# DESIGN GUIDELINE 220553
# MECHANICAL IDENTIFICATION AND PAINTING

## General

In general, follow the guidelines below when specifying identification and painting of mechanical piping, ductwork and equipment. Unless otherwise indicated, these guidelines are not intended to restrict or replace professional judgment.

## Related Sections

## Related References

In general it is the University's intention to follow industry practice, and to use existing standards to establish these guidelines.

- ANSI A13.1 - Scheme for the Identification of Piping Systems

## Piping and Ductwork Identification

All pipes in all exposed locations shall be identified with factory fabricated, precurled labels securely attached to the pipe. Film markers are not acceptable, as they tend to wear off with time. Ductwork mains and all fume hood exhaust ductwork require labeling.

Clearly identify direction of flow in piping and ductwork with arrows. Arrows and markers shall be mounted to provide unobstructed visibility from floor level.

Pipe and Ductwork labels should indicate full name of service as indicated below. Abbreviations should be used on drawings only.

### Pipe Labeling

Pipe labels should be installed at all access panels or doors, adjacent to valves and branch connections, both sides of floors, ceilings and walls, all major changes in direction, on straight lengths of pipe every 25 feet, and at points of termination (except in occupied spaces).

Identify contents of piping system by both fluid contained and unique temperature and/or pressure (if necessary to distinguish between other systems with same fluid at different conditions); e.g., Potable Hot Water - 110$^{o}$F vs. Potable Hot Water - 140$^{o}$F.

| Plumbing and Waste Pipe System Labels | Drawing I.D. | Letter and Label Color |
|---|---|---|
| Acid Waste | ACID | Black on Yellow |
| Brine | BR | White on Green |
| Compressed Air | A | White on Blue |
| Fire Protection | FP | White on Red |
| Hazardous Waste | HAZ | Black on Yellow |
| High Purity Water | DI | White on Green |
| Hot Water Supply, Potable | HW | Black on Yellow |
| Hot Water Return, Potable | HWR | Black on Yellow |
| Natural Gas | G | Black on Yellow |
| Non-Potable Water | NPW | Black on Yellow |
| Potable Cold Water | CW | White on Green |
| Radiation Waste | RAD | Black on Yellow |
| Sanitary Waste | SAN | White on Green |
| Silver Recovery | AG | Black on Yellow |
| Soft Cold Water | SCW | White on Green |

| Heating and Cooling Pipe System Labels | Drawing I.D. | Letter and Label Color |
|---|---|---|
| Chilled Water Return | CHWR | White on Green |
| Chilled Water Supply | CHWS | White on Green |
| Condenser Water Return | CWR | White on Green |
| Condenser Water Supply | CWS | White on Green |
| Fuel Oil Return | FOR | Black on Yellow |
| Fuel Oil Supply | FOS | Black on Yellow |
| High Pressure Condensate | HPC | Black on Yellow |
| High Pressure Steam | HPS | Black on Yellow |
| Hot Water Heating Return | HHWR | Black on Yellow |
| Hot Water Heating Supply | HHWS | Black on Yellow |
| Low Pressure Condensate | LPC | Black on Yellow |
| Low Pressure Steam (15#) | LPS | Black on Yellow |
| Medium Pressure Condensate | MPC | Black on Yellow |
| Medium Pressure Steam (60#) | MPS | Black on Yellow |
| Pumped Steam Condensate | PC | Black on Yellow |

| Medical Gas Pipe System Labels | Drawing I.D. | Letter and Label Color |
|---|---|---|
| Medical Compressed Air | MCA | Black on Yellow |
| Laboratory Vacuum | LVAC | White on Blue |
| Dental Vacuum | DVAC | White on Blue |
| Nitrous Evacuation | N20EVAC | White on Blue |
| Oxygen | OX | White on Green |
| Nitrous Oxide | NO | White on Blue |
| Carbon Dioxide | CO2 | White or Black on Gray |
| Helium | HE | White on Brown |
| Nitrogen | N | White on Black |
| Medical Vacuum | MVAC | Black on White |

**Ductwork Labeling**

Ductwork labels should be installed at all access panels or doors, both sides of floors, ceilings and walls, all major changes in direction, and on straight lengths of duct every 40 feet.

For ductwork, drawing identification and label should include identification of associated equipment, eg. “Supply Air (AHU-1)” for label, and “SA (AHU-1)” on drawings.

| Service/ Duct Label | Drawing | Letter and Label Color |
|---|---|---|
| HVAC Supply Air (Equip. #) | SA (Eq.#) | White on Green |
| HVAC Return Air (Equip. #) | RA (Eq.#) | White on Green |
| HVAC Exhaust Air (Equip. #) | EA (Eq.#) | Black on Yellow |
| Outdoor Air (Equip. #) | OA (Eq.#) | White on Green |
| Fume Hood Exhaust (Equip. #) | FHEA (Eq.#) | Black on Yellow |

**Equipment Identification**

During design phase, A/E shall assign equipment numbers to be used in the construction documents, in conjunction with the Project Coordinator.

Numbers for major mechanical equipment such as air handlers, chillers and pumps should be unique within a building and continue the sequence established by existing equipment. As an example, if air handlers AC-1, AC-2 and AC-3 already exist, then a new air handler should be named AC-4 (not AC-1 or AHU-4 or ACU-4). Although many equipment designators are presently used throughout the University, the A/E is encouraged to use the designators listed below where possible. All major equipment shall be labeled using this designator, engraved on a plastic label and permanently affixed to the unit. Where the first equipment item on a project is not named "..-1", the equipment schedule should note that all the equipment with names preceding it are existing.

All small equipment intended to appear on test and balance reports, including VAV boxes, should be identified on design drawings with a unique number. Field labeling is not required for small equipment.

| Drawing I.D. & Equip. Label | Equipment | Drawing I.D. & Equip. Label | Equipment |
|---|---|---|---|
| ACC | air cooled condenser | GEF | general exhaust fan |
| AHU | air handling unit | GWH | gas-fired water heater |
| CH | chiller | HTX | heat exchanger |
| CHWP | chilled water pump | HWB | hot water boiler |
| CP | condensate pump | HWHP | hot water heating pump |
| CT | cooling tower | P | pump (other than those listed) |
| CUH | cabinet unit heater | RF | return fan |
| CWP | condenser water pump | SB | steam boiler |
| EWH | electric water heater | SF | supply fan |
| FHEF | fume hood exhaust fan | UH | unit heater |
| FP | fire pump | VP | vacuum pump |

## Valve Identification

Only special use valves need be numbered on design drawings. However, all valves and regulators, except those directly serving equipment, shall be provided with 1-1/2 inch diameter brass tags with stamped numbers and letters. Tags shall indicate the system in which installed (using abbreviations listed in "Piping and Ductwork Identification" above), and valve number for systems having more than one valve.

Contractor shall provide a separate directory and drawing for plumbing, heating, and air conditioning systems. Drawing shall be scaled as required to indicate the location of each valve. A copy of the drawing shall be plastic laminated, suitable for framing, and turned over to maintenance for field use. A copy of each drawing shall be included in each copy of the Operation and Maintenance Manuals.

## Painting

In general, painting of mechanical components is to be done where needed for component protection, housekeeping or aesthetics, not for identification of mechanical systems. All fire protection piping shall be painted red.

In concealed areas, including shafts and above acoustic ceilings:
Paint is not required for most piping and ductwork.

In exposed areas, including mechanical equipment rooms, and labs with no ceilings:
Paint uninsulated pipe and ductwork the same color as the background ceiling. Consult with architect and Project Coordinator. Insulated pipe and ductwork does not require paint, unless called for by Project Coordinator for aesthetic reasons.

Exterior:
Paint uninsulated pipe and ductwork the same color as the background building, or complementary color as directed by Project Coordinator. Insulated pipe and ductwork does not require paint, provided insulation material does not require paint for protection. Depending on visibility, insulated pipe and duct, and mechanical equipment may be painted to match background, as instructed by Project Coordinator.