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		Date: 06/15/16
		Author: Office of Facilities
CC: Project Folder		

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## PART 1 - INTRODUCTION


### 1.1 PURPOSE

- A. This section is intended to define the general installation and minimum product requirements for hydronic and steam valves.

## PART 2 - GENERAL DESIGN REQUIREMENTS

### 2.1 GENERAL VALVE REQUIREMENTS

- A. Refer to Service Index dated June 15, 2016 for valve types.
- B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system operating, maximum, and test pressures and temperatures.
- C. Manual Valve Sizes: Same as upstream piping unless otherwise indicated.
- D. Valve Actuator Types:
  1. Gear Actuator: For quarter-turn valves with wheels NPS 6 and larger.
  2. Hand wheel: Fastened to valve stem, for valves other than quarter turn.
  3. Hand lever: For quarter-turn valves NPS 6 and smaller.
  4. Wrench: For plug valves with square heads. Furnish Owner with 1 wrench for every plug valve, for each size square plug-valve head.
  5. Chain wheel: Device for attachment to valve hand wheel, stem, or other actuator; for all valves installed 6 feet or higher above finished floor extend chains to an elevation of 5 feet above finished floor. Chain shall be equipped with clasp and hook to secure chain as not to be in the path of egress.
- E. Valves in Insulated Piping: Provide stem extensions and the following features:
  1. Gate Valves: With rising stem.
  2. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
  3. Butterfly Valves: With extended neck.
- F. Valve-End Connections:
  1. Flanged: With flanges according to ASME B16.1 for iron valves.
  2. Grooved: With grooves according to AWWA C606.
  3. Solder Joint: With sockets according to ASME B16.18.
  4. Threaded: With threads according to ASME B1.20.1.
  5. Valve Bypass and Drain Connections: MSS SP-45.

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G. By-pass and Drain Connections: Isolation valves shall be provide with by-passes for Pressure Reducing Stations (PRS) and other systems as directed by Yale. Comply with MSS SP-45 bypass and drain connections.

H. Wet Tap/ Hot Tap Valves

1. Valves shall conform to the requirements of this and other applicable university standards.

2.2 MANUAL VALVE DESIGNATION

A. This section includes the valve identification code, and Standard used in the Service Index.

1. Table 1: Valve Identification

Valve Designation	Valve Type	Standard
BA	Ball	Ball Valves
BF	Butterfly	Butterfly Valves
GA	Gate	Gate Valves
PL	Plug	Plug Valves
GL	Globe	Globe Valves
CK	Check	Check Valves

2.3 DESIGN DOCUMENT REQUIREMENTS


A. The design drawings shall include a riser and flow diagram and details of system specialties for all HVAC systems. Collectively, the drawing elements shall capture and illustrate all valve applications including: shut-off, balancing, bypass, control, direction flow control, and drain valves.

B. The riser flow diagram shall include valve tags as identified in the university Service Index and applicable Valve Standard.

C. Standard details, and plan view drawings shall include valves, and specialty items. Valves and specialty items shall be tagged per university Service Index.


2.4 DESIGN SYSTEM REQUIREMENTS:

A. Where new piping connections are indicated to be connected to existing system, the consultant shall confirm and indicate in the contract documents the location of existing isolation valves. If there are no existing isolation valves to connect the new piping to

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existing piping without requiring a pipe freeze, wet, or hot tap the consultant shall identify the scope of work in the contract documents. The scope of work shall identify the following

