

NFPA® 1955

Standard on Personal Protective Equipment (PPE) for Surface Water Operations and Contaminated Water Operations

2025 Edition



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NFPA® 1955

Standard on

Personal Protective Equipment (PPE) for Surface Water Operations and Contaminated Water Operations

2025 Edition

This edition of NFPA 1955, *Standard on Personal Protective Equipment (PPE) for Surface Water Operations and Contaminated Water Operations*, 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 November 16, 2024, with an effective date of December 6, 2024.

This edition of NFPA 1955 was approved as an American National Standard on December 6, 2024.

Origin and Development of NFPA 1955

This first edition of NFPA 1955 consolidates two standards: NFPA 1952 and NFPA 1953. This is part of the document consolidation plan affecting all the documents in the Emergency Response and Responder Safety (ERRS) project, first approved during the April 2019 Standards Council meeting. The content of each document was brought together with the others to form one complete standard, and each Technical Committee was still responsible for the content relative to their scope and purpose.

Overall, definitions were consolidated to account for meanings in both documents consolidated into NFPA 1955. The standard was written with separate scope and purpose chapters applying only to the specific content for that committee. To apply specific content from previous editions of each consolidated document, a roadmap was established in chapter one under the application heading and, in the annex, explaining how to do that.

NFPA 1955 does not deviate far from previous editions. There are some revisions to helmets and modifications to some of the test methods, including the removal of certain provisions deemed too restrictive because, as of the publication of this document, there are still no certified ensembles to NFPA 1952 or NFPA 1953. However, overall, NFPA 1955 is similar to the previous editions of NFPA 1952 and NFPA 1953. The committee will have to decide if they want to continue further developing this standard or cease making revisions and let it lapse.

For more information about the ERRS consolidation project, see nfpa.org/errs.

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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 firefighters 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.

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Standard on

Personal Protective Equipment (PPE) for Surface Water Operations and Contaminated Water Operations

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

Chapter 1 Administration

1.1 Scope

1.1.1 This standard provides minimum design, performance, testing, and certification requirements for the following:

- (1) New protective clothing and equipment items, including full body suits, helmets, gloves, footwear, and personal flotation devices designed to provide limited protection from physical, environmental, thermal, and certain common chemical and biological hazards for emergency services personnel during surface water operations.
- (2) New protective clothing and equipment items, including dry suits, 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 for any offshore water operations or any dive operations.

1.1.4 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.

1.1.5 This standard shall not specify requirements for protective clothing and protective equipment for any other technical rescue operation, any firefighting operations, or any hazardous materials emergencies.

1.1.6 This standard shall specify requirements for any accessories or enhancements built into, attached to, or sold with surface water 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 to ensure the performance and functions of the surface water or contaminated water operations protective clothing and equipment.

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

1.2 Purpose.

1.2.1 The purpose of this standard is to specify minimum requirements for the protection of emergency services personnel assigned to or involved in the following:

- (1) Surface water search and rescue operations or other surface water incident operations
- (2) Search and rescue activities in and below the surface of contaminated water

1.2.2 This standard shall not serve as a detailed manufacturing or purchasing specification but shall be permitted to be referenced in purchase specifications as minimum requirements.

1.3* Application. This standard can be applied as follows:

- (1) Chapters 1 through 3, 4 through 8, and Annexes A through D constitute NFPA 1952.
- (2) Chapters 1 through 3, 9 through 13, and Annexes A and D constitute of NFPA 1953.

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, Health, and Wellness Program*, 2021 edition.

NFPA 1952, *Standard on Surface Water Operations Protective Clothing and Equipment*, 2021 edition.

NFPA 1953, *Standard on Protective Ensembles for Contaminated Water Diving*, 2021 edition.

NFPA 1990, *Standard for Protective Ensembles for Hazardous Materials and CBRN Operations*, 2022 edition.

NFPA 2500, *Standard for Operations and Training for Technical Search and Rescue incidents and Life Safety Rope and Equipment for Emergency Services*, 2022 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 TM42, *Test Method for Water Resistance: Impact Penetration*, 2017e.

AATCC TM70, *Test Method for Water Repellency: Tumble Jar Dynamic Absorption*, 2015.

