

Technical Specification: Fire Hydrants

1. Fire hydrants heads shall be cast iron body conforming to the requirements of AWWA C503 (WET-BARREL FIRE HYDRANTS) with bronze working parts.
2. Fire hydrants shall be designed for a minimum pressure of 1.0MPa (150 psi) and have a 100mm (4") flanged inlet and two (2) 63mm (2½") fire hose outlet.
3. The outlets shall have National Standard Hose Threads with hose caps and chains.
4. The stem shall be provided with at least two (2) O-rings.
5. Hydrant valves shall open counter clockwise.
6. Breakable piece and extension elbow shall be provided.
7. Epoxy lining and coatings for valves shall conform to AWWA C550 (PROTECTIVE EPOXY INTERIOR COATINGS FOR VALVES AND HYDRANTS).
8. *Testing:* For every size, two (2) sample hydrants representing each lot of one hundred (100) pieces or less shall be tested for compliance with this specification. Any visible defect or failure to meet the quality standards herein will be grounds for rejecting the entire order.
9. *Certification:* The manufacturer shall furnish a sworn statement that the inspection and metallurgical and pressure tests have been results thereof comply with the requirements of the applicable Standard(s) herein specified. A copy of the Certification shall be submitted to Calamba Water District.

Technical Specification: Cast Iron Fittings

1. *Fitting Description:* Cast iron fitting shall conform to the requirements of AWWA C110 (American standard for cast iron and ductile iron fittings, 2-in through 48-in., for water and other liquids) or is r13 (cast iron pipes, special casting and cast iron parts for pressure mainlines).

Fitting shall have a wall thickness of not less than that of the pipe with which they are used and the ends shall have the ends suitable for making watertight joints.

2. *Fitting Construction:* Fittings are manufactured of ductile iron grade 70-50-05 (minimum tensile strength: 70,000psi; minimum yield strength: 50,000; minimum elongation: 5%) as specified in AWWA C110 or C153. The flanges can be tapped for studs when specified. Unless otherwise specified flanges will have bolt holes straddling centerline, bolt hole drilling can be rotated when so specified.

Fittings shall be furnished with mechanical or flanged joints.

- a. *Mechanical Joints:* All mechanical joint fittings will be Bell and Bell unless otherwise specified. Mechanical joint fittings shall be rated for 350 psi working pressure for sizes 4" – 24".
 - b. *Flanges:* All flanges are plain without projections and are furnished smooth or with shallow serrations. The flanges can be tapped for studs when specified. Unless otherwise specified flanges will have bolt holes straddling centerline. Bolt hole drilling can be rotated when so specified. Flanged fittings shall be rated for 250 psi working pressure for sizes 4" – 64".
 - c. *Bolts, Studs and Nuts:* Bolts are hex head machine bolts with regular or heavy hex nuts as specified. Studs with one hex nut each are required for tapped flanges. Bolts, studs and nuts are low-carbon steel per ASTM A307 Grade B; threads are ANSI B1.1 Coarse Thread Series, Class 2A external and Class 2B internal. Recommended studs are the same length as corresponding bolt length with "tap end" threaded approximately the same length as flange thickness.
3. *Coating:* All fittings shall be epoxy coated internally and externally in accordance to AWWA C116 (protective fusion-bonded epoxy coatings for the interior and exterior surfaces of ductile-iron and gray-iron fittings for water supply service).
 4. *Testing:* All sizes of fittings shall be chosen at random and subject to a pressure test of 1.1 MPa (160 psi). If any sample tested cracks or leaks, the lot represented will be rejected. The manufacturer shall furnish one certified copy of the reports to the Calamba Water District.
 5. *Certification:* The manufacturer shall furnish a sworn statement that the inspection and metallurgical and pressure tests have been results thereof comply with the requirements of the applicable Standard(s) herein specified. A copy of the Certification shall be submitted to Calamba Water District.

Technical Specification: Gate Valves

1. Valve Description

All valves shall conform to the AWWA Specifications C509 (STANDARD FOR RESILIENT SEATED GATE VALVES). Component parts are constructed of heavy, rugged proportions for extra strength to withstand pipe strain and possible shifting in underground service. Gate valves shall be flange or mechanical joint where the pipelines design pressure is 1.0MPa (150 psi) or less be designed for minimum water working pressure of 1.0 MPa (150 psi).