1. Location of POC
  2. System and equipment interruption and coordination shutdowns.
  3. Type of tie-in procedure
  4. Work associated with recommissioning existing system
- B. Valve flange rating shall be compliant with system working, maximum and test pressure, per ANSI pressure classification tables.
- C. Within each building there shall be a building valve to isolate the service to the building.
- D. Isolation valves shall be provided at all pumps, tanks, reducing and automatic or mechanical flow control devices, radiation, coils and heat exchangers, and at all other apparatus requiring partial drainage of the system for periodic maintenance or inspection. The isolation valves shall be so located as to permit removal and/or service of the isolated equipment without draining complete or substantial portions of the system. Except where flanged valves are used, each connection to equipment shall be made with screwed or flanged union on the equipment side of the valve.
- E. Isolation valves shall be provided at all branch takeoffs from system mains and risers and returns to system.
- F. Check valves installed in the horizontal position shall be swing checks; valves installed in the vertical position shall be silent checks, except that all check valves in pump discharges shall be silent checks.
- G. Strainers shall have isolation valves up and down stream of strainer, to avoid draining the entire system or hydronic circuit the strainer serves.
- H. Provide blow-down valves at all strainers, and pipe to drain.
- I. Risers shall have drain valves installed at the low point to permit draining of supply and return risers without impacting other system risers. Drain valves shall have approved ball valve type hose bibs and caps.
- J. Provide balancing valves in the branch lines of water systems where hydraulic disparities between the branches may exist.
- K. Provide isolation valves of water piping leaving MER's to permit repairs of MER

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equipment without draining the entire system.

- L. High-performance butterfly valves shall be in the closed position during installation in the piping systems. Leave all valves in the closed position at the completion of the installation.

## 2.5 MECHANICAL IDENTIFICATION REQUIREMENTS

- A. Manual and control valves shall be labeled with 1-1/2" (one and one half inch) brass tags bearing a letter to indicate the service and a number to indicate the valve. A permanent valve chart and system schematic diagram shall show the location of all valves. Valve Tags and schematic diagram names shall be coordinated with the final P&ID diagram.
- B. Valves shall have the name of the manufacturer and the nominal size of the valve on the body or bonnet or shown on a permanently attached plate in die-stamped letters.


## 2.6 INDUSTRY STANDARDS, CODE AND MANUFACTURE REQUIREMENTS

- A. Valves for potable water service shall comply with the most current version NSF 61, SDWA and shall not exceed the allowable content of lead.
- B. Valves and flanges shall comply with applicable ANSI, AWWA, API, ASTM, ASME, OSHA, and MSS requirements.
- C. Valve installation shall be in accordance with manufacturer's recommendations.

## **PART 3 - MINIMUM PRODUCT CRITERIA**

### 3.1 PRODUCT DATA SHEETS

See following Product Data Sheets.

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VALVE DATA SHEET

Valve tag: BA-1

Function: On/off

Service: Chilled Water, Heating Hot Water, Condenser Water, Non-potable water

Class: -

Pressure: 600/400 psi CWP, 150 psi SWP

Temperature, F: 500 F, max

Vacuum: 29 in. Hg

Body: Bronze, B584-C84400

Ball: 316 SS Ball and Stem

Trim: 316 SS

Seats: RPTFE

Seals: RPTFE

Packing: -

End connection: Threaded, Solder

Body construction: Three piece


Trim construction: N/A

Accepted Models:

<u>Manufacturer</u>	<u>Model Number</u>	<u>Size Range (inches)</u>
Apollo	82-140/240	¼ - 3
Or Approved Equal	-	-
-	-	-

Notes:

- 1.) Full port ball valve
- 2.) Adjustable packing gland

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VALVE DATA SHEET

Valve tag: BA-2

Function: On/off

Service: Steam: Low, Medium, High-Pressure, Steam Condensate gravity and pumped

Class: Class 600: ¼ inch to 2 inch; Class 300 2-1/2 inch to 3 inch

Pressure: Refer to Service Index and Piping Standard for minimum requirements

Temperature, F: 500 F, max

Vacuum: 29 in. Hg

Body: ASTM A216 WCB

Ball: 316 SS (ball and stem)

Trim: -

Seats: TFM

Seals: Graphite (Body)

Packing: NOVA

End connection: Threaded, Socket, Butt, Class 300 and 600 Flange (match to valve).

Body construction: Three piece

Trim construction: N/A


Accepted Models:

<u>Manufacturer</u>	<u>Model Number</u>	<u>Size Range</u>
Sharpe	Series 84	¼ to 3
Or Approved Equal	-	-
-	-	-

Notes:

- 1.) Shall be full port ball valve
- 2.) Condensate valves shall accommodate schedule-80 pipe.