AATCC TM135, *Dimensional Changes of Fabrics After Home Laundering*, 2018.

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

ASTM B117, *Standard Practice for Operating Salt Spray (Fog) Apparatus*, 2019.

ASTM D471, *Standard Test Method for Rubber Property — Effect of Liquids*, (2021).

ASTM D751, *Standard Test Methods for Coated Fabrics*, 2019.

ASTM D2061, *Standard Test Methods for Strength Tests for Zippers*, 2007 (2021).

ASTM D2062, *Standard Test Methods for Operability of Zippers*, 2003 (2021).

ASTM D2582, *Standard Test Method for Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting*, 2021.

ASTM D3884, *Standard Guide for Abrasion Resistance of Textile Fabrics (Rotary Platform, Abrader Method)*, 2022.

ASTM D3885, *Standard Test Method for Abrasion Resistance of Textile Fabrics (Flexing and Abrasion Method)*, 2007A (2019)e1.

ASTM D4157, *Standard Test Method for Abrasion Resistance of Textile Fabrics (Oscillatory Cylinder Method)*, 2013 (2022).

ASTM D4966, *Standard Test Method for Abrasion Resistance of Textile Fabrics (Martindale Abrasion Tester Method)*, 2022.

ASTM D5034, *Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)*, 2021.

ASTM D5035, *Standard Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method)*, 2011 (2019).

ASTM E810, *Standard Test Method for Coefficient of Retroreflection of Retroreflective Sheeting Utilizing the Coplanar Geometry*, 2020.

ASTM F392/F392M, *Standard Practice for Conditioning Flexible Barrier Materials for Flex Durability*, 2021.

ASTM F739, *Standard Test Method for Permeation of Liquids and Gases Through Protective Clothing Materials Under Conditions of Continuous Contact*, 2020.

ASTM F903, *Standard Test Method for Resistance of Materials Used in Protective Clothing to Penetration by Liquids*, 2018.

ASTM F1001, *Standard Guide for Selection of Chemicals to Evaluate Protective Clothing Materials*, 2012 (2017).

ASTM F1342/F1342M, *Standard Test Method for Protective Clothing Material Resistance to Puncture*, 2005 (2022).

ASTM F1359/F1359M, *Standard Test Method for Liquid-Penetration Resistance of Protective Clothing or Protective Ensembles Under a Shower Spray While on a Manikin*, 2022.

ASTM F1446, *Standard Test Methods for Equipment and Procedures Used in Evaluating the Performance Characteristics of Protective Headgear*, 2020.

ASTM F1671/F1671M, *Standard Test Method for Resistance of Materials Used in Protective Clothing to Penetration by Blood-Borne Pathogens Using Phi-X174 Bacteriophage Penetration as a Test System*, 2022.

ASTM F1790/F1790M, *Standard Test Method for Measuring Cut Resistance of Materials Used in Protective Clothing with CPP Test Equipment*, 2015.

ASTM F1868, *Standard Test Method for Thermal and Evaporative Resistance of Clothing Materials Using a Sweating Hot Plate*, 2017.

ASTM F2010/F2010M, *Standard Test Method for Evaluation of Glove Effects on Wearer Finger Dexterity Using a Modified Pegboard Test*, 2018.

ASTM F2913, *Standard Test Method for Measuring the Coefficient of Friction for Evaluation of Slip Performance of Footwear and Test Surfaces/Flooring Using a Whole Shoe Tester*, 2019.

2.3.3 CAN/CGSB Publications. Canadian General Standards Board, L'Esplanade Laurier, 6th Floor East Tower, 140 O'Connor Street, Ottawa, ON K1A 0R5, Canada.

CAN/CGSB 65.16, *Marine Abandonment Immersion Suit Systems*, 2005.

2.3.4 ISO Publications. International Organization for Standardization, ISO Central Secretariat, BIBC II, Chemin de Blandinnet 8, CP 401, 1214 Vernier, Geneva, 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, confirmed 2014.

ISO 1817, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*, 2015.

ISO 9001, *Quality management systems — Requirements*, 2015.

ISO 17011, *Conformity assessment — Requirements for accreditation bodies accrediting conformity assessment bodies*, 2017.

