



Designation: **C930—12 C930 – 18**

# Standard Classification of Potential Health and Safety Concerns Associated With Thermal Insulation Materials and Accessories<sup>1</sup>

This standard is issued under the fixed designation C930; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

*This standard has been approved for use by agencies of the U.S. Department of Defense.*

## 1. Scope

1.1 This classification identifies potential concerns and effects that could result from direct contact with thermal insulation materials and accessories, or be caused by indirect action of events such as aging, fire, or physical disturbance.

### 1.2 Intent of Classification:

1.2.1 It is the intent of this classification to alert others to potential concerns, effects, hazards, or risk.

1.2.2 It is not the intent of this classification to establish the degree of risk or hazard or limiting values of potential hazards.

1.2.3 It is not the intent of this classification to establish or recommend methods or markings to reduce or mitigate the potential; however, it is recognized that correct procedures and precautionary measures can substantially reduce or eliminate some of the potential concerns, effects, hazards, or risks.

NOTE 1—See [Appendix X1](#) for commentary.

1.3 This classification recognizes the responsibility of producers and users, as appropriate, to: (1) provide information on known effects or hazards, (2) advise on established safety and health practices, and (3) determine applicable regulatory requirements.

1.4 This classification does not address the health and safety concerns of thermal insulation materials and accessories during manufacture.

1.5 Omission of an item from this classification does not imply an absence of potential concerns or effects.

1.6 There is no importance in the order of listing.

1.7 This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

## 2. Referenced Documents

### 2.1 ASTM Standards<sup>2</sup>

[C1055 Guide for Heated System Surface Conditions that Produce Contact Burn Injuries](#)

## 3. Terminology

### 3.1 Definitions of Terms Specific to This Standard:

3.1.1 *degree of risk*—the probability or expected frequency of the event, multiplied by the expected magnitude of exposure and the potential for harm.

3.1.2 *direct contact*—the straightforward touching resulting from use, manipulation, placement, etc.

3.1.3 *hazard*—a condition or set of circumstances that presents a specific injury or adverse health potential.

3.1.4 *indirect action or events*—the actions or events that are not directly created by, or straightforwardly caused by, the person(s) potentially exposed to the effects or hazards.

<sup>1</sup> This classification is under the jurisdiction of ASTM Committee [C16](#) on Thermal Insulation and is the direct responsibility of Subcommittee [C16.40](#) on Insulation Systems.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3.1.5 *potential*—the possible as opposed to the actual; that which may, but has not yet, come into being; that which is latent, unrealized.

3.1.6 *risk*—the exposure to chance of injury or illness or loss.

### 3.1.6.1 *Discussion*—

Risk is a combination of hazard and the probability of harm.

## 4. Significance and Use

4.1 The purpose of this classification is to identify potential concerns and effects which may occur during the life cycle (installation, service, removal, and disposal) of insulation materials and accessories resulting from direct contact or indirect action or events.

4.2 This classification does not identify remedial or preventive steps that may be taken to correct potential problems or hazards; rather it is intended as a checklist that will make it easier to deal constructively with these potentials, and to determine what, if any, specific requirements need to be added to other standards concerning insulation materials or accessories. (See [Appendix X2](#) for sources of information.)

4.3 This classification recognizes that proper handling and installation procedures can substantially reduce the potential concerns and effects. Further, it recognizes that in some situations the presence or creation of potential effects or hazards results from an intervening act of human or natural origin, or depends on access to or contact with the materials or accessories. Lack of compatibility of the individual components of an insulation system with each other or the environmental conditions within which the system will operate, or both, may create unanticipated effects. (See [Appendix X3](#).)

## 5. Basis of Classification

5.1 Classification is based on several broad groupings of potential concerns that could result from direct contact with thermal insulation materials and accessories, or be caused by indirect actions or events.

5.2 Potentials that occur from direct contact or indirect action or events are described as follows:

5.2.1 *Potential Health Effects*—Those effects that create risk of temporary or permanent changes in normal body functions and biochemical activity. The latter may involve vapors (such as organic solvent fumes), corrosive liquids (acids, alkalies, and organics), and solids (usually high surface area particulates) that react with body tissues or fluids.

5.2.1.1 A ~~Material~~ Safety Data Sheet (~~MSDS~~)(SDS) is required by the Occupational Safety and Health Administration (OSHA), U.S. Department of Labor (~~29CFR~~-(29 CFR 1910.1200)) for hazardous chemicals produced in the United States, or imported. (The ~~MSDS~~SDS for any product or material is issued and available from the organization producing the product or material.)

