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This MANU-SPEC[®] utilizes the Construction Specifications Institute (CSI) *Manual of Practice*, including *MasterFormat*[™], *SectionFormat*[™] and *PageFormat*[™]. A MANU-SPEC is a manufacturer-specific proprietary product specification using the proprietary method of specifying applicable to project specifications and master guide specifications. Optional text is indicated by brackets []; delete optional text in final copy of specification. Specifier Notes typically precede specification text; delete notes in final copy of specification. Trade/brand names with appropriate symbols typically are used in Specifier Notes; symbols are not used in specification text. Metric conversion, where used, is soft metric conversion.

This MANU-SPEC specifies valves and accessories. These products are manufactured by Hayward Flow Control Systems. Revise MANU-SPEC section number and title below to suit project requirements, specification practices and section content. Refer to CSI *MasterFormat* for other section numbers and titles.

SECTION 23 05 23
GENERAL-DUTY VALVES FOR HVAC PIPING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 1. Ball Valves.
 2. Check Valves.
 3. Butterfly Valves.
 4. Swing Check Valve.
 5. Y Check Valves.
 6. Y Strainers.
 7. Basket Strainers.
 8. Bag Filters Housings.
 9. Filter Cartridges and Bags.
 10. Operating Handles.
 11. Electric Actuators.
 12. Pneumatic Actuators.

Specifier Note: Revise paragraph below to suit project requirements. Add section numbers and titles in accordance with CSI *MasterFormat* and specifier's practice.

- B. Related Sections:
 1. Section [_____].

Specifier Note: Article below includes submittal of relevant data to be furnished by Contractor before, during or after construction. Coordinate this article with Architect's and Contractor's duties and responsibilities in Conditions of the Contract and Division 01 Submittal Procedures Section.

1.02 SUBMITTALS



- A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 01 Submittal Procedures.
- B. Product Data: Submit manufacturer’s complete product literature for specified valves, actuators and accessories, detailed installation diagrams and instructions, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Samples:

Specifier Note: Describe specific types and quantities of samples required to determine style, finish or other characteristics.

- 1. Submit [One] [_____] sample[s] of each type of valve, actuator and accessory.
- 2. Identify each sample by label indicating applicable specification paragraph number, brand name and model number.
- 3. After approval, samples will be returned for incorporation into work.
- D. Quality Assurance:
 - 1. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
 - 2. Manufacturer’s Instructions: Manufacturer’s installation instructions.

Specifier Note: Coordinate paragraph below with Part 3 Field Quality Requirements Article. Retain or delete as applicable.

- E. Manufacturer’s Field Reports: Manufacturer’s field reports specified.
- F. Closeout Submittals: Submit the following:
 - 1. Warranty: Manufacturer’s standard warranty document executed by authorized company official. Manufacturer’s warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.
 - 2. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 01 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.

1.03 QUALITY ASSURANCE

- A. Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.

Specifier Note: Paragraph below should list obligations for compliance with specific code requirements particular to this section. General statements to comply with a particular code are typically addressed in Conditions of the Contract and Division 01 Regulatory Requirements Section. Repetitive statements should be avoided.

- B. Preinstallation Meetings: Conduct preinstallation meeting to verify project requirements, manufacturer’s installation instructions and manufacturer’s warranty requirements. Comply with Division 01 Project Management and Coordination (Project Meetings).

1.04 DELIVERY, STORAGE & HANDLING

- A. General: Comply with Division 01 Product Requirements.
- B. Ordering: Comply with manufacturer’s ordering instructions and lead time requirements to avoid construction delays.
- C. Delivery, Storage and Protection:
 - 1. Deliver, store and handle in accordance with Section [01 61 00 - Common Product Requirements] [_____].
 - 2. Deliver, store and handle materials in accordance with manufacturer’s written instructions.
 - 3. Deliver in original packaging with labels and identification intact.
- D. Waste Management and Disposal:

Specifier Note: ENVIRONMENT: The disposal of packaging waste into landfill site demonstrates an inefficient use of natural resources and consumes valuable landfill space.

1. Separate waste materials for [Reuse] [And] [Recycling] [_____] in accordance with Section [01 74 19 - Construction Waste Management and Disposal] [_____].
2. Remove from site and dispose of packaging materials at appropriate recycling facilities.
3. Collect and separate for disposal [Paper] [Plastic] [Polystyrene] [Corrugated cardboard] [_____] packaging material [In appropriate onsite bins] [_____] for recycling.