ISO/IEC 17021-1, *Conformity assessment — Requirements for bodies providing audit and certification of management systems — Part 1: Requirements*, 2015.

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*, 2017.

ISO/IEC 17065, *Conformity assessment — Requirements for bodies certifying products, processes and services*, 2012.

2.3.5 SAE Publications. SAE International, Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096.

SAE J211, *Instrumentation for Impact Test — Part 1 — Electronic Instrumentation*, 2014.

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

ANSI/UL 1123, *Marine Buoyant Devices*, 2020.

ANSI/UL 1197, *Immersion Suits*, 2021.

2.3.7 US Government Publications. US Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20401.

Title 46, Code of Federal Regulations, Part 164.018, “Retro-reflective Material for Lifesaving Equipment.”

2.3.8 Other Publications.

Merriam-Webster’s Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2020.

2.4 References for Extracts in Mandatory Sections.

NFPA 1951, *Standard on Protective Ensembles for Technical Rescue Incidents*, 2020 edition.

Chapter 3 Definitions

3.1 General.

3.1.1 The definitions contained in this chapter shall apply to the terms used in this standard.

3.1.2 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.

3.1.3 *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. 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 phrases “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* Basic Plane. The anatomical plane that includes the superior rim of the external auditory meatus, the upper edge of the external openings of the ear, and the interior margin of the orbit, which is the lowest point of the floor of the eye socket.

3.3.2 Body Borne Pathogen. An infectious bacteria or virus carried in human, animal, or clinical body fluids, organs, or tissues.

3.3.3 Body Fluids. Fluids that are produced by the body including, but not limited to, blood, semen, mucus, feces, urine, vaginal secretions, breast milk, amniotic fluid, cerebrospinal fluid, synovial fluid, and pericardial fluid.

3.3.4 Bootie. A sock-like extension of the garment or suit leg that covers the entire foot.

3.3.5 Brim. A part of the shell of the helmet extending around the entire circumference of the helmet.

3.3.6 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.

3.3.7 Chin Strap. An adjustable strap for the helmet that fits under or around the chin to secure the helmet to the head.

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

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

3.3.10 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.

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

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

3.3.13 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.

3.3.14 Crown. The portion of the helmet that covers the head above the reference plane.

3.3.15 Crown Straps. The part of the helmet suspension that passes over the head.

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

3.3.17 Dry Suit. A suit that provides exposure protection for contaminated water operations. (*See also 3.3.59, Surface Water Operations Protective Dry Suit.*)

3.3.17.1 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.

3.3.17.2* 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.

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

3.3.18 Energy Absorbing System. A material or system used to attenuate impact energy.

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

3.3.20 Flotation Device. See 3.3.66, Surface Water Operations Protective Personal Flotation Device.

3.3.21 Fluorescence. The process by which radiant flux of certain wavelengths is absorbed and reradiated nonthermally in other, usually longer, wavelengths.

3.3.22 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.

3.3.23 Footwear. See 3.3.60, Surface Water Operations Protective Dry Suit Footwear; 3.3.64, Surface Water Operations Protective Ice Suit Footwear; and 3.3.68, Surface Water Operations Protective Wet Suit Footwear.

3.3.24 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 breath-

ing 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.

3.3.25 Garment Closure. The garment component designed and configured to allow the wearer to don (put on) and doff (take off) the garment. [1951, 2020]

3.3.26 Garment Closure Assembly. The combination of the garment closure and the seam attaching the garment closure to the garment, including any protective flap or cover. [1951, 2020]

3.3.27 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.

3.3.28 Glove Body. The part of the glove that extends from the tip of the fingers to the wrist crease or a specified distance beyond the wrist crease.

3.3.29 Glove Liner. The innermost component of the glove body composite that comes into contact with the wearer's skin.

3.3.30 Hardware. Non-fabric components of the protective clothing and equipment including, but not limited to, those made of metal or plastic.

3.3.31 Headform. A device that simulates the configuration of the human head.

3.3.32 Helmet. See 3.3.62, Surface Water Operations Protective Helmet.

3.3.33 Horizontal Center Plane. Any plane passing through the helmet whose intersection with the helmet surface is equidistant from the top of the helmet at all points.

