

## 23 09 23.11 – Pressure Independent Control Valves

### 1. Introduction

- A. This section contains guidelines and requirements for all Building HVAC system pressure independent control valves.
- B. For utility projects coordinate control valve requirements and installations with DUES Engineering.
- C. Designers should coordinate with Duke FMD to coordinate selection and execution of requirements for pressure independent control valves.

### 2. References

- A. North Carolina Building Code (Latest Edition)
- B. Duke University Construction Standards, Section 23 01 00 Chilled Water Systems
- C. Duke University Construction Standards, Section 23 21 13 Hydronic Piping
- D. Duke University Construction Standards, Section 23 70 00 Central HVAC Equipment
- E. Duke University Construction Standards, Section 23 07 16 HVAC Equipment Insulation
- F. Duke University Construction Standards, Section 23 05 23 General Duty Valves for Piping

### 3. Design Standards

- A. General Requirements for Pressure Independent Control valves
  - a. Preferred Manufacturers
    - i. Danfoss, Siemens or approved equal.
    - ii. Any deviation from preferred manufacturers requires approval from Duke FMD.
  - b. General Requirements:
    - i. Valve stem assembly shall be of a pack-less design (no grease) and be field-replaceable without removing the valve body from the piping.
    - ii. Valve Bodies shall be made of Brass, Bronze, Stainless Steel or Ductile Iron equipped with either Brass or Stainless Steel stems, seats and springs along with EPDM diaphragms and seals.
    - iii. Valve bodies, stems or internal components made of plastic or composite materials are not acceptable.
    - iv. Valves shall not be installed with stems below the horizontal plane to prevent actuator damage due to stem seal leakage, or accumulation of particulate in the stem packing.
    - v. Valves shall be capable for use in chilled, warm, and heating hot water system applications and with glycol solutions up to 50% concentration.
    - vi. Typical pressure independent control valve action is last position unless approved by Duke FMD.

- vii. All control valves to be equipped with strainers to protect control valves along with isolation valves and applicable connections to allow for valve body removal:
    - a) Provide union connections for ½" -2" valve sizes.
    - b) Provide ANSI flanged connections for 2.5"-10" valve sizes.
  - viii. Pressure Independent control valves to be 24 volt control unless approved by Duke FMD.
  - ix. Valve to be equipped with adjustable maximum flow with control ranges and shall have linear flow characteristics.
  - x. Actuated valves shall be capable of closing off against their maximum operating system differential pressure.
  - xi. Valve Body to include Low and High measuring pressure (P/T) ports.
  - xii. Actuated valves shall be capable of closing off against their maximum operating system differential pressure.
  - xiii. System flushing must be performed per Duke Construction Standards Hydronic Piping Section and accepted by Duke FMD prior to installation of any control valves.
4. As-Built Documentation
- A. Final As-builts of all control valve selections, O&M data and applicable valve criteria shall be documented in the final Controls As-Built documents.