MECHANICAL, PLUMBING, AND FIRE PROTECTION IDENTIFICATION

Valves, Steam Traps, and Strainers

Valves and steam traps located in the University utility tunnel system or in University buildings shall be given identifying tags in accordance with the following standard. All tags shall be 1-1/2” diameter brass tags with black lettering and shall be attached using 3/32” diameter galvanized, zinc plated steel wire rope with sealed oval sleeve compression connectors.

VALVE, STEAM TRAP, STRAINER IDENTIFICATION LEGEND - UTILITY TUNNELS

<table>
<thead>
<tr>
<th>Building Code</th>
<th>System Code</th>
<th>Sequential Number</th>
<th>Tunnel Segment Code</th>
<th>Location Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>TUNN</td>
<td>MSV</td>
<td>001</td>
<td>B3</td>
<td>1+07</td>
</tr>
</tbody>
</table>

VALVE, STEAM TRAP, STRAINER IDENTIFICATION LEGEND - BUILDING LOCATIONS

<table>
<thead>
<tr>
<th>Building Code</th>
<th>System Code</th>
<th>Sequential Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>CARR</td>
<td>CSV</td>
<td>001</td>
</tr>
</tbody>
</table>

Building Code

The building code shall correspond to the standard 4 character building code used for all buildings on campus as entered in 25 Live (the space inventory and room scheduling software that the University uses). For utility tunnel locations this code is “TUNN”.

System Code:

- Chemical Feed Valve (for valves on steam, hydronic, and condenser water chemical treatment systems) CFW
- Chilled Water Return Valve CRV
- Chilled Water Supply Valve CSV
- Chilled Water Strainer CHS
- Compressed Air Strainer - For service to tools, labs, workshops, etc. CAS
- Compressed Air Valve – For service to tools, labs, workshops, etc. CAV
- Condensate Return Expansion Joint CDX
- Condensate Return Strainer CDS
- Condensate Return Valve (pumped or gravity flow, regardless of pressure) CDV
- Domestic Cold Water Strainer DCS
- Domestic Cold Water Valve DCV
- Domestic Hot Water Return Strainer DRS
- Domestic Hot Water Return Valve DRV
- Domestic Hot Water Strainer DHS
- Domestic Hot Water Valve DHV
- Feed Water Strainer – Boiler feed water systems FWS
Feed Water Valve – Boiler feed water systems
Fire Protection Valve
Fuel Oil Strainer
Fuel Oil Valve
Heat Pump Return Valve (Hydronic)
Heat Pump Supply Valve (Hydronic)
Heat Pump Strainer (Hydronic)
Heating Return Valve
Heating Supply Valve
Heating Strainer (Hydronic Building Heat)
Heating/Chilled Water Return Valve
Heating/Chilled Water Supply Valve
Heating/Chilled Water Strainer
High Pressure Steam Expansion Joint – Main Steam (for any exp. jt. at system pressure)
High Pressure Steam Strainer – Main Steam (for any strainer at system pressure)
High Pressure Steam Trap – Main Steam (for any trap at system pressure)
High Pressure Steam Valve – Main Steam (for any steam valve at system pressure)
Instrument Air Strainer – For pneumatic controls or instruments
Instrument Air Valve – For pneumatic controls or instruments
Lab Vacuum Strainer
Lab Vacuum Valve
Low Pressure Steam Strainer – Auxiliary Steam (any strainer downstream of a reducing valve)
Low Pressure Steam Trap – Auxiliary Steam (any trap downstream of a reducing valve)
Low Pressure Steam Valve – Auxiliary Steam (any valve downstream of a reducing valve)
Natural Gas Regulator
Natural Gas Valve
Soft Water Strainer
Soft Water Valve
Steam/Condensate – High Pressure Drains (drain valves, blow down valves and low point drains on the Main Steam header and boilers)
Sump Pump Discharge Valve
Water – City Water Strainer (any strainer on the domestic water header)
Water – City Water Valve (any valve on the domestic water header)
Water – Irrigation System Strainer (any strainer on the irrigation water header downstream of the well and domestic water header)
Water – Irrigation System Valve (any valve on the irrigation water header downstream of the well and domestic water header)
Water – Well Water Strainer (any strainer between well and irrigation or domestic water)
Sequential Number:
The sequential number shall start at 001 for each system and shall number sequentially for each unit within the system code located within an individual building or within the utility tunnel system. All sequential numbers shall include 3 digits. Include leading zeroes in numbers less than 99.

Tunnel Segment Code – Tunnel Locations:
The tunnel segment code shall correspond to the tunnel segment in which the item is located. Refer to the campus utility map for tunnel segment designations.