1.05 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

Specifier Note: Coordinate article below with Conditions of the Contract and with Division 01 Closeout Submittals (Warranty).

1.06 WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents. Manufacturer's standard warranty:
- C. Warranty Period: [Specify term.] years commencing on Date of Substantial Completion.

1.07 MAINTENANCE

Specifier Note: Use the following article to specify extra materials for remote locations or where size and type of projects require spare parts stored at the project.

- A. Extra Materials:
 1. Furnish the following spare parts:
 - a. Valve Seats: One for every [10] [_____] valves each size, minimum [1] [_____].
 - b. Discs: One for every [10] [_____] valves, each size, minimum [1] [_____].
 - c. O-Rings: One for every [10] [_____] valves, each size, minimum [1] [_____].
 - d. Valve Handles: [2] [_____] of each size.

PART 2 PRODUCTS

Specifier Note: Retain article below for proprietary method specification. Add product attributes, performance characteristics, material standards and descriptions as applicable. Use of such phrases as "or equal" or "or approved equal" or similar phrases may cause ambiguity in specifications. Such phrases require verification (procedural, legal and regulatory) and assignment of responsibility for determining "or equal" products.

2.01 VALVES AND ACCESSORIES

- A. Manufacturer: Hayward Flow Control Systems.
 1. Contact: 1 Hayward Industrial Drive, Clemmons, NC 27012; Telephone: (888) 429-4635, (336) 712-9900; Fax: (336) 712-9935; E-mail: hiflow@haywardnet.com; website: www.haywardflowcontrol.com.
- B. Proprietary Products/Systems: Hayward Flow Control Systems valves and actuators.
- C. Ball Valves (1/4 inch - 6 inches (6.4 - 152 mm)): Plastic, full port true union valves designed for easy service and automation with reversible PTFE seats, fine pitch seal retainer threads and double O-ring stem seals.
 1. Material: [PVC] [Corzan CPVC] [PPL].

Specifier Note: Ball valves in PPL are available in sizes 1/2 inch - 2 inches (12.7 - 51 mm) only.

2. Size: [1/4 inch - 6 inches (6.4 - 152 mm)] [_____] inches (_____] mm).
3. End Connection:
 - a. 1/4 inch - 3/8 inch (6.4 - 9.5 mm): [Socket] [Threaded].
 - b. 1/2 inch - 4 inches (12.7 - 102 mm): [Socket] [Threaded] [Flanged].

- c. 1/2 inch - 2 inches (12.7 - 51 mm): [PPL] [Threaded].
- d. 6 inches (152 mm): Flanged.
- 4. Seals: [FPM] [EPDM].

Specifier Note: Select and specify options to suit valve function and project requirements. Coordinate lever handle assemblies and options with information specified for these items.

- 5. Options: Provide options as follows: [Stem extensions] [Lockouts] [2 inch (51 mm) square operating nuts] [Pneumatic actuators] [Electric actuators].
- 6. Handle: [Manufacturer's standard] [Lever handle assembly {With} {Failsafe spring} {Failsafe spring and limit switch}] [Limit switch NEMA 4X] [Limit switch NEMA 4 and 7].
- 7. Acceptable Material: Hayward Flow Control Systems True Union Ball Valves.
- D. Check Valves (1/4 inch - 6 inches (6.4 - 152 mm)): Plastic, full port, true union valves, designed for easy removal and plastic ball in elastomer square cut seat.
 - 1. Material: [PVC] [Corzan CPVC] [PPL].

Specifier Note: Check valves in PPL are available in sizes 1/2 inch - 2 inches (12.7 - 51 mm) only.

- 2. Size: [1/4 inch - 6 inches (6.4 - 152 mm)] [_____ inches (_____ mm)].
- 3. End Connection:
 - a. 1/4 inch - 3/8 inch (6.4 - 9.5 mm): [Socket] [Threaded].
 - b. 1/2 inch - 4 inches (12.7 - 102 mm): [Socket] [Threaded] [Flanged].
 - c. 1/2 inch - 2 inches (12.7 - 51 mm): [PPL] [Threaded].
 - d. 6 inches (152 mm): Flanged.
- 4. Seals: [FPM] [EPDM].

Specifier Note: Select and specify options to suit valve function and project requirements.

