

NFPA[®] 1953

Standard on Protective Ensembles for Contaminated Water Diving

2016 Edition



NFPA, 1 Batterymarch Park, Quincy, MA 02269-9101
An International Codes and Standards Organization

Documents
Document Sharing Hub

IMPORTANT NOTICES AND DISCLAIMERS CONCERNING NFPA® DOCUMENTS

NOTICE AND DISCLAIMER OF LIABILITY CONCERNING THE USE OF NFPA DOCUMENTS

NFPA® codes, standards, recommended practices, and guides (“NFPA Standards”), of which the document contained herein is one, are developed through a consensus standards development process approved by the American National Standards Institute. This process brings together volunteers representing varied viewpoints and interests to achieve consensus on fire and other safety issues. While the NFPA administers the process and establishes rules to promote fairness in the development of consensus, it does not independently test, evaluate, or verify the accuracy of any information or the soundness of any judgments contained in NFPA Standards.

The NFPA disclaims liability for any personal injury, property or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the publication, use of, or reliance on NFPA Standards. The NFPA also makes no guaranty or warranty as to the accuracy or completeness of any information published herein.

In issuing and making NFPA Standards available, the NFPA is not undertaking to render professional or other services for or on behalf of any person or entity. Nor is the NFPA undertaking to perform any duty owed by any person or entity to someone else. Anyone using this document should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances.

The NFPA has no power, nor does it undertake, to police or enforce compliance with the contents of NFPA Standards. Nor does the NFPA list, certify, test, or inspect products, designs, or installations for compliance with this document. Any certification or other statement of compliance with the requirements of this document shall not be attributable to the NFPA and is solely the responsibility of the certifier or maker of the statement.

REMINDER: UPDATING OF NFPA STANDARDS

Users of NFPA codes, standards, recommended practices, and guides (“NFPA Standards”) should be aware that NFPA Standards may be amended from time to time through the issuance of Tentative Interim Amendments or corrected by Errata. An official NFPA Standard at any point in time consists of the current edition of the document together with any Tentative Interim Amendment and any Errata then in effect.

In order to determine whether an NFPA Standard has been amended through the issuance of Tentative Interim Amendments or corrected by Errata, visit the Document Information Pages on NFPA’s website. The Document Information Pages provide up-to-date, document specific information including any issued Tentative Interim Amendments and Errata.

To access the Document Information Page for a specific NFPA Standard, go to <http://www.nfpa.org/docinfo> to choose from the list of NFPA Standards or use the search feature on the right to select the NFPA Standard number (e.g., NFPA 101). In addition to posting all existing Tentative Interim Amendments and Errata, the Document Information Page also includes the option to sign-up for an “Alert” feature to receive an email notification when new updates and other information are posted regarding the document.

ISBN: 978-145591190-5 (Print)

ISBN: 978-145591227-8 (PDF)

IMPORTANT NOTICES AND DISCLAIMERS CONCERNING NFPA® STANDARDS

ADDITIONAL NOTICES AND DISCLAIMERS

Updating of NFPA Standards

Users of NFPA codes, standards, recommended practices, and guides (“NFPA Standards”) should be aware that these documents may be superseded at any time by the issuance of new editions or may be amended from time to time through the issuance of Tentative Interim Amendments or corrected by Errata. An official NFPA Standard at any point in time consists of the current edition of the document together with any Tentative Interim Amendments and any Errata then in effect. In order to determine whether a given document is the current edition and whether it has been amended through the issuance of Tentative Interim Amendments or corrected through the issuance of Errata, consult appropriate NFPA publications such as the National Fire Codes® Subscription Service, visit the NFPA website at www.nfpa.org, or contact the NFPA at the address listed below.

Interpretations of NFPA Standards

A statement, written or oral, that is not processed in accordance with Section 6 of the Regulations Governing the Development of NFPA Standards shall not be considered the official position of NFPA or any of its Committees and shall not be considered to be, nor be relied upon as, a Formal Interpretation.

Patents

The NFPA does not take any position with respect to the validity of any patent rights referenced in, related to, or asserted in connection with an NFPA Standard. The users of NFPA Standards bear the sole responsibility for determining the validity of any such patent rights, as well as the risk of infringement of such rights, and the NFPA disclaims liability for the infringement of any patent resulting from the use of or reliance on NFPA Standards.

NFPA adheres to the policy of the American National Standards Institute (ANSI) regarding the inclusion of patents in American National Standards (“the ANSI Patent Policy”), and hereby gives the following notice pursuant to that policy:

NOTICE: The user’s attention is called to the possibility that compliance with an NFPA Standard may require use of an invention covered by patent rights. NFPA takes no position as to the validity of any such patent rights or as to whether such patent rights constitute or include essential patent claims under the ANSI Patent Policy. If, in connection with the ANSI Patent Policy, a patent holder has filed a statement of willingness to grant licenses under these rights on reasonable and nondiscriminatory terms and conditions to applicants desiring to obtain such a license, copies of such filed statements can be obtained, on request, from NFPA. For further information, contact the NFPA at the address listed below.

Law and Regulations

Users of NFPA Standards should consult applicable federal, state, and local laws and regulations. NFPA does not, by the publication of its codes, standards, recommended practices, and guides, intend to urge action that is not in compliance with applicable laws, and these documents may not be construed as doing so.

Copyrights

NFPA Standards are copyrighted. They are made available for a wide variety of both public and private uses. These include both use, by reference, in laws and regulations, and use in private self-regulation, standardization, and the promotion of safe practices and methods. By making these documents available for use and adoption by public authorities and private users, the NFPA does not waive any rights in copyright to these documents.

Use of NFPA Standards for regulatory purposes should be accomplished through adoption by reference. The term “adoption by reference” means the citing of title, edition, and publishing information only. Any deletions, additions, and changes desired by the adopting authority should be noted separately in the adopting instrument. In order to assist NFPA in following the uses made of its documents, adopting authorities are requested to notify the NFPA (Attention: Secretary, Standards Council) in writing of such use. For technical assistance and questions concerning adoption of NFPA Standards, contact NFPA at the address below.

For Further Information

All questions or other communications relating to NFPA Standards and all requests for information on NFPA procedures governing its codes and standards development process, including information on the procedures for requesting Formal Interpretations, for proposing Tentative Interim Amendments, and for proposing revisions to NFPA standards during regular revision cycles, should be sent to NFPA headquarters, addressed to the attention of the Secretary, Standards Council, NFPA, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101; email: stds_admin@nfpa.org

For more information about NFPA, visit the NFPA website at www.nfpa.org. All NFPA codes and standards can be viewed at no cost at www.nfpa.org/freeaccess.

Copyright © 2015 National Fire Protection Association®. All Rights Reserved.

NFPA®1953

Standard on

Protective Ensembles for Contaminated Water Diving

2016 Edition

This inaugural edition of NFPA 1953, *Standard on Protective Ensembles for Contaminated Water Diving*, was prepared by the Technical Committee on Special Operations Protective Clothing and Equipment and released by the Correlating Committee on Fire and Emergency Services Protective Clothing and Equipment. It was issued by the Standards Council on May 26, 2015, with an effective date of June 15, 2015.

This edition of NFPA 1953 was approved as an American National Standard on June 15, 2015.

