SECTION 21 0523

GENERAL-DUTY VALVES FOR WATER-BASED FIRE-SUPPRESSION PIPING

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LANL MASTER SPECIFICATION SECTION

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| Rev. 0: New specification section adopting content aligned with commercial industry practice. |

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This template must be edited for each project.  In doing so, specifier must add job-specific requirements.  Brackets are used in the text to indicate designer choices or locations where text must be supplied by the designer.  Once the choice is made or text supplied, remove the brackets.  The section must also be edited to delete requirements for processes, items, or designs that are not included in the project -- and specifier’s notes such as these.  To seek a variance from applicable requirements, contact the Engineering Standards Manual Fire [POC](http://engstandards.lanl.gov/POCs.shtml#fire). Please contact POC with suggestions for improvement as well.

When assembling a specification package, include sections from all applicable Divisions, especially Division 1, General Requirements.

This template was developed for ML-4 projects.  For ML-1, 2, and 3 applications, additional requirements and independent reviews should be added if increased confidence in procurement or execution is desired; see ESM Chapter 1 Section Z10 Specifications and Quality sections.
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PART 1 GENERAL

1. SECTION INCLUDES
2. Two-piece ball valves with indicators.
3. Bronze butterfly valves with indicators.
4. Iron butterfly valves with indicators.
5. Check valves.
6. Bronze OS&Y gate valves.
7. Iron OS&Y gate valves.
8. NRS gate valves.
9. Indicator posts.
10. Trim and drain valves.
11. RELATED SECTIONS
12. Section 07 8400, *Firestopping*
13. Section 21 1200, *Fire-Suppression Standpipes*
14. Section 21 1300, *Fire-Suppression Sprinkler Systems*
15. Section 28 4600*, Fire Detection and Alarm*
16. ABBREVIATIONS AND ACRONYMS
17. EPDM: Ethylene-propylene diene monomer.
18. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
19. NRS: Non-rising stem.
20. OS&Y: Outside screw and yoke.
21. PTFE: Polytetrafluoroethylene.
22. SBR: Styrene-butadiene rubber.
23. REFERENCES
24. American Society of Mechanical Engineers (ASME)
25. ASME B1.20.1 - *Pipe Threads, General Purpose, Inch*
26. ASME B16.1 - *Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250*
27. ASME B16.5 – *Pipe Flanges and Flanged Fittings NPS ½ through NPS 24, Metric/Inch Standard*
28. ASME B31.9 - *Building Services Piping*
29. ASME BPVC-IX - *Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators*
30. American Water Works Association (AWWA)
31. AWWA C508 - *Swing-Check Valves for Waterworks Service, 2-In. Through 48-In. (50-mm Through 1,200-mm) NPS*
32. AWWA C509 - *Resilient-Seated Gate Valves for Water Supply Service*
33. AWWA C606 - *Grooved and Shouldered Joints*
34. FM Approvals
35. FM (AG) - *FM Approval Guide*
36. National Fire Protection Association (NFPA)
37. NFPA 13 - *Standard for the Installation of Sprinkler Systems*
38. NFPA 13R - *Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies*
39. NFPA 14 – *Standard for the Installation of Standpipe and Hose Systems*
40. NFPA 20 – *Standard for the Installation of Stationary Pumps for Fire Protection*
41. Underwriters Laboratories Inc. (UL)
42. UL (DIR) - *Online Certifications Directory*
43. UL 262 - *Gate Valves for Fire-Protection Service*
44. UL 312 - *Check Valves for Fire-Protection Service*
45. UL 789 - *Indicator Posts for Fire-Protection Service*
46. UL 1091 - *Standard for Butterfly Valves for Fire-Protection Service*
47. ACTION SUBMITTALS
48. Product Data: Provide data on valves including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
49. INFORMATIONAL SUBMITTALS
50. Warranty: Submit manufacturer warranty and ensure that forms have been completed and registered with manufacturer.
51. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts listings.
52. QUALITY ASSURANCE
53. Where listed products are specified, provide products listed, classified, and labeled by UL and/or FM as suitable for the purpose indicated.
54. DELIVERY, STORAGE, AND HANDLING
55. Use the following precautions during storage:
56. Maintain valve end protection and protect flanges and specialties from dirt.
	1. Provide temporary inlet and outlet caps.
	2. Maintain caps in place until installation.
57. Store valves in shipping containers and maintain in place until installation.
	1. Store valves indoors and maintain at higher than ambient dew point temperature.
	2. If outdoor storage is unavoidable, store valves off the ground in watertight enclosures.
58. Use the following precautions for handling:
59. Use sling to handle large valves, rigged to avoid damage to exposed parts.
60. Do not use operating handles or stems as lifting or rigging points.