2. Valve Construction

The body shall be cast iron. Manufactured from USA, Middle East.

The gate valve shall be flanged and/or mechanical joint. Flanges and drilling shall conform to ISO 7005 – 2

All the resilient gate valves have a full bore with same nominal diameter as the pipeline. The full bore ensures minimum pressure loss, as the valve does not cause any reduction in the flow path, other great advantages are that the full bore allows drilling and facilitates pipe pigging to ensure high quality potable water.

The ductile iron core is full vulcanized with EPDM rubber internally and externally. No iron parts are exposed to the medium and the excellent rubber vulcanization prevents creeping corrosion underneath the rubber.

The fixed integral wedge nut reduces the number of moveable valve parts and risk of malfunction.

The valve shall have 50mm (2 in) square operating nut with cast arrow showing direction in which the nut is to be turned open the valve.

The body and cover bolts and nuts shall meet specifications of ASTM A-307 (rust roofed).

The valve shall be encapsulated and shall conform to the following dimensions:

Nominal Size, in	2	3	4	6	8	10
Nominal Diameter, mm	50	75	100	150	200	250
Length (Face to Face) m m	178-180	203-205	221-229	267-268	292-295	330-335
Height (above Centerline) m m	241-326	297-318	334-345	443-448	544-562	627-750
Weight k g	13-18	20-23	26-33	51-53	83	128-132

3. Coatings

All valve casting to be shot blasted prior to epoxy coating. Epoxy coating shall conform to AWWA Specifications DIN 30677-2 (PROTECTIVE EPOXY INTERIOR COATINGS FOR VALVES AND HYDRANTS). Body and bonnet are coated internally and externally. Layer thickness shall be 250-400 microns on flat and pressurized parts and 150-300 microns on convex outer edge.

4. Testing

For every size and type of wedging mechanism, two sample gate valves representing each lot of one hundred (100) pieces or less shall be tested for reliability of operation. Any sample tested that failed to passed specification and testing shall automatically will be rejected. This test is in addition to those required under section 28.2 and 28.3 of AWWA C500. The shell and seat should be tested equal to 1.5 MPa and 1.1 MPa respectively. The manufacturer shall furnish one certified copy of the test reports to the Calamba Water District.

5. Certification

The manufacturer shall furnish a sworn statement that the inspection and metallurgical test and pressure test have been results thereof comply with the requirements of the applicable Standard(s) herein specified. A copy of the Certification including compliance with NSF/ANSI 61 shall be submitted to Calamba Water District.

Technical Specification: Unplasticized Polyvinyl Chloride Pipe

1. *Pipe Description:* Pipes and fittings shall conform to the requirements of AWWA C900 or PNS 65 and shall be pressure Class 150 (Series 8).
2. Comply with ISO 1452 and lead free with 1CP-EOS Method and machine installed Integral Fixed Seal. The seal is glass reinforced polypropylene (PP) highly flexible EDPM Rubber homogeneous bonded to PP ring.
3. *Pipe and Fitting Construction:* The pipe and fittings shall have steel pipe equivalent or cast iron equivalent outside dimensions. Rating as indicated with integral push-on bell with elastomeric gasket seal on one end and plain beveled on the other end. PVC Pipes and fittings shall be made from clean, blue-pigmented, virgin, NSF approved Class 12454-A or 12454-B PVC compound conforming to the requirements of ASTM D1784. All pipes shall be furnished in lengths of 6 meters.
4. *Pipe Dimensions:* Pipe shall conform to the following dimensions:

Nominal Pipe Size, in	2	3	4	6	8	10	12
Nominal Diameter, mm	50	75	100	150	200	250	300
Outside Diameter, mm							
min	63	90	110	160	225	280	315
max	63.3	90.3	110.4	160.5	225.7	280.9	316.0
Wall Thickness, mm							
min	3.6	5.2	6.6	9.5	11.9	13.4	18.7
max	4.16	5.92	7.13	10.32	14.39	17.80	20.00

5. *Markings:* Pipes to be marked with trace ability codes.
6. *Random Testing:* For every size, two (2) sample pipes representing each lot of one hundred (100) pieces or less shall be tested for compliance with this specification. Any visible defect or failure to meet the quality standards herein will be grounds for rejecting the entire order.
7. *Certification:* The manufacturer shall furnish a sworn statement that the inspection and metallurgical and pressure tests have been results thereof comply with the requirements of the applicable Standard(s) herein specified. A copy of the Certification shall be submitted to Calamba Water District.

