

ASME A13.1-2007

[Revision of ASME A13.1-1996 (R2002)]

Scheme for the Identification of Piping Systems

AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**

ASME A13.1-2007

[Revision of ASME A13.1-1996 (R2002)]

Scheme for the Identification of Piping Systems

AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**

Three Park Avenue • New York, NY 10016

Date of Issuance: April 4, 2007

The next edition of this Standard is scheduled for publication in 2012. There will be no addenda issued to this edition.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. Interpretations are published on the ASME Web site under the Committee Pages at <http://cstools.asme.org> as they are issued.

ASME is the registered trademark of The American Society of Mechanical Engineers.

This code or standard was developed under procedures accredited as meeting the criteria for American National Standards. The Standards Committee that approved the code or standard was balanced to assure that individuals from competent and concerned interests have had an opportunity to participate. The proposed code or standard was made available for public review and comment that provides an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

ASME does not “approve,” “rate,” or “endorse” any item, construction, proprietary device, or activity.

ASME does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to insure anyone utilizing a standard against liability for infringement of any applicable letters patent, nor assume any such liability. Users of a code or standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

Participation by federal agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this code or standard.

ASME accepts responsibility for only those interpretations of this document issued in accordance with the established ASME procedures and policies, which precludes the issuance of interpretations by individuals.

No part of this document may be reproduced in any form,
in an electronic retrieval system or otherwise,
without the prior written permission of the publisher.

The American Society of Mechanical Engineers
Three Park Avenue, New York, NY 10016-5990

Copyright © 2007 by
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
All rights reserved
Printed in U.S.A.

CONTENTS

Foreword	iv
Committee Roster	v
Introduction	vi
1 Object and Scope	1
2 Definitions and References	1
3 Method of Identification	1
Figure	
1 Location of Identification Markers	2
Tables	
1 Examples of Content Descriptions Appearing in a Legend	1
2 Designation of Colors	2
3 Size of Legend Letters	2

FOREWORD

This is a revision of the Scheme for the Identification of Piping Systems, originally affirmed in 1928; reaffirmed in 1945; revised in 1956, 1975, and 1981; reaffirmed in 1985 and 1993; revised in 1996, reaffirmed in 2002, and revised in 2007.

Shortly after the turn of the twentieth 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 pipelines, 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.

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), took place on June 14, 1922, resulting in the 1928 publication.

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, a 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) for approval and designation as an American Standard. This was granted on January 27, 1956.

In the late 1960s, 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 and designation as an American National Standard was obtained on November 16, 1981.

This edition of A13.1, which was approved by the A13 Committee and ASME, was approved by the American National Standards Institute on February 12, 2007.

ASME A13.1 COMMITTEE

Scheme for the Identification of Piping Systems

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

STANDARDS COMMITTEE OFFICERS

J. A. Ciba, Jr., *Chair*
J. A. Gruber, *Vice Chair*
J. D. Wendler, *Secretary*

STANDARDS COMMITTEE PERSONNEL

J. A. Ciba, Jr., Brady Corp.
L. Moquet, *Alternate*, Seton Identification Products
P. D. Flenner, Flenner Engineering Services
D. R. Frikken, Becht Engineering Co.
J. A. Gruber, Wheatland Tube Co.
R. F. Heisler, Jr., Air Products & Chemicals
A. Mukherjee, Tri Ocean Engineering
T. J. O'Grady II, VECO Alaska
W. V. Richards, Consultant
R. F. Seath, Gippsland Water
G. B. Stanton, Jr., American Hazard Control Consultants, Inc.
J. D. Wendler, The American Society of Mechanical Engineers

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 chances 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.

METRIC CONVERSIONS

This Standard contains SI (metric) units and U.S. Customary units. Either system may be used to meet the standard.

SCHEME FOR THE IDENTIFICATION OF PIPING SYSTEMS

1 OBJECT AND SCOPE

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.

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

Existing schemes for identification shall be considered as meeting the requirements of this Standard if

- (a) such schemes are described in writing
- (b) employees are trained as to the operation and hazards of the piping systems

2 DEFINITIONS AND REFERENCES

2.1 Piping Systems

For the purpose of this Standard, piping systems shall include piping of any kind including fittings, valves, and pipe coverings. Supports, brackets, or other accessories are specifically excluded from applications of this Standard. Piping is defined as conduits used to convey, distribute, mix, separate, discharge, meter, control, or snub fluid flows.

2.2 Materials

2.2.1 Flammable. This classification includes fluids, which under ambient or expected operating conditions, are a vapor or produce vapors that can be ignited and continue to burn in air. The term thus may apply, depending on service conditions, to fluids defined for other purposes as *flammable* or *combustible*.

2.2.2 Combustible. This classification includes fluids that can burn, but are not flammable.

2.2.3 Toxic and Corrosive. This classification includes fluids that are corrosive or toxic, or will produce corrosive or toxic substances when released.

2.2.4 Fire Quenching. This classification includes water, foam, and CO₂ used in sprinkler systems and fire fighting piping systems.

2.3 References

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

**Table 1 Examples of Content Descriptions
Appearing in a 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"

ANSI Z535.1, Safety Color Code

Publisher: American National Standards Institute
(ANSI), 25 West 43rd Street, New York, NY 10036

3 METHOD OF IDENTIFICATION

3.1 Legend

This Standard considers a 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. Where flow can be in both directions, arrows in both directions shall be displayed. Contents shall be identified by a legend with sufficient additional details such as temperature, pressure, etc., as are necessary to identify the hazard.

Legends 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.

