICATION

### GENERAL

Hydrants shall be of a dry barrel, dry top design and shall meet or exceed all requirements and tests of ANSI and comply with AWWA Standard C-502. Fire hydrants shall meet all test requirements and be listed by Underwriters Laboratories, Inc. Fire hydrants shall comply in all respect with UL 246, latest revision. Hydrants shall have been tested for compliance with Underwriters Laboratories standards UL246B (security listing) for resistance to dust, salt spray, air mixtures of moist hydrogen sulfide, carbon dioxide and sulfur dioxide, variable ambient air temperatures (-31F – 151F), ultraviolet light and water exposure, humidity, and external icing. Hydrant materials and coatings shall be in compliance with NSF61 (Drinking Water Systems Components - Health Effects) and NSF372 (Drinking Water System Components - Lead Content) standards. Hydrants shall be of the compression type, with the main valve opening against the pressure and closing with the pressure. The main valve opening shall be (5-1/4") in diameter. Hydrants shall be so designed that, in the event of an accident or breakage of the hydrant above or near grade level, the main valve will remain closed. Hydrants shall be manufactured and tested in an ISO 9001 certified facility. All bolts and nuts shall be stainless steel.

### SECURITY FEATURES

Hydrant design shall include features that prevent unauthorized access to all nozzles and operating nut and be so designed that when pumper cap is secured the side nozzle caps cannot be removed. The steamer cap shall also secure the operating nut cover plate. Operating nut shall not be accessible without removal of pumper nozzle cap. Removal of all features that secure and protect the operating nut and remove nozzle caps must be accomplished by a single wrench tool that can also fit the operating nut and nozzle cap lugs on standard fire hydrants.

### PRESSURE RATING

Fire hydrants shall be rated at 300 psi (2,068 kPa) water working pressure, tested at 600 pounds (4,137 kPa) hydrostatic for structural soundness in the following manner: 600 pounds (4,137 kPa) hydrostatic test supplied from the inlet side, first with main valve closed for the testing of valve seat; second, with main valve open for testing of the drain valves and entire hydrant. Testing to be complete in accordance with AWWA C-502 and UL-FM requirements.

### UPPER BARREL

Hydrant upper barrel shall be a single-cast ductile iron body with an integrated boltless head having three recessed nozzle outlets; one (1) 4-1/2" pumper connection, and two (2) 2-1/2" hand line hose connections.

### NOZZLES

Pumper and hose nozzles shall be threaded and screwed into the nozzle section utilizing O-ring seals, and then mechanically locked to prevent inadvertent nozzle removal. Threads on pumper and hose nozzles shall be National Standard unless otherwise specified by the end-user. To help prevent cross-threading a Higbee cut (blunt start) will be provided on the lead thread of the outlet nozzles and nozzle caps. Changes in size or shape of the waterway (hydrant nozzles) shall be accomplished by means of easy curves. Nozzle thread assembly shall be recessed so that when nozzle caps are affixed the cap and hydrant body are tightly seamed to create a continuous rounded shape.

## NOZZLE CAPS

Nozzle caps shall be anodized aluminum and when secured shall fit tightly and be flush with barrel head without wrench lug extrusions. Side nozzle caps shall have a ratcheted lug design that locks the cap in place against locking pins when the steamer cap is secured.

## OPERATING NUT

Operating nuts shall be one-piece bronze self-lubricating design with anti-friction washers to further minimize operating torque. It shall be pentagon in shape. The direction of the opening shall be as specified by the end-user. The operating threads of the hydrant shall be designed to avoid the working of any iron or steel parts against either iron or steel. The operating nut and stem threads shall be square or acme type.

## OPERATING STEMS

All hydrant operating stems shall be made of stainless steel, shall consist of two pieces, not less than 1 1/4" diameter (excluding threaded or machined areas), and shall be connected by a stainless steel safety coupling at the ground line flange. Safety couplings shall have an integral internal stop to prevent the coupling from sliding down into the lower barrel when the hydrant is struck. Screws, pins, bolts, or fasteners used in conjunction with the operating stem and couplings shall also be stainless steel.