Origin and Development of NFPA 1953

The Technical Committee on Special Operations Protective Clothing and Equipment began the process to create the first edition of NFPA 1953 in 2008 with a request to Standards Council. After some clarification, the committee received permission to begin work on a draft, which was completed and approved by the Standards Council in August 2012.

The technical committee developed NFPA 1953 with the goal of establishing protection requirements for protective clothing and equipment to reduce the safety risks and health risks associated with exposure of personnel to the hazards of contaminated water diving.

It is left to emergency services organizations to select the appropriate items for the protection of their emergency responders based on the expected and anticipated contaminated water incidents to which the organizations will or could be expected to respond.

Correlating Committee on Fire and Emergency Services Protective Clothing and Equipment

William E. Haskell, III, *Chair*

National Institute for Occupational Safety & Health, MA [E]

Eric J. Beck, *Secretary*

Mine Safety Appliances Company, PA [M]

Rep. Compressed Gas Association

Jason L. Allen, Intertek Testing Services, NY [RT]

Joseph Arrington, San Antonio Fire Department, TX [U]

Roger L. Barker, North Carolina State University, NC [SE]

James E. Brinkley, International Association of Fire Fighters, DC [L]

Rep. International Association of Fire Fighters

Steven D. Corrado, UL LLC, NC [RT]

Cristine Z. Fargo, International Safety Equipment Association, VA [M]

Robert A. Freese, Globe Manufacturing Company, NH [M]

Patricia A. Gleason, Safety Equipment Institute (SEI), VA [RT]

Beverly F. Gulledge, Tyco/Scott Safety, NC [M]

David V. Haston, U.S. Department of Agriculture, ID [E]

Kimberly M. Henry, PBI Performance Products, Inc., NC [M]

Thomas M. Hosea, U.S. Department of the Navy, FL [RT]

James S. Johnson, Lawrence Livermore National Laboratory, CA [RT]

Jeff Legendre, Northborough Fire Department, MA [U]

Karen E. Lehtonen, Lion Apparel, Inc., OH [M]

David G. Matthews, Fire & Industrial (P.P.E) Ltd., United Kingdom [SE]

Rep. International Standards Organization

Michael F. McKenna, Michael McKenna & Associates, LLC, CA [SE]

Anthony D. Putorti, Jr., National Institute of Standards & Technology, MD [RT]

Jack E. Reall, Columbus (OH) Division of Fire, OH [L]

Rep. Columbus Firefighters Union

Jeffrey O. Stull, International Personnel Protection, Inc., TX [M]

Tim W. Tomlinson, Addison Fire Department, TX [C]

Robert D. Tutterow, Jr., Fire Industry Equipment Research Organization (FIERO), NC [U]

Rep. NFPA Fire Service Section

William A. Van Lent, Veridian Ltd., Inc., IA [M]

Rep. Fire & Emergency Manufacturers & Services Association

Bruce H. Varner, BHVarner & Associates, AZ [M]

Rep. International Fire Service Training Association

Harry P. Winer, HIP Consulting LLC, MA [SE]

Alternates

Louis Carpentier, Innotech Inc., Canada [M]

(Alt. to W. A. Van Lent)

Brandi L. Chestang, U.S. Department of the Navy, FL [RT]

(Alt. to T. M. Hosea)

Patricia A. Freeman, Globe Manufacturing Company, LLC, NH [M]

(Alt. to R. A. Freese)

Tim J. Gardner, 3M Company, MN [M]

(Alt. to C. Z. Fargo)

Pamela A. Kavalesky, Intertek Testing Services, NY [RT]

(Alt. to J. L. Allen)

Gary L. Neilson, Sparks, NV [U]

(Alt. to R. D. Tutterow, Jr.)

Amanda H. Newsom, UL LLC, NC [RT]

(Alt. to S. D. Corrado)

Anthony Petrilli, U.S. Department of Agriculture, MT [E]

(Alt. to D. V. Haston)

Stephen R. Sanders, Safety Equipment Institute (SEI), VA [RT]

(Alt. to P. A. Gleason)

Russell Shephard, Australasian Fire & Emergency Service Authorities Council, Australia [SE]

(Alt. to D. G. Matthews)

David P. Stoddard, Michael McKenna & Associates, LLC, CA [SE]

(Alt. to M. F. McKenna)

Grace G. Stull, International Personnel Protection, Inc., TX [M]

(Alt. to J. O. Stull)

Jonathan V. Szalajda, National Institute for Occupational Safety & Health, PA [E]

(Alt. to W. E. Haskell, III)

Donald B. Thompson, North Carolina State University, NC [SE]

(Alt. to R. L. Barker)

Nonvoting

Robert J. Athanas, FDNY/SAFE-IR, Incorporated, NY [U]

Rep. TC on Electronic Safety Equipment

Christina M. Baxter, U.S. Department of Defense, VA [E]

Rep. TC on Hazardous Materials PC & E

Tricia L. Hock, Safety Equipment Institute (SEI), VA [RT]

Rep. TC on Emergency Medical Services PC & E

Stephen J. King, Babylon, NY [SE]

Rep. TC on Structural and Proximity Fire Fighting PC & E

Jeremy Metz, West Metro Fire Rescue, CO [U]

Rep. TC on Special Operations PC & E

Brian Montgomery, U.S. Department of Justice, DC [E]

Rep. TC on Nonstructural Fire Fighting SCBA

Daniel N. Rossos, Oregon Department of Public Safety Standards & Training, OR [E]

Rep. TC on Respiratory Protection Equipment

Rick L. Swan, IAFF Local 2881/CDF Fire Fighters, CA [L]

Rep. TC on Wildland Fire Fighting PC & E

David G. Trebisacci, NFPA Staff Liaison

This list represents the membership at the time the Committee was balloted on the final text of this edition. Since that time, changes in the membership may have occurred. A key to classifications is found at the back of the document.

NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This Committee shall have primary responsibility for documents on the design, performance, testing, and certification of protective clothing and protective equipment manufactured for fire and emergency services organizations and personnel, to protect against exposures encountered during emergency incident operations. This Committee shall also have the primary responsibility for documents on the selection, care, and maintenance of such protective clothing and protective equipment by fire and emergency services organizations and personnel.

Technical Committee on Special Operations Protective Clothing and Equipment

Jeremy Metz, *Chair*
West Metro Fire Rescue, CO [U]

Karen E. Lehtonen, *Secretary*
Lion Apparel, Inc., OH [M]

Jason L. Allen, Intertek Testing Services, NY [RT]
Joseph Arrington, San Antonio Fire Department, TX [U]
Steven D. Corrado, UL LLC, NC [RT]
Paul Dacey, W. L. Gore & Associates, MD [M]
Shawn G. Davis, Essex-Windsor Emergency Medical Services, Canada [U]
Keith B. Dempsey, City of Dalton Fire Department, GA [C]
James A. Frank, CMC Rescue, Inc., CA [M]
Stephen J. Geraghty, Fire Department City of New York, NY [U]
William E. Haskell, III, National Institute for Occupational Safety & Health, MA [E]
Diane B. Hess, PBI Performance Products, Inc., NC [M]
Tricia L. Hock, Safety Equipment Institute (SEI), VA [RT]
Gavin P. Horn, University of Illinois Fire Service Institute, IL [SE]