3.2 Color

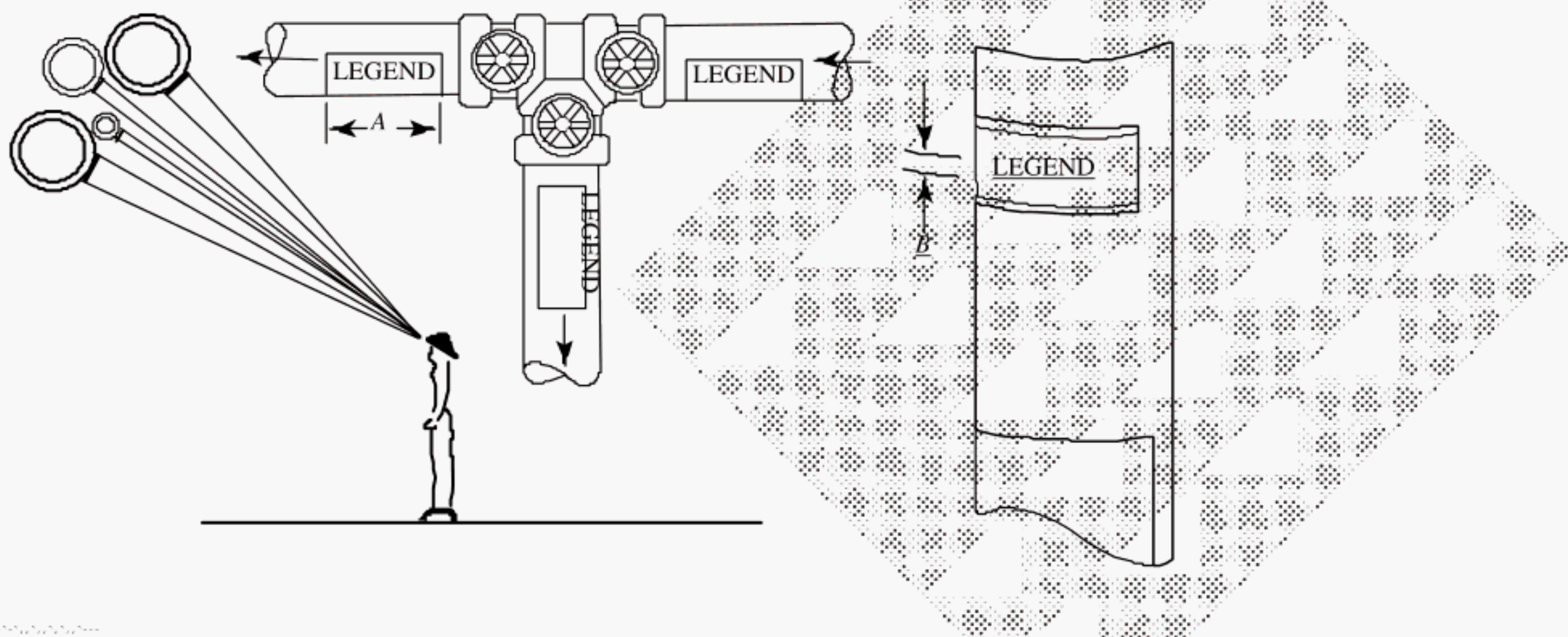
Color should be used to identify the characteristic hazards of the contents. Color should be displayed on, or contiguous to, the piping by any physical means, but its use shall be in combination with legend. Color may be used in continuous, total length coverage or in intermittent displays. Colors preceded by the word "Safety" shall meet the requirements of ANSI Z535.1. See Table 2.

Fluid Service

Table 2 Designation of Colors

Fire quenching fluids			
Toxic and corrosive fluids			
Flammable fluids			
Combustible fluids	Safety red	White	Letters
	Safety orange	Black	Letters
	Safety yellow	Black	Letters
	Safety brown	White	Letters
Potable, cooling, boiler feed, and other water	Safety green	White	Letters
Compressed Air	Safety blue	White	Letters
To be defined by the user	Safety purple	White	Letters
To be defined by the user	Safety white	Black	Letters
To be defined by the user	Safety gray	White	Letters
To be defined by the user	Safety black	White	Letters

Fig. 1 Location of Identification Markers



3.3 Visibility

Attention shall be given to visibility with reference to pipe markings. Where pipelines are located above or below the normal line of vision, the lettering shall be placed below or above the horizontal centerline of the pipe. See Fig. 1.

3.4 Type and Size of Letters

Contrast shall be provided between color field and legend for readability. Use of letters of standard style,¹ in sizes $\frac{1}{2}$ in. (13 mm) and larger, is recommended. See Table 3 for specific size recommendations. For identification of materials in pipes of less than $\frac{3}{4}$ 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.

Table 3 Size of Legend Letters

Outside Diameter of Pipe Covering, in. (mm)	Length of Color Field, A, in. (mm)	Size of Letters, B, in. (mm)
$\frac{3}{4}$ to 1 $\frac{1}{4}$ (19 to 32)	8 (200)	$\frac{1}{2}$ (13)
1 $\frac{1}{2}$ to 2 (38 to 51)	8 (200)	$\frac{3}{4}$ (19)
2 $\frac{1}{2}$ to 6 (64 to 150)	12 (300)	1 $\frac{1}{4}$ (32)
8 to 10 (200 to 250)	24 (600)	2 $\frac{1}{4}$ (64)
Over 10 (over 250)	32 (800)	3 $\frac{1}{2}$ (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 paras. 3.1, 3.2, and 3.3.

ASME A13.1-2007

ISBN 0 7918 3081 0



9 780791 830819



L03307