PART 2 PRODUCTS

1. GENERAL REQUIREMENTS
2. UL Listed: Provide valves listed in [UL (DIR)](http://www.ul.com/) under following headings and bearing UL mark:
3. Main Level: HAMV - Fire Main Equipment.
	1. Level 1: HCBZ - Indicator Posts, Gate Valve.
	2. Level 1: HLOT - Valves.
	3. Level 3: HLUG - Ball Valves, System Control.
	4. Level 3: HLXS - Butterfly Valves.
	5. Level 3: HMER - Check Valves.
	6. Level 3: HMRZ - Gate Valves.
4. Main Level: VDGT - Sprinkler System & Water Spray System Devices.
	1. Level 1: VQGU - Valves, Trim, and Drain.
5. FM Global Approved: Provide valves listed in [FM (AG)](http://www.fmglobal.com) Approval Guide under the following headings:
6. Automated Sprinkler Systems:
	1. Indicator posts.
	2. Valves:
7. Gate valves.
8. Single check valves.
9. Miscellaneous valves.
10. ASME Compliance:
11. [ASME B16.1](http://global.ihs.com/doc_detail.cfm?rid=BSD&document_name=ASME%20B16.1) for flanges on iron valves.
12. [ASME B1.20.1](https://global.ihs.com/doc_detail.cfm?rid=BSD&document_name=ASME%20B1.20.1) for threads on threaded-end valves.
13. [ASME B31.9](https://global.ihs.com/doc_detail.cfm?rid=BSD&document_name=ASME%20B31.9) for building services piping valves.
14. Comply with [AWWA C606](https://global.ihs.com/doc_detail.cfm?rid=BSD&document_name=AWWA%20C606) for grooved-end connections.
15. Comply with NFPA 13 for valves.
16. Valve Pressure Ratings: Not less than minimum pressure rating indicated or higher as required.
17. Valve Sizes: Same as upstream piping unless otherwise indicated.
18. Valve Actuator Types:
19. Worm-gear actuator with handwheel for quarter-turn valves, except trim and drain valves.
20. Handwheel: For other than quarter-turn trim and drain valves.
21. Hand-lever: For quarter-turn trim and drain valves 2 NPS *and smaller.*
22. TWO-PIECE BALL VALVES WITH INDICATORS
23. Manufacturers:
24. FNW
25. Nibco
26. Reliable
27. Substitutions: [Alternate products may be accepted, follow Section 01 2500, *Substitution Procedures*; or Not permitted – No substitutions].
28. [UL 1091](http://global.ihs.com/doc_detail.cfm?rid=BSD&document_name=UL%201091), except with ball instead of disc and [FM (AG)](http://www.fmglobal.com) standard listing for indicating valves (butterfly or ball type), Class Number 1112.
29. Description:
30. Minimum Pressure Rating: 175 psig
31. Body Design: Two piece.
32. Body Material: Forged brass or bronze.
33. Port Size: Full or standard.
34. Seat: PTFE.
35. Stem: Bronze or stainless steel.
36. Ball: Chrome-plated brass.
37. Actuator: Worm gear or traveling nut.
38. Supervisory Switch: Internal or external.
39. End Connections for Valves 1 NPS through 2 NPS: Threaded ends.
40. End Connections for Valves 2-1/2 NPS: Grooved ends.
41. BRONZE BUTTERFLY VALVES WITH INDICATORS
42. Manufacturers:
43. FNW
44. Reliable
45. \_\_\_\_\_\_\_\_\_\_
46. Substitutions: [Alternate products may be accepted, follow Section 01 2500, *Substitution Procedures*; or Not permitted – No substitutions].
47. [UL 1091](http://global.ihs.com/doc_detail.cfm?rid=BSD&document_name=UL%201091) and [FM (AG)](http://www.fmglobal.com) standard listing for indicating valves, (butterfly or ball type), Class Number 1112.
48. Minimum Pressure Rating: 175 psig.
49. Body Material: Bronze.
50. Seat: EPDM.
51. Stem: Bronze or stainless steel.
52. Disc: [Bronze; Stainless steel; or \_\_\_\_\_\_\_][with EPDM coating; \_\_\_\_\_\_\_\_\_\_\_; or None - N/A].
53. Actuator: Worm gear or traveling nut.
54. Supervisory Switch: Internal or external.
55. End Connections for Valves 1 NPS through 2 NPS: Threaded ends.
56. End Connections for Valves 2-1/2 NPS: Grooved ends.
57. IRON BUTTERFLY VALVES WITH INDICATORS
58. Manufacturers:
59. FNW
60. Kennedy Valve
61. Nibco