5.2.1.2 The ~~MSDS~~SDS for any insulation product, system, or accessory (including adhesives) should be obtained and reviewed to determine any potential effect on humans using or installing the material.

5.2.1.3 When *tests* are included in a standard, the ~~MSDS~~SDS for chemicals required ~~should~~should be reviewed to ensure that proper guidance for safe handling and use is incorporated.

5.2.2 *Potential Traumatic Injury Effects* ([Table 1](#))—These effects may result from sharp or rough materials or accessories which have protrusions or abrasive surfaces, cause overheating, or transmit electrical energy, and generally require direct contact with the material or accessory causing lacerations, abrasions, punctures, etc.

5.2.3 *Potential Effects Resulting from ~~Combustion~~*-(~~Combustion~~-[Table 2](#))—Those effects that result principally from the emission of heat, gases (toxic and non-toxic), fibers, particulates, and depletion of oxygen which takes place during combustion that exposes or involves insulation materials or accessories. The exposure effects can result from the actual combustion process or from the effluents that originate as a consequence of the combustion. Combustion can cause thermal effects (burns or scalds), toxic effects (resulting from the inhalation of asphyxiant or irritant combustion products, typically contained in the vapor phase), dermal effects (such as skin irritation) and impaired vision due to smoke obscuration, which can impair egress or rescue, or both, in case of fire. The effects resulting from combustion (or fire) are a function of the material (or materials) involved in the fire, the fire scenario and the amount of material that has burnt. Any combustible insulation material has the potential to be involved in fires. ASTM Committees E05 (on Fire Standards), E34 (on Occupational Health and Safety) and F23 (on Protective Clothing), as well as NFPA (National Fire Protection Association), SFPE (Society of Fire Protection Engineers) are potential resources to better understand the effects of combustion or fire.

5.2.4 *Potential Effects from Structural Conditions* ([Table 32](#))—Those effects that result principally from the overloading or deterioration of structural members of a building resulting in failure of the structure, or a portion of it, and its collapse on occupants.

5.2.5 *Guidance on Burn Injuries*. Guide [C1055](#) provides guidance on burn injuries associated with heated system surface contacts.

**TABLE 1 Potential Traumatic Injury**

Insulation Product, System, or Accessory	Potential Exposure	Potential Effect on Humans
Cellular glass Encapsulated or reflective insulation Insulation materials and accessories	abrasive surface high surface temperature application of thermal insulation around or adjacent to electrical wiring or fixtures (particularly important if the covering on the electrical circuit is old) may produce: <sup>A</sup> (a) overheating that could result in deterioration of the wire covering and contact with electrical energy (b) if subject to moisture accumulation could result in deterioration of the wire covering and contact with electrical energy (c) overheating that could result in fire	Contact may abrade skin Contact may cause thermal burns.  Electrical shock  Electrical shock  Thermal burns
Man-made vitreous fibers: Glass Mineral wool Refractory Metal encapsulated or reflective insulation	fiber stalks or bundles	Contact may abrade or puncture skin.
Metal foil	electrically conductive	Contact may transmit electrical energy if touching an electrical circuit resulting in minor or serious electrical shock. Contact may transmit electrical energy if touching an electrical circuit resulting in minor or serious electrical shock.
Sheet metal lagging, bands, fasteners, sheet metal	sharp or pointed edges	Contact may cause skin cuts, tears or punctures.

<sup>A</sup>Also see [Table 32](#).

**TABLE 2 Potential Effects Resulting from Combustion**

Insulation Product, System, or Accessory	Potential Exposure	Potential Effect on Humans
Adhesives, coatings, and mastics containing solvents	combustion of flammable or combustible solvents, during application or from residual solvents	Thermal burns and other effects from flame; flashover or explosion. Impaired vision from smoke. Toxic effects <sup>A</sup>
Organic polymeric foams	combustion of organic materials	Thermal burns. Impaired vision from smoke. Toxic effects <sup>A</sup>
Organic fibers: Animal hair Cellulosic Vegetable PVC-jacketing	combustion of organic materials	Thermal burns. Impaired vision from smoke. Toxic effects <sup>A</sup>
Urea formaldehyde foam	combustion of organic materials	Thermal burns. Impaired vision from smoke. Toxic effects <sup>A</sup>
Vapor retarders including asphalt-coated	combustion of organic materials	Thermal burns. Impaired vision from smoke. Toxic effects <sup>A</sup>
Insulations (principally fibrous) organically bound or impregnated	combustion of organic materials	Thermal burns. Impaired vision from smoke. Toxic effects <sup>A</sup>

<sup>A</sup>Toxicity of smoke and fumes depends on materials burning and intensity.

**TABLE 32 Potential Effects Resulting from Structural Conditions**

Insulation Product, System, or Accessory	Potential Exposure	Potential Effect on Humans
Insulation materials and accessories	contact with metal structural components may result in oxidation of the metal additional weight load to structure plus snow or ice.	Long term structural weakening or failure and collapse on occupants.  Structural failure and collapse on occupants if design characteristics are not reevaluated prior to installation.

## 6. Keywords

### 6.1 hazards; health effects; injury; safety

APPENDIXES

(Nonmandatory Information)

X1. COMMENTARY

X1.1 *Background of Standard*—The original concept was to develop two standards that alert task groups writing standards to safety and health concerns associated with thermal insulation materials and accessories *during* installation and *after* installation. Classification C930 – 80 resulted from a number of drafts and concerned the effects *during* installation.

X1.1.1 Subsequently attention was given to the effects *after* installation and a proposed classification standard proceeded through a number of drafts, with several new approaches to the classification and information presented. Finally, it was agreed there was sufficient similarity between the existing standard (Classification C930 – 80) and the proposed, so that they should be combined into one standard (Oct. 1982 Subcommittee meeting).

X1.1.2 ~~This revision combines~~ Early revisions combined the concerns and effects associated with thermal insulation materials and accessories during installation, and (after) when remodeling, or retrofitting, or as a result of indirect action or events.

X1.1.3 This classification is intended as a resource document intended solely to alert standards writers and users of insulating materials and accessories to *potentials*. It is most emphatically *not* an evaluation of comparative risks, nor is it a predictor of inevitable problems. No effort has been made to address the numerous preventive or remedial measures available to manufacturers and users, even though it is recognized that many of these are routinely used. The user in a corporate sense has a responsibility to advise the installer (tradesman), as an employee, of the information supplied by the manufacturer.

X1.1.4 During deliberations on the revision of C930 – 80, many requests to add qualifying or explanatory phrases and footnotes that indicate increased or decreased potential risk with specific products were received. It became clear that this qualifying or explanatory information would move the classification into territory beyond its own scope by noting palliative measures and assigning degrees of risk to some products and not others. Consequently, it was agreed that the tables should not contain comparative risk information.

X1.1.5 The tables are non-qualitative, non-quantitative lists of potential hazards to be used by standards writers, manufacturers, and users who are responsible for taking the potentials into account. Thus, they are no more, no less, than checklists.

X1.1.6 ~~Since adoption of Classification C930 – 85, an OSHA (Occupational Safety and Health Administration, U.S. Department of Labor) Regulation on Hazard Communication 29CFR–29 CFR 1910.1200 has been implemented.~~ implemented since Classification C930 was originally developed. The use and availability of Material Safety Data Sheets (MSDSs)(SDSs) has become widespread. ~~MSDSs are more comprehensive and up-to-date than Table 1 in Classification C930 – 85. Therefore, Table 1 has been deleted.~~ Standards writers and users should refer to MSDSs/SDSs and applicable federal, state, and local laws and regulations for potential health effects.

~~X1.2—Summary of Changes in Classification C930 – 85:~~

~~X1.2.1 Descriptions of Terms Specific to This Standard—This section replaced the former Section 2 on Definitions. All of the terms were new and relate to terms used:~~

~~X1.2.2 Significance and Use—This section was new. It focuses on identification of the potential concerns and effects that may occur during the life cycle (installation, service, removal, and disposal) of insulation materials and accessories, and points out that remedial or preventative steps are not identified:~~

~~X1.2.3 Basis of Classification—This section replaced the previous 4, “General Types of Hazard” of Classification C930 – 80. It reflects a new approach to the grouping and identification of potentials. All sections are concerned with potentials that may occur during and after installation:~~

X1.2.4 ~~Table 1, Potential Health Effects~~—The terminology of products, etc., were upgraded and the quantifiers were removed from “potential effects on humans.”

X1.2.5 ~~Table 2, Potential for Traumatic Injury~~—This table replaced the former ~~Table 2, “Mechanical Safety Hazards,”~~ and principally covers electric shock potentials.

X1.2.6 ~~Table 3, Potential Effects Resulting from Combustion~~—This table reflects the intent of the previous ~~Table 3~~.

X1.2.7 ~~Table 4, Potential Effects Resulting from Structural Conditions~~—This new category recognizes that there may be an effect from moisture on certain structural components, or from unanticipated additional weight load of added insulating materials. All items listed in the previous Table 4 of Classification C930 – 80 are now listed under ~~Table 1~~ and ~~Table 2~~.

X1.2.8 ~~Appendix X1~~—This appendix provides details on the current changes to Classification C930:

X1.2.9 ~~Appendix X2~~—This appendix continues the sources of information listed in Classification C930 – 80:

X1.2.10 ~~Appendix X3~~—This appendix covers additional items of concern on possible situations where generalization is difficult, but where there may be lack of compatibility between individual components of an insulation system. These items were contained in Section 4 of Classification C930 – 80:

X1.2 ~~Summary Basis of Changes Classification~~—in Paragraph ~~5.2.1~~ Classification reflects C930 – 92: a revised approach to identifying potential health effects on humans through use of the SDS, which are readily available and which provide comprehensive, up-to-date information.

X1.3.1 ~~Basis of Classification~~—Paragraph ~~5.2.1~~ reflects a revised approach to identifying potential health effects on humans through use of the MSDS, which are readily available and which provide comprehensive, up-to-date information.

## X2. SOURCES OF INFORMATION

### ASTM C930-18

X2.1 Where questions arise about the effects of a specific insulation component, by itself, or in combination with other materials in a system for use in a specific environment, the first source for knowledgeable information is the component or system manufacturer and it should be the first contact for information. Information from trade or industry associations, government agencies, and others should be regarded as secondary. Some specific potentially useful generic sources are listed below, but that list is not intended to be comprehensive.

American Conference of Governmental Industrial Hygienists

- American Chemistry Council (ACC)

([www.americanchemistry.com](http://www.americanchemistry.com))

700 Second Street, NE

Washington, DC 20002

- American Conference of Governmental Industrial Hygienists (ACGIH) ([www.acgih.org](http://www.acgih.org))

1330 Kemper Meadow Drive

Cincinnati, OH 45240

- American Industrial Hygiene Association (AIHA)

([www.aiha.org](http://www.aiha.org))

3141 Fairview Park Drive, Ste 777

Falls Church, VA, 22042

- American National Standards Institute (ANSI)

([www.ansi.org](http://www.ansi.org))

1899 L Street, NW, 11th Fl

Washington, DC, 20036

- EPS Industry Alliance (www.epsindustry.org)  
1298 Cronson Boulevard, Ste 201  
Crofton, MD 21114
- Extruded Polystyrene Foam Association (XPSA)  
(www.xpsa.com)  
750 National Press Building  
529 14th Street, NW  
Washington, DC 20045
- Insulation Contractors Association of America  
(www.insulate.org)  
1321 Duke St., Ste #303  
Alexandria, VA 22314
- International Isocyanate Institute, Inc.  
(www.diisocyanates.org)  
321 W Main St  
Boonton, NJ 07005
- National Academy of Sciences (NAS)  
(www.nasonline.org)  
2101 Constitution Ave., N.W.  
Washington, DC 20418
- National Fire Protection Association (NFPA)  
(www.nfpa.org)  
Batterymarch Park  
Quincy, MA 02269
- National Institute for Occupational Safety and Health (NIOSH) (www.cdc.gov/niosh)  
Center for Disease Control (CDC)  
1600 Clifton Rd.  
Atlanta, GA 30333
- National Insulation Association  
12100 Sunset Hills Rd., Ste. 330  
Reston, VA 20190
- National Research Council  
(www.nationalacademies.org)  
The National Academies of Sciences,  
Engineering, and Medicine  
500 Fifth Street, NW  
Washington, DC 20001
- National Roofing Contractors Association (NRCA)  
(www.nrca.net)  
10255 W. Higgins Road, Ste 600  
Rosemont, IL 60018
- National Safety Council (NSC) (www.nsc.org)  
1121 Spring Lake Dr.  
Itasca, IL 60143
- National Science Foundation (NSF) (www.nsf.org)  
4201 Wilson Boulevard  
Arlington, VA 22230
- National Technical Information Service (NTIS)  
(www.ntis.gov)  
5301 Shawnee Road  
Alexandria, VA 22312
- North American Insulation Manufacturers Association (NAIMA) (www.naima.org)  
11 Canal Center Plaza, Ste 103  
Alexandria, VA 22314

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