SECTION 15030 - PIPING IDENTIFICATION SYSTEMS

City of San Diego, CWP Guidelines

PART 1 -- GENERAL

1.1 WORK OF THIS SECTION

A. The WORK of this Section includes providing identification devices for all piping and valves using color bands, lettering, flow direction arrows, and related permanent identification devices, and all appurtenant works. The WORK of this Section also includes providing identification devices for all hazardous materials storage and conveyance facilities.

1.2 RELATED SECTIONS

A. The WORK of the following Sections applies to the WORK of this Section. Other Sections of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this WORK.

1. Section 02810 Landscape Irrigation System
2. Section 09800 Protective Coating
3. Section 10400 Identifying Devices
4. Divisions 11, 13, 15 Piping, Valves, and Appurtenances, as applicable

1.3 SPECIFICATIONS AND STANDARDS

A. Except as otherwise indicated, the current editions of the following apply to the WORK of this Section:

1.	ANSI A13.1	Scheme for the Identification of Piping Systems
2.	ANSI Z535.1	Safety Color Code
3.	MIL-STD-810	Environmental Test Methods and Engineering Guidelines
4.	NFPA	Guide to Hazardous Materials
5.	NFPA 704	Hazard Identification System
6.	UFC 79-3	Identification of the Health, Flammability and Reactivity of Hazardous Materials
7.	29CFR 1910.106	Flammable and Combustible Liquids (OSHA)
8.	29CFR 1910.145	Specification for Accident Prevention Signs and Tags (OSHA)
[9.	29CFR 1910.1200	Hazard Communication (OSHA)]

1.4 CODES

A. The WORK of this Section shall comply with the following codes in the California Code of Regulations (CCR):

1.	CCR, Title 8, § 537	Piping Systems Valving and Labeling (Cal-OSHA)
2.	CCR, Title 8, § 3321	Identification of Piping (Cal-OSHA)
3.	CCR, Title 8, § 5194	Hazard Communication (Cal-OSHA)

1.5 SHOP DRAWINGS AND SAMPLES

A. The following shall be submitted in compliance with Section 01300:

1. Samples of all types of identification devices to be used in the WORK.
2. A list of suggested wording for all valve tags.

PART 2 -- PRODUCTS

2.1 IDENTIFICATION OF EXPOSED PIPING

A. Identification of all exposed interior and exterior pipe, including pipe in accessible ceiling spaces, pipe trenches, pipe chases, vaults and valve boxes, shall be accomplished by complete color coded painting of all visible pipe and its insulation in accordance with Section 09800 and providing marker lettering and color banding as indicated. Stainless steel pipe shall be color coded utilizing bands at 20 feet intervals as specified for identification of hazardous substance conveyance facilities in CCR, Title 8, Section 3321. Certain pipe indicated in paragraph 3.5 also shall be color coded utilizing bands at 20 feet intervals as specified for identification of hazardous substance conveyance facilities in CCR, Title 8, Section 3321.

B. Each pipe identification shall consist of a printed pipe marker identifying the name of the pipe and a flow arrow to indicate direction(s) of flow in the pipe. All markers shall be preprinted. Markers shall be the mechanically attached type that are easily removable; they shall not be the adhesive applied type. Markers shall consist of pressure sensitive legends applied to plastic backing which is strapped or otherwise mechanically attached to the pipe. Fasteners shall be non-metallic. Legend and backing shall be resistant to petroleum based oils and grease and shall meet criteria for humidity, solar radiation, rain, salt, fog and leakage fungus, as specified by MIL-STD-810C. Markers shall withstand a continuous operating temperature range of minus 40 degrees F to 180 degrees F. Plastic coding markers shall not be the individual letter type, but shall be manufactured and applied in one continuous length of plastic.

C. Marker and letter sizes shall conform to ANSI A13.1 except as otherwise indicated for hazardous materials identification. Directional arrows shall be the same size as the lettering.

D. Except as otherwise indicated for hazardous materials identification, markers shall be white with black letters and directional arrows, except for pipes painted white, on which markers shall be blue with white letters.