Technical Specification: Pressure Gauge

1. Gauge Description

The pressure gauge and shut-off cock shall be installed on the discharge line of each pumping facility on in-line booster pumping stations; a pressure gauge shall also be installed on the suction side. Gauge shall be calibrated to read 1.0 MPa (150 psi). The pressure elements of the gauge shall be protected against excessive pulsations and surges by an external pressure snubbed.

2. Gauge Construction

<i>Accuracy:</i>	3-2-3%, ASME Grade B
<i>Dial Size:</i>	3.5"
	Black figures on white background
	1001TH – Back mount, window with clamp
	1005H – polycarbonate window
<i>Case Type:</i>	black steel case and 304 stainless roll ring
<i>Window:</i>	polycarbonate window (or safety glass window)
<i>Face and Pointer:</i>	quality steel finish
<i>Movement:</i>	brass
	Movement with polyester segment
<i>Sensing Element:</i>	Bourdon Tube
	1 1/2" – 1/8" back
<i>Tube Materials:</i>	brass or phosphor bronze tube
<i>Connection:</i>	Brass bottom connection
	Center back connection
	Lower back connection
	Center back connection with front flange
	Center back connection with U-clamp
	Bottom connection with rear flange
<i>Thread:</i>	1/8", 1/4", 3/8", 1/2" BSP, NPT, BSPT
<i>Pressure range:</i>	Vacuum to 6000 psi
<i>Type Numbers:</i>	1005H – Back mount, ABS
	1000H – Steel with glass window

Application: For rugged applications and harsh environment conditions where pulsation and vibration is a problem.

3. Testing

Each pressure gauge shall be tested. The manufacturer shall furnish one certified copy of the test reports to the Calamba Water District.

4. Certification

The manufacturer shall furnish a sworn statement that the inspection and the entire specified test have been results thereof comply with the requirements of the applicable standard(s) herein specified. A copy of the CERTIFICATION sent to Calamba Water District.

Technical Specification: Valve Box Cover / Manhole Frame

- 1.** The manhole frame and cover shall be round manufactured from cast iron or ductile iron conforming to ASTM A-126, Class B or ASTM A-536-80, Class 400 respectively.
- 2.** The frame depth shall not exceed 200mm and four (4) bolt holes shall be provided for anchoring purposes.
- 3.** The cover shall be 575mm – 625mm in diameter. The face of the cover shall include the name and/or logo of Calamba Water District. The name/logo shall be cast into the cover during manufacture.
- 4.** The cover shall be connected to the frame with a hinged. A locking mechanism shall be included to prevent unauthorized access.
- 5.** The cover shall be one-man operable and shall be designed for a maximum highway loading.
- 6. Certification:** The manufacturer shall furnish a sworn statement that the inspection and metallurgical and pressure tests have been results thereof comply with the requirements of the applicable Standard(s) herein specified. A copy of the Certification shall be submitted to Calamba Water District.

Technical Specification: Gate Valves

1. Valve Description

All valves shall conform to the AWWA Specifications C509 (STANDARD FOR RESILIENT SEATED GATE VALVES). Component parts are constructed of heavy, rugged proportions for extra strength to withstand pipe strain and possible shifting in underground service. Gate valves shall be flange or mechanical joint where the pipelines design pressure is 1.0MPa (150 psi) or less be designed for minimum water working pressure of 1.0 MPa (150 psi).

2. Valve Construction

The body shall be cast iron.