Thomas Howard, New York Division of Homeland Security & Emergency Services, NY [E]
Kim Klaren, Fairfax County Fire & Rescue Department, VA [U]
George R. Krause, II, Globe Manufacturing Company, Inc., NH [M]
Loui McCurley, PMI Denver, CO [M]
Robert G. Nelson, Chula Vista Fire Department, CA [U]
H. Dean Paderick, Special Rescue International, VA [SE]
Jack E. Reall, Columbus (OH) Division of Fire, OH [L]
Rep. Columbus Firefighters Union
Michael T. Stanhope, TenCate/Southern Mills, Inc., GA [M]
R. Douglas Stephenson, City of Johns Creek Fire Department, TN [U]
Robert Stinton, Diving Unlimited International Inc., CA [M]

Alternates

Jamey B. Brads, Special Rescue International, VA [SE]
(Alt. to H. D. Paderick)
Charles S. Dunn, TenCate/Southern Mills, GA [M]
(Alt. to M. T. Stanhope)
Patricia A. Freeman, Globe Manufacturing Company, LLC, NH [M]
(Alt. to G. R. Krause, II)
Gregory Gould, New York State Division of Homeland Security & Emergency Services-OFFPC, NY [E]
(Alt. to T. Howard)
Kimberly M. Henry, PBI Performance Products, Inc., NC [M]
(Alt. to D. B. Hess)
Daniel Hudson, City Of Dalton Fire Department, GA [C]
(Alt. to K. B. Dempsey)
Pamela A. Kavalesky, Intertek Testing Services, NY [RT]
(Alt. to J. L. Allen)

Chris Farrell, NFPA Staff Liaison

John McKently, CMC Rescue, Inc., CA [M]
(Alt. to J. A. Frank)
Craig P. Mignogno, Columbus Firefighters Union, IAFF67, OH [L]
(Alt. to J. E. Reall)
Dean D. Moran, Safety Equipment Institute (SEI), VA [RT]
(Alt. to T. L. Hock)
James E. Murray, Fire Department City of New York, NY [U]
(Alt. to S. J. Geraghty)
Jon Saito, West Metro Fire Rescue, CO [U]
(Alt. to J. Metz)
Ashley M. Scott, Lion Apparel, Inc., OH [M]
(Alt. to K. E. Lehtonen)
Beverly Wooten Stutts, UL LLC, NC [RT]
(Alt. to S. D. Corrado)

This list represents the membership at the time the Committee was balloted on the final text of this edition. Since that time, changes in the membership may have occurred. A key to classifications is found at the back of the document.

NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This Committee shall have primary responsibility for documents on special operations protective clothing and protective equipment, except respiratory equipment, that provides hand, foot, torso, limb, head, and interface protection for fire fighters and other emergency services responders during incidents involving special operations functions including, but not limited to, structural collapse, trench rescue, confined space entry, urban search and rescue, high angle/mountain rescue, vehicular extraction, swift water or flooding rescue, contaminated water diving, and air operations. This Committee shall also have primary responsibility for documents on station/work uniform garments that are not of themselves primary protective garments but can be combined with a primary protective garment to serve dual or multiple functions. Additionally, this Committee shall have primary responsibility for documents on the selection, care, and maintenance of special operations protective clothing and equipment by fire and emergency services organizations and personnel.

Contents

Chapter 1 Administration	1953- 6	7.2 Contaminated Water Diving Operations Protective Dry Suit Glove Elements.	1953- 20
1.1 Scope.	1953- 6	7.3 Contaminated Water Diving Operations Protective Dry Suit Footwear Elements.	1953- 20
1.2 Purpose.	1953- 6		
1.3 Application.	1953- 6		
1.4 Units.	1953- 7		
Chapter 2 Referenced Publications	1953- 7	Chapter 8 Test Methods	1953- 22
2.1 General.	1953- 7	8.1 Sample Preparation Procedures.	1953- 22
2.2 NFPA Publications.	1953- 7	8.2 Air Retention Test.	1953- 22
2.3 Other Publications.	1953- 7	8.3 Exhaust Valve Inward Leakage Test.	1953- 23
2.4 References for Extracts in Mandatory Sections.	1953- 8	8.4 Inlet Valve Pull Test.	1953- 23
Chapter 3 Definitions	1953- 8	8.5 Burst Strength Test.	1953- 23
3.1 General.	1953- 8	8.6 Puncture Propagation Tear Resistance Test. ..	1953- 23
3.2 NFPA Official Definitions.	1953- 8	8.7 Seam Breaking Strength Test.	1953- 24
3.3 General Definitions.	1953- 8	8.8 Chemical Permeation Resistance Test.	1953- 24
Chapter 4 Certification	1953- 9	8.9 CBRN Permeation Resistance Test.	1953- 26
4.1 General.	1953- 9	8.10 Viral Penetration Resistance Test.	1953- 32
4.2 Certification Program.	1953- 10	8.11 Cut Resistance Test.	1953- 33
4.3 Inspection and Testing.	1953- 11	8.12 Abrasion Resistance Test One.	1953- 34
4.4 Annual Verification of Product Compliance. .	1953- 12	8.13 Zipper Strength Test.	1953- 34
4.5 Manufacturers' Quality Assurance Program. ..	1953- 12	8.14 Resistance to Twist of Pull and Slider Test.	1953- 34
4.6 Hazards Involving Compliant Product.	1953- 12	8.15 Opening and Closing of Zippers Test.	1953- 34
4.7 Manufacturers' Investigation of Complaints and Returns.	1953- 16	8.16 Zipper Point Breaking Strength Test.	1953- 35
4.8 Manufacturers' Safety Alert and Product Recall Systems.	1953- 16	8.17 Retroreflectivity Test.	1953- 35
Chapter 5 Labeling and Information	1953- 16	8.18 Corrosion Resistance Test.	1953- 35
5.1 Product Label Requirements.	1953- 16	8.19 Label Durability and Legibility Test.	1953- 36
5.2 User Information.	1953- 17	8.20 Puncture Resistance Test.	1953- 37
Chapter 6 Design Requirements	1953- 18	8.21 Abrasion Resistance Test Two.	1953- 37
6.1 Contaminated Water Diving Operations Protective Dry Suit Design Requirements.	1953- 18	8.22 Torque Test	1953- 38
6.2 Contaminated Water Diving Operations Protective Dry Suit Glove Design Requirements.	1953- 18	8.23 Slip Resistance.	1953- 38
6.3 Contaminated Water Diving Operations Protective Dry Suit Footwear Design Requirements.	1953- 19	8.24 Footwear Drainage Test.	1953- 39
Chapter 7 Performance Requirements	1953- 19	8.25 Chemical Degradation Resistance Test for Exhaust Valves.	1953- 39
7.1 Contaminated Water Diving Operations Protective Dry Suit Ensemble Performance Requirements.	1953- 19	8.26 Hood to Full-Face Diving Mask Seal Test.	1953- 40
		8.27 Diving Helmet Seal Test.	1953- 41
		8.28 Chemical Penetration Resistance Test.	1953- 41
		Annex A Explanatory Material	1953- 42
		Annex B Informational References.	1953- 45
		Index	1953- 47

NFPA 1953

Standard on

Protective Ensembles for Contaminated Water Diving

2016 Edition

IMPORTANT NOTE: This NFPA document is made available for use subject to important notices and legal disclaimers. These notices and disclaimers appear in all publications containing this document and may be found under the heading "Important Notices and Disclaimers Concerning NFPA Documents." They can also be obtained on request from NFPA or viewed at www.nfpa.org/disclaimers.

