

PART III – CSU FACILITIES PLANNING, DESIGN AND CONSTRUCTION STANDARDS

DIVISION 23 –HVAC Updated 2021 - Mar - Modified for HDS

Housing and Dining Facilities (HDS) has adopted amendments for all HDS facilities. Confirm applicable standards with Project Representative on a per Project basis.

Housing and Dining Services takes the following exceptions highlighted in Gray.

DIVISION 23 – HEATING, VENTILATION, AND AIR-CONDITIONING

23 00 00 – HVAC GENERAL INFORMATION

A. Life-Cycle Cost:

1. In general, Systems shall be designed and selected in order to optimize both first-cost and life cycle cost.
 - a. HDS: This analysis shall be based on a 15-year life-cycle.

E. Equipment Sizing and Capacity:

1. All HVAC equipment, to include duct mains and hydronic mains, shall have excess capacity for future expansion.
 - a. Buildings or building additions with an area of 50,000 gross square feet or less shall incorporate 5% excess capacity.
 - i. HDS: Shall incorporate 15% excess capacity since most of HDS SF is static – use is primary residential.
5. Energy Conservation:
 - c. HDS: Use Energy Star rated, or equivalent, equipment whenever possible.
6. Equipment Rooms:
 - j. Equipment rooms and air handler interiors shall have a safe level of lighting.
 - i. HDS: Lighting shall be properly located near equipment to allow adequate visibility when maintaining and repairing equipment.
 - k. Lifting eyes and hoisting rails shall be permanently placed to aid in lifting and removal of mechanical equipment weighing over 200 pounds.
 - i. HDS: Weighing over 100 pounds.

23 05 00 – COMMON WORK RESULTS FOR HVAC

3. Discussion:
 - ee. HDS: Location of bleed valves shall be at highpoints.

23 07 00 – HVAC INSULATION

C. HVAC Piping Insulation:

2. Products Not Allowed:
 - b. HDS: Open Cell Foam
1. Discussion:
 - o. HDS: Access to mechanical equipment shall be provided by means other than needing to crawl on the pipe insulation.

23 09 00 – INSTRUMENTATION AND CONTROLS FOR HVAC

A. Manufacturers:

PART III – CSU FACILITIES PLANNING, DESIGN AND CONSTRUCTION STANDARDS

DIVISION 23 –HVAC Updated 2021 - Mar - Modified for HDS

1. Acceptable Manufacturers:
 - c. HDS: Innotech America

3. Exceptions for proprietary equipment controllers and Systems:
 - a. In the event of a need to use a local controller manufactured by a Vendor other than those listed in the approved Manufacturer's list follow the below:
 - ii. If the third party packaged controller is being used for water side HVAC such as for a Chiller or Boiler, the controller shall not be integrated to into the local BAS.
 - c) HDS: Static pressure sensor required on the supply side as well as the return.

B. General Guidelines for BAS:

1. FM BAS Shop uses a campus-wide BAS for control, alarming and energy management purposes. All new construction shall utilize this technology.
 - a. HDS: Control system shall be compatible with HDS Facilities BAS system.

C. Control Wiring:

4. All wire connections shall reside in a junction box or panel.
 - a. HDS: All low voltage control wiring shall be in blue conduit.

M. Controls Commissioning:

1. All Building Automation controls and supporting equipment are subject to Test and Balance Verification and Commissioning.
 - b. HDS: All control sequence and as-built documentation shall be submitted to Housing and Dining Facilities BAS/HVAC group within 30 days after the completion of commissioning

S. HDS: Commercial Kitchen Hoods

1. Exhaust controller shall report to HDS Facilities BAS system.

23 11 00 – FACILITY FUEL PIPING

A. Natural Gas Piping:

3. Discussion:
 - b. Exterior piping shall be painted.
 - 1) HDS: Color to be approved by University Representative

B. HDS: Propane Fuel Piping

1. HDS: All propane fuel piping to be braided cooper.
2. HDS: Fuel Storage Tanks
 - a. HDS: All fuel storage tanks must be encased in concrete.

23 25 00 – HVAC WATER TREATMENT

A. General Information:

1. FM has an in-house Water Treatment Technician and maintains a contract with a water treatment company for supplies and consulting.
 - a. HDS: Housing and Dining Facilities has a dedicated contractor for a water treatment and maintains a contract with the water treatment company for supplies and consulting. New projects should consult with Housing and Dining Facilities and the chemical treatment vendor through the University Representative to

PART III – CSU FACILITIES PLANNING, DESIGN AND CONSTRUCTION STANDARDS

DIVISION 23 –HVAC Updated 2021 - Mar - Modified for HDS

determine a proper chemical treatment program.

2. New projects shall consult with FM and the Chemical Treatment Vendor through the Project Representative to determine a proper chemical treatment program.
 - a. HDS: Coordinate all start-ups with Housing and Dining Facilities and the chemical treatment vendor by notifying the University Representative

B. Treatment for Closed–Loop Hydronic Systems:

1. Auto make–up of water to Closed–Loop Systems is prohibited.
 - c. HDS: Auto make-up of water to closed-loop systems are allowed provided there is a reduced pressure backflow device and a flow switch connected to the BAS. If using a manual connection, provide a make-up water tap from the industrial water system.

