The American Society of Mechanical Engineers

AN AMERICAN NATIONAL STANDARD

SCHEME FOR THE IDENTIFICATION OF PIPING SYSTEMS

ASME A13.1-1996

(Revision of ASME A13.1-1981)

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ASME A13.1-1996

Following approval by the ASME A13 Committee and ASME, after public review, this ASME A13.1-1996 was approved by the American National Standards Institute on August 13, 1996.

SUMMARY OF CHANGES

ASME A13.1-1996 consists of A13.1-1981, as well as the following additional changes. The changes given below are identified on the page by a margin note (**96**), placed on the affected area. The pages not listed do not contain changes.

Page	*Location*	*Change*
iii	Foreword	(1) First paragraph revised (2) Fifth paragraph revised (3) Sixth paragraph deleted (4) Eighth paragraph revised
v	Committee Roster	Updated
vii	Table of Contents	Added
1	2 2.5	Title revised Added
3	Table 2, Note (1)	Reference updated

FOREWORD

(This Foreword is not a part of ASME A13.1-1996.)

This is a revision of the Scheme for the Identification of Piping Systems, originally affirmed in 1928, reaffirmed in 1945, revised in 1956, revised in 1975, revised in 1981, reaffirmed in 1985 and 1993, and revised in 1996. **(96)**

Shortly after the turn of the century, with the resultant industrial expansion, it became apparent that some scheme should be devised to identify piping. In 1908, an article on "Identification of Power House Piping by Colors" was read at a meeting of The American Society of Mechanical Engineers. In 1909, an article called "Standard Colors for Power Station Piping" was read at the meeting of the Association of Edison Illuminating Companies.

In 1920, the National Safety News pointed out the need for a color scheme for pipe lines, and the following year several papers were published and reports made to various committees, notably the Prime Movers Committee of the National Electric Light Association, The American Society of Mechanical Engineers, and the U. S. Navy Department which actually wrote its specifications.

In the meantime, many large companies compiled their own scheme with no thought to standardization of pipe colors, even in their own plants. When personnel were shifted, accidents could and did happen.

The organization of the Sectional Committee on the Identification of Piping Systems, under the procedure of the American Standards Association (now called the American National Standards Institute, Inc.), took place on June 14, 1922. **(96)**

On August 23, 1950, the committee was reorganized to investigate the possibility of a revision to the standard. It was felt that a revision was necessary because of the tremendous number of different materials being carried in pipes. After many meetings and much discussion, this revision of American Standard, Scheme for Identification of Piping Systems, was approved by the sectional committee and sponsors. It was then presented to the American Standards Association (now called the American National Standards Institute, Inc.) for approval and designation as an American Standard. This was granted on January 27, 1956.

In the late 1960's the committee began discussions on the possibility of revising the 1956 Standard. These discussions continued for a number of years, eventually resulting in approval by the American National Standards Institute, Inc. and the secretariat. Approval by the American National Standards Institute, Inc. and designation as an American National Standard was obtained on November 16, 1981.

This latest edition of A13.1 was approved by the American National Standards Institute on August 13, 1996. **(96)**

Suggestions for improvement of this revision will be welcomed. They should be sent to The American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, N.Y., 10017.

COMMITTEE ON THE SCHEME FOR THE IDENTIFICATION OF PIPING SYSTEMS

(96)

(The following is a roster of the Committee at the time of approval of this Standard.)

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INTRODUCTION

Purposes of Standardization

Schemes for identification of the contents of piping systems have been developed in the past by a large number of industrial plants and organizations of various kinds. Generally speaking, the standards arrived at in individual cases may have given satisfaction to those using them but they also may have suffered from a lack of uniformity. Numerous injuries to personnel and damage to property have occurred because of mistakes made in turning valves on, or disconnecting pipes at the wrong time or place, particularly when outside agencies, such as municipal fire departments, were called in to assist. Furthermore, there has been considerable confusion in the minds of those who change employment from one plant to another.

In order to promote greater safety, lessen the changes of error, confusion, or inaction, especially in times of emergency, a uniform system for the identification of piping contents has been established to warn personnel when the piping contents are inherently hazardous. Therefore, while this Standard has been prepared to specify the identification of the contents of piping systems on the basis of legends, it also suggests the use of color as a supplementary means of identifying the type of hazard of the material contained in the system.