UPDATES, ALERTS, AND FUTURE EDITIONS: New editions of NFPA codes, standards, recommended practices, and guides (i.e., NFPA Standards) are released on scheduled revision cycles. This edition may be superseded by a later one, or it may be amended outside of its scheduled revision cycle through the issuance of Tentative Interim Amendments (TIAs). An official NFPA Standard at any point in time consists of the current edition of the document, together with any TIAs and Errata in effect. To verify that this document is the current edition or to determine if it has been amended by any TIAs or Errata, please consult the National Fire Codes® Subscription Service or visit the Document Information (DocInfo) pages on the NFPA website at www.nfpa.org/docinfo. In addition to TIAs and Errata, the DocInfo pages also include the option to sign up for Alerts for each document and to be involved in the development of the next edition.

NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Annex A.

A reference in brackets [] following a section or paragraph indicates material that has been extracted from another NFPA document. As an aid to the user, the complete title and edition of the source documents for extracts in mandatory sections of the document are given in Chapter 2 and those for extracts in informational sections are given in Annex B. Extracted text may be edited for consistency and style and may include the revision of internal paragraph references and other references as appropriate. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

Information on referenced publications can be found in Chapter 2 and Annex B.

Chapter 1 Administration**1.1* Scope.**

1.1.1* This standard shall specify the minimum design, performance, testing, and certification requirements for protective clothing and equipment items, including dry suit, dry suit gloves and dry suit footwear designed to provide limited protection from physical, environmental and certain chemical and biological hazards that are listed herein for emergency services personnel during contaminated water dive operations.

1.1.2* This standard shall specify requirements for protective clothing and protective equipment used during operations in contaminated water dive operations.

1.1.3 This standard shall not specify requirements for protective clothing and protective equipment used during operations in surface water, swift water, tidal water, surf, and ice.

1.1.4* This standard shall not specify requirements for protective clothing and protective equipment for any other technical rescue operation, any fire-fighting operations, or any hazardous materials emergencies.

1.1.5* This standard shall specify requirements for any accessories or enhancements built into, attached to, or sold with contaminated water dive operations protective clothing and equipment by the protective clothing and equipment manufacturer for later attachment, and shall be tested with the protective clothing and equipment with the accessories and enhancements installed or attached, as specified in 4.3.9.4, to assure the performance and functions of the contaminated water dive operations protective clothing and equipment.

1.1.6 This standard shall not be construed as addressing all of the safety concerns associated with the use of compliant contaminated water dive operations protective clothing and equipment. It shall be the responsibility of the persons and organizations that use compliant contaminated water dive operations protective clothing and equipment to establish safety and health practices and to determine the applicability of regulatory limitations prior to use.

1.1.7 This standard shall not be construed as addressing all of the safety concerns, if any, associated with the use of this standard by testing facilities. It shall be the responsibility of the persons and organizations that use this standard to establish safety and health practices and to determine the applicability of regulatory limitations prior to use of this standard for designing, manufacturing, and testing.

1.1.8 Certification of contaminated water dive operations protective clothing and equipment to the requirements of this standard shall not preclude certification to additional appropriate standards where the protective clothing or equipment meets all the applicable requirements of each standard.

1.1.9 Nothing herein shall restrict any jurisdiction or manufacturer from exceeding these minimum requirements.

1.2 Purpose.

1.2.1* The purpose of this standard shall be to establish minimum levels of protection for emergency services personnel assigned to or involved in performing search and rescue activities in and below the surface of contaminated water.

1.2.2* Controlled laboratory tests used to determine compliance with the performance requirements of this standard shall not be deemed as establishing performance levels for all situations to which emergency services personnel might be exposed.

1.2.3* This standard is not intended as a detailed manufacturing or purchase specification, but shall be permitted to be referenced in purchase specifications as minimum requirements.

1.3 Application.

1.3.1 This standard shall apply to the design, manufacture, and certification of new contaminated water dive operations protective clothing and equipment.

1.3.2 This standard shall not apply to any contaminated water dive operations protective clothing and equipment manufac-

tured to the requirements of any other organization's standards.

1.3.3 This standard shall not apply to the use of any contaminated water dive operations protective clothing and equipment, as such use requirements for fire departments are specified in NFPA 1500 and the use requirements specified by other emergency services organizations.

1.3.4 This standard shall apply to protective clothing and protective equipment used during contaminated water dive operations.

1.3.5 This standard shall not apply to protective clothing and protective equipment for operations in surface water, swift water, tidal water, surf, and ice.

1.3.6 This standard shall not apply to protective clothing and protective equipment for any other technical rescue operation, any fire-fighting operations, or any hazardous materials emergencies.

1.3.7 This standard shall not apply to protection from all biological agents or to protection from all hazardous chemicals.

1.3.8* This standard shall apply to any accessories or enhancements built into, attached to, or sold with the contaminated water dive operations protective clothing and equipment by the protective clothing and equipment manufacturer for later attachment, and shall be tested with the protective clothing and equipment with the accessories and enhancements installed or attached, as specified in 4.3.9.4 to assure the performance and functions of the contaminated water dive operations protective clothing and equipment.

1.4* Units.

1.4.1 In this standard, values for measurement are followed by an equivalent in parentheses, but only the first stated value shall be regarded as the requirement.

1.4.2 Equivalent values in parentheses shall not be considered as the requirement, as these values might be approximate.

Chapter 2 Referenced Publications

2.1 General. The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

2.2 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, 2013 edition.

NFPA 1670, *Standard on Operations and Training for Technical Search and Rescue Incidents*, 2014 edition.

NFPA 1994, *Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents*, 2012 edition.

2.3 Other Publications.

2.3.1 AATCC Publications. American Association of Textile Chemists and Colorists, P. O. Box 12215, Research Triangle Park, NC 27709.

AATCC 135, *Dimensional Changes in Automatic Home Laundering of Woven and Knit Fabrics*.

2.3.2 ASTM Publications. ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM B117, *Standard Practice of Using Salt Spray (Fog) Apparatus*, 2011.

ASTM D471, *Standard Test Method for Rubber Property — Effect of Liquids*, 2010.

ASTM D751, *Standard Test Methods for Coated Fabrics*, 2006 (rev. 2011).

ASTM D2061, *Standard Test Methods for Strength Tests for Zippers*, 2007 (rev. 2013).

ASTM D2062, *Standard Test Methods for Operability of Zippers*, 2003 (rev. 2014).

ASTM D2582, *Standard Test Method for Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting*, 2009.

ASTM D3884, *Standard Test Method for Abrasion Resistance of Textile Fabrics (Rotary Platform, Double-Head Method)*, 2009 (rev. 2013).

ASTM D3885, *Standard Test Method for Abrasion Resistance of Textile Fabrics (Flexing and Abrasion Method)*, 2007 (rev. 2011).

ASTM D4157, *Standard Test Method for Abrasion Resistance of Textile Fabrics (Oscillatory Cylinder Method)*, 2013.

ASTM D4966, *Standard Test Method for Abrasion Resistance of Textile Fabrics*, 2012.