Location Code – Utility Tunnel Locations:
The location code shall correspond to the distance in feet from station 0+00 within the tunnel segment in which the valve or trap is located. Round the distance to the nearest foot. Tunnel segments and station points are marked in the tunnels at a maximum of 25 foot intervals for reference.

Example – Utility Tunnel Locations:
The example in the legend for tunnel locations at the top of this standard is the designation for the shut off valve on the high pressure steam system (main steam). The valve is located 107 feet from station 0+00 in tunnel segment B3. When written as a designation it will appear as follows: TUNN/HSV001-B3:1+07

Example – Building Locations:
The example in the legend for the building locations at the top of this standard is the designation for a shut off valve on the chilled water supply piping located on the fourth floor of Carrington Hall in the south central area of the floor. When written as a designation it will appear as follows: CARR/CSV001

Mechanical Equipment

All mechanical equipment shall be provided with plastic tags engraved with the equipment designation as noted within this standard. The tag shall be a minimum of 3” wide by 1” high and shall be attached to the equipment with mechanical fasteners so as to provide a permanent installation. Engraving stock shall be melamine plastic laminate punched or drilled for mechanical fasteners - 1/16-inch (1.6-mm) minimum thickness for signs up to 20 sq. in. or less than 8” long; 1/8-inch minimum thickness for larger sizes. Labels shall be engraved in black letters on white background. Fasteners for labels shall be self-tapping, stainless-steel screws or No. 10/32 stainless-steel machine screws with nuts and flat and lock washers. Labels may be factory installed as long as the meet these standards

Mechanical equipment located within University facilities shall be given designations in accordance with the following standard.

MECHANICAL EQUIPMENT IDENTIFICATION LEGEND

<table>
<thead>
<tr>
<th>Building Code</th>
<th>Equipment Code</th>
<th>Sequential Number</th>
</tr>
</thead>
</table>

Standards Planning, Design & Construction Missouri State University

Mechanical, Plumbing, and Fire Protection Identification

May 6, 2014
Building Code:
The building code shall correspond to the standard 4 character building code used for all buildings on campus as entered in 25 Live (the space inventory and room scheduling software that the University uses). For utility tunnel locations this code is “TUNN”.

Equipment Code:
Equipment codes shall indicate the type of equipment in accordance with the following list.

- Air Compressor – Fire Protection System: ACF
- Air Compressor – Instrument Air (for pneumatic controls or instruments): ACI
- Air Compressor – Laboratory (for compressed air to laboratories): ACL
- Air Compressor – Pool or Spa Filter: ACP
- Air Compressor – Service Air (for compressed air to workshops or tools): ACS
- Air and Dirt Separator: ADS
- Ari Dryer – Non-refrigerated: NAD
- Air Dryer - Refrigerated: RAD
- Air Filter Housing: FLT
- Air-Handling Unit: AHU
- Boiler Chemical Injection Pump: BCP
- Backflow Preventer: BFP
- Boiler: BLR
- Chemical Pot Feeder (Chemical Shot Feeder): CPF
- Chilled Water Pump – District: DCP
- Chilled Water Pump – Primary: PCP
- Chilled Water Pump – Secondary: SCP
- Chiller: CHL
- Condensate Return Pump - Electric: CPE
- Condensate Return Pump – Steam Powered: CPS
- Condensing Unit – Air Cooled: CUA
- Cooling Tower: CTR
- Cooling Tower Basket Strainer: CBS
- Cooling Tower Chemical Injection Pump: CCP
- Domestic Booster Pump: DBP
- Domestic Hot Water Recirculating Pump: DRP
- Domestic Water Heater - Electric: WHE
- Domestic Water Heater - Gas: WHG
- Domestic Water Heater - Steam: WHS
- Electric Drinking Fountain: EDF
- Electric Hydration Fountain: EHF
- Energy Recovery Unit: ERU
- Exhaust Fan – Fume Hoods (may serve fume hoods or other laboratory exhaust): FEF
- Exhaust Fan – General Exhaust (loading dock, general room exhaust, etc.): GEF
- Exhaust Fan – Kitchen Hood Service: KEF
- Exhaust Fan – Serving Toilet Rooms (may also serve custodial closets): TEF
Exhaust Fan – Smoke Control Systems
Expansion tank
Fan Coil Unit (chilled/hot water or direct expansion)
Fat, Oil, and Grease Trap
Filter Housing (not part of a piece of built up equipment)
Fire Protection Pump
Fire Protection Pump Controller
Fire Protection Booster Pump (Jockey Pump)
Fire Protection Booster Pump Controller (Jockey Pump)
Furnace – Gas Fired
Heat Exchanger – Steam to Water (shell and tube)
Heat Exchanger – Water to Water (shell and tube)
Heat Exchanger – Plate and Frame
Heat Pump – Air Cooled
Heating Hot Water Pump – Primary
Heating Hot Water Pump – Secondary
Heating/Chilled Water Pump
Heat Recovery Coil Housing (typically includes filter and access sections)
Heat Recovery Loop Pump (run around coil)
Hot Water Tempering Valve (thermostatic mixing valve)
Hydronic Heat Pump
Hydronic Heat Pump Loop Pump
Loop Injection Pump
Meter – Chilled Water
Meter – Condensate Return
Meter – Domestic Water
Meter – Electric
Meter – Gas
Pool Basket Strainer
Pool or Spa Chemical Injection Pump
Pool or Spa Recirculating Pump
Pool or Spa Vacuum Blower Pump
Pool, Spa, or Fountain Filter
Pressure Reducing Valve – Steam
Pressure Reducing Valve - Water
Radiant Ceiling Panel
Relief Fan
Return Fan
Roof Hood (may be gravity, intake, exhaust, or relief)
Rooftop Air-handling Unit
Safety Relief Valve – Pressure and Temperature
Safety Relief Valve – Steam
Safety Relief Valve – Water
Storage Tank Heating/Chilled Water
Sump Pump
Ultraviolet Duct Cleaner UVD
Unit Heater – Cabinet Type (floor, wall, or ceiling mounted) CUH
Unit Heater - Horizontal Propeller Type (hydronic, gas fired, or electric) HUH
Vacuum Pump VAC
VAV Box – Constant Volume VCV
VAV Box – Exhaust Service VAE
VAV Box – No Reheat Coil VAV
VAV Box – Parallel Fan-powered VPF
VAV Box - Reheat VRH
VAV Box – Series Fan-powered VSF
Variable Frequency Drive (Variable Speed Drive) VSD
Water Softener WSF
Water-to-Water Heat Pump WHP