The gate valve shall be flanged and mechanical joint. Flanges and drilling shall conform to ISO 7005 – 2

All the resilient gate valves have a full bore with same nominal diameter as the pipeline. The full bore ensures minimum pressure loss, as the valve does not cause any reduction in the flow path, other great advantages are that the full bore allows drilling and facilitates pipe pigging to ensure high quality potable water.

The ductile iron core is full vulcanized with EPDM rubber internally and externally. No iron parts are exposed to the medium and the excellent rubber vulcanization prevents creeping corrosion underneath the rubber.

The fixed integral wedge nut reduces the number of moveable valve parts and risk of malfunction.

The valve shall be non-rising stem with a minimum two "O" ring seals (at least one above the stem collar), or rising stem.

The valve shall have 50mm (2 in) square operating nut with cast arrow showing direction in which the nut is to be turned open the valve.

The body and cover bolts and nuts shall meet specifications of ASTM A-307 (rust proofed).

The valve shall be encapsulated and shall conform to the following dimensions:

Nominal Size, in	2	3	4	6	8	10
Nominal Diameter, mm	50	75	100	150	200	250
Length (Face to Face)	178-180	203-205	221-229	267-268	292-295	330-335

Technical Specification: Air Release and Air/Vacuum Valves

1. Air release and air/vacuum valves shall conform to the requirements of AWWA C512 (AIR RELEASE, AIR/VACUUM AND COMBINATION AIR VALVES FOR WATERWORKS SERVICE).
2. 25mm (1") air release and air/vacuum valves shall be single body type with National Pipe Threaded (NPT) inlet and outlet configurations.
3. Epoxy lining and coatings for valves shall conform to AWWA C550 (PROTECTIVE EPOXY INTERIOR COATINGS FOR VALVES AND HYDRANTS).
4. *Certification:* The manufacturer shall furnish a sworn statement that the inspection and metallurgical and pressure tests have been results thereof comply with the requirements of the applicable Standard(s) herein specified. A copy of the Certification shall be submitted to Calamba Water District.

Technical Specification: Check Valves

1. Check valves shall be resilient seated conforming to AWWA C508 (Swing-check Valves for Waterworks Service 2-in through 24-in (50-mm through 600-mm) NPS) or the latest revision or its equivalent.
2. The valve shall be designed for a minimum water working pressure of 1.0 MPa (150psi)
3. The valve body and cover shall be cast in Ductile Iron and coated with a thermally applied polymeric coating.
4. The disc shall be encapsulated in EPDM rubber.
5. The check valve shall be designed so that the disc and body seat may be easily removed without removing the valve from the line.
6. The check valve shall be flanged type conforming to ISO 7005 – 2.

Technical Specification: Brass Gate Valves

1. Valve Description

Valves shall be full port, screwed-in bonnet and non-rising stem.

2. Valve Construction

The valve body, bonnet and solid wedge disc shall be brass conforming to ASTM B584 Alloy C84400-1996 or the latest revision or its equivalent. The minimum

Height (above Centerline)	m m	241-326	297-318	334-345	443-448	544-562	627-750
Weight	k g	13-18	20-23	26-33	51-53	83	128-132

3. Coatings

All valve casting to be shot blasted prior to epoxy coating. Epoxy coating shall conform to AWWA Specifications C550 (PROTECTIVE EPOXY INTERIOR COATINGS FOR VALVES AND HYDRANTS). Body and bonnet are coated internally and externally. Layer thickness shall be 250-400 microns on flat and pressurized parts and 150-300 microns on convex outer edge.

4. Testing

For every size and type of wedging mechanism, two sample gate valves representing each lot of one hundred (100) pieces or less shall be tested for reliability of operation. This test is in addition to those required under section 28.2 and 28.3 of AWWA C500. The shell and seat should be tested equal to 1.5 MPa and 1.1 MPa respectively. The manufacturer shall furnish one certified copy of the test reports to the Calamba Water District.

5. Certification

The manufacturer shall furnish a sworn statement that the inspection and metallurgical test and pressure test have been results thereof comply with the requirements of the applicable Standard(s) herein specified. A copy of the Certification including compliance with NSF/ANSI 61 shall be submitted to Calamba Water District.