ASTM D5035, *Standard Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method)*, 2011.

ASTM E810, *Standard Test Method for Coefficient of Retroreflection of Retroreflective Sheeting Utilizing the Coplanar Geometry*, 2003 (rev. 2013).

ASTM F392, *Standard Test Method for Flex Durability of Flexible Barrier Materials*, 2011.

ASTM F739, *Standard Test Method for Resistance of Protective Clothing Materials to Permeation by Liquids or Gases Under Conditions of Continuous Contact*, 2012.

ASTM F903, *Standard Test Method for Resistance of Protective Clothing Materials to Penetration by Liquids*, 2010.

ASTM F1001, *Standard Guide for Selection of Chemicals to Evaluate Protective Clothing Materials*, 2012.

ASTM F1342, *Standard Test Method for Resistance of Protective Clothing Materials to Puncture*, 2005 (rev. 2013).

ASTM F1671, *Standard Test Method for Resistance of Materials Used in Protective Clothing to Penetration by Blood-Borne Pathogens Using Phi-X174 Bacteriophage as a Test System*, 2013.

ASTM F1790, *Test Methods for Measuring Cut Resistance of Materials Used in Protective Clothing*, 2014.

2.3.3 CAN/CGSB Publications. Canadian General Standards Board, 11 Laurier Street, Ottawa, Canada K1A 1G6.

CAN/CGSB-65.16, *Immersion Suit Systems*, 2005.

2.3.4 FIA Publications. Footwear Industries of America, 1420 K Street, NW, Suite 600, Washington, DC 20005.

FIA 1209, *Whole Shoe Flex*, 1984.

2.3.5 ISO Publications. International Organization for Standardization, 1, ch. de la Voie-Creuse, Case postale 56, CH-1211, Geneva 20, Switzerland.

ISO Guide 27, *Guidelines for corrective action to be taken by a certification body in the event of misuse of its mark of conformity*, 1983.

ISO 65, *General requirements for bodies operating product certification systems*, 1996.

ISO 1817, Rubber, vulcanized or thermoplastic — *Determination of the effect of liquids*, 2011.

ISO 9001, *Quality management systems — requirements*, 2000.

ISO 13287, *Personal Protective Equipment — Footwear — Test Method for Slip Resistance*, 2008.

ISO 17011, *General requirements for accreditation bodies accrediting conformity assessment bodies*, 2004.

ISO/IEC 17021, *Conformity assessment — requirements for bodies providing audit and certification of management systems*, 2006.

ISO 17025, *General requirements for the competence of calibration and testing laboratories*, 2005.

2.3.6 UL Publications. Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

ANSI/UL 1197, *Standard of Safety for Immersion Suits*, 2007.

2.3.7 U.S. Government Publications. U.S. Government Printing Office, Washington, DC 20402.

Title 46, Code of Federal Regulations, Part 164.018, Retroreflective Material for Lifesaving Equipment.

2.3.8 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

2.4 References for Extracts in Mandatory Sections. (Reserved)

Chapter 3 Definitions

3.1 General. The definitions contained in this chapter shall apply to the terms used in this standard. Where terms are not defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary*, 11th edition, shall be the source for the ordinarily accepted meaning.

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

3.2.3 Labeled. Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates

compliance with appropriate standards or performance in a specified manner.

3.2.4* Listed. Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

3.2.5 Shall. Indicates a mandatory requirement.

3.2.6 Should. Indicates a recommendation or that which is advised but not required.

3.2.7 Standard. An NFPA Standard, the main text of which contains only mandatory provisions using the word “shall” to indicate requirements and that is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions are not to be considered a part of the requirements of a standard and shall be located in an appendix, annex, footnote, informational note, or other means as permitted in the NFPA Manuals of Style. When used in a generic sense, such as in the phrase “standards development process” or “standards development activities,” the term “standards” includes all NFPA Standards, including Codes, Standards, Recommended Practices, and Guides.

3.3 General Definitions.

3.3.1 Bootie. A sock-like extension of the dry suit leg that covers the entire foot.

3.3.2 Certification/Certified. A system whereby a certification organization determines that a manufacturer has demonstrated the ability to produce a product that complies with the requirements of this standard, authorizes the manufacturer to use a label on listed products that comply with the requirements of this standard, and establishes a follow-up program conducted by the certification organization as a check on the methods the manufacturer uses to determine continued compliance of labeled and listed products with the requirements of this standard.

3.3.3 Closure. The component that allows the wearer to enter (don) and exit (doff) the dry diving suit.

3.3.4 Compliance/Compliant. Meeting or exceeding all applicable requirements of this standard.

3.3.5 Compliant Product. Product that is covered by this standard and has been certified as meeting all applicable requirements of this standard that pertain to the product.

3.3.6 Component(s). Any material, part, or subassembly used in the construction of the compliant product.

3.3.7 Composite. The layer or layers of materials or components.

3.3.8 Contaminated Water. A body of water that potentially contains a chemical or biological substance that poses a chronic or acute health risk to exposed personnel.

3.3.9 Diving Helmet. Headgear that provides protection from contaminated water by sealing the diver's entire head from the water while incorporating the breathing system.

3.3.10 Dry Suit. A suit that provides exposure protection for contaminated water operations.

3.3.10.1 Dry Suit Closure Assembly. The combination of the dry suit closure and the seam attaching the dry suit closure to the dry suit, excluding any protective flap or cover.

3.3.10.2* Dry Suit Footwear. The portion of the dry suit ensemble for contaminated water diving that is designed to provide protection to the foot, ankle, and lower leg.

3.3.10.3 Dry Suit Overboot. A secondary boot worn over an integrated attached bootie.

3.3.11 Exhaust Valve. Device used to allow for removal air from the dry suit.

3.3.12 Follow-Up Program. The sampling, inspections, tests, or other measures conducted by the certification organization on a periodic basis to determine the continued compliance of labeled and listed products that are being produced by the manufacturer to the requirements of this standard.

3.3.13 Full-Face Diving Mask. A type of diving mask that seals the whole of the diver's face from the water and contains a mouthpiece or diving valve that provides the diver with breathing gas allowing the diver see clearly underwater, providing the diver's face with some protection from cold and polluted water, increasing breathing security and providing a space for equipment that lets the diver communicate with the surface support team.

3.3.14 Glove. An item of protective clothing used with contaminated water dry suits that are designed to provide minimum protection to fingers, thumb, hand, and wrist.

3.3.15 Hardware. Nonfabric components of the protective clothing and equipment including, but not limited to, those made of metal or plastic.

3.3.16 Inlet Valve. Device used to allow for addition of air into the dry suit.

3.3.17 Manufacturer. The entity that directs or controls any of the following: compliant product design, compliant product manufacturing, or compliant product quality assurance; or the entity that assumes the liability for the compliant product or provides the warranty for the compliant product.

3.3.18 Model. The collective term used to identify a group of individual items, elements, or items of the same basic design and components from a single manufacturer produced by the same manufacturing and quality assurance procedures that are covered by the same certification.

3.3.19* Moderate Contamination. Contaminated water where increased levels of chemical and/or biological contamination are anticipated to be found: poses a moderate health risk to the rescuer if not properly protected.