62. Reliable
63. Substitutions: [Alternate products may be accepted, follow Section 01 2500, *Substitution Procedures*; or Not permitted – No substitutions].
64. [UL 1091](http://global.ihs.com/doc_detail.cfm?rid=BSD&document_name=UL%201091) and [FM (AG)](http://www.fmglobal.com) standard listing for indicating valves (butterfly or ball type), Class Number 112.
65. Minimum Pressure Rating: 175 psig.
66. Body Material: Cast or ductile iron with [nylon; EPDM; epoxy; polyamide; or \_\_\_\_\_\_\_] coating.
67. Seat: EPDM.
68. Stem: Stainless steel.
69. Disc: Ductile iron, [nickel plated; EPDM or SBR coated; or \_\_\_\_\_\_\_\_\_\_\_].
70. Actuator: Worm gear or traveling nut.
71. Supervisory Switch: Internal or external.
72. Body Design: Grooved-end connections.
73. CHECK VALVES
74. Manufacturers:
75. FNW.
76. Kennedy Valve
77. Nibco
78. Reliable.
79. \_\_\_\_\_\_\_\_\_\_
80. Substitutions: [Alternate products may be accepted, follow Section 01 2500, *Substitution Procedures*; or Not permitted – No substitutions].
81. [UL 312](http://global.ihs.com/doc_detail.cfm?rid=BSD&document_name=UL%20312) and [FM (AG)](http://www.fmglobal.com) standard listing for check valves, Class Number 1045.
82. [AWWA C508](https://global.ihs.com/doc_detail.cfm?rid=BSD&document_name=AWWA%20C508) compliant check valves.
83. Minimum Pressure Rating: 175 psig.
84. Type: Center guided check valve.
85. Body Material: Cast iron, ductile iron.
86. Center guided check with elastomeric seal.
87. Hinge Spring: Stainless steel.
88. End Connections: Flanged, grooved, or threaded.
89. BRONZE OS&Y GATE VALVES
90. Manufacturers:
91. FNW
92. Nibco
93. Reliable
94. \_\_\_\_\_\_\_\_\_\_
95. Substitutions: [Alternate products may be accepted, follow Section 01 2500, *Substitution Procedures*; or Not permitted – No substitutions].
96. [UL 262](http://global.ihs.com/doc_detail.cfm?rid=BSD&document_name=UL%20262) and [FM (AG)](http://www.fmglobal.com) standard listing for fire-service water control valves (OS&Y and NRS-type gate valves).
97. Minimum Pressure Rating: 175 psig.
98. Body and Bonnet Material: Bronze or brass.
99. Wedge: One-piece bronze or brass.
100. Wedge Seat: Bronze.
101. Stem: Bronze or brass.
102. Packing: Non-asbestos PTFE.
103. Supervisory Switch: External.
104. End Connections: Threaded.
105. IRON OS&Y GATE VALVES
106. Manufacturers:
107. FNW
108. Kennedy Valve
109. Nibco
110. Reliable
111. \_\_\_\_\_\_\_\_\_\_\_\_.
112. Substitutions: [Alternate products may be accepted, follow Section 01 2500, *Substitution Procedures*; or Not permitted – No substitutions].
113. Listed and Body Marked: [AWWA C509](https://global.ihs.com/doc_detail.cfm?rid=BSD&document_name=AWWA%20C509), [FM (AG)](http://www.fmglobal.com), and [UL 262](http://global.ihs.com/doc_detail.cfm?rid=BSD&document_name=UL%20262).
114. Size: [As indicated on drawings; 2.5 inch; 3 inch ; 4 inch; 6 inch; 8 inch; 10 inch; \_\_\_\_\_ inch].
115. End Connections: [Flanged; Grooved; Threaded; or \_\_\_\_\_\_\_].
116. Maximum Working Pressure: [175 psi; 200 psi; 300 psi; \_\_\_\_\_ psi].
117. Working Temperature: [32 to 175 degrees Fahrenheit; \_\_\_\_\_ degrees Fahrenheit].
118. Body and Bonnet Material: Cast or ductile iron.
119. Wedge: Cast or ductile iron, or bronze [with elastomeric coating; \_\_\_\_\_\_\_\_\_\_\_; or None - N/A].
120. Stem: Brass, bronze, or stainless steel.
121. Packing: Non-asbestos PTFE.
122. Supervisory Switch: External.
123. NRS GATE VALVES
124. Manufacturers:
125. FNW
126. Nibco
127. Reliable
128. \_\_\_\_\_\_\_\_\_\_
129. Substitutions: [Alternate products may be accepted, follow Section 01 2500, *Substitution Procedures*; or Not permitted – No substitutions].