E. Pipelines which convey hazardous materials and hazardous materials storage facilities shall be labeled in full conformance with the Cal-OSHA and Federal OSHA regulatory standards, and the guidelines provided in UFC 79-3 and NFPA 704. As a minimum, pipeline identification

shall include the chemical name and an appropriate hazard warning using words, pictures, symbols, or a combination thereof to identify flammability, health and reactivity. Placards may be used for hazard warnings, if affixed to the pipes.

2.2 IDENTIFICATION OF EXPOSED VALVES AND SHORT PIPE LENGTHS

A. Identifying devices for valves, and the sections of pipe that are too short to be identified with preprinted markers, and arrows, shall be plastic tags.

B. Plastic tags shall be engraved. The minimum tag thickness shall be 1/6-inch; the minimum size of 2-1/2-inch by 2-1/2-inch with 5/32-inch diameter top holes. Color shall be white with black lettering. Minimum lettering height shall be 1/4-inch. All tags shall be designed to be firmly attached to the valves or short pipes or to the structure immediately adjacent to such valves or short pipes.

2.3 LOCATION MARKING OF BURIED PIPES

A. Caution tape shall be provided above buried pipes of the following systems:

Fluid Abbreviation	Function and Identification
FOR	Fuel Oil Return
FOS	Fuel Oil Supply
HFR, HFS	Hydraulic Fluid
LO, LOR, LOS	Lube Oil
WLO	Waste Lube Oil
BG, DG, DGB	Biogas (Sludge/Digester) Gas
GAS	Gasoline
LPG	Liquefied Petroleum Gas or Propane (as applicable)
LFG	Landfill Gas
NG	Natural Gas

B. Tape shall be orange with black letters and shall read "CAUTION - OIL OR GAS LINE BURIED BELOW". Tape shall be 6 inches wide and shall be constructed of a full width metal strip covered with polyethylene.

C. For caution tape for landscape irrigation systems, refer to Section 02810.

D. Identification of buried electrical conduits shall be in accordance with Section 16050 and as indicated.

2.4 EXISTING IDENTIFICATION SYSTEMS

A. In installations where existing piping identification systems have been established, the CONTRACTOR shall continue to use the existing system for pipes which convey non-hazardous materials. Where existing identification systems are incomplete, utilize the existing system as far as practical and supplement with the indicated system. The objective is to fully identify all new piping, valves, and appurtenances to the level indicated herein.

2.5 MANUFACTURERS

A. Products of the type indicated shall be manufactured by the following (or equal):

1. W.H. Brady Co.
2. Seton Nameplate Corp.

PART 3 -- EXECUTION

3.1 GENERAL

A. All markers and identification tags shall be installed in accordance with the manufacturer's printed instructions, and shall be neat and uniform in appearance. All such tags or markers shall be readily visible from all normal working locations.

3.2 VALVE TAGS

A. Valve tags shall be attached to the valve or structure by means of self-locking plastic or nylon ties.

B. Wording on the valve tags shall include both the valve number and a description of the exact function of each valve, e.g., "DHWR-BALANCING," "CLS THROTTLING", "RAS-PUMP SHUT-OFF," etc.

3.3 EXPOSED PIPE IDENTIFICATION

A. Each exposed pipe shall be identified at intervals of 20 feet, and at least one time in each room. Piping shall also be identified at a point approximately within 2 feet of all turns, ells, valves, and on the upstream side of all distribution fittings or branches. Sections of pipe that are too short to be identified with lettered markers, and directional arrows shall be tagged and identified similar to valves.

B. Pipe identification shall consist of two to four elements: color coating and/ or banding of the pipe, a lettered marker with a directional arrow; and a hazard warning for pipelines which convey hazardous materials.

3.4 BURIED PIPE

A. Caution tape for the systems listed in paragraph 2.3A shall be located 2 to 3 feet above the top of the pipe.

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NTS: In the following schedule, exceptions to the recommended identification are indicated as follows: in brackets [ ] for the [Point Loma Wastewater Treatment Plant]; in braces { } for the {North City Water Reclamation Plant}; and in angle brackets + , for the +Metro Biosolids Center,. The schedule shall be edited by the DESIGN CONSULTANT to eliminate items that are not applicable to the project. Tnemec color numbers are current as of May 1999.

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3.5 EXPOSED PIPE IDENTIFICATION SCHEDULE

A. Application of the pipe identification systems shall conform to the following color codes. Marker lettering shall conform to that listed under "Function and Identification."