## STANDPIPE

Fire hydrant standpipes shall be ductile iron. Standpipes shall have a minimum diameter (I.D.) of 7" (17.8 cm) to assure maximum flow performance. Bury shall be (specified by end-user) measuring depth from grade line to bottom of trench or connecting pipe. Hydrants shall be of the type that can be extended without excavating. The proper ground line shall be marked clearly on the standpipe and shall provide not less than 20" of clearance from the centerline of the lowest nozzle to the ground.

## MAIN VALVE ASSEMBLY

Fire hydrants shall be so designed that when in place, no excavation will be required to remove the main valve assembly and movable parts of the drain valve, should maintenance be required. Main valve assemblies shall be seated in hydrants with a bronze-to-bronze connection and shall be O-ring pressure sealed. A minimum of four (4) external drain openings are required. Main valves shall be molded Acetal having a durometer hardness of 95 (+/- 5), and be supported by a one-piece bronze lower valve top plate / drain valve mechanism. The bottom threads of the main valve stem shall be fitted with a powder coated, cast iron lower valve plate, bronze lower valve plate nut with gasket. Valve assembly shall be a tri-arm style configuration that provides for three points of continuous contact against the valve seat ring when hydrant is opened and closed.

## DRAIN RING ASSEMBLY

Drain system shall include a distribution ring that prevents impingement or a direct line by the drain holes from the water discharging from the standpipe to the surrounding earthen material in order to eliminate the infiltration of roots and debris. Drainage shall be accomplished so that when the hydrant main valve is closed the water drains through four (4) rectangular openings in the drain ring that directs water into a saturation plate housing that disperses the water to the soil through eight (8) offset rectangular openings. The assembly shall seal shut when the hydrant is opened. The drain assembly shall operate without the use of springs, toggles, tubes, levers or other intricate synchronizing mechanisms. Main valves shall provide complete closing of the drain holes after less

than three (3) turns of the operating nut in the opening direction. Drain valves shall be faced with molded Acetal.

#### INLET CONNECTION

Fire hydrants shall be connected by a 6" powder coated shoe with inlet connection types being either Mechanical Joint, Tyton Joint or Flanged (as specified by end-user). Mechanical Joint and Tyton Joint shoes shall be fitted with strapping lugs and shall comply with the requirements of AWWA C-111. Flanged ends shall comply with ANSI/ASME B16.1, class 125 flanges. Inlet shoes shall have ample blocking pads for sturdy setting. A minimum of six stainless steel bolts and nuts is required to fasten the shoe to the standpipe.

#### TRAFFIC FEATURES

Fire hydrants shall have nozzle section and standpipe joined at the ground line by a separate breakaway flange providing 360o rotation of nozzle section for proper pumper nozzle facing. The safety flange segments shall be located under the nozzle section flange to prevent the segments from falling into the standpipe in the event the hydrant is struck. This flange shall employ not less than eight Dacromet coated steel bolts and nuts. The pressure seal at the ground line connection between the nozzle section and standpipe shall be an o-ring.

#### PROTECTIVE COATINGS

Fire hydrants shall be powder coated and lined except for bronze, stainless steel or threaded machined surfaces. All hydrant nozzle sections, standpipes and shoes shall have interior and exterior sandblasted, then coated with a zinc rich primer followed by a polyester powder coating of 10 to 12 mils, shall meet all the requirements of ANSI/AWWA C-550 (latest edition) and AAMA 2604. Painted finish shall be factory applied polyester powder coating and be warranted for 15 years.

