


Technique	Use of coding and identifying piping systems as to the content and pressure within.
 <h2 style="margin: 0;">Ground Piping Systems Color Coding and Identification</h2> <p style="margin: 0;"><i>Provides an aid to Maintenance and Safety</i></p>	
Benefits	<p>Easy and ready identification of piping systems contents. Such identification can aid in:</p> <ul style="list-style-type: none"> • Reduced time in researching a particular system location that is to be modified. Knowing the system that is to be modified, visual identification of that system eliminates a large amount of research time reviewing the pipe location drawings. • Safely traversing an area knowing which systems can be dangerous to physical contact. Examples of such systems are high temperature steam lines, low temperature LOX and LH₂ lines. • Tracing systems in search of leaks or in search of a shutoff valve to stop a leak. • Locating a fire box in case of fire (all fire lines are painted red). <p>Each example has beneficial aspects from saving time to saving lives and equipment.</p>
Key Words	Pipe system identification, Color coding hazardous area
Application Experience	This practice applies to all Ground Based Piping Systems installed in areas under the jurisdiction of KSC, including the systems located in floor trenches and above suspended ceilings. Sections of piping that are concealed underground, in floor slabs, or in walls or partitions are not subject to the requirements of this practice.
Technical Rationale	Color coding of the piping systems provides accurate and immediate visual and written identification of the contents within the pipe. This will provide greater safety and lessen the chances of confusion when working within an area with numerous piping systems. The markings on the outside of the pipe show content in color code, the flow direction, pressures and name of contents (See Figure 1).
Contact Center	Kennedy Space Center (KSC)

Ground Piping Systems Color Coding and Identification *Technique DFE-5*

This practice establishes, defines, and assigns a color for recognition to each of six classes of material. Five classes represent universally recognized types of hazards involved in the handling of dangerous gases/liquids. A sixth is assigned for exclusive use of fire protection for materials and equipment. The practice requires the application of color warnings in a distinctive manner, as a visual aid and supplement to written identification. Further details can be found in KSC-STD-SF-0004B.

This practice is not applicable to electrical conduits, ventilation units, or pipelines installed in missiles, spacecraft airborne equipment, or storage vessels.

Identification methods for bulk petroleum product system is covered in MIL-STD-161. The identification of pipelines for aircraft, missiles, and space vehicles is covered in MIL-STD-1247, and color coding for containers of liquid propellants is covered in MIL-STD-172.

Piping systems are described in any pipe line used to transport gases, liquids or semiliquids, but not those for carrying solids in gas or air. Valves, fittings, operating accessories, pipe coverings and tie-in points at storage facilities are considered piping systems.

Piping identification is broken down into 4 types of markings on the outside of the pipe. The primary set of markings identifies the content which is shown by a color band taped around the pipe. All contents are broken down into 8 colors. The colors used

conform to requirements identified in Federal Standard No. 595, "Colors" and are:

- Yellow, No. 13655 - Flammable Materials known ordinarily as flammables or combustibles.
- Brown, No. 10080 - Toxic and Poisonous Materials. All materials extremely hazardous to life or health under normal conditions as toxics or poisons.
- Blue, No. 15102 - Anesthetics and Harmful Materials. All materials productive of anesthetic vapors and all liquid chemicals and compounds hazardous to life and property but not normally productive of dangerous quantities of fumes or vapors.
- Green, No. 14110 - Oxidizing Materials which readily furnish oxygen for combustion and fire producers which react explosively or with the evolution of heat in contact with many other materials.
- Gray, No. 16187 - Physically Dangerous Materials. All materials, not dangerous in themselves, which are asphyxiating in confined areas or which are generally handled in a dangerous physical state of pressure or temperature.
- Red, No. 11105 - Fire Protection Materials. All materials provided in piping systems or in compressed gas cylinders exclusively for use in fire protection.
- Black, No. 17038 and White, No. 17875. These colors are assigned for general use where specified in KSC-STD-SF-0004B, "Safety Standard for Ground Piping Systems Color Coding and Identification" except as follows. Water Piping Systems

containing water suitable for human consumption and installed for this purpose shall be painted white, No. 17875 throughout or shall be painted to match surroundings when not in conflict with color designations in referenced standard.

The second set of markings is shown as the color used in the flow arrow which is taped to the outside of the pipe. The secondary color marking is used to identify a second characteristic associated with the content. If a second characteristic does not exist, the flow arrow is black and white. The flow arrow indicates the direction of flow, if the content can flow in either direction a double headed arrow is shown.

The third set of markings is the title. The title identifies the contents by name or recognized abbreviations. The tiles may be taped, glued or stenciled onto the sides of the pipe.

The fourth set is the pressure rating which is shown by a numerical number taped on the outside of the pipe. The pressure will be given immediately below the title using the same sizes and color. Piping systems may not need a pressure rating shown if it is below 60 psig.