- 5. Options: Foot valve screen.
- 6. Acceptable Material: Hayward Flow Control Systems True Union Ball Check Valves.
- E. Butterfly Valves (1 1/2 inches - 12 inches (38 - 305 mm)): Plastic, rated to 150 psi (_____), 1-piece body with fully supported flanged bolt holes, integral mounting pad, blowout-proof stainless steel stem, full body liner with V-notch retention design, integrally molded face seal and lever handle with built-in lockout feature. Valves designed for easy fitting into metal piping system and are ready for actuation.
 - 1. Material: [Corzan CPVC] [PVC] [PPL].
 - 2. Disks: [Corzan CPVC] [PVC] [PPL].
 - 3. Size: [1 1/2 inches (38 mm)] [2 inches (51 mm)] [3 inches (76 mm)] [4 inches (102 mm)] [6 inches (152 mm)] [8 inches (203 mm)] [10 inches (254 mm)] [12 inches (305 mm)].
 - 4. Liners: [FPM] [EPDM] [Nitrile].
 - 5. Operator: [Gear box] [Hand wheel] [Handle] [Electric] [Pneumatic] [_____].
 - a. Lever Operator [With stem extension, stem extension size {_____} inches (_____ mm)].

Specifier Note: Select and specify options to suit valve function and project requirements. Coordinate lever handle assemblies and options with information specified for these items.

- 6. Options: Provide options as follows [Stem extension] [Lug body design] [Titanium shaft] [2 inches (51 mm) square operating nut] [PVDF discs] [Pneumatic actuators] [Electric actuators].
- 7. Acceptable Materials: Hayward Flow Control Systems Butterfly Valves 1 1/2 inches - 12 inches (38 - 305 mm).
- F. Large Diameter Butterfly Valves (14 inches - 24 inches (356 - 610 mm)): Plastic, 1-piece body, fully lined with full face liner, stainless steel, Type 316, stem isolated from process media and sphered disk seals. Provide 2 lifting lug/handles, slotted

bottom bolt holes and heavy duty, high torque gearbox. Valves designed for easy installation and operation and are ready for actuation.

1. Material: [Natural PPL] [PVDF].
2. Size: [14 inches (356 mm)] [16 inches (406 mm)] [18 inches (457 mm)] [20 inches (508 mm)] [24 inches (610 mm)].
3. Liner and Seals: [EPDM] [FPM] [Nitrile].
4. Operator: [Gear operator] [Electric] [Pneumatic] [_____].
5. Options: Lugs type 316 stainless steel.
6. Acceptable Materials: Hayward Flow Control Systems Butterfly Valves 14 inches - 24 inches (356 - 610 mm).

G. Butterfly Valve Options: Provide options to suit butterfly valves specified.

Specifier Note: Coordinate valve options with butterfly valves specified. Stem extension lengths vary from 24 inches - 120 inches (610 - 3048 mm) in 6 inch (152 mm) increments only. For other sizes, consult the factory. Select to suit project requirements.

Specifier Note: Lever handle operative stem extension available for butterfly valve sizes 1 1/2 inches - 8 inches (38 - 203 mm). Consult factory for option drawings for 14 inch - 24 inch (356 - 610 mm) size butterfly valves. Select to suit project requirements.

1. Lever handle operative stem extensions, [1 1/2 inches (12.7 mm)] [_____ inches (_____ mm)], length [_____ inches (_____ mm)].

Specifier Note: Stem extensions for gear operated butterfly valves vary from 1 1/2 inches - 12 inches (38 - 305 mm); select to suit project requirements.

2. Gear operative stem extensions with PVC housing, [1 1/2 inches (12.7 mm)] [_____ inches (_____ mm)], length [_____ inches (_____ mm)].

Specifier Note: Available on butterfly valves from 1 1/2 inches - 8 inches (38 - 203 mm). Consult factory for option drawings for 14 inch - 24 inch (356 - 610 mm) size butterfly valves. Select to suit project requirements.

3. Operating Nut: Non-locking, 2 inches (51 mm) square, [1 1/2 inches (38 mm)] [_____ inches (_____ mm)].

Specifier Note: Available on butterfly valves from 1 1/2 inches - 8 inches (38 - 203 mm); select to suit project requirements.

4. Operating Nut: 2 inches (51 mm) square, [1 1/2 inches (38 mm)] [_____ inches (_____ mm)].

Specifier Note: Available on butterfly valves from 1 1/2 inches - 12 inches (38 - 305 mm); select to suit project requirements.

