COLUMBIA UNIVERSITY
FACILITIES

DESIGN REQUIREMENTS

IDENTIFICATION FOR PIPING AND EQUIPMENT

GENERAL INFORMATION

1.1 This section applies to identification for HVAC, Plumbing and Fire Protection Systems.

1.2 Provide labeling for all piping, ductwork and equipment.

1.3 All labeling shall conform to ANSI A13.1.

DESIGN REQUIREMENTS

2.1 Pipe Labels

a. Identify all piping systems with color-coded bands per ANSI A13.1 sharply contrasting with background. Locate bands near strategic points, such as valves, items of equipment, changes in directions, wall penetrations, capped stub out for future connection and every 40 feet of straight runs. If necessary, paint a strip background of black or white to obtain contrast.

b. Each set of bands to consist of one (1) band on which the name of the service is printed in black letters not less than 1½" high, and two (2) bands on which is printed a black directional arrow located on each side of legend. Apply bands where they can be easily read and with their long dimension parallel to the axis of the pipe. Provide bands with backgrounds of different colors from the various service groups.

c. Drain piping serving mechanical equipment items for which the drain discharge is not visible from the equipment shall be marked in accordance with ANSI 13.1 near the point of discharge indicating the item of equipment served.

d. Use labeling coloring as set forth in 2.3. "Piping System Abbreviations and Letter and Label Color", contained herein.

2.2 Valve Tags and Charts

a. Provide a valve tag on every isolation valve and control valve in each piping system. Exclude check valves, valves within factory fabricated equipment units, plumbing fixture faucets, interior and exterior hose bibs, shut off valves at plumbing fixtures, HVAC terminal devices, and similar rough-in connections of end use fixtures and units. List each tagged valve in the valve schedules for each piping system.

b. Provide 1 ½" – 2" diameter, 19 gauge, polished brass valve tags with black paint filled stamp engraved piping system abbreviation in ¼" high letters and sequenced valve numbers ½" high, and with 5/32" hole for fastener. Attach tags with chain, S-hook or split ring as appropriate. Tags shall indicate the system in which installed (using abbreviations listed in 2.3. "Piping System Abbreviations and Letter and Label Color", contained herein), and valve number for systems having more than one valve.

c. Contractor shall provide valve charts that include a separate directory and drawing for each mechanical piping system. Drawing shall be scaled as required to indicate the location of each valve.

d. Provide frames of finished hardwood or extruded aluminum plastic (Lexan) panes for each valve chart. Secure with screws for secure, removable mounting on walls of each Mechanical Equipment Room. A copy of each chart shall be included in each copy of the Operation and Maintenance Manuals.

2.3 Piping System Abbreviations and Letter and Label Coloring

Heating and Cooling Pipe System Labels	Drawing I.D.
Chilled Water Return	CHWR
Chilled Water Supply	CHWS
Condenser Water Return	CWR
Condenser Water Supply	CWS
Fuel Oil Return	FOR
Fuel Oil Supply	FOS
High Pressure Condensate	HPC
High Pressure Steam	HPS
Hot Water Heating Return	HWR
Hot Water Heating Supply	HWS
Low Pressure Condensate	LPC
Low Pressure Steam (15#)	LPS
Medium Pressure Condensate	MPC
Medium Pressure Steam (60#)	MPS
Pumped Condensate Return	PCR
Compressed Air (Controls)	CCA
Secondary Hot Water Supply	SHWS
Secondary Hot Water Return	SHWR
Secondary Chilled Water Supply	SCHWS

Heating and Cooling Pipe System Labels	Drawing I.D.
Secondary Chilled Water Return	SCHWR
Dual Temperature Water Supply	DTWS
Dual Temperature Water Return	DTWR

Plumbing, Waste & Lab Pipe Labels	Drawing I.D.
Acid Waste	ACID
Brine	BR
Compressed Air	A
Fire Protection	FP
Hazardous Waste	HAZ
High Purity Water	DI
Potable Cold Water	DCW
Hot Water Supply, Potable	DHW
Hot Water Return, Potable	DHWR
Laboratory Hot Water Supply (Non-Potable)	LHWS
Laboratory Hot Water Return (Non-Potable)	LHWS
Laboratory Cold Water (Non-Potable)	LCWS
Natural Gas	G
Compressed Air	CA
Laboratory Vacuum	VAC
Oxygen	O_2
Carbon Dioxide	CO_2
Helium	HE
Nitrogen	N_2

2.4 Equipment Identification

a. Numbers for major mechanical equipment such as air handlers, chillers and pumps shall 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 shall be named AC-4 (not AC-1 or AHU-4 or ACU-4). Although many equipment designators are presently used through the University, the Architect/Engineer is encouraged to use the designations listed below, where possible. All major equipment shall be labeled using these designations, 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 shall note that all equipment with names preceding it is existing.

b. All small equipment intended to appear on test and balance reports, including VAV boxes, shall be identified on design drawings with a unique number consistent with that labeled in field.

Drawing I.D. & Equip. Label	Equipment	Drawing I.D. & Equip. Label	Equipment
ACC	air cooled condenser	TE	toilet exhaust
AHU	air handling unit	GE	general exhaust fan
CH	chiller	GWH	gas-fired water heater
CHWP	chilled water pump	HTX	heat exchanger
CP	condensate pump	HWB	hot water boiler
CT	cooling tower	HWHP	hot water heating pump
CUH	cabinet unit heater	P	pump (other than those listed)
CWP	condenser water pump	RF	return fan
EWH	electric water heater	SB	steam boiler
FHEX	fume hood exhaust fan	SF	supply fan
FP	fire pump	UH	unit heater
RHC	reheat coil	VP	vacuum pump
VAV	variable air volume box	VAVRH	variable air volume box with reheat
CV	constant air volume box	RV	constant air volume box with reheat

c. Identify mechanical equipment by means of nameplates permanently attached to the equipment. Provide black surface, white core laminated bakelite with engraved letters. Minimum size plates 3" long by 1" wide with white letters 3/8" high for smaller equipment.

d. Larger equipment such as air handling units, chillers and cooling tower, the lettering shall be a minimum of ¼" wide by 6" high. Attach nameplates in a permanent manner in a location that will be clearly visible after installation is complete.

e. Mask all labels prior to field painting of equipment. Labels that are painted over will be replaced by Contractor at no cost to the Owner.

2.5 Ductwork Labeling

a. All ductwork and all fume hood exhausts ducts require labeling or stenciling.

b. Ductwork identification shall 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.

c. Duct identification shall include associated equipment and service (supply, return, return/exhaust, exhaust outside air) onto ducts at strategic locations. Provide arrows to show direction of flow, e.g., "Supply (AHU-1) or "return/exhaust" (RF-4).

d. Stenciling to be done after insulation and other duct coverings are completed.

e. Systems on which duct identification has been covered or is otherwise not visible will not be accepted.

2.6 Painting

a. In general, painting of mechanical components is to be done where needed for component protection, housekeeping or aesthetics, not for identification of mechanical systems with the exception that all fire protection piping shall be painted red in accordance with NYCBC requirements.

b. 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 un-insulated pipe and ductwork the same color as the background ceiling. Insulated pipe and ductwork does not require paint, unless called for by Project Manager for aesthetic reasons.

c. Exterior

1. Paint un-insulated pipe and ductwork the same color as the background building, or complementary color as approved by the University. 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 Manager.

d. Historic Columbia Facilities colors for piping systems are:

HVAC PIPING		
Service	Color	Designation
High Pressure Steam	Orange	HPS
Medium Pressure Steam	Orange	MPS
Low Pressure Steam	Orange	LPS
Pumped Condensate	Orange	PR
Chilled Water Supply	Blue	CHWS

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HVAC PIPING		
Service	Color	Designation
Chilled Water Return	Cyan	CHWR
Secondary Chilled Water Supply	Magenta	CHWS
Secondary Chilled Water Return	Magenta	CHWR
Condenser Water Supply	Green	CWS
Condenser Water Return	Green	CWR
Hot Water Supply	Orange	HWS
Hot Water Return	Orange	HWR
Compressed Air Controls	Green	CCA
Fuel Oil Supply	Black	FOS
Fuel Oil Return	Black	FOR

PLUMBING PIPING		
Service	Color	Designation
Compressed Air	Green	CA
Drain	Brown	DR
Natural Gas	Magenta	GAS
Hydrogen	Yellow	H_2
Nitrogen	Blue	N_2
Oxygen	Yellow	O_2
Vacuum	Yellow	VAC
Domestic Cold Water (Potable)	Cyan	DCWS
Domestic Hot Water (Potable)	Orange	DHWS
Domestic Hot Water Return	Orange	DHWR
Lab Cold Water (Non-Potable)	Cyan	LCWS
Lab Hot Water (Non-Potable)	Orange	LHWS
Deionized Water	Green	DI

FIRE PROTECTION PIPING		
Service	Color	Designation
Sprinkler	Red	SPRINKLER
Standpipe	Red	SPRINKLER
Dry Chemical	Red	Dry Chemical

CONSTRUCTION REQUIREMENTS

2.7 Install all labeling in a readily visible location.

2.8 In areas of removable ceilings, install appropriate color-coded tile markers to indicate location of valves and other equipment that may require maintenance service.

REFERENCE

3.1 The applicable CSI Specification Sections are 23 05 53, 22 05 53 and 21 05 53.