References

1. KSC-STD-SF-0004B
2. MIL-STD-161
3. MIL-STD-1247
4. MIL-STD-172
5. FED-STD-595

**EXACT IDENTIFICATION
 ALWAYS BY NAME OF THE MATERIAL CONTAINED**

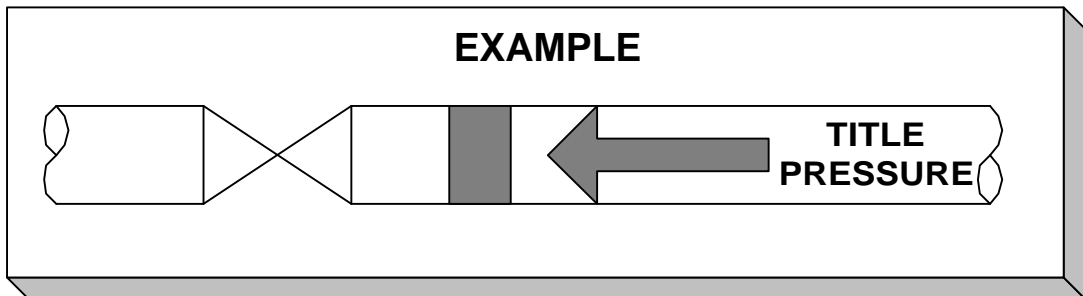
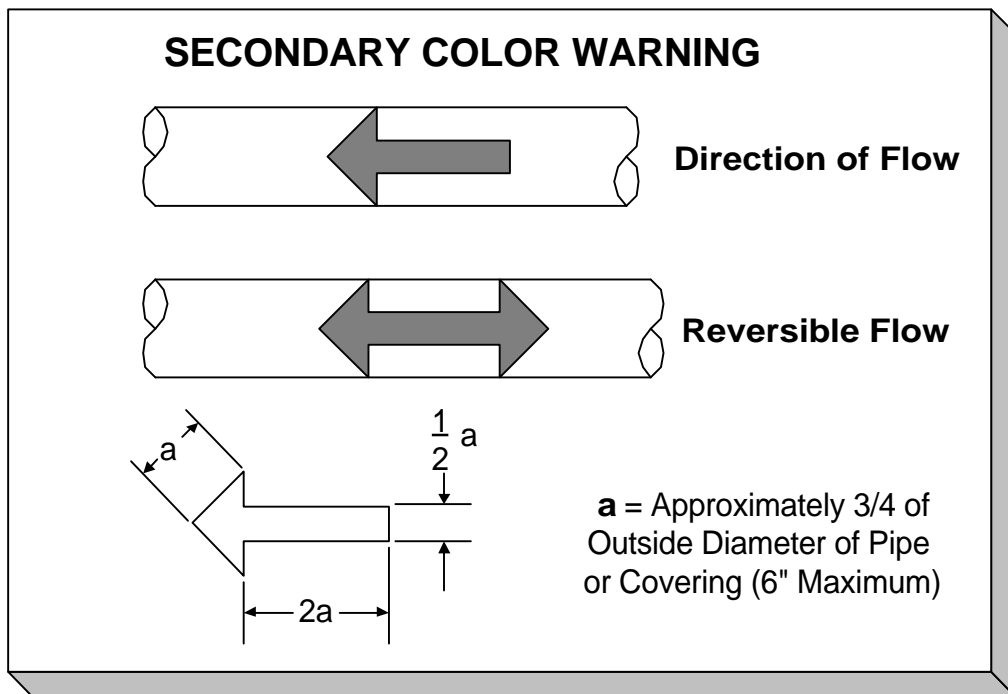
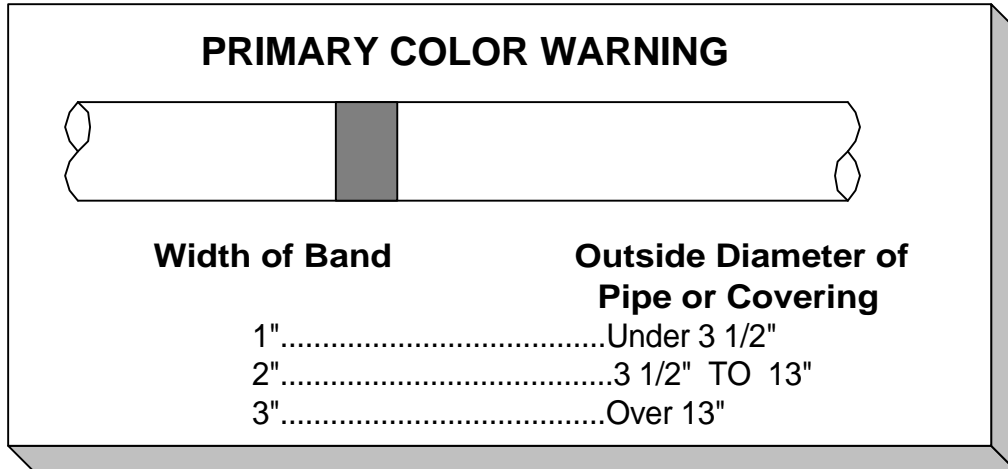


Figure 1. Piping Systems, Color Warnings