Sequential Number:
The sequential number shall start at 001 for each system and shall number sequentially for each unit within the system code and within the building.

The example in the table above is the designation for air-handling unit number 2 located on the first floor Carrington Hall in the northeast area of the floor. When written as a designation it will appear as follows: CARR/AHU002
Mechanical, Plumbing, and Fire Protection Piping

Pipe labels shall comply with ASME A13.1, "Scheme for the Identification of Piping Systems," for letter size and color, filed color, length, and viewing angle. Labeling shall indicate pressure and/or temperature when applicable, such as high pressure steam, low pressure steam, domestic cold water, domestic hot water, etc. Pipe labels shall be color coded, preprinted, gloss vinyl film (minimum 2 mil thickness) with permanent pressure sensitive adhesive. At each end of pipe marker provide appropriately color coded adhesive tape with flow direction arrows indicating the direction of flow. Adhesive tape banding shall be not less than 1-1/2 inch wide and shall lap the end of the pipe label. Tape banding shall wrap the pipe fully and lap itself a minimum of 3 inches.

Provide pipe labels where piping is exposed or above accessible ceilings in finished spaces; in machine rooms; in accessible maintenance spaces such as shafts, tunnels, and plenums; and at exterior exposed locations. Where piping runs are grouped, install pipe markers on each pipe in the same location to aid in differentiating each pipe in the group. Locate pipe labels as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units.
3. Where flow pattern is not obvious, mark each pipe at branch.
4. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
5. At access doors, manholes, and similar access points that permit view of concealed piping.
6. Near major equipment items and other points of origination and termination.
7. Spaced at maximum intervals of 50 feet along each run. Spacing shall be reduced to 25 feet maximum in areas of congested piping and equipment.

If piping is to be color coded by continuously painting runs of piping, color coding shall be as outlined in the listing below. Note that if piping is to be painted for aesthetic purposes, such as to match adjacent surfaces in finished areas or at building exterior, this color coding is not required to be followed.

| Domestic Water                          | Blue          |
| Drain (HVAC condensate drain, storm water, sump pump discharge, etc.) | Green         |
| Fire Suppression (Standpipes, fire sprinkler systems, etc.)          | Red           |
| Fuel Oil                                | Orange        |
| Irrigation Water                       | Gray          |
| Natural Gas or Propane                 | Yellow        |
| Sanitary Sewer                         | Brown         |
| Steam and Condensate Return            | Silver        |

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