



INTERNATIONAL SAFETY
EQUIPMENT ASSOCIATION

The Catalyst for Safety Worldwide

ANSI / ISEA

107-2020

American National Standard for High-Visibility Safety Apparel

ANSI/ISEA 107-2020
(REVISION OF ANSI/ISEA 107-2015)

American National Standard for
High-Visibility Safety Apparel

Secretariat
International Safety Equipment Association

Approved September 8, 2020
American National Standards Institute, Inc.

**American
National
Standard**

An American National Standard implies a consensus of those substantially concerned with its scope and provisions. An American National Standard is intended as a guide to aid the manufacturer, the consumer, and the general public. The existence of an American National Standard does not in any respect preclude anyone, whether they have approved the standard or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standard. American National Standards are subject to periodic review and users are cautioned to obtain the latest editions.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation of any American National Standard. Moreover, no persons shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute.

CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken to reaffirm, revise, or withdraw this standard no later than five years from the date of publication. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

Published by

**International Safety Equipment Association
1901 North Moore Street, Arlington, Virginia 22209 USA**

Copyright 2020 by ISEA

All rights reserved.

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

Printed in the United States of America

Foreword

(This Foreword is not part of American National Standard ANSI/ISEA 107-2020)

This 2020 version of ANSI/ISEA 107 represents the fifth edition of the voluntary industry consensus standard addressing high-visibility safety apparel used in occupational settings. Since its initial publication in 1999, the standard has been the authoritative document for the design, performance or materials for high visibility PPE in the United States, having been codified into U.S. Department of Transportation, Federal Highway Administration (FHWA) regulations and incorporated by reference into other relevant worker protection standards.

ANSI/ISEA 107-2020 retains the long-standing Type-Performance Class designation of garments, whereby the Type is based on the expected use setting and the Performance Class is identified based on the amount of visible materials and design attributes incorporated into the finished garment. The criteria for high-visibility accessories have been removed in favor of continuing to emphasize the configurations and design requirements that contribute to the Type-Performance Class designation. Wearers and users should be encouraged to utilize high-visibility accessories including gloves, hoods, and head coverings to enhance their visibility.

It has been recognized that there are many work applications where worker visibility is imperative and the working environment itself can cause the garment to become soiled easily. To accommodate these scenarios, the updated ANSI/ISEA 107 version includes specific criteria for a single-use disposable coverall. It should be noted that this coverall configuration complies with the requisite minimum material amounts and color requirements imposed on all compliant high-visibility safety apparel and that the associated material integrity requirements are only applicable to single-use disposable coveralls, for which unique marking is applied. Updates have also been made to the tests methods in an effort to align more closely with other material integrity tests and to recognize current versions used for evaluating the materials.

The 2020 edition of the standard is introducing the concept of measuring the overall nighttime luminance of a garment by including optional language that allows a manufacturer to test a garment according to ASTM E1501. The committee believes that this standardized method and the data it generates throughout the next revision cycle will allow wearers to more easily compare the nighttime performance of garments and manufacturers to improve the design and performance of HVSA.

This revision was prepared by members of the High Visibility Products 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:

Arcwear.com	NASCO Industries
Blauer Manufacturing	National Safety Apparel
Bulwark FR	OccuNomix International
Carhartt	ORAFOL Americas, Inc.
DuPont	Pacific Safety Supply
ERB Industries	Performance Textiles, Inc. (div. of Brand and Oppenheimer)
Ergodyne	Protective Industrial Products
Global Glove & Safety	Pyramex Safety
Ironwear	Radians, Inc.
M.L. Kishigo Manufacturing	Safe Reflections
Lakeland Industries	Surewerx
3M Company	Tingley Rubber
Majestic Glove	Vartest Laboratories
MCR Safety	VisionVest

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.

American Road and Transportation Builders
Association
American Traffic Safety Services Association
Association of Hazards Materials Professionals
BSNF Railway
Ms. Holly Burgess, CSP
FCx Performance
Georgia Department of Transportation
Laborers' Health and Safety Fund of North
America

Michigan Department of Transportation
North Carolina State University
Reflective Apparel Factory
Roza Sunnyside Valley Irrigation
State of Ohio Public Employment Risk Reduction
Program
Texas Department of Transportation
Westex by Milliken

Suggestions for the improvement of this standard are welcome. Send suggestions to:

International Safety Equipment Association
1901 N. Moore Street
Arlington, VA 22209 USA
isea@safetyequipment.org