VALVE DATA SHEET

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Valve tag: BA-3  
 Function: On/off  
 Service: Potable, Well, and Tempered Water  
 Pressure: 600 psi CWP, 150 psi SWP  
 Temperature, F: 400 F, max  
 Vacuum: 29 in. Hg  
 Body: Lead Free Brass, C27451  
 Ball: LF Brass < 4 inch, SS 4 inch  
 Trim: Lead Free  
 Seats: RPTFE  
 Seals: -  
 Packing: RPTFE  
 End connection: NPT, Solder  
 Body construction: Two piece  
 Trim construction: N/A


Accepted Models:

<u>Manufacturer</u>	<u>Figure Number</u>	<u>Size Range</u>
Apollo	77LFL-100/200	1/4 .. 4 inch
Or Approved Equal	-	-
-	-	-

Notes:

1. Full ported valves

VALVE DATA SHEET

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Valve tag: BA-4  
 Function: On/off  
 Service: City Potable Water (Service Entrance)  
 Pressure: 600/400 psi CWP, 150 psi SWP  
 Temperature, F: 400 F, max  
 Vacuum: 29 in. Hg  
 Body: Bronze, Lead Free  
 Ball: Brass, Lead Free  
 Trim: -  
 Seats: RPTFE  
 Seals: RPTFE  
 Packing: MPTFE  
 End connection: NPT, Solder  
 Body construction: Three piece  
 Trim construction: N/A


Accepted Models:

Manufacturer	Figure Number	Size Range
Apollo	82LF-100/200	2-1/2" and less
Or Approved Equal	-	-
-	-	-

Notes:

- 1.) Full ported



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VALVE DATA SHEET

Valve tag: BF-1

Function: On/off

Service: Building Chilled Water, Heating Hot Water, Condenser Water,

Pressure: -

Temperature, F: 500, F max

Body: Carbon Steel

Lever Operator: 8 inch and under, lever operator with position latch for open, closed, and intermediate positions.  
10 inch and over, manual enclosed gear operator.

Trim: Disk and Shaft, 316 SS

Seats: PTFE

Seals: PTFE

Packing: None

End connection: ANSI Class 150


Body construction: Lug

Accepted Models:

<u>Manufacturer</u>	<u>Figure Number</u>	<u>Size Range</u>
Jamesbury	815L-11-2236TT	2-1/2" to 24"
Or Approved Equal	-	-
-	-	-

Notes:

- 1.) Valve shall be rated for bi-directional flow.
- 2.) Valve shall be bubble tight rated.

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VALVE DATA SHEET

Valve tag: BF-2

Function: On/off

Service: HPS, MPS, LPS, Plant Chilled Water

Pressure: -

Temperature, F: 500, F max

Body: -

Lever Operator: 8 inch and under, lever operator with position latch for open, closed, and intermediate positions.  
10 inch and over, manual enclosed gear operator.

Trim: -

Seats: -

Seals: -

Packing: None

End connection: -


Body construction: Lug

Accepted Models:

<u>Manufacturer</u>	<u>Figure Number</u>	<u>Size Range</u>
Velan	TORQSEAL M(XX)-1CP02- DADA	2-1/2 – 24 Inch
Vanessa	30.000 SERIES	2-1/2 – 24 Inch
Quadax	EQAL (0000) BXBBFKXBBBB BBXX7FXXXX	2-1/2 – 24 Inch

Notes:

- 1.) Valve shall be rated for bi-directional flow.
- 2.) Valve shall be bubble tight rated.
- 3.) Valve shall be triple-offset type.

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VALVE DATA SHEET

Valve tag: GA-3

Function: On/off

Service: Chilled Water, Glycol Chilled Water, Heating Hot Water, Low Pressure Steam

Design pressure: 230 psig at 300 degrees F

Body: ASTM A216 WCB, cast steel

Bonnet: ASTM A216 WCB, cast steel

Trim: API 8

Seats: -

Seals: -

Packing: Graphite

End connection: Class 150, RF, Butt Weld

Body construction: Bolted bonnet, OS&Y

Trim construction: Screwed

Accepted Models:


<u>Manufacturer</u>	<u>Figure Number</u>	<u>Size Range</u>
Milwaukee	1550 / 1552	2" to 12"
Or Approved Equal	-	-
-	-	-

Notes:

- 1.) Low pressure steam not to exceed 15 psig
- 2.) Heating Hot Water not to exceed 240 F
- 3.) Glycol Chilled water, check fluid compatibility with valve material.