5. Chain Operator: Size [1 1/2 inches (38 mm)] [_____ inches (_____ mm)].

Specifier Note: Available on butterfly valves from 1 1/2 inches - 12 inches (38 - 305 mm); select to suit project requirements.

6. Lug Mounts: Size [1 1/2 inches (38 mm)] [_____ inches (_____ mm)].
7. Acceptable Materials: Hayward Flow Control Systems Butterfly Valve Options.

H. Swing Check Valve: High temperature/pressure rated plastic valves with 2-in-1 seat design, built-in O-ring flange seals, 2 drain ports and self-aligning clapper seal.

1. Material: [PVC] [Corzan CPVC].
2. Size: [3 inches (76 mm)] [4 inches (102 mm)] [6 inches (152 mm)] [8 inches (203 mm)].
3. End Connection: [Flanged] [_____].
4. Seals: [FPM] [EPDM].
5. Options: Provide options as follows: [Counterweight for closing resistance] [Limit switch for position indicator] [Spring assist closure].
6. Acceptable Materials: Hayward Flow Control Systems Swing Check Valves.

I. Y Check Valves (1/2 inch - 4 inches (12.7 - 102 mm): PVC and Corzan CPVC construction with full flow design, FPM seals,

backflow prevention and heavy duty hex cap.

1. Size: [1/2 inch (12.7 mm)] [_____ inches (_____ mm)].
 2. End Connection: [Socket] [Threaded] [Flanged].
 3. Options: True Union Connections.
 4. Acceptable Materials: Hayward Flow Control Systems Y Check Valves.
- J. Spring Loaded Y Check Valves (1/2 inch - 4 inches (12.7 - 102 mm)): PVC construction with full flow design, FPM seals, backflow prevention, lock ring and double seals and heavy duty hex cap.

Specifier Note: Spring loaded valves are not supplied in the 1 1/4 inch (32 mm) size.

1. Size: [1/2 inch (12.7 mm)] [_____ inches (_____ mm)].
 2. End Connection: [Threaded] [_____].
 3. Options: True Union Connections.
 4. Acceptable Materials: Hayward Flow Control Systems Spring Loaded Y Check Valves.
- K. Y Strainers (1/2 inch - 4 inches (12.7 - 102 mm)): Plastic, lightweight, compact construction, designed for horizontal or vertical installation, with 2:1 open air ratio, heavy duty hex cap and FPM seals; body [PVC] [Clear PVC] [Corzan CPVC].

Specifier Note: Clear PVC Y strainers are only available in sizes 1/2 inch - 2 inches (12.7 - 51 mm).

1. Size: [1/2 inch (12.7 mm)] [_____ inches (_____ mm)].

Specifier Note: The Y strainer sizes 1/2 inch - 1 1/2 inches (12.7 - 38 mm) are not available with flanged end connections.

2. End Connection: [Socket] [Threaded] [Flanged].
3. Options: [Stainless Steel Strainer Screens] [True Union Connections].

Specifier Note: Stainless steel screen is available with mesh opening from 1/2 inch (12.7 mm) to super fine 325 mesh; select and specify to project requirements.

4. Screen: [Ultrasonically welded plastic with 1/32 inch (0.8 mm) perforations] [Type 316 stainless steel [1/2 inch (12.7 mm)] [_____ inches (_____ mm) mesh].
 5. Acceptable Materials: Hayward Flow Control Systems Y Strainers.
- L. Simplex Basket Strainers (1/2 inch - 8 inches (12.7 - 203 mm)): Plastic basket strainer, with external body threads, low pressure drop, True Union connectors, ergonomic hand removable cover, FPM seals, integral, flat mounting base, hand removable vent and drain and liquid displacing cover.
1. Material:
 - a. Basket 1/2 inch - 4 inches (12.7 - 102 mm) [PVC] [Corzan CPVC] [Eastar Polyester].
 - b. Basket 6 inches - 8 inches (152 - 203 mm) [PVC] [Corzan CPVC].
 2. Size: [1/2 inch (12.7 mm)] [_____ inches (_____ mm)].
 3. Piping Connections: [In-line] [Loop].

Specifier Note: Basket strainers sizes 6 inches - 8 inches (152 - 203 mm) are only available with flanged end connectors.