SCHEME FOR THE IDENTIFICATION OF PIPING SYSTEMS

1 OBJECT AND SCOPE

1.1 This Standard is intended to establish a common system to assist in identification of hazardous materials conveyed in piping systems and their hazards when released in the environment.

1.2 This scheme concerns identification of contents of piping systems in industrial and power plants. It is also recommended for the identification of piping systems used in commercial and institutional installations, and in buildings used for public assembly. It does not apply to pipes buried in the ground nor to electrical conduits.

1.3 Existing schemes for identification shall be considered acceptable if such schemes are described in writing and implemented so that the using facility can demonstrate that the basic concerns outlined in this Standard are being met. For example, petroleum refineries and primary chemical manufacturing plants, in which hazardous work permit systems and emergency procedure manuals are utilized, wherein effective methods for the identification of pipe contents have been established, and wherein employees are trained as to the operation and hazards of the piping systems, shall be considered as meeting the requirements of this Standard.

(96) 2 DEFINITIONS AND REFERENCES

2.1 Piping Systems

For the purpose of this Standard, piping systems shall include pipes of any kind and, in addition, fittings, valves, and pipe coverings. Supports, brackets, or other accessories are specifically excluded from applications of this Standard. Pipes are defined as conduits for the transport of gases, liquids, semiliquids, or fine particulate dust.

2.2 Materials Inherently Hazardous

2.2.1 Flammable or Explosive. This classification includes materials which are easily ignited. It includes materials known as fire producers or those creating an explosive atmosphere.

2.2.2 Chemically Active or Toxic. This classification includes materials which are corrosive, or are in themselves toxic or productive of poisonous gases.

2.2.3 At Temperatures or Pressures. This classification includes materials which when released from the piping would have a potential for inflicting injury or property damage by burns, impingement, or flashing to vapor state.

2.2.4 Radioactive. This classification includes those materials which emit ionizing radiation.

2.3 Materials of Inherently Low Hazard

This classification includes all materials which are not hazardous by nature, and are near enough to ambient pressure and temperature that people working on systems carrying these materials run little risk through the release of these materials.

2.4 Fire Quenching Materials

This classification includes sprinkler systems and other piped fire fighting or fire protection equipment. This includes water (for fire fighting), foam, CO_2, Halon, etc.

2.5 References (96)

This Standard is supplemented by the following standard. Since revisions in and additions to this Standard do occur, the edition bearing the latest date of issue shall be used. It is expected that best current practice will prevail.

The following standard shall, to the extent specified herein, form a part of this Standard.

ANSI Z535.1 Safety Color Code

Publisher: American National Standards Institute, Inc.
11 West 42nd Street
New York, NY 10036

TABLE 1 EXAMPLES OF LEGEND

"HOT WATER"	"HYDRAULIC OIL"
"SLURRY"	"FOAM"
"AIR 100 PSIG"	"CARBON TETRACHLORIDE"
"ARGON 500 PSIG"	"CAUSTIC"
"PROPANE"	"SULFURIC ACID"
"H. P. RETURN"	"STEAM 100 PSIG"

3 METHOD OF IDENTIFICATION

3.1 Legend

This Standard considers legend to be primary and explicit for identification of contents. Positive identification of the contents of a piping system shall be by lettered legend giving the name of the contents in full or abbreviated form (see Table 1). Arrows shall be used to indicate direction of flow. Contents shall be identified by legend with sufficient additional details such as temperature, pressure, etc., as are necessary to identify the hazard.

Legend shall be brief, informative, pointed, and simple for greatest effectiveness. Legends shall be applied close to valves or flanges and adjacent to changes in direction, branches, and where pipes pass through walls or floors; and at intervals on straight pipe runs sufficient for identification. Identification may be accomplished by stenciling, the use of tape, or markers. In any situation, the number and location of identification markers shall be based on the particular piping system. (See Fig. 1.)

3.2 Color

Color should be used to identify the characteristic hazards of the contents (see Table 2). Color should be displayed on, or contiguous to, the piping by any physical means, but its use shall be in combination with legend. Color may be used in continuous, total length coverage or in intermittent displays.