#### LUBRICATION

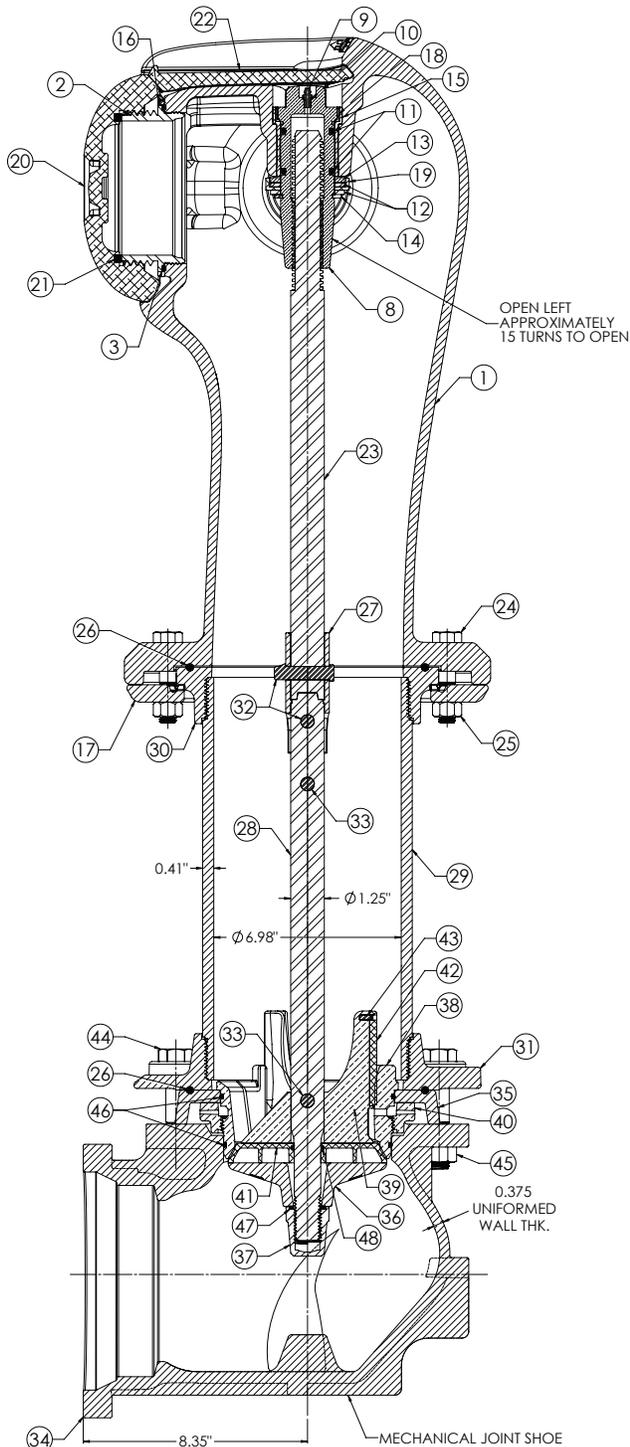
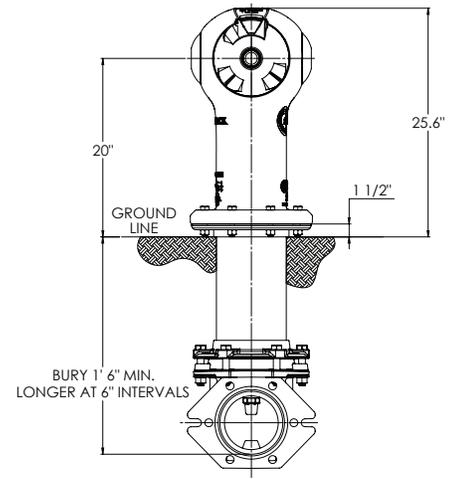
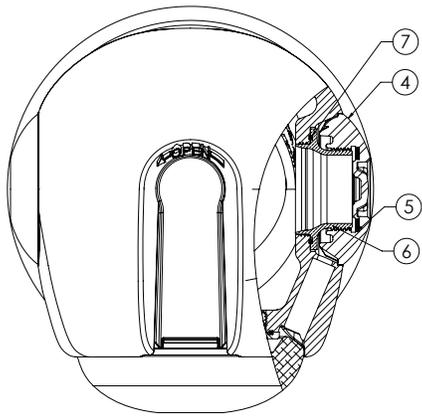
Operating threads shall be factory lubricated with a low viscosity NSF/FDA approved non-toxic food grade lubricant which will remain fluid through a temperature range of -60o F. to +150o F. A lubrication port shall be provided to field lubricate the operating mechanism without disassembly of the operating nut and stem section. O-rings and gaskets shall be made of EPDM to help prevent the effects of permeation.