130. [UL 262](http://global.ihs.com/doc_detail.cfm?rid=BSD&document_name=UL%20262) and [FM (AG)](http://www.fmglobal.com) standard listing for fire-service water control valves (OS&Y and NRS-type gate valves).
131. Minimum Pressure Rating: 175 psig.
132. Body and Bonnet Material: Cast or ductile iron.
133. Wedge: Cast or ductile iron [ with elastomeric coating; \_\_\_\_\_\_\_\_\_\_\_; or None - N/A].
134. Wedge Seat: Cast or ductile iron, or bronze [ with elastomeric coating; \_\_\_\_\_\_\_\_\_\_\_; or None - N/A].
135. Stem: Brass or bronze.
136. Packing: Non-asbestos PTFE.
137. Supervisory Switch: External.
138. End Connections: [Flanged; Grooved; Threaded; or \_\_\_\_\_\_\_].
139. INDICATOR POSTS
140. Manufacturers:
141. American Flow Control
142. Kennedy Valve
143. Nibco
144. Mueller
145. \_\_\_\_\_\_\_\_\_\_
146. Substitutions: [Alternate products may be accepted, follow Section 01 2500, *Substitution Procedures*; or Not permitted – No substitutions].
147. [UL 789](https://global.ihs.com/doc_detail.cfm?rid=BSD&document_name=UL%20789) and [FM (AG)](http://www.fmglobal.com) standard listing for indicator posts.
148. Type: [Underground; Pit; Wall; or \_\_\_\_\_\_\_\_\_\_\_].
149. Base Barrel Material: [Cast or ductile iron; PVC; or \_\_\_\_\_\_\_].
150. Extension Barrel for Adjustable Length Indicator Posts: Cast or ductile iron.
151. Cap: Cast or ductile iron.
152. Operation: [Wrench; Handwheel; or \_\_\_\_\_\_\_\_\_].
153. TRIM AND DRAIN VALVES
154. Ball Valves:
155. Manufacturers:
	1. Reliable
	2. AFG Manufacturing
	3. Argco
	4. Viking
	5. \_\_\_\_\_\_\_\_\_\_\_
	6. Substitutions: [Alternate products may be accepted, follow Section 01 2500, *Substitution Procedures*; or Not permitted – No substitutions].
156. Description:
	1. Pressure Rating: [175 psig; 250 psig; 300 psig; \_\_\_\_\_ psig].
	2. Body Design: Two piece.
	3. Body Material: Forged brass or bronze.
	4. Port Size: Full or standard.
	5. Seat: PTFE.
	6. Stem: Bronze or stainless steel.
	7. Ball: Chrome-plated brass.
	8. Actuator: Hand-lever.
	9. End Connections for Valves 1 NPS through 2-1/2 NPS: Threaded ends.
	10. End Connections for Valves 1-1/4 NPSand 2-1/2 NPS: Grooved ends.

PART 3 EXECUTION

1. EXAMINATION
2. Confirm valve interior to be free of foreign matter and corrosion.
3. Remove packing materials.
4. Examine guides and seats by operating valves from the fully open position to the fully closed position.
5. Examine valve threads and mating pipe for form and cleanliness.
6. Examine mating flange faces for conditions that might cause leakage.
7. Check bolting for proper size, length, and material.
8. Verify gasket for size, defects, damage, and suitable material composition for service.
9. Replace all defective valves with new valves.
10. INSTALLATION
11. Install listed fire protection shutoff valves supervised-open, located to control sources of water supply except from fire department connections.
12. Install permanent identification signs indicating portion of system controlled by each valve.
13. Install check valve in water supply connections and backflow preventer at potable water supply connections.
14. Valves with threaded connections to have unions at equipment arranged for easy access, service, maintenance, and equipment removal without system shutdown.
15. Valves in horizontal piping installed with stem at or above the pipe center.
16. Position valves to allow full stem movement.
17. Install valve tags***.***

END OF SECTION

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Do not delete the following reference information:

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THE FOLLOWING STATEMENT IS FOR LANL USE ONLY

This project specification section is based on LANL Master Specification Section 21 0523 Rev. 0, dated December 5, 2024.