Fluid Abbreviation	Function & Identification	Identification Color	Remarks Suggested Tnemec Color or Equal
A	Aeration Air	Off-White	Barbados PA24
AA	Agitation Air [Actuator Air]	Off-White	Barbados PA24
AAG [ALP	Grit Agitation Air Air, Low Pressure]	Off-White	Barbados PA24
AL	Alum	Yellow	Safety Yellow
BD	Bottom Drain	Brown	Banyonbark AC12 (dark brown)
BG [DG	Biogas - Methane Digester Gas - Methane]	Yellow	Safety Yellow
BP	Bypass	See Remarks	Same color corresponding to fluid being bypassed
BSL	Blended Sludge	Brown	Banyonbark AC12 (dark brown)
CA	Compressed Air	Off-White	Barbados PA24
CAW	Channel Agitation Water	Green	Safety Green
CD	Chemical Drain	Yellow	Safety Yellow
CLG	Chlorine Gas	Yellow	Safety Yellow
CLL	Chlorine Liquid	Yellow	Safety Yellow
CLS	Chlorine Solution	Yellow	Safety Yellow
CLV	Chlorine Gas under Vacuum	Yellow	Safety Yellow
CLVT	Chlorinator Vent	Yellow	Safety Yellow
CLWR	Cooling Water Return	Green	Safety Green (add green band to existing light blue piping)
CLWS	Cooling Water Supply	Green	Safety Green (add green band to existing light blue piping)
CN	Centrate	Grey	Grey IN05
CNDS	Condensate	See Remarks	Same color corresponding to fluid from which condensate comes
CS	Sodium Hydroxide	Yellow	Safety Yellow
CSL	Circulated Sludge	Brown	Banyonbark AC12 (dark brown)

Fluid Abbreviation	Function & Identification	Identification Color	Remarks Suggested Tnemec Color or Equal
CVT	Chemical Vent	Yellow	Safety Yellow
CW	Cooling Water	Green	Safety Green (add green band to existing blue piping)
CWR	Chilled Water Return	Green	Safety Green (add green band to existing light blue piping)
CWS	Chilled Water Supply	Green	Safety Green (add green band to existing light blue piping)
D	Drain	Brown	Banyonbark AC12 (dark brown)
DCS	Defoaming Chemical Solution	Yellow	Safety Yellow
[DG	Digester Gas - Methane	Yellow	Safety Yellow]
[DGB	Digester Gas, Boosted - Methane	Yellow	Safety Yellow]
DFSL	Digester Feed Sludge	Brown	Banyonbark AC12 (dark brown)
DHW +PWH	Domestic Hot Water Potable Water, Hot,	White	White WH01
DHWR	Domestic Hot Water Return	White	White WH01
DHWS	Domestic Hot Water Supply	White	White WH01
DIW	Deionized (Demineralized) Water	Light Blue	Clear Sky EN17
DN	Decantate	See Remarks	Same color corresponding to fluid from which decantate comes
DSL	Digested Sludge +Digested Biosolids,	Brown	Banyonbark AC12 (dark drown)
DWSL	Dewatered Sludge +Dewatered Biosolids,	Brown	Banyonbark AC12 (dark drown)
EBE	Equalization Basin Effluent	Grey	Grey IN05
EBI	Equalization Basin Influent	Grey	Grey IN05
ECA	Engine Combustion Air	Off-White	Barbados PA24
ECWR	Engine Cooling Water Return	Yellow	Safety Yellow (add yellow band to existing light blue piping)