3.3.20 Neck Seal. A device used for preventing water from entering the dry suit at the neck.

3.3.21 Penetration. For a protective clothing material or item the process by which a substance moves through closures, seams, interstices, and pinholes or other imperfections on a non-molecular level.

3.3.22* Permeation. The process by which a chemical moves through a protective clothing material on a molecular level.

3.3.23 Product. See 3.3.5, Compliant Product.

3.3.24 Product Label. A marking provided by the manufacturer for each compliant product, containing compliance statements, certification statements, manufacturer and model information, or similar data.

3.3.25 Reinforcement. An area of added mechanical protection.

3.3.26 Retroreflection/Retroreflective. The reflection of light in which the reflected rays are preferentially returned in the direction close to the opposite of the direction of the incident rays, with this property being maintained over wide variations of the direction of the incident rays.

3.3.27 Sample. The equipment, equipment component, ensemble, element, item, component, or composite that is conditioned for testing. (See also 3.3.30, *Specimen*.)

3.3.28 Seam. Any permanent attachment of two or more materials, in a line formed by joining the separate material pieces.

3.3.29* Severe Contamination. Grossly contaminated water with highly concentrated chemical and/or biological contamination: poses an immediate and/or severe health risk to rescuers if not fully encapsulated.

3.3.30 Specimen. The conditioned equipment, equipment component, ensemble, element, product, item, composite, component, or opposite that is tested. Specimens are taken from samples. (See also 3.3.27, *Sample*.)

3.3.31 Suit. See 3.3.10 Dry Suit.

3.3.32 Suit Material. The primary protective principal material(s) used in the construction of contaminated water dry suits.

3.3.33 Trim. See 3.3.34, Visibility Markings.

3.3.34 Visibility Markings. Retroreflective enhancements that improve nighttime conspicuity and fluorescent enhancements that improve daytime conspicuity.

3.3.35 Wrist Seal. A device used for preventing water from entering the dry suit at the wrist.

Chapter 4 Certification

4.1 General.

4.1.1 The process of certification for contaminated water dive operations protective clothing and equipment as being compliant with NFPA 1953 shall meet the requirements of Sections 4.1 through 4.8.

4.1.2 All compliant contaminated water dive operations protective clothing and equipment that are labeled as being compliant with this standard shall meet or exceed all applicable requirements specified in this standard and shall be certified.

4.1.3 All certification shall be performed by a certification organization that meets at least the requirements specified in Section 4.2, Certification Program, and that is accredited for personal protective equipment in accordance with ISO 65,

General requirements for bodies operating product certification systems. The accreditation shall be issued by an accreditation body operating in accordance with ISO 17011, *General requirements for accreditation bodies accrediting conformity assessment bodies.*

4.1.4* Manufacturers shall not claim compliance with portions or segments of the requirements of this standard and shall not use the NFPA name or the name or identification of this standard, NFPA 1953, in any statements about their respective item(s) unless the item(s) is certified as compliant to this standard.

4.1.5 All compliant protective clothing and equipment shall be labeled.

4.1.6 All compliant contaminated water dive protective clothing and equipment items shall be listed by the certification organization. This listing shall uniquely identify the certified product, for example, by style, model number, or part number.

4.1.7 All compliant contaminated water dive protective clothing and equipment items shall also have a product label that meets the requirements specified in Section 5.1, Product Label Requirements.

4.1.8 The certification organization's label, symbol, or identifying mark shall be attached to the product label, shall be part of the product label, or shall be immediately adjacent to the product label.

4.2 Certification Program.

4.2.1* The certification organization shall not be owned or controlled by manufacturers or vendors of the items being certified.

4.2.2 The certification organization shall be primarily engaged in certification work and shall not have a monetary interest in the product's ultimate profitability.

4.2.3 The certification organization shall be accredited for personal protective equipment in accordance with ISO 65, *General requirements for bodies operating product certification systems.* The accreditation shall be issued by an accreditation body operating in accordance with ISO 17011, *General requirements for accreditation bodies accrediting conformity assessment bodies.*

4.2.4 The certification organization shall refuse to certify products to this standard that do not comply with all applicable requirements of this standard.

4.2.5* The contractual provisions between the certification organization and the manufacturer shall specify that certification is contingent on compliance with all applicable requirements of this standard.

4.2.5.1 The certification organization shall not offer or confer any conditional, temporary, or partial certifications.

4.2.5.2 Manufacturers shall not be authorized to use any label or reference to the certification organization on products that are not compliant with all applicable requirements of this standard.

4.2.6* The certification organization shall have laboratory facilities and equipment available for conducting proper tests to determine product compliance.

4.2.6.1 The certification organization laboratory facilities shall have a program in place and functioning for calibration of all

instruments, and procedures shall be in use to ensure proper control of all testing.

4.2.6.2 The certification organization laboratory facilities shall follow good practice regarding the use of laboratory manuals, form data sheets, documented calibration and calibration routines, performance verification, proficiency testing, and staff qualification and training programs.

4.2.7 The certification organization shall require the manufacturer to establish and maintain a quality assurance program that meets the requirements of Section 4.5, Manufacturer's Quality Assurance Program.

4.2.7.1* The certification organization shall require the manufacturer to have a product recall system as specified in Section 4.8, Manufacturers' Safety Alert and Product Recall Systems, as part of the manufacturer's quality assurance program.

4.2.7.2 The certification organization shall audit the manufacturer's quality assurance program to ensure that the quality assurance program provides continued product compliance with this standard.

4.2.8 The certification organization and the manufacturer shall evaluate any changes affecting the form, fit, or function of the compliant product to determine its continued certification to this standard.

4.2.9* The certification organization shall have a follow-up inspection program of the manufacturing facilities of the compliant product with at least two random and unannounced visits per 12-month period.

4.2.9.1 As part of the follow-up inspection program, the certification organization shall select sample compliant product at random from the manufacturer's production line, from the manufacturer's in-house stock, or from the open market.

4.2.9.2 Sample product shall be inspected and tested by the certification organization to verify the product's continued compliance.

4.2.9.3 The certification organization shall be permitted to conduct specific testing to verify the product's continued compliance.

4.2.9.4 For products, components, and materials where prior testing, judgment, and experience of the certification organization have shown results to be in jeopardy of not complying with this standard, the certification organization shall conduct more frequent testing of sample product, components, and materials acquired in accordance with 4.2.9.1 against the applicable requirements of this standard.

4.2.10 The certification organization shall have in place a series of procedures, as specified in Section 4.6, Hazards Involving Compliant Product, that address report(s) of situation(s) in which a compliant product is subsequently found to be hazardous.

4.2.11 The certification organization's operating procedures shall provide a mechanism for the manufacturer to appeal decisions. The procedures shall include the presentation of information from both sides of a controversy to a designated appeals panel.

4.2.12 The certification organization shall be in a position to use legal means to protect the integrity of its name and label. The name and label shall be registered and legally defended.

4.3 Inspection and Testing.

4.3.1 For both initial certification and recertification of items, the certification organization shall conduct both inspection and testing as specified in this section.

4.3.2 All inspections, evaluations, conditioning, and testing for certification or for recertification shall be conducted by a certification organization's testing laboratory that is accredited in accordance with the requirements of ISO 17025, *General requirements for the competence of testing and calibration laboratories*.

4.3.2.1 The certification organization's testing laboratory's scope of accreditation to ISO 17025, *General requirements for the competence of testing and calibration laboratories*, shall encompass testing of personal protective equipment.