#### MARKINGS

Fire hydrants shall be marked with the name of the manufacturer, size of valve opening, direction of opening and the year of manufacture all in accordance with AWWA C-502 and UL-FM requirements.

#### WARRANTY

Fire hydrants shall be warranted by the manufacturer against defects in materials or workmanship for a period of (25) years from the date of manufacture.



ITEM #	QTY.	PART NUMBER	DESCRIPTION	MATERIAL
1	1	SH2001H	Nozzle Housing	Ductile Iron
2	1	SH2002F	Pumper Nozzle	Eco Brass
3	1	OR2257	Pumper Nozzle O-Ring	EPDM
4	2	SH2003M	Hose Nozzle Cap	Aluminum
5	2	OR2102	Hose Nozzle Cap O-Ring	EPDM
6	2	SH2004G	Hose Nozzle	Silicone Bronze
7	2	OR2240	Hose Nozzle O-Ring	EPDM
8	1	SH2005J	Operating Nut	Eco Brass
9	1	GF2001	Grease Fitting	Stainless Steel
10	1	HAP1066	Grease Fitting O-Ring	EPDM
11	2	OR2326	Operating Nut O-Ring	Buna-N
12	2	SH2006A-2	Low Friction Thrust Washer 2	Stainless Steel
13	1	SH2006A-1	Low-Friction Thrust Washer 1	Bronze
14	1	RR2001	Operating Nut Retaining Ring	Zinc-Dichromate Steel
15	1	SH2008D	Operating Nut Sleeve	Acetal
16	9	SS2001	Nozzle Set Screw	Stainless Steel
17	2	SH2010D	Safety Flange	Gray Iron
18	1	SH2013	Operating Nut Intermediary Sleeve	Acetal
19	1	SH2014	Operating Nut Bearing Housing	Acetal
20	1	SH2102D	Screw Pumper Cap	Aluminum
21	1	OR2429	Screw Pumper Cap O-Ring	EPDM
22	1	SH2103A	Screw Cap Tongue	Aluminum
23	1	SH2601F	Upper Operating Stem	Stainless Steel
24	8	BT2001	Safety Flange Bolt	Stainless Steel
25	8	NT2001	Safety Flange Nut	Stainless Steel
26	2	OR7446	Standpipe O-Ring	EPDM
27	1	SH2602B	Safety Coupling	Stainless Steel
28	1	SH2603D	Lower Operating Stem	Stainless Steel
29	1	SH2604A	Bury Standpipe	Ductile Iron
30	1	SH2605B	Standpipe Upper Flange	Ductile Iron
31	1	SH2606B	Standpipe Lower Flange	Ductile Iron
32	2	PN2601	Self Locking Cotter Pin	Stainless Steel
33	2	PN2602	Grooved Pin	Stainless Steel
34	1	SH2701-MJ	Inlet Elbow	Ductile Iron
35	1	SH2702A	Saturation Ring	Gray Iron
36	1	SH2703D	Lower Valve Plate	Ductile Iron
37	1	SH2704A	Valve Bottom Plate Nut	Stainless Steel
38	1	SH2705E	Valve Seat Ring	Stainless Steel
39	1	SH2706F	Tri-arm Valve Top Plate	Stainless Steel
40	1	SH2707C	Drain Ring	Eco Brass
41	1	SH2708F	Main Seat valve	Acetal
42	3	SH2709F	Drain Valve Facing	Acetal
43	3	SS2701	Drain Valve Set Screw	Stainless Steel
44	6	BT2701	Inlet Flange Bolt	Stainless Steel
45	6	NT2701	Inlet Flange Nut	Stainless Steel
46	1	OR7256	Valve Seat Ring O-Ring (Bottom)	EPDM
47	1	OR7215	Bottom Plate Nut O-Ring	EPDM
48	1	OR7120	Main Valve O-Ring	EPDM