3.3 Visibility

Attention shall be given to visibility with reference to pipe markings. Where pipe lines are located above or below the normal line of vision, the lettering shall be placed below or above the horizontal centerline of the pipe.

3.4 Type and Size of Letters

Contrast shall be provided between color field and legend for readability. Table 2 gives recommendations for color of legend on various color fields covered in this Standard. Use of letters of standard style,[1] in sizes 1/2 in. (13 mm) and larger, is recommended. Refer to Table 3 for specific size recommendations. For identification of materials in pipes of less than 3/4 in. (19 mm) in diameter, and for valve and fitting identification, the use of a permanently legible tag is recommended.

[1] Sans serif gothic bold lettering provides high readability.

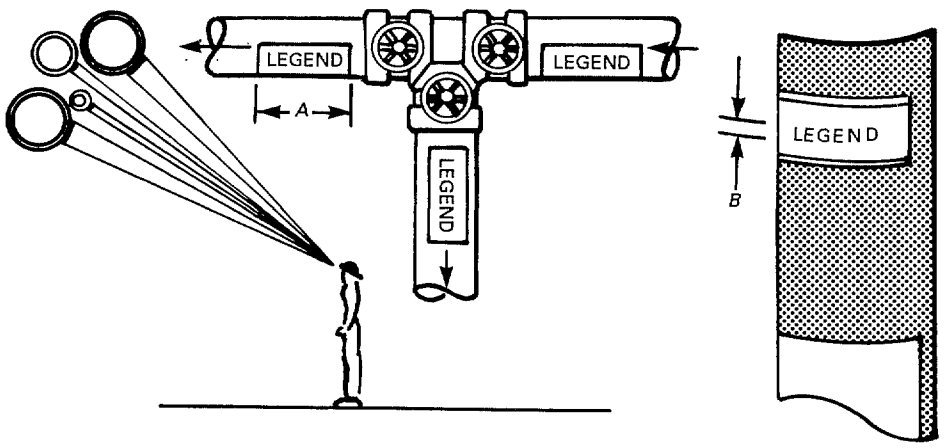

FIG. 1

TABLE 2
CLASSIFICATION OF HAZARDS OF MATERIALS AND DESIGNATION OF COLORS[1]

Classification	Color Field	Color of Letters for Legend
Materials Inherently Hazardous		
Flammable or Explosive	Yellow	Black
Chemically Active or Toxic	Yellow	Black
Extreme Temperatures or Pressures	Yellow	Black
Radioactive[2]	Yellow	Black
Materials of Inherently Low Hazard		
Liquid or Liquid Admixture[3]	Green	White
Gas or Gaseous Admixture	Blue	White
Fire Quenching Materials		
Water, Foam, CO_2, Halon, etc.	Red	White

(96) NOTES:

(1) When the color scheme above is used, the colors should be as recommended in ANSI Z535.1 latest revision, Safety Color Code.

(2) Previously specified radioactive markers using yellow and purple are acceptable if already installed and/or until existing supplies are depleted, subject to pertinent Federal Regulations.

(3) Markers with black letters on a green color field are acceptable if already installed and/or until existing supplies are depleted.

TABLE 3 SIZE OF LEGEND LETTERS

Outside Diameter of Pipe or Covering		Length of Color Field A		Size of Letters B	
in.	mm	in.	mm	in.	mm
3/4 to 1 1/4	19 to 32	8	200	1/2	13
1 1/2 to 2	38 to 51	8	200	3/4	19
2 1/2 to 6	64 to 150	12	300	1 1/4	32
8 to 10	200 to 250	24	600	1 1/2	64
over 10	over 250	32	800	3 1/2	89

3.5 Unusual or Extreme Situations

When the piping layout creates or occurs in a limited area of inaccessibility or of extreme complexity, such segments of layouts may require substitute techniques to achieve positive identification. Use of substitute techniques shall be limited to such segments and shall not deviate from the concept of identification described in 3.1, "Legend," 3.2, "Color," and Table 2, "Classification of Hazards of Materials and Designation of Colors."