Fluid Abbreviation	Function & Identification	Identification Color	Remarks Suggested Tnemec Color or Equal
ECWS	Engine Cooling Water Supply	Yellow	Safety Yellow (add yellow band to existing light blue piping)
EE	Engine Exhaust	Yellow	Safety Yellow
ǂF	Fire	Red	Safety Red,
FA	Foul Air (ducts & tanks)	Off-White w/ yellow band	Barbados PA24
FAS	Filter Air Scour	Off-White	Barbados PA24
6FBW	Filter Backwash Water	Purple	Reclaimed Purple R1217
FC ǂFC3,	Ferric Chloride	Yellow	Safety Yellow
FC2	Ferrous Chloride	Yellow	Safety Yellow
FE	Final Effluent	Green	Safety Green
FLE	Filter Effluent	Green	Safety Green
FLI	Filter Influent	Green	Safety Green
FM	Forcemain	See Remarks	Same color corresponding to fluid being carried
FOR	Fuel Oil Return	Green	Safety Green
FOS	Fuel Oil Supply	Green	Safety Green
FOV	Fuel Oil Vent	Yellow	Safety Yellow
FPW ǂF	Fire Protection Water Fire,	Red	Safety Red
FSW	Filter Surface Wash-Water	Purple	Reclaimed Purple R1217
G	Grit	Brown	Banyonbark AC12 (dark brown)
GAS	Gasoline	Yellow	SafetyYellow
HF	Hydrofluosilicic Acid	Yellow	Safety Yellow
HFR	Hydraulic Fluid Return	Yellow or Green	Safety Yellow or Safety Green, depending on pressure)
HFS	Hydraulic Fluid Supply	Yellow or Green	Safety Yellow or Safety Green, depending on pressure)
ǂHUWLP	Hot Utility Water Low Pressure (Reclaimed Water)	Purple	Reclaimed Purple R1217,

Fluid Abbreviation	Function & Identification	Identification Color	Remarks Suggested Tnemec Color or Equal
HPO	High Purity Oxygen	Blue	Safety Blue
HPX [HP]	Hydrogen Peroxide	Yellow	Safety Yellow
HSL	Heated Sludge	Brown	Banyonbark AC12 (dark brown)
HWR	Htg Water Return +Hot Water Return,	Yellow	Safety Yellow (add yellow band to existing light blue piping)
HWS	Htg Water Supply +Hot Water Supply,	Yellow	Safety Yellow (add yellow band to existing light blue piping)
IA	Instrument Air	Off-White	Barbados PA24
LBA	Laboratory Air	Off-White	Barbados PA24
LFG	Landfill Gas	Yellow	Safety Yellow
LO	Lube Oil	Green	Safety Green
LOR	Lube Oil Return	Yellow or Green	Safety Yellow or Safety Green, depending on pressure
LOS	Lube Oil Supply	Yellow or Green	Safety Yellow or Safety Green, depending on pressure
LPG	Liquefied Petroleum Gas or Propane (as applicable)	Yellow	Safety Yellow
LS	Lime Slurry	Yellow	Safety Yellow
LSP	Landscaping Sprinkler - Potable Water	Light Blue	Clear Sky EN17
LSR	Landscaping Sprinkler - Reclaimed Water	Purple	Reclaimed Purple R1217
MA	Muriatic Acid	Yellow	Safety Yellow
ML	Mixed Liquor	Brown	Banyonbark AC12 (dark brown)
MLR	Mixed Liquor Recycle	Brown	Banyonbark AC12 (dark brown)
NG	Natural Gas	Yellow	Safety Yellow
O	Ozone	Yellow	Safety Yellow
OF	Overflow	See Remarks	Same color corresponding to fluid from which overflow comes
OSA	Outside Air	Off-White	Barbados PA24
PA	Plant Air	Off-White	Barbados PA24

Fluid Abbreviation	Function & Identification	Identification Color	Remarks Suggested Tnemec Color or Equal
PD	Plant Drain	Brown	Banyonbark AC12 (dark brown)
PE	Primary Effluent	Grey	Grey IN05
PER	Primary Effluent Return	Grey	Grey IN05
PES	Primary Effluent Supply	Grey	Grey IN05
PEA/N	Polymer-Anionic/Nonionic	Green	Safety Green
PEC	Polymer-Cationic	Green	Safety Green
PEN	Polymer-Nonionic	Green	Safety Green
PI	Primary Influent	Grey	Grey IN05
PLI	Plant Influent	Grey	Grey IN05
POF	Plant Overflow	See Remarks	Same color corresponding to fluid from which overflow comes
POL	Polymer	Green	Safety Green
PP	Potassium Permanganate	Yellow	Safety Yellow
PRW [W2	Process Water (air-gapped potable) W2 - Industrial Water]	Light Blue	Clear Sky EN17
PSC	Primary Scum	Brown	Banyonbark AC12 (dark brown)
PSL	Primary Sludge	Brown	Banyonbark AC12 (dark brown)
PW [W1	Potable Water W1 - Potable Water]	White	White WH01
+PWH	Potable Water, Hot	White	White WH01,
RAS	Return Activated Sludge	Brown	Banyonbark AC12 (dark brown)
RD	Roof Drain	Brown	Banyonbark AC12 (dark brown)
RS	Raw Sewage	Grey	Grey IN05
RSL	Raw Sludge +Raw Solids,	Brown	Banyonbark AC12 (dark brown)
[RSL,DSL,PSL	Combined Sludge	Brown	Banyonbark AC12 (dark brown)]
RW	Reclaimed Water	Purple	Reclaimed Purple R1217
RWL	Rainwater Leader	Grey	Grey IN05
S [PSC	Scum Primary Scum]	Brown	Banyonbark AC12 (dark brown)