4. End Connection: [Socket] [Threaded] [Flanged].
5. Options: [Stainless steel mesh strainer baskets] [EPDM seals].
6. Strainer Basket:

Specifier Note: The plastic basket's perforations are available in sizes 1/32 inch - 3/16 inch (0.8 - 4.8 mm); select and specify to suit project requirements.

- a. Plastic Basket: [1/32 inch (0.8 mm)] [_____ inches (_____ mm)].

Specifier Note: The stainless steel basket's perforations are available in sizes 1/2 inch - 1/32 inch (12.7 - 0.8 mm). The basket mesh is available in sizes from 20 mesh to 325 mesh; select and specify to suit project requirements.

- b. Stainless Steel Basket: [1/2 inch (12.7 mm)] [_____ inches (_____ mm)].
- 7. Acceptable Materials: Hayward Flow Control Systems Simplex Basket Strainers.
- M. Duplex Basket Strainers (1/2 inch - 4 inches (12.7 - 102 mm)): Plastic basket strainer, with external cover threads, uninterrupted flow, low pressure drop, True Union connections, ergonomic hand removable cover, FPM seals, integral, flat mounting base, hand removable vent and drain and liquid displacing cover.
 - 1. Material:
 - a. 1/2 inch - 2 inches (12.7 - 51 mm) Eastar Polyester.
 - b. 1/2 inch - 4 inches (12.7 - 102 mm) [PVC] [Corzan CPVC].
 - 2. Size: [6 inches (152 mm)] [_____ inches (_____ mm)].
 - 3. Piping Connections: [In-line] [Loop].
 - 4. End Connection: [Socket] [Threaded] [Flanged].
 - 5. Options: [Stainless steel mesh strainer baskets] [EPDM seals].
 - 6. Strainer Basket:

Specifier Note: The plastic basket's perforations are available in sizes 1/32 inch - 3/16 inch (0.8 - 4.8 mm); select and specify to suit project requirements.

- a. Plastic Basket: [1/32 inch (0.8 mm)] [_____ inches (_____ mm)].

Specifier Note: The stainless steel basket's perforations are available in sizes 1/2 inch - 1/32 inch (12.7 - 0.8 mm). The basket mesh is available in sizes from 20 mesh to 325 mesh; select and specify to suit project requirements.

- b. Stainless Steel Basket: [1/2 inch (12.7 mm)] [_____ inches (_____ mm)].
- 7. Acceptable Materials: Hayward Flow Control Systems Duplex Basket Strainers.
- N. Bag Filters Housings:
 - 1. Simplex Bag Filters (PVC and Corzan CPVC): Plastic housing, True Union connectors, hand removable cover, integral mounting base and vent valve on cover.
 - a. Material: [PVC] [CVPC].
 - b. Size: [Single] [Double] length.
 - c. Seals: [FPM] [EPDM].
 - d. Drain Connection: [2 inch (51 mm) True Union socket] [NPT threaded] [150# flanged].
 - e. Piping Connection: [Inline] [Loop].
 - f. End Connection: [Flanged] [_____].
 - g. Options: Provide options as follows: [Pressure differential gauge and switch] [Manifolded housings] [1/4 inch (6.4 mm) pressure differential gauge taps] [Metric connections].
 - h. Acceptable Materials: Hayward Flow Control Systems Simplex Bag Filters.
 - 2. Simplex Bag Filters (PPL and PVDF): Plastic housing, hand removable cover, integral mounting flange, external cover threads and vent valve on cover.

Specifier Note: PVDF available only on double length.

- a. Material: [PPL] [PVDF].
- b. Size: [Single] [Double] length.
- c. Seals: [FPM] [EPDM].

Specifier Note: PVDF available with 2 inch (51 mm) flanged drain and piping connections only.

- d. Drain Connection: [2 inches (51 mm) NPT threaded] [#150 flanged].
 - e. Piping Connection: [Inline] [Loop], 2 inches (51 mm) socket [NPT threaded] [#150 flanged].
 - f. Options: Provide options as follows: [Pressure differential gauge and switch] [Vent gauge with gauge guard] [Manifold housings] 1/4 inch (6.4 mm) NPT differential pressure gauge holes].
 - g. Acceptable Materials: Hayward Flow Control Systems Simplex Bag Filters Model [CFLT 4201] [CFLT 4202] [CFLT 4203].
3. Duplex Bag Filters: Plastic housing, 2 bag filters linked with custom Corzan CPVC valve assembly, hand removable cover, built-in mounting system, vent/bleed valve installed on both filter housing covers.
- a. Material: Glass-reinforced PPL bag filters and Corzan CPVC valve assemblies.
 - b. Size: [Single] [Double] length.
 - c. Seal: FPM.
 - d. Drain Connection: 2 inches (51 mm) NPT threaded.
 - e. Piping Connection: [Inline] [Loop] [2 inches (51 mm) #150 flanged].
 - f. Options: Provide options as follows: [Pressure differential gauges] [Pressure differential switches] [Actuator mounts] [Pneumatic actuators] [Electric actuators].
 - g. Acceptable Materials: Hayward Flow Control Systems Duplex Bag Filters Model CFLT 5202F.
- O. Filter Cartridges and Bags:

Specifier Note: Refer to the Hayward Flow Control Systems technical bulletin "How to Select a Bag Filter" for guidance in selecting the correct filter to suit project requirements.

- 1. Water Filtration Cartridges: Heavy duty cartridges with polypropylene core with cellulose element sealed with plastisol end caps, FDA approved, complete with adapter kit, filter micron size [_____].
 - a. Acceptable Material: Hayward Flow Control Systems Water Filtration Cartridges Model [HC 1] [HC 2].
- 2. Absolute Filtration Cartridge: Pleated, silicone-free filter media housed in polypropylene cage, complete with double O-ring seals, FDA approved, length [20 inches (508 mm)] [30 inches (762 mm)], filter micron size [_____].
 - a. Acceptable Material: Hayward Flow Control Systems Absolute Filtration Cartridges Model PF.
- 3. Filter Bags: Heavy duty, [PPL felt] [PPL mesh] material, construction [Welded] [Sewn], plastic ring seal, silicone free, micron rating [_____].

Specifier Note: Filter bag model numbers relate to both the type of filter bag and the micron rating specified. Refer to the Hayward Flow Control Systems catalog for complete model listings.

- a. Acceptable Material: Hayward Flow Control Systems Absolute Filtration Cartridges Model [_____].

P. Operating Handles:

- 1. Lever Handle Assemblies: Zinc titanium alloy, with mild steel, baked epoxy coated lever. Shaft and mounting hardware: Stainless steel.
 - a. Acceptable Material: Hayward Flow Control Systems Lever mounting assembly only; model LH1.

Specifier Note: Specify lever handle options to suit project requirements.

- 2. Failsafe Spring Return: Spring module sized to close or open valve with release of lever handle, baked epoxy-coated lever with weatherproof zinc and titanium housing and stainless steel mounting hardware.
 - a. Acceptable Material: Hayward Flow Control Systems Lever mounting assembly failsafe spring return; model LH1SR.

Specifier Note: Hayward Flow Control Systems provides the lever handle assembly with a limit switch top mounted. The limit switch housing is available in 3 types. Select and specify types to suit project requirements.

- 3. Lever handle assembly with failsafe spring and limit switch.

- a. Acceptable Material: Hayward Flow Control Systems Lever mounting assembly with failsafe spring and limit switch; model LH1SRS2.
- 4. Lever Handle Assembly With Limit Switch (NEMA 4X): [Flat cover] [Black and yellow beacon top], self-locking cam, with instantaneous manual setting, micro brand switches, UL and CSA listed.
 - a. Acceptable Material: Hayward Flow Control Systems Lever handle assembly with limit switch (NEMA 4X); model Zytel Limit Switch, Type #2 [Flat top - Suffix S2] [Black and yellow beacon - Suffix S4].
- 5. Lever handle assembly with limit switch (NEMA 4 and 7): [Flat cover] [Black and yellow beacon top], self-locking cam, with instantaneous manual setting, micro brand switches, UL and CSA listed.
 - a. Acceptable Material: Hayward Flow Control Systems Lever handle assembly with limit switch (NEMA 4 and 7); model Aluminum Limit Switch, Type #2 [Flat top - Suffix SA2] [Black and yellow beacon - Suffix SA4].
- Q. Electric Actuators:
 - 1. Operation: Designed to provide precise quarter turn electric operation.
 - a. Torque Range: Up to 13,300 in/lb and speed ranges from 10 seconds - 30 seconds to move from fully open to fully closed.
 - b. Gear train within actuator to provide smooth continuous rotary power stroke for accurate automatic valve positioning. Factory set, field adjustable cam-actuated travel limit switches to provide precise control of shaft rotation.
 - 2. Construction:

Specifier Note: Not all electric actuators have the same construction. Refer to Hayward Flow Control Systems "Technical Information" data sheets for construction information.