3.3.34 Ice Suit. See 3.3.63, Surface Water Operations Protective Ice Suit.

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

3.3.36 Insole. The inner component of the footwear upon which the foot rests.

3.3.37 Liquidborne Pathogen. See 3.3.3, Body Fluids.

3.3.38 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.

3.3.39 Manufacturing Facility. A facility that is involved in the production, assembly, final inspection, or labeling of the compliant end product.

3.3.40* 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.

3.3.41* 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.

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

3.3.43 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.

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

3.3.45 Product. See 3.3.10, Compliant Product.

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

3.3.47 Reference Plane. A dimensionally defined plane, parallel to the basic plane, that is measured from the top of the applicable headform or the basic plane.

3.3.48 Reinforcement. An area of added mechanical protection.

3.3.49 Rescue Operations. Those activities operations directed at locating and removing endangered persons, and removing endangered persons from danger, treating the injured at an emergency incident, and providing transport to an appropriate health care facility.

3.3.50 Retention System. The complete assembly by which the helmet is retained in position on the head.

3.3.51 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.

3.3.52 Sample. The equipment, equipment component, ensemble, element, item, component, or composite that is conditioned for testing. (See also 3.3.55, *Specimen*.)

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

3.3.54* 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.

3.3.55 Specimen. The conditioned equipment, equipment component, ensemble, element, product, item, composite, or component, or opposite that is tested. Specimens are taken from samples. (See also 3.3.52, *Sample*.)

3.3.56 Suit. See 3.3.17, Dry Suit; 3.3.59, Surface Water Operations Protective Dry Suit; 3.3.63, Surface Water Operations Protective Ice Suit; and 3.3.67, Surface Water Operations Protective Wet Suit.

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

3.3.58 Surface Water Operations. Technical rescue activities requiring water functional capabilities involving surface water, swift water, tidal water, surf, and ice that do not require under-water respiratory equipment.

3.3.59* Surface Water Operations Protective Dry Suit. A suit that provides exposure protection for water operations.

3.3.60 Surface Water Operations Protective Dry Suit Footwear. An item of protective clothing used with surface water protective dry suits that are designed to provide minimum protection to the foot, ankle, and lower leg.

3.3.61 Surface Water Operations Protective Dry Suit Gloves. An item of protective clothing used with surface water protective dry suits that are designed to provide minimum protection to fingers, thumb, hand, and wrist.

3.3.62 Surface Water Operations Protective Helmet. An item of protective equipment designed to provide minimum protection to the head.

3.3.63* Surface Water Operations Protective Ice Suit. A suit that provides thermal and flotation protection for extreme cold water conditions.

3.3.64 Surface Water Operations Protective Ice Suit Footwear. An item of protective clothing used with surface water protective ice suits that are designed to provide minimum protection to the foot, ankle, and lower leg.

3.3.65 Surface Water Operations Protective Ice Suit Gloves. An item of protective clothing used with surface water protective ice suits that are designed to provide minimum protection to fingers, thumb, hand, and wrist.

3.3.66 Surface Water Operations Protective Personal Flotation Device. An item of protective equipment designed to provide flotation assistance to the wearer.

3.3.67* Surface Water Operations Protective Wet Suit. A permeable suit that preserves body heat by trapping water in between the suit and the body.

3.3.68 Surface Water Operations Protective Wet Suit Footwear. An item of protective clothing used with surface water protective wet suits that are designed to provide minimum protection to the foot, ankle, and lower leg.

3.3.69 Surface Water Operations Protective Wet Suit Gloves. An item of protective clothing used with surface water protective wet suits that are designed to provide minimum protection to fingers, thumb, hand, and wrist.

3.3.70 Surface Water Rescue. Rescue of a victim who is accessible from the surface of a body of water.

3.3.71 Suspension. An energy attenuating system of the helmet that is made up of the headband and crown strap.

3.3.72 Swiftwater. Water moving at a rate of greater than 1 knot (1.85 km/hr).

3.3.73* Tidal Water. Ocean water or bodies of water that are connected to oceans that either experience a twice daily rise and fall of their surface caused by the gravitational pull of the moon or experience a corresponding ebb and flow of water in response to the tides.