Fluid Abbreviation	Function & Identification	Identification Color	Remarks Suggested Tnemec Color or Equal
SAM	Sample Line	See Remarks	Same color corresponding to fluid being sampled
SC	Screenings	Brown	Banyonbark AC12 (dark brown)
SD	Sanitary Drain	Grey	Grey IN05
SDN	Scum Decant	Brown	Banyonbark AC12 (dark brown)
SDR	Storm Drain	Grey	Grey IN05
SE	Secondary Effluent	Green	Safety Green
SHC	Sodium Hypochlorite	Yellow	Safety Yellow
SI	Secondary Influent	Grey	Grey IN05
SLF	Sludge Filtrate	Grey	Grey IN05
SLW	Seal Water	Light Blue	Clear Sky EN 17
SN	Supernatant	See Remarks	Same color corresponding to fluid from which supernatant comes
SOA	Sulfuric Acid	Yellow	Safety Yellow
SOG	Sulfur Dioxide - Gas	Yellow	Safety Yellow
SOL	Sulfur Dioxide - Liquid	Yellow	Safety Yellow
SOS	Sulfur Dioxide Solution	Yellow	Safety Yellow
SOV	Sulfur Dioxide Gas under Vacuum	Yellow	Safety Yellow
SPD	Sump Pump Discharge	Brown	Banyonbark AC12 (dark brown)
SPRW [W2S	Softened Process Water W2S - Industrial Water, Soft]	Light Blue	Clear Sky EN17
SS	Sanitary Sewer	Grey	Grey IN05
SSC	Secondary Scum	Brown	Banyonbark AC12 (dark brown)
ST	Steam	Yellow	Safety Yellow
SU	Structure Underdrain	Light Blue	Clear Sky EN17
SUC	Structure Underdrain Collector	Light Blue	Clear Sky EN17
SVT	Sanitary Vent	Grey	Grey IN05

Fluid Abbreviation	Function & Identification	Identification Color	Remarks Suggested Tnemec Color or Equal
TA	Treated Air	Off-White w/ yellow band	Barbados PA24
TPA	Tank Padding Air	Off-White	Barbados PA24
TPR	Thickener Pressurized Recycle	Brown	Banyonbark AC12 (dark brown)
TSL	Thickened Sludge	Brown	Banyonbark AC12 (dark brown)
TSO	Thickener Subnatant Overflow	Brown	Banyonbark AC12 (dark brown)
TSSL	Thickened Screened Sludge	Brown	Banyonbark AC12 (dark brown)
TST	Thickener Subnatant	Brown	Banyonbark AC12 (dark brown)
UWHP {UHWR}	Utility Water High Pressure (Reclaimed Water)	Purple	Reclaimed Purple R1217
UWLP	Utility Water Low Pressure (Reclaimed Water)	Purple	Reclaimed Purple R1217
V	Vacuum	Off-White	Barbados PA24
VT	Vent	See Remarks	Same color corresponding to fluid being vented
WAS	Waste Activated Sludge	Brown	Banyonbark AC12 (dark brown)
WLO	Waste Lube Oil	Green	Safety Green
WW	Filter Waste Backwash Water	Brown	Banyonbark AC12 (dark brown)
[W1	W1 - Potable Water	White	White WH01]
[W2	W2 - Industrial Water	Light Blue	Clear Sky EN17]
[W2S	W2S - Industrial Water, Soft	Light Blue	Clear Sky EN17]

** END OF SECTION **