- a. Housings: Heavy duty industrial grade for rugged use.
- b. Actuators: Continuous duty with high efficiency single phase reversing capacitor motor with thermal overload protection.
- c. Gears and pinions constructed from hardened steel.
- d. Gear train to be permanently lubricated.
- e. Mechanical brake to ensure that gear is locked in precise position.
- 3. Electrical:
 - a. Standard Voltage: [120 VAC, 60 Hz] [_____].

Specifier Note: Voltage options are shown in Hayward Flow Control Systems "Technical Information" data sheets. Refer to individual actuators for voltage information.

- b. Control Options: [4-20 Ma DC] [0-10 VDC].
- c. Electrical Rating: NEMA 4/4X.
- 4. Control Station:
 - a. Corrosion resistant enclosure.
 - b. Mounted on [Actuator] [Wall] [_____].
 - c. Actuator Control: [Remote] [Local].
 - d. Illuminated valve position indicator lights.
 - e. Optional keyed selector switches.
- 5. Accessories:
 - a. Timer Board: Solid state device allows programming actuators to automatically control valves in repetitive on/off functions.
 - 1) Acceptable Material: Hayward Flow Control Systems Timer Board - Suffix A.
 - b. Cycle Time Rate Regulator: Designed for control of open and close times by pulsing motor either in open or close cycle, or both.

- 1) Acceptable Material: Hayward Flow Control Systems Cycle Time Rate Regulator - Suffix B.
- c. Positioners: Used for flow-throttling applications in response to external control signal. Actuator will cycle and stop at any desired position between full open and full closed (90 degrees); positioner circuit board located inside the actuator enclosure.
 - 1) Acceptable Material: Hayward Flow Control Systems Positioners Suffix C2E.
- d. 180° Center-Off: Used with 3-way, with available 3-way ball; installed in valve to provide off position.
 - 1) Acceptable Material: Hayward Flow Control Systems 180° Center-Off - Suffix D.
- e. Extended Duty Motors 75 - 100%: Designed as extended duty motors allowing extended periods of operation without overheating.
 - 1) Acceptable Material: Hayward Flow Control Systems Extended Duty Motor - 75 to 100% - Suffix E.
- f. Re-transmitter - 115 VAC Input/4-20 mA Output: Provides 4-20 mA output signal directly proportional to actuator/valve angular output drive movement or position; accurate within ± 0.5%; complete with power supply.
 - 1) Acceptable Material: Hayward Flow Control Systems Re-Transmitter - 115 VAC Input/2-20 mA Output - Suffix G.

Specifier Note: Hayward Flow Control Systems include mechanical brakes on actuators used on butterfly valves.

- g. Mechanical Brake - 115 VAC Standard: Provides instantaneous and secure stopping of actuator.
 - 1) Acceptable Material: Hayward Flow Control Systems Mechanical Brake - 115 VAC Standard, Suffix K.
- h. Electric Failsafe (Battery): Designed to allow valve closure in event of AC power loss. Unit supplies dependable valve actuation to fail-open or fail-close and provides 15 complete cycles under its own power; complete with rechargeable battery pack on plug-in modular PC board located under actuator cover and LED indicators to show charge condition.
 - 1) Acceptable Material: Hayward Flow Control Systems Electric Failsafe (Battery) Suffix L2.
- i. Feedback Potentiometer: Provide continuous, remote status indication of valve's position at control panel or other monitoring equipment.
 - 1) Acceptable Material: Hayward Flow Control Systems Feedback Potentiometer Suffix [P - use 90°, 0 - 100 ohms for 2-way valves] [P2 - use no-stop, 0 - 1000 ohms for 3-way valves] [P3 - use dual, 0 - 10000 ohms for applications requiring 2 distinct feedback signals].

R. Pneumatic Actuators:

1. Operation: Rack and pinion, in compact package.
 - a. Select torque to suit application. Refer to manufacturer's data sheets.
 - b. Housing and end caps.
 - c. Actuators internally lubricated to ensure long service life.
2. Operators:
 - a. Double-acting pneumatic actuator using compressed air to energize actuator in both directions.
 - b. Spring-return failsafe pneumatic actuator using compressed air to energize actuator in one direction. Use compressed air to compress steel springs within actuator mechanism. Use energy stored in these compressed springs to return actuator to original position at which time air pressure is released.
 - c. Pneumatic actuator designed to be set to have spring rather than air pressure open or close valve.
3. Accessories:

Specifier Note: Solenoid valves are used with pneumatic actuators to allow high pressure air to rotate the actuators vane, the vane and a spring to open the valve and, when de-energized, close the valve. Hayward Flow Control Systems makes a number of different solenoid valves to suit different actuator configurations. Their literature provides detailed descriptions on how each works. Coordinate solenoid selection with project requirements; select solenoid and specify in the following article.

