



ANSI/ISEA

201-2019

**American National Standard
for Insulation and Wash Durability
Classification of Apparel Used in
Cold Work Environments**

ANSI/ISEA 201-2019

(Revision of ANSI/ISEA 201-2012)

**American National Standard for
Insulation and Wash Durability Classification of Apparel
Used in Cold Work Environments**

Secretariat

International Safety Equipment Association

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American National Standards Institute, Inc.

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Foreword (This Foreword is not part of American National Standard ANSI/ISEA 201-2019)

The contribution of clothing to maintain consistent comfortable temperatures for the wearer is an important factor in productivity, endurance and safety in performing a given activity. Employees engaged in work in cold temperature environments, such as food processing or certain pharmaceutical manufacturing sites, or those involved in outdoor work during the cold weather seasons run the risk of cold stress related impairments including hypothermia, frostbite and chilblains.

To minimize such impairments, clothing ensembles worn in these environments must meet a number of requirements. It must provide the required level of insulation for the comfort and protection of the wearer in the exposure environment. The clothing must maintain the level of "as new" performance reasonably throughout the expected useful lifetime of the garment or ensemble. In addition, the garment's other performance properties such as warmth to weight, thickness to weight, warmth to thickness, breathability, and bending modulus must be considered to optimize the ensemble for comfort and performance in the chosen activity.

This second iteration revises the 2012 version of ANSI/ISEA 201. Key updates include changes to the number of classifications to be more meaningful when selecting the appropriate garments. Durability classification is now recognized as an optional assessment and updates to the laundering protocols and number of classes have been made to reflect a more practical approach.

This revision was prepared by members of the Protective Apparel Group of the International Safety Equipment Association (ISEA). The following companies were members of the group at the time of the approval of the standard:

Ansell Protective Products	3M Company
Carhartt	Magid Glove and Safety
DuPont Personal Protection	NASCO Industries
Encon Safety Products	National Safety Apparel
Gentex Corporation	OccuNomix International LLC
International Enviroguard	Protective Industrial Products
Ironwear	Radians
Kimberly-Clark Professional	Rasco FR
Lakeland Industries, Inc.	

This standard was processed and approved using consensus procedures prescribed by the American National Standards Institute. The following organizations were contacted prior to the approval of this standard. Inclusion in this list does not necessarily imply that the organization concurred with the submittal of the proposed standard to ANSI.

Amaril	Kansas State University
Aramark	KLME Martin Associates
East Coast Communications	3M Company
EMI Alaska	North Carolina State University College of Textiles
FCx Performance	PECO Energy
HexArmor	Refrigiwear
Intertek	United States Army – NATICK
International Personnel Protection Inc.	United Steel

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American National Standard for Insulation and Wash Durability

Classification of Apparel Used in Cold Work Environments

1 Scope

This standard establishes classification requirements for occupational apparel items worn in cold environments. The apparel items specified in this standard are insulated so as to reduce heat loss from the body to a cold environment.

Specific criteria are included for thermal insulation (in units of clo) and thermal transport properties. The resistance to the deterioration of these properties due to laundering may be optionally assessed and classified accordingly. The standard also includes garment care and labeling requirements and provides guidance on the selection of the apparel items based on given environments and activity levels.

Specific apparel covered by this standard includes insulated or shell jackets, parkas, vests, coveralls, pants and insulated flame-resistant occupational wear, as well as combinations thereof.

This standard does not address gloves, headwear, and footwear, although these items should be included in the prescribed cold weather ensemble in order to achieve functional protection.

Apparel items which are actively heated or use phase change materials (PCMs) to regulate body temperature of the wearer by actively generating, adding, or releasing heat are not included in this standard.

2 Purpose

The standard is intended to be a tool to assist selectors or specifiers in determining appropriate apparel items for cold ambient environments based on temperature and the activity of the wearer. The basis of this determination is the quantification and classification of the relative insulative effectiveness of the apparel items, the apparel's appropriateness for the scenario, and optionally its durability in the use environment. It is also intended to assist manufacturers to

balance material selection and performance of said apparel items (See Appendix A).

3 Normative References

The following documents contain provisions which, through reference, constitute mandatory requirements of this standard. Other reference documents, which do not contain mandatory provisions, are included in at the end of this standard.

ANSI/ISEA 125-2014, *American National Standard for Conformity Assessment of Safety and Personal Protective Equipment*

ASTM D5489-18, *Standard Guide for Care Symbols for Care Instructions on Textile Products*

ASTM F2732-16, *Standard Practice for Determining the Temperature Ratings for Cold Weather Protective Clothing*

ISO 6330:2012, *Textiles – Domestic washing and drying procedures for textile testing*

ISO 15797:2017, *Textiles -- Industrial washing and finishing procedures for testing of workwear. Table 2 – Washing Procedures for Colored Workwear*

ISO 3175-2:2017 *Textiles -- Professional care, drycleaning and wetcleaning of fabrics and garments -- Part 2: Procedure for testing performance when cleaning and finishing using tetrachloroethene*

4 Definitions

Accredited laboratory: A laboratory having a certificate of accreditation meeting the requirements of ISO/IEC 17025:2017, *General requirements for the competence of testing and calibration laboratories*, for the collection and analysis of data within the parameters of this standard.

clo: Unit of thermal resistance defined as the insulation required to keep a resting man