VALVE DATA SHEET

Valve tag: GA-4

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Function: On/off  
 Service: Medium Pressure Steam  
 Design pressure: 410 psig at 800 degrees F  
 Body: ASTM A216 WCB, cast steel  
 Bonnet: ASTM A216 WCB, cast steel  
 Trim: API 8  
 Seats: -  
 Seals: -  
 Packing: Graphite  
 End connection: Class 300, RF, Butt Weld  
 Body construction: Bolted bonnet, OS&Y  
 Trim construction: Screwed

Accepted Models:

<u>Manufacturer</u>	<u>Figure Number</u>	<u>Size Range</u>
Milwaukee	3050 / 3052	2" to 12"
Or Approved Equal	-	-
-	-	-

VALVE DATA SHEET

Valve tag: GA-5  
 Function: On/off

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Service: High Pressure Steam  
 Design pressure: 825 psig at 800 degrees F  
 Body: ASTM A2116 WCB, cast steel  
 Bonnet: ASTM A2116 WCB, cast steel  
 Trim: API 8  
 Seats: -  
 Seals: -  
 Packing: Graphite  
 End connection: Class 600, RF, Butt Weld  
 Body construction: Bolted bonnet, OS&Y  
 Trim construction: Screwed


Accepted Models:

<u>Manufacturer</u>	<u>Figure Number</u>	<u>Size Range</u>
Milwaukee	6050 / 6053	2" to 12"
Or Approved Equal	-	-
-	-	-

Notes:

VALVE DATA SHEET

Valve tag: GL-1  
 Function: Throttling  
 Service: High Pressure Steam

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Design pressure: 825 psig at 800 degrees F  
 Body: ASTM A2116 WCB, cast steel  
 Bonnet: ASTM A2116 WCB, cast steel  
 Trim: API 8  
 Seats: -  
 Seals: -  
 Packing: Graphite  
 End connection: Class 600, RF, Butt Weld  
 Body construction: Bolted bonnet, OS&Y  
 Trim construction: Screwed

Accepted Models:


<u>Manufacturer</u>	<u>Figure Number</u>	<u>Size Range</u>
Milwaukee	6050 / 6053	2" to 12"
Or Approved Equal	-	-
-	-	-

Notes:

- 1.) Shall be Class IV valve or higher

VALVE DATA SHEET

Valve tag: PL-1  
 Function: On/Off  
 Service: No. 2 fuel oil  
 Design pressure: 125 psi at 100 degrees F

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Body: Carbon steel  
 Trim: Stainless steel plug  
 Seats: Viton  
 Sleeve: Tufline XP sleeved PTFE  
 Packing: N/A  
 End connection: 2" and up: Flanged  
 1/2" through 1 1/2": Threaded

Accepted Models:

<u>Manufacturer</u>	<u>Figure Number</u>	<u>Size Range</u>
XOMOX	XX-066-TS-2-6-P1-WY-X	1/2 inch thru 1 1/2 inches
XOMOX	XX-067-TS-2-6-P1-WY-X	2 inches to 6 inches

Notes:

- 1.) Provide valve with locked closed option.

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VALVE DATA SHEET

Valve tag: PL-2

Function: On/off

Service: Natural Gas and LPG

Design pressure: 200 psi at 150 degrees F

Body: Ductile iron,

Trim: Lubricated

Seats: Ductile iron

Seals: TFE

Packing: N/A

End connection: Class 125 FF

Body construction: Bolted, wrench operated

Trim construction: Cylindrical port plug

Accepted Models:

<u>Manufacturer</u>	<u>Figure Number</u>	<u>Size Range</u>
Homestead	622 with 650 sealant	1 inch to 6 inches
Or Approved Equal		

Notes:

- 1.) Provide valve with locked closed option.