Table of Contents

SECTION	PAGE
1. Scope	1
2. Purpose.....	1
3. Definitions	1
4. Compliance	2
4.1 Background Materials	2
4.2 Combined-Performance and Retroreflective Materials.....	2
4.3 Finished HVSA.....	2
4.4 Declaration of Conformity	3
5. Types and Classes	3
5.1 HVSA Types.....	3
5.2 Performance Classes.....	3
5.3 Supplemental Class E.....	4
6. Design.....	4
6.1 Ergonomics	4
6.2 Apparel Configurations	4
6.3 Construction Requirements	6
7. Criteria for Optional Features and Testing	7
7.1 Pockets	7
7.2 Identification Panels, Lettering and Logos (Type R and P)	7
7.3 Identification of Personnel (Type P).....	8
7.4 Flame Resistance	8
7.5 Single-Use Disposable Coveralls.....	8
7.6 Overall Luminance	8
8. Requirements for Background and Combined-Performance Retroreflective Materials	8
8.1 Color.....	8
8.2 Colorfastness of Background Material	9
8.3 Dimensional Change of Background Material	10
8.4 Mechanical Properties of Background Material	10
8.5 Performance Under Wet Conditions	10
8.6 Water Vapor Permeability for Background Materials Classified as Breathable.....	10
9. Photometric and Physical Performance Requirements for Retroreflective and Combined- Performance Materials.....	11
9.1 Retroreflective Performance Requirements Prior to Test Exposure.....	11
9.2 Retroreflective Performance Requirements After Test Exposure.....	11

10.	Test Methods	11
10.1	Sampling and Conditioning	11
10.2	Determination of Color	11
10.3	Method for Determination of Retroreflective Photometric Performance	12
10.4	Retroreflection After Test Exposure	12
10.5	Flame Resistance	13
11.	High-Visibility Single-Use Disposable Coveralls.....	14
11.1	Requirements for Background and Combined-Performance Retroreflective Materials	14
11.2	Retroreflective Performance Requirements.....	14
11.3	Seam Strength for Single-Use Disposable Coverall Construction (Full Garment) .	14
12	Care Labeling.....	14
13.	Marking	14
13.1	General	14
13.2	Specific Marking.....	14
14.	Instructions for Use	15
14.1	Product Information.....	15
14.2	Service Life Guidelines	15

APPENDICES

Appendix A - Color of Background and Combined-Performance Material.....	A-1
Appendix B – Method of Measuring Wet Performance of Retroreflective Material	A-2
B1. Principle	A-2
B2. Apparatus.....	A-2
B3. Procedure.....	A-2
Appendix C – Suggested Type and Class Guidelines and Scenarios	A-4
Appendix D – Examples of Garment Design	A-6
Appendix E – Test Reports.....	A-16
E1. Background Material Testing Report	A-17
E2. Combined-Performance and Retroreflective Material Testing Report.....	A-21
E3. Declaration of Conformity	A-23
Appendix F – Examples of High-Visibility Safety Apparel Labels	A-25
Appendix G – High-Visibility Apparel Service Life.....	A-26
Appendix H – Benefits and Explanation of Optional Testing for Overall Luminance of HVSA	A-27

NORMATIVE REFERENCES.....	A-28
---------------------------	------

American National Standard for High-Visibility Safety Apparel

1 Scope

This standard specifies performance requirements for high-visibility safety apparel. For the purpose of this standard, the term “high-visibility safety apparel (HVSA)” shall be used to mean apparel PPE intended to provide conspicuity to the user in hazardous situations under any light conditions by day and under illumination by vehicle headlights in the dark or other low light conditions.

Performance requirements are included for color, retroreflection, physical properties and minimum areas of background, retroreflective and combined-performance materials, as well as the recommended configuration of the materials. Test methods are provided in the standard to ensure that a minimum level of visibility is maintained when garments are subjected to ongoing care procedures. These specifications may prescribe a wide variety of occupational HVSA, but shall not be applied to firefighter turnout gear.

2 Purpose

Conspicuity is enhanced by high contrast between the garment and the ambient background against which it is seen. This standard provides performance requirements for conspicuous materials to be used in HVSA and specifies minimum amounts of background, retroreflective and combined-performance materials, colors and placement of materials for garments, and supplemental items used to enhance the visibility and safety of workers. Performance Class guidelines are identified with corresponding recommendations for selection based on worker risk hazards, such as complex backgrounds, vehicular traffic and speeds encountered.

3 Definitions

Accredited laboratory: A laboratory having a certificate of accreditation meeting the requirements 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.

Background material: Colored fluorescent material intended to be highly conspicuous in daytime and dawn/dusk conditions, but not intended to comply with the requirements of this standard for retroreflective material.

Band: A strip or stripe that contrasts with the adjacent material in color, texture, material or function.

Combined-performance material: Material that exhibits both background and retroreflective properties.

Conspicuity: The characteristics of an object influencing the probability that it will come to the attention of an observer, especially in a complex environment which has competing objects.

Declaration of conformity: A statement by the manufacturer or supplier, based on a decision following review, that fulfillment of the requirements specified in this standard has been demonstrated. (Appendix E3)

Flame resistance: The property of a material whereby flaming combustion is prevented, terminated or inhibited following application of a flaming or non-flaming source of ignition with or without subsequent removal of the ignition source.

Fluorescent material: Material that instantaneously emits optical radiation within the visible range at wavelengths longer than absorbed and for which emission ceases upon removal of the source of irradiation. These materials enhance daytime visibility, especially during dawn and dusk.

High-visibility safety apparel (HVSA): Personal protective safety clothing intended to