3.3.74 Trim. See 3.3.75, Visibility Markings.

3.3.75 Visibility Markings. Retroreflective and fluorescent conspicuity enhancements. Retroreflective enhancements improve nighttime conspicuity, and fluorescent enhancements improve daytime conspicuity.

3.3.76 Wet Suit. See 3.3.67, Surface Water Operations Protective Wet Suit.

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

Chapter 4 Certification

4.1 General Certification Requirements (NFPA 1952; NFPA 1953).

4.1.1 The process of certification of products as being compliant with NFPA 1952 and NFPA 1953, as incorporated in NFPA 1955, shall meet the requirements of Section 4.1, General Certification Requirements (NFPA 1952; NFPA 1953), through Section 4.8, Manufacturer's Safety Alert and Product Recall Systems, as well as with the associated certification requirements in Chapter 5 and Chapter 9.

4.1.2 All products that are labeled as being compliant with this standard shall meet or exceed all the 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 (PPE) in accordance with ISO/IEC 17065, *Conformity assessment — Requirements for bodies certifying products, processes and services*.

4.1.3.1 The accreditation shall be issued by an accreditation body operating in accordance with ISO 17011, *Conformity assessment — 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 or use the NFPA name or the name or identification of this standard in any statements about their respective item(s) unless the item(s) is certified as compliant with this standard.

4.1.5 All compliant products shall be labeled and listed.

4.1.5.1 The listing shall uniquely identify the certified product by, at a minimum, style, model number, or part number.

4.1.6 All compliant products shall also have a product label that meets the requirements specified in the applicable label requirements.

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

4.1.8 The certification organization shall not issue any new certifications based on the following standards on or after the NFPA effective date of this edition of NFPA 1955:

- (1) 2021 edition of NFPA 1952
- (2) 2021 edition of NFPA 1953

4.1.9 The certification organization shall not permit any manufacturer to continue to label any protective ensembles or ensemble elements that are certified as compliant with the 2021 edition of NFPA 1952 or the 2021 edition of NFPA 1953 on the effective date of this edition of NFPA 1955, plus 18 months.

4.1.10 The certification organization shall require manufacturers to remove all certification labels and product labels indi-

cating compliance with the 2021 edition of NFPA 1952 or the 2021 edition of NFPA 1953 from all products that are under the control of the manufacturer on the effective date of this edition of NFPA 1955, plus 18 months, and verify that this action is taken.

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 (PPE) in accordance with ISO/IEC 17065, *Conformity assessment — Requirements for bodies certifying products, processes and services*.

4.2.3.1 The accreditation shall be issued by an accreditation body operating in accordance with ISO 17011, *Conformity assessment — 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 the 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 the 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 the applicable requirements of this standard.

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

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

4.2.6.1.1 Procedures shall be in use to ensure proper control of all testing.

4.2.6.2 The certification organization's 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, Manufacturer's 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 for the manufacturing facilities of the compliant product with at least two random and unannounced visits per 12-month period to verify the product's continued compliance.

4.2.9.1 Where portions of the production processes are carried out by multiple facilities, the certification organization shall determine the appropriate follow-up program according to the facility or facilities that most closely meet the definition of *manufacturing facility* (see 3.3.39).

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

4.2.9.3 Sample product shall be evaluated by the certification organization to verify the product's continued compliance to ensure that the materials, components, and manufacturing quality assurance systems are consistent with the materials, components, and manufacturing quality assurance systems that were inspected and tested by the certification organization during initial certification and recertification.

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

4.2.9.5 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 4.2.9.2 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 reports of situations 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.

4.2.11.1 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.

4.2.12.1 The certification organization's 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 recertification shall be conducted by a certification organization's testing laboratory that is accredited in accordance with the requirements of ISO/IEC 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/IEC 17025, *General requirements for the competence of testing and calibration laboratories*, shall encompass testing of PPE.

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, *Conformity assessment — 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/IEC 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/IEC 17025, *General requirements for the competence of testing and calibration laboratories*, shall encompass testing of PPE.

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, *Conformity assessment — 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 required 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 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 the required label attachments, compliance statements, certification statements, and other product information are at least as specified for the products identified in Chapter 5 (NFPA 1952) or Chapter 10 (NFPA 1953).

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 infor-

mation, as permitted by 6.1.5 (NFPA 1952) or 11.1.5 (NFPA 1953), 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 6.2, User Information, (NFPA 1952), or Section 11.2, User Information, (NFPA 1953), 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 7 (NFPA 1952) or Chapter 11 (NFPA 1953) shall be performed on whole or complete products.

4.4 Annual Verification.

4.4.1 All products that are labeled as being compliant with this standard shall, on an annual basis, undergo a verification evaluation to all the requirements as required by this standard.

4.5 Manufacturer's 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, Manufacturer's Safety Alert and Product Recall Systems.

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

4.5.3 All the following entities shall either be registered to ISO 9001, *Quality management systems — Requirements*, or shall be listed as a covered location under an ISO 9001-registered entity:

- (1) Manufacturer
- (2) Manufacturing facility
- (3) The entity that directs and controls compliant product design
- (4) The entity that directs and controls compliant product quality assurance
- (5) The entity that provides the warranty for the compliant product
- (6) The entity that puts its name on the product label and markets and sells the product as its own

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/IEC 17021-1, *Conformity assessment — Requirements for bodies providing audit and certification of management systems — Part 1: Requirements*.

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

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

4.5.4* Where the manufacturer uses subcontractors in the construction or assembly of the compliant product, the locations and names of all the subcontractor facilities shall be documented and 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.

4.6.1.1 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 situation that results in the exposure of life, limb, or property to an imminently dangerous or dangerous condition.

4.6.4 Where a specific hazard is identified, the determination of the appropriate action for the certification organization and the manufacturer to undertake shall take into consideration the severity of the hazard and its consequences to the safety and health of users.

4.6.5 Where it is established that a hazard is involved with a compliant product, the certification organization shall determine the scope of the hazard, including the products, model numbers, serial numbers, factory production facilities, production runs, and quantities involved.

4.6.6 The certification organization's investigation shall include, but not be limited to, the extent and scope of the problem as it might apply to other compliant product or compliant product components manufactured by other manufacturers or certified by other certification organizations.

4.6.7 The certification organization shall also investigate reports of a hazard where compliant product is gaining widespread use in applications not foreseen when the standard was written, such applications, in turn, being ones for which the product was not certified, and no specific scope of application has been provided in the standard and no limiting scope of application was provided by the manufacturer in written material accompanying the compliant product at the point of sale.

4.6.8 The certification organization shall require the manufacturer of the compliant product, or, if applicable, the manufacturer of the compliant product component, to assist the certification organization in the investigation and conduct its own investigation as specified in Section 4.7, Manufacturer's Investigation of Complaints and Returns.

4.6.9 Where the facts indicating a need for corrective action are conclusive and the certification organization's appeal procedures referenced in 4.2.11 have been followed, the certification organization shall initiate corrective action immediately, provided there is a manufacturer to be held responsible for such action.

4.6.10 Where the facts are conclusive and corrective action is indicated but there is no manufacturer to be held responsible, such as when the manufacturer is out of business or bankrupt, the certification organization shall immediately notify relevant governmental and regulatory agencies and issue a notice to the user community about the hazard.

4.6.11* Where the facts are conclusive and corrective action is indicated, the certification organization shall take one or more of the following corrective actions:

- (1) Notify the parties authorized and responsible for issuing a safety alert when, in the opinion of the certification organization, such a notification is necessary to inform the users
- (2) Notify the parties authorized and responsible for issuing a product recall when, in the opinion of the certification organization, such a recall is necessary to protect the users
- (3) Remove the mark of certification from the product

4.6.12 Where a hazardous condition exists and it is not practical to implement 4.6.11(1), 4.6.11(2), or 4.6.11(3) or the responsible parties refuse to take corrective action, the certification organization shall notify relevant governmental and regulatory agencies and issue a notice to the user community about the hazard.

4.6.13* Where a change to an NFPA standard(s) is felt to be necessary, the certification organization shall also provide a copy of the report and corrective actions indicated to the National Fire Protection Association and submit either a Public Input for a proposed change to the next revision of the applicable standard or a proposed Temporary Interim Amendment (TIA) to the current edition of the applicable standard.

4.7 Manufacturer's Investigation of Complaints and Returns.

4.7.1 Manufacturers shall provide corrective action in accordance with ISO 9001, *Quality management systems — Requirements*, when investigating written complaints and returned products.

4.7.2 A manufacturer's record of returns and complaints related to safety issues shall be retained for at least 5 years.

4.7.3 Where the manufacturer discovers, during the review of specific returns or complaints, that a compliant product or compliant product component might constitute a potential safety risk to end users that is possibly subject to a safety alert or product recall, the manufacturer shall immediately contact the certification organization and provide all the information about the review to assist the certification organization with its investigation.

4.8 Manufacturer's Safety Alert and Product Recall Systems.

4.8.1 Manufacturers shall establish a written safety alert system and a written product recall system that describes the procedures to be used in the event that it decides or is directed by the certification organization to either issue a safety alert or conduct a product recall.

4.8.2 The manufacturer's safety alert and product recall system shall provide the following:

- (1) The establishment of a coordinator and their responsibilities for the handling of safety alerts and product recalls
- (2) A method of notifying all dealers, distributors, purchasers, users, and NFPA about the safety alert or product recall that can be initiated within a one-week period following the manufacturer's decision to issue a safety alert or conduct a product recall or after the manufacturer has been directed by the certification organization to issue a safety alert or conduct a product recall
- (3) Techniques for communicating accurately and understandably the nature of the safety alert or product recall

and, in particular, the specific hazard or safety issue found to exist

- (4) Procedures for removing product that is recalled and documenting the effectiveness of the product recall
- (5) A plan for either repairing, replacing, or compensating purchasers for returned product

Chapter 5 Surface Water Operations PPE Certification Requirements (NFPA 1952)

5.1 Scope and Certification Requirements.

5.1.1* Scope.

5.1.1.1* Chapters 4 through 9 of this standard shall specify the minimum design, performance, testing, and certification requirements for protective clothing and equipment items, including full body suits, helmets, gloves, footwear, and personal flotation devices designed to provide limited protection from physical, environmental, thermal, and certain common chemical and biological hazards for emergency services personnel during surface water operations.

5.1.1.2* Chapters 4 through 9 of this standard shall specify requirements for protective clothing and protective equipment used during operations in surface water, swift water, tidal water, surf, and ice.

5.1.1.3 This standard shall not specify requirements for protective clothing and protective equipment for any offshore water or dive operations.

5.1.1.4* Chapters 4 through 9 of this standard shall not specify requirements for protective clothing and protective equipment for any other technical rescue operation, firefighting operation, or hazardous materials emergency.

5.1.1.5* Chapters 4 through 9 of this standard shall specify the requirements for any accessories or enhancements built into, attached to, or sold with surface water operations protective clothing and equipment by the protective clothing and equipment manufacturer for later attachment.

5.1.1.5.1 The accessories or enhancements shall be installed or attached and tested with the protective clothing and equipment to assure the performance and function of the surface water operations protective clothing and equipment.

5.1.1.6 Chapters 4 through 9 of this standard shall not be construed as addressing all of the safety concerns associated with the use of compliant surface water operations protective clothing and equipment.

5.1.1.6.1 It shall be the responsibility of the persons and organizations that use compliant surface water operations protective clothing and equipment to establish safety and health practices and determine the applicability of regulatory limitations prior to use.

5.1.1.7 Chapters 4 through 9 of 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.

5.1.1.7.1 It shall be the responsibility of the persons and organizations that use this standard to establish safety and health practices and determine the applicability of regulatory limitations prior to the use of this standard for designing, manufacturing, and testing.

5.1.1.8 Certification of surface water operations protective clothing and equipment to the requirements of Chapters 4 through 9 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.

5.1.1.9 Nothing herein shall restrict any authority having jurisdiction or manufacturer from exceeding these minimum requirements.

5.1.2 Purpose.

5.1.2.1* The purpose of Chapters 4 through 9 of this standard shall be to establish minimum levels of protection for emergency services personnel assigned to or involved in surface water search and rescue operations or other surface water incident operations.

5.1.2.2* Controlled laboratory tests used to determine compliance with the performance requirements of Chapters 4 through 9 of this standard shall not be deemed as establishing performance levels for all situations to which emergency services personnel might respond.