C. Treatment for Open Hydronic Systems:

2. Open Recirculating Cooling System – Treatment Chemicals:
 - a. The acceptable Vendor is:
 - ii. HDS: Rocky Mountain Aqua Tech
 - b. The specified Corrosion & Deposit Inhibitor is:
 - ii. HDS: RMA-9585: Organo-Phosphonate + Dispersants
 - c. Microbiological Control options are:
 - i. Option #1: Dual Non–Oxidizing Microbicides
 - c) HDS: RMA-4215: Isothiazolin
 - d) HDS: RMA-4615: Gluteraldehyde
 - ii. Option #2: Bromine based Oxidizing Microbicide
 - b) HDS: RMA-4909: Stabilized Liquid Bromine
 - d. The specified initial system cleaning chemical is:
 - i. FLUSHOUT™ 624L System Cleaner
 - ii. HDS: RMA-6100: Alkaline System Cleaner
 - e. The specified wet or dry system corrosion inhibitor for layup is:
 - i. PROTECSOL® 700P Multi–Metal Powdered Corrosion Inhibitor
 - ii. HDS: RMA-Chemfilm Wet Lay-up Passivator

3. Open Recirculating Cooling System – Equipment:

- b. Acceptable Vendors/Manufacturers are:
 - iv. HDS: Rocky Mountain Aqua Tech
- e. Acceptable Vendors/Manufacturers are:
 - iv. HDS: Rocky Mountain Aqua Tech
- i. Meter sizes shall be based on chiller tonnage. Recommended sizes are:
 - vi. HDS: Badger
 - vii. HDS: Neptune
- k. Acceptable Vendors/Manufacturers are:
 - iii. HDS: Nonacceptable - Solenis

4. Filtration:

- d. Acceptable Vendors/Manufacturers are:
 - i. HDS: Non-acceptable - HDS: Solenis Industrial Water Division
HDS: a four-station, 3/4" PCV corrosion coupon rack should be installed in a convenient side stream.
 - iii. Acceptable Vendors / Manufactures are:
 - a) Rocky Mountain Aqua Tech

23 30 00 – HVAC AIR DISTRIBUTION

A. Zoning:

PART III – CSU FACILITIES PLANNING, DESIGN AND CONSTRUCTION STANDARDS

DIVISION 23 –HVAC Updated 2021 - Mar - Modified for HDS

1. Rooms in HVAC zones shall be of similar use, loading, and façade exposure.
 - a. For the purpose of zoning, similar use is defined as variation of the design internal load of 50% or less for more than one hour (continuous).
 2. Zones shall be limited to three rooms.
 3. A room at a corner or with façade exposure different than surrounding rooms shall have its own zone.
 4. Refer to 23 09 00 – Instrumentation and Controls for HVAC for more information.
- B. All restrooms shall have supply air, regardless of size, at 80% of the exhaust air quantity.
1. If heat loss calculations require more supply, exhaust shall then be increased to 120% of supply air.
- C. All break rooms shall be exhausted at a rate of 1 cfm per square foot.

23 31 00 – HVAC DUCTS AND CASINGS

A. Metal Ducts:

7. HDS: Prefabricated engineered ductwork is acceptable as an alternative to welded duct.

23 33 00 – AIR DUCT ACCESSORIES

A. Dampers:

4. Fire dampers shall be installed where required for ducts which pass through rated firewalls or ceilings.

c. HDS: All electronic actuator dampers must have “END” switch that reports to the BAS

23 34 00 – HVAC FANS

p. HDS: Continuous duty fans shall utilize pillow block bearings.

23 38 00 – VENTILATION HOODS

A. Commercial Kitchen Hoods:

2. HDS: See Section 11 40 25

23 41 00 – PARTICULATE AIR FILTRATION

A. Panel and Bag Filters:

3. Discussion:

e. For Systems serving primarily office and classroom space, a single set of filters shall be installed, 4” MERV 9 with a standard size of 24” x 24”.

i. HDS: For systems servicing primarily office and classroom space, a single set of filters shall be installed, 2” MERV 8 with a standard size of 24 x 24 inches.

23 51 00 – BREECHINGS, CHIMNEYS, AND STACKS

C. Gas Vents:

PART III – CSU FACILITIES PLANNING, DESIGN AND CONSTRUCTION STANDARDS

DIVISION 23 –HVAC Updated 2021 - Mar - Modified for HDS

b. HDS: Listed and manufacturer approved stainless steel or approved non-metallic vents shall be installed for condensing boilers.

23 52 00 – HEATING BOILERS

B. Condensing Hot Water Boilers:

1. Acceptable Products:

e. HDS: AERCO Benchmark Series

2. Products not Allowed:

a. AERCO Benchmark Series

B. Non-Condensing Tubeless Boilers:

1. Acceptable Products:

a. Hurst – 4VT Series Cyclone for steam or hot water, or approved equal

b. HDS: Duramax

END OF DIVISION