4.3.2.2 The accreditation of a certification organization's testing laboratory shall be issued by an accreditation body operating in accordance with ISO 17011, *General requirements for accreditation bodies accrediting conformity assessment bodies*.

4.3.3 A certification organization shall be permitted to utilize conditioning and testing results conducted by a product or component manufacturer for certification or recertification provided the manufacturer's testing laboratory meets the requirements specified in 4.3.3.1 through 4.3.3.5.

4.3.3.1 The manufacturer's testing laboratory shall be accredited in accordance with the requirements of ISO 17025, *General requirements for the competence of testing and calibration laboratories*.

4.3.3.2 The manufacturer's testing laboratory's scope of accreditation to ISO 17025, *General requirements for the competence of testing and calibration laboratories*, shall encompass testing of personal protective equipment.

4.3.3.3 The accreditation of a manufacturer's testing laboratory shall be issued by an accreditation body operating in accordance with ISO 17011, *General requirements for accreditation bodies accrediting conformity assessment bodies*.

4.3.3.4 The certification organization shall approve the manufacturer's testing laboratory.

4.3.3.5 The certification organization shall determine the level of supervision and witnessing of the conditioning and testing for certification or recertification conducted at the manufacturer's testing laboratory.

4.3.4 Sampling levels for testing and inspection shall be established by the certification organization and the manufacturer to ensure a reasonable and acceptable reliability at a reasonable and acceptable confidence level that products certified to this standard are compliant, unless such sampling levels are specified herein.

4.3.5 Inspection and evaluation by the certification organization shall include a review of all product labels to ensure that all required label attachments, compliance statements, certification statements, and other product information are at least as specified for the product in Section 5.1, Product Label Requirements.

4.3.6 Inspection and evaluation by the certification organization shall include an evaluation of any symbols and pictorial

graphic representations used on product labels or in user information, as permitted by 5.1.5, to ensure that the symbols are clearly explained in the product's user information package.

4.3.7 Inspection and evaluation by the certification organization shall include a review of the user information required by Section 5.2, User Information, to ensure that the information has been developed and is available.

4.3.8 Inspection and evaluation by the certification organization for determining compliance with the design requirements specified in Chapter 6 shall be performed on whole or complete products.

4.3.9 Testing by the certification organization to determine product compliance with the performance requirements specified in Chapter 7 shall be conducted in accordance with the specified testing requirements of Chapter 8.

4.3.9.1 Testing shall be performed on new product.

4.3.9.2 Testing shall be performed on specimens representative of materials and components used in the actual construction of the compliant product.

4.3.9.3 The certification organization also shall be permitted to use sample materials cut from a representative product.

4.3.9.4 Where there are any accessories, enhancements, or both that are built into, attachable to, or detachable from the contaminated water dive operations protective clothing and equipment, the certification organization shall inspect and evaluate the protective clothing and equipment as specified in Chapter 6 and shall test the protective clothing and equipment as specified in Chapter 8, and the protective clothing and equipment shall meet the performance requirements specified in Chapter 7 with those accessories and enhancements installed or attached.

4.3.10 The certification organization shall accept from the manufacturer, for evaluation and testing for certification, only product or product components that are the same in every respect to the actual final product or product component.

4.3.11 The certification organization shall not allow any modifications, pretreatment, conditioning, or other such special processes of the product or any product component prior to the product's submission for evaluation and testing by the certification organization.

4.3.12 The certification organization shall not allow the substitution, repair, or modification, other than as specifically permitted herein, of any product or any product component during testing.

4.3.13 The certification organization shall not allow test specimens that have been conditioned and tested by one method to be reconditioned and tested by another test method unless specifically permitted in the test method.

4.3.14 Where certification testing includes product with one or more accessories, the product with each accessory shall be certified as complying with 4.3.9.4.

4.3.15 Any change in the design, construction, or materials of a compliant product shall necessitate new inspection and testing to verify compliance to all applicable requirements of this standard that the certification organization determines can be affected by such change. This recertification shall be conduc-

ted before labeling the modified product as being compliant with this standard.

4.3.16 The manufacturer shall maintain all design and performance inspection and test data from the certification organization used in the certification of the manufacturer's compliant product. The manufacturer shall provide such data, upon request, to the purchaser or authority having jurisdiction.

4.4 Annual Verification of Product Compliance.

4.4.1 All products that are labeled as being compliant with this standard shall undergo recertification on an annual basis. This recertification shall include the following:

- (1) Inspection and evaluation to all design requirements as required by the standard on all manufacturer models and components
- (2) Testing to all performance requirements as specified in Table 4.4.1 on all manufacturers' models and components within the following protocol:
 - (a) Where a test method incorporates testing both before and after the laundering preconditioning specified in 8.1.3 and the test generates quantitative results, recertification testing shall be limited to the conditioning that yielded the worst-case test result during the initial certification for the model or component.
 - (b) Where a test method incorporates testing both before and after the laundering preconditioning specified in 8.1.3 and the test generates nonquantitative results, recertifications shall be limited to a single conditioning procedure in any given year. Subsequent annual recertification shall cycle through the remaining conditioning procedure to ensure that all required conditionings are included over time.
 - (c) Where a test method requires the testing of three specimens, a minimum of one specimen shall be tested for annual certification.
 - (d) Where a test method requires the testing of five or more specimens, a minimum of two specimens shall be tested for annual certification.

4.4.1.1 This recertification shall include inspection and evaluation to all design requirements and testing to all performance requirements as required by this standard on all manufacturers' models and components as required by 4.4.3.

4.4.1.2 Any change that affects the product's performance under design or performance requirements of this standard shall constitute a different model.

4.4.1.3 For the purpose of this standard, models shall include each unique pattern, style, or design of the product.

4.4.2 Any change that affects the element's performance under the design or performance requirements of this standard shall constitute a different model.

4.4.3 For the purpose of this standard, models shall include each unique pattern, style, or design of the individual element.

4.4.4 Samples of manufacturer models and components for recertification shall be acquired as part of the follow-up program in accordance with 4.2.9 and shall be permitted to be used toward annual recertification.

4.4.5 The manufacturer shall maintain all design, inspection, performance, and test data from the certification organization used in the recertification of manufacturer models and components. The manufacturer shall provide such data, upon request, to the purchaser or authority having jurisdiction.

4.5 Manufacturers' Quality Assurance Program.

4.5.1 The manufacturer shall provide and operate a quality assurance program that meets the requirements of this section and that includes a product recall system as specified in 4.2.7.1 and Section 4.8, Manufacturers' Safety Alert and Product Recall Systems.

4.5.2 The operation of the quality assurance program shall evaluate and test compliant product production to the requirements of this standard to assure production remains in compliance.

4.5.3 The manufacturer shall be registered to ISO 9001, *Quality management systems – requirements*.

4.5.3.1 Registration to the requirements of ISO 9001, *Quality management systems – requirements*, shall be conducted by a registrar that is accredited for personal protective equipment in accordance with ISO 17021, *Conformity assessment – Requirements for bodies providing audit and certification of management systems*.

4.5.3.2 The scope of the ISO registration shall include at least the design and manufacturing systems management for the personal protective equipment being certified.