5.1.2.3* The requirements in Chapters 4 through 9 of this standard are not intended to be detailed manufacturing or purchase specifications but shall be permitted to be referenced in purchase specifications as minimum requirements.

5.1.3 Application.

5.1.3.1 Chapters 4 through 9 of this standard shall apply to the design, manufacture, and certification of new surface water operations protective clothing and equipment.

5.1.3.2 Chapters 4 through 9 of this standard shall not apply to any surface water operations protective clothing and equipment manufactured to the requirements of any other organization's standards.

5.1.3.3 Chapters 4 through 9 of this standard shall not apply to the use of any surface water 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.

5.1.3.4 Chapters 4 through 9 of this standard shall apply to protective clothing and protective equipment used during operations in surface water, swift water, tidal water, surf, and ice.

5.1.3.5 This standard shall not apply to protective clothing and protective equipment for any offshore water operations or any dive operations.

5.1.3.6 Chapters 4 through 9 of this standard shall not apply to protective clothing and protective equipment for any other technical rescue operation, firefighting operation, or hazardous materials emergency.

5.1.3.7 Chapters 4 through 9 of this standard shall not apply to protection from all biological agents or hazardous chemicals.

5.1.3.8* Chapters 4 through 9 of this standard shall apply to any accessories or enhancements built into, attached to, or sold with the surface water operations protective clothing and equipment by the protective clothing and equipment manufacturer for later attachment.

5.1.3.8.1 The accessories or enhancements shall be installed or attached and tested with the protective clothing and equipment to assure the performance and function of the surface water operations protective clothing and equipment.

5.1.4* Units.

5.1.4.1 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.

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

5.2 General.

5.2.1 The process of certifying products as being compliant with Chapters 4 through 9 of this standard shall meet the requirements of Section 4.1, General Certification Requirements (NFPA 1952; NFPA 1953); Section 4.2, Certification Program; Section 4.3, Inspection and Testing; Section 4.4, Annual Verification; Section 4.5, Manufacturer's Quality Assurance Program; Section 4.6, Hazards Involving Compliant Product; Section 4.7, Manufacturer's Investigation of Complaints and Returns; and Section 4.8, Manufacturer's Safety Alert and Product Recall Systems.

5.2.2 All compliant products that are labeled as being compliant with Chapters 4 through 9 of this standard shall meet or exceed all the applicable requirements specified in Chapters 4 through 9 and shall be certified.

5.3 Inspection and Testing.

5.3.1 Testing to determine product compliance with the performance requirements specified in Chapter 9 shall be conducted by the certification organization in accordance with the specified testing requirements of Chapter 10.

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

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

5.3.2 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 as the actual final product or product component.

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

5.3.4 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.

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

5.3.6 The certification organization shall test ensemble elements with the specific ensembles with which they are to be certified.

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

5.3.7.1 Recertification shall be conducted before labeling the modified product as being compliant with this standard.

5.3.8 The manufacturer shall maintain all the design and performance inspection and test data from the certification organization used in the certification of the manufacturer's compliant product.

5.3.8.1 The manufacturer shall provide such data, upon request, to the purchaser or authority having jurisdiction.

5.4 Annual Verification.

5.4.1 All products that are labeled as being compliant with Chapters 4 through 9 of this standard shall undergo recertification on an annual basis.

5.4.1.1 The 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 5.4.1.1 on all manufacturer models and components within the following protocol:
 - (a) Where a test method incorporates testing both before and after the laundering preconditioning specified in 9.1.3 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 9.1.3 and the test generates nonquantitative results, recertification 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 the required conditioning is 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.

5.4.1.2 This annual verification shall include inspection and evaluation to all the design requirements and testing to all the performance requirements as required by this standard on all the manufacturer's models and components as required by 5.4.3.

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

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

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

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

5.4.4 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 for annual verification.

5.4.5 The manufacturer shall maintain all the design, inspection, performance, and test data from the certification organization used in the recertification of manufacturer models and components.

5.4.5.1 The manufacturer shall provide such data, upon request, to the purchaser or authority having jurisdiction.

Table 5.4.1.1 Annual Verification Schedule

Product/Test	Initial Certification	Year 2	Year 3	Year 4	Year 5
Wet suit					
8.1.1 Overall Donning Efficiency Test	X				
8.