Pipe Marker Labels & Signs

**Overview:**

Hazardous materials and chemicals are widely transported through piping systems in industrial, commercial, and governmental situations. Though these piping systems may be constructed to strict design standards, their operation and maintenance can be inherently hazardous to workers, the general public, and the environment. Mistakes made in turning on valves or disconnecting pipes at the wrong time or place can result in serious injuries or damage to property. [1]

In order to promote greater safety, lessen the chances of error, confusion, or inaction, especially in times of emergency, a uniform system for the identification of piping contents is important to warn personnel when the piping contents are inherently hazardous. [1] Though OSHA regulates safety standards for all piping systems, it relies on a number of identification standards, each of which addresses the labeling of a particular type of piping.

<table>
<thead>
<tr>
<th>PIPING TYPE</th>
<th>IDENTIFICATION STANDARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Piping</td>
<td>ASME A13.1-2015</td>
</tr>
<tr>
<td>Medical Gases Piping</td>
<td>NFPA 99C; CGA C-9-2013</td>
</tr>
<tr>
<td>Electrical Piping</td>
<td>ANSI Z535.1</td>
</tr>
<tr>
<td>HVAC Duct</td>
<td>ASME A13.1-2015</td>
</tr>
</tbody>
</table>

**Resources:**

- [NFPA 99C](http://www.nfpa.org/): ($$$)
- [CGA C-9-2013](https://www.techstreet.com/standards/cga-c-6?product_id=1860561): ($$$)
- [IIAR Bulletin #114](https://www.osha.gov/SLTC/etools/ammonia_refrigeration/references/iiar_bulletin114.html): ($$$)
- [ANSI Z535.1](http://webstore.ansi.org/): ($$$)
- [OSHA Ammonia Refrigeration](http://www.osha.gov/SLTC/ammoniarefrigeration/index.html): (Free)
- [Compliancesigns.com Pipe Label Article](http://compliancesignsconnection.blogspot.com/2012/01/understanding-ansi-asme-pipe-marking.html): (Free)
Design of Pipe Marker Labels & Signs:

- **CHEMICAL PIPING LABELS:** The ASME A13.1 Scheme for the Identification of Piping Systems identifies the contents and hazards associated with piping containing hazardous materials. The standard is applicable to chemical piping systems found in industrial, commercial, and public facilities, but does not apply to buried pipelines or electrical conduits. Two identification components appear on each label identifying a chemical; legend and color. The legend is the name of the chemical within the pipe along with an arrow indicating the direction of flow. The color of the label indicates the characteristic hazards the chemical presents. The colors used comply with the ANSI Z535.1 Safety Color Code. The standard also stipulates the label size and placement for maximum visibility. (ASME A13.1.1-3) *(See graphic aid 1 below)*

**Graphic Aid 1**

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>White on Red</td>
<td>Fire quenching fluids</td>
</tr>
<tr>
<td>Black on Orange</td>
<td>Toxic and corrosive fluids</td>
</tr>
<tr>
<td>Black on Yellow</td>
<td>Flammable and oxidizing fluids</td>
</tr>
<tr>
<td>White on Brown</td>
<td>Combustible fluids</td>
</tr>
<tr>
<td>White on Green</td>
<td>Potable, cooling, boiler feed, and other water</td>
</tr>
<tr>
<td>White on Blue</td>
<td>Compressed air</td>
</tr>
<tr>
<td>White on Purple</td>
<td>User defined</td>
</tr>
<tr>
<td>Black on White</td>
<td>User defined</td>
</tr>
<tr>
<td>White on Gray</td>
<td>User defined</td>
</tr>
<tr>
<td>White on Black</td>
<td>User defined</td>
</tr>
</tbody>
</table>
Pipe Markers

Compliance – Resource Bulletin

(Pipe Marker Labels & Signs Continued)

- **AMMONIA REFRIGERATION PIPING LABELS**: Guidelines for Identification of Ammonia Refrigeration (IIAR Bulletin 114) is the accepted standard for the labeling of ammonia piping systems. Though it adopts the size, legend and color components stipulated by ASME A13.1, it also defines additional components ammonia labels should display:
  - Abbreviations indicating system components.
  - Colored bands with legend indicating the physical state of the refrigerant: liquid, vapor, or both.
  - A colored band with legend indicating the internal pipe pressure level. *(See graphic aid 2 below)*

### Graphic Aid 2

- **MEDICAL GASES PIPING LABELS**: Gases used in medical facilities are stored in containers and delivered to medical equipment via piping systems. Collaboration between The National Fire Protection Association (NFPA 99C) and The Compressed Gas Association (CGA Pamphlet C-9) resulted in the accepted standard for the labeling of medical gases. NFPA 99C addresses which equipment should be labeled, where labels should be applied, label legend content, and adopt the CGA C-9 label color codes indicating a specific gas. *(NFPA 99C 5.1.11) (See graphic aid 3 below)*

### Graphic Aid 3
Pipe Marker Labels & Signs Continued

- **ELECTRICAL PIPING LABELS**: Electrical conduit, breaker panels, and equipment all pose the risk of electric shock or electrocution if handled incorrectly by workers. Conduit, and the devices they feed, should be labeled to provide important hazard information about their contents. These labels are formatted using the ANSI Z535.1 and OSHA safety orange color denoting a “warning” hazard level. Common legend information provided on conduit labels is:
  
  - Voltage (V)
  - Current level (AMP)
  - Current type (AC or DC)
  - Phase (single or three)
  - Main Disconnect
  - Contents (telephone, power, fiber optic, etc.)

- **HVAC DUCT LABELS**: HVAC is an acronym for heating, ventilating and air conditioning systems. The movement of air in facility HVAC systems occurs in galvanized metal or flexible plastic ducts. The labeling of ducts assists workers differentiate between different air systems. The accepted standard for duct labeling is based on the ASME A13.1 labeling system. The label consists of a legend describing the contents of the duct, a directional arrow indicating air flow, and a color coded background indicating physical properties of the air. The three colors used are: Green (cold air supply & exhaust); Yellow (warm air supply & exhaust); Blue (mixed air supply & exhaust). Some of the air types indicated in the legend are:
  
  - Intake Air
  - Supply Air
  - Relief Air
  - Exhaust Air
  - Return Air
  - Outside Air

- **UNDERGROUND UTILITY, PIPELINE, & CABLE LABELS**: Piping systems are widely used for the underground transport of petroleum products, natural gas, electrical and communication cabling, and municipal water and sewer utilities. Because these systems travel underground, they present the challenge of identifying their location both from the standpoint of system maintenance and accident prevention during excavation.

  The Pipeline & Hazardous Materials Safety Administration (PHMSA) is an agency of The Department of Transportation (DOT) responsible for pipeline safety standards. Other entities such as The American Gas Association and American Public Works Association are also contributors to standards for underground location involving systems in their industries. Consequently, the variety of hazardous materials transported underground results in a number of identification standards.

  The location and labeling of underground piping systems before excavation at construction sites is the responsibility of the contractor in charge but is performed by either the owner of the pipeline, the local municipality, or a locating service dispatched to the site by calling the national “Call Before You Dig” phone number, 811. The types of piping system utilities requiring location are:
Pipe Markers

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(Pipe Marker Labels & Signs Continued)

- Buried cable: electric, telephone, fiber optics
- Gas pipeline: natural & chemical gases
- Water and sewer pipelines
- Petroleum pipelines

Widely used types of labeling systems are:

- Above ground color coded staked markers and labels.
- Detectable underground piping tapes. (allows electronic location)
- OSHA formatted safety signs warning of buried piping. (See graphic aids 4 & 5 below)

Graphic Aid 4 & 5

For Pipe Marker labels & signs please visit our store: http://www.compliancesigns.com


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