4.5.3.3 The registrar shall affix the accreditation mark on the ISO registration certificate.

4.5.4* Any entity that meets the definition of manufacturer specified in Section 3.3, General Definitions, and therefore is considered to be the “manufacturer,” but does not manufacture or assemble the compliant product, shall meet the requirements specified in this Section 4.5.

4.5.5* Where the manufacturer uses subcontractors in the construction or assembly of the compliant product, the locations and names of all subcontractor facilities shall be documented and the documentation shall be provided to the manufacturer's ISO registrar and the certification organization.

4.6 Hazards Involving Compliant Product.

4.6.1* The certification organization shall establish procedures to be followed where situation(s) are reported in which a compliant product is subsequently found to be hazardous. These procedures shall comply with the provisions of ISO Guide 27, *Guidelines for corrective action to be taken by a certification body in the event of misuse of its mark of conformity*, and as modified herein.

4.6.2* Where a report of a hazard involved with a compliant product is received by the certification organization, the validity of the report shall be investigated.

4.6.3 With respect to a compliant product, a hazard shall be a condition, or create a situation, that results in exposing life, limb, or property to an imminently dangerous or dangerous condition.

Table 4.4.1 Recertification Schedule

Product	Test	Frequency	Year				
			1	2	3	4	5
Labels	Label Durability and Legibility Test	Initial certification only	X				
Hardware	Corrosion Resistance	Initial certification only	X				
Dry Suit	Air Retention Test	Every year	X	X	X	X	X
Dry Suit Exhaust Valve	Exhaust Valve Chemical Penetration Resistance Test	Initial certification (all chemicals); every year (for certain chemicals, 3 per year)	X	X	X	X	X
Dry Suit Inlet Valve	Inlet Valve Pull Test	Initial certification only	X				
Dry Suit Material	Burst Strength Test	Initial certification and year 3	X		X		
Dry Suit Material	Puncture Propagation Tear Resistance Test	Initial certification only	X				
Dry Suit Material	Chemical Permeation Resistance Test	Initial certification (all chemicals); every year (for certain chemicals, 3 per year)	X	X	X	X	X
Dry Suit Material	Viral Penetration Resistance Test	Initial certification only	X				
Dry Suit Material	Cut Resistance Test	Initial certification and year 3	X		X		
Dry Suit Material	Abrasion Resistance Test	Initial certification and year 4	X			X	
Dry Suit	Zipper Strength Test	Initial certification only	X				
Dry Suit	Resistance to Twist of Pull and Slider Test	Initial certification only	X				
Dry Suit	Opening and Closing of Zippers Test	Initial certification only	X				
Dry Suit	Zipper Point Breaking Strength Test	Initial certification only	X				
Dry Suit Zipper	Zipper Penetration Resistance Test	Initial certification (all chemicals); every year (for certain chemicals, 3 per year)	X	X	X	X	X
Dry Suit	Retroreflectivity Test	Initial certification only	X				
Dry Suit Seams	Seam Breaking Strength Test	Every year	X	X	X	X	X
Dry Suit Seams	Chemical Permeation Resistance Test	Initial certification (all chemicals); every year (for certain chemicals, 3 per year)	X	X	X	X	X
Dry Suit Seams	Viral Penetration Resistance Test	Initial certification only	X				
Attached Integrated Dry Suit Bootie Material	Burst Strength Test	Initial certification and year 3	X		X		
Attached Integrated Dry Suit Bootie Material	Puncture Propagation Tear Resistance Test	Initial certification only	X				
Attached Integrated Dry Suit Bootie Material	Chemical Permeation Resistance Test	Initial certification (all chemicals); every year (for certain chemicals, 3 per year)	X	X	X	X	X
Attached Integrated Dry Suit Bootie Material	Viral Penetration Resistance Test	Initial certification only	X				
Attached Integrated Dry Suit Bootie Material	Cut Resistance Test	Initial certification and year 3	X		X		
Attached Integrated Dry Suit Bootie Material	Abrasion Resistance Test	Initial certification and year 4	X			X	
Attached Integrated Dry Suit Bootie Seams	Seam Breaking Strength	Every year	X	X	X	X	X

(continues)

Table 4.4.1 *Continued*

Product	Test	Frequency	Year				
			1	2	3	4	5
Attached Integrated Dry Suit Bootie Seams	Chemical Permeation Resistance Test	Initial certification (all chemicals); every year (for certain chemicals, 3 per year)	X	X	X	X	X
Attached Integrated Dry Suit Bootie Seams	Viral Penetration Resistance Test	Initial certification only	X				
Attached Integrated Dry Suit Boot Materials	Burst Strength Test	Initial certification and year 3	X		X		
Attached Integrated Dry Suit Boot Materials	Puncture Propagation Tear Resistance Test	Initial certification only	X				
Attached Integrated Dry Suit Boot Materials	Cut Resistance Test	Initial certification and year 3	X		X		
Attached Integrated Dry Suit Boot Materials	Abrasion Resistance Test	Initial certification and year 4	X			X	
Dry Suit Hood Material	Burst Strength Test	Initial certification and year 3	X		X		
Dry Suit Hood Material	Puncture Propagation Tear Resistance Test	Initial certification only	X				
Dry Suit Hood Material	Chemical Permeation Resistance Test	Initial certification (all chemicals); every year (for certain chemicals, 3 per year)	X	X	X	X	X
Dry Suit Hood Material	Viral Penetration Resistance Test	Initial certification only	X				
Dry Suit Hood Material	Cut Resistance Test	Initial certification and year 3	X		X		
Dry Suit Hood Material	Abrasion Resistance Test	Initial certification and year 4	X			X	
Dry Suit Hood Seams	Seam Breaking Strength	Every year	X	X	X	X	X
Dry Suit Hood Seams	Chemical Permeation Resistance Test	Initial certification (all chemicals); every year (for certain chemicals, 3 per year)	X	X	X	X	X
Dry Suit Hood Seams	Viral Penetration Resistance Test	Initial certification only	X				
Dry Suit Glove	Cut Resistance Test	Initial certification and year 4	X			X	
Dry Suit Glove	Puncture Resistance Test	Initial certification and year 3	X		X		
Dry Suit Glove	Abrasion Resistance Test Two	Initial certification and year 4	X			X	
Dry Suit Glove	Torque Test	Initial certification only	X				
Dry Suit Glove	Chemical Permeation Resistance Test	Initial certification (all chemicals); every year (for certain chemicals, 3 per year)	X	X	X	X	X
Dry Suit Glove	Viral Penetration Resistance	Initial certification only	X				
Dry Suit Footwear Uppers	Abrasion Resistance Test Two	Initial certification and year 4	X			X	
Dry Suit Footwear Uppers	Cut Resistance	Initial certification and year 4	X			X	
Dry Suit Footwear Uppers	Puncture Resistance Test	Initial certification and year 3	X		X		
Dry Suit Footwear Soles	Abrasion Resistance Test Two	Initial certification and year 4	X			X	
Dry Suit Footwear Soles	Puncture Resistance Test	Initial certification and year 3	X		X		
Dry Suit Footwear Soles	Slip Resistance	Initial certification only	X				
Attached Integrated Dry Suit Boot Materials	Chemical Permeation Resistance Test	Initial certification (all chemicals); every year (for certain chemicals, 3 per year)	X	X	X	X	X

(continues)