- a. Solenoid Valve: [_____].
 - 1) Acceptable Material: Hayward Flow Control Systems [_____].

Specifier Note: These control panels are used to control operation of 5 - 25 electrically or pneumatically activated valves using control relay technology. Although this article is included here, the text should be relocated to electrical actuators when they are specified and when a control panel is required.

- b. Control Panel: NEMA 4X enclosure, [UL] [CSA] [CE] listed, with transparent hinged cover, built-in circuit breaker, control relay with expansion module, interposing relays, terminal wiring block, control switches and indicator and alarm lights.
 - 1) Acceptable Material: Hayward Flow Control Systems Universal Control Panel for Automated Valve Systems.
- c. Limit Switches: Provide limit switches as follows: [Auxiliary switches] [NEMA 4/4X/7/9] [Second conduit entry].
 - 1) Acceptable Material: Hayward Flow Control Systems [Suffix {S} {S3} - Auxiliary Limit Switches] [Suffix T - Heater and Thermostat Switches] [Suffix X2 - NEMA Enclosure] [NEMA 4/4X/7/9] [Suffix Y - Second Conduit Entry] [Suffix - 24A; Suffix - 220A; Suffix - 12D; Suffix - 24D Optional Voltages].

Specifier Note: Edit Paragraph below to suit project requirements. If substitutions are permitted, edit text below. Add text to refer to Division 01 Project Requirements (Product Substitution Procedures) Section.

2.02 PRODUCT SUBSTITUTIONS

- A. Substitutions: No substitutions permitted.

PART 3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

Specifier Note: Article below is an addition to the CSI *SectionFormat* and a supplement to MANU-SPEC. Revise article below to suit project requirements and specifier's practice.

- A. Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions and product carton installation instructions.

3.02 EXAMINATION

- A. Site Verification of Conditions: Verify that substrate conditions are acceptable for product installation in accordance with manufacturer's instructions.

3.03 PREPARATION

- A. Valve and Mating Flange Preparation:
 - 1. Inspect adjacent pipeline; remove rust, scale, welding slag or other foreign material.
 - 2. Ensure that valve seats and pipe flange faces are free of dirt or surface irregularities that may disrupt flange seating and cause external leakage.
 - 3. Inspect valve disc seating surfaces and waterway and eliminate dirt or foreign material.

3.04 VALVE INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Do not use gaskets between pipe flanges and valves unless instructed otherwise by valve manufacturer.
- C. Verify suitability of valve for application by inspection of identification tag.
- D. Mount actuator onto valve prior to installation.
- E. Handle valve with care so as to prevent damage to disc and seat faces.
- F. Valves in horizontal pipelines should be installed with stem in horizontal position to minimize liner and seal wear.
- G. Ensure that valves are centered between bolts before bolts are tightened and then opened and closed to ensure unobstructed disc movement. If interference occurs, due for example to pipe wall thickness, taper bore adjacent piping to remove interference.
- H. Install butterfly valves with disc in almost closed position.

3.05 ACTUATOR INSTALLATION

- A. Air hoses or electrical connections to be made by actuator manufacturer.

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- B. Cycle valve operation from fully closed to fully open, then back to fully closed.
 - C. At same time, check travel stop settings for proper disc alignment.

3.06 ADJUSTING

- A. Check valve installation for proper alignment.
- B. Turn valve fully open and closed 3 or 4 times to ensure smooth operation and proper seating.
- C. Test and adjust relays, timers and counters for proper function.

3.07 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch up, repair or replace damaged products before Substantial Completion.

3.08 FIELD QUALITY CONTROL

- A. Site Tests, Inspection: Inspect completed assembly for proper locknut screw-in depth, after installation and prior to final acceptance. Report component damage to [Supplier] [_____].

3.09 CLEANUP

- A. Proceed in accordance with Section [01 74 00 - Cleaning and Waste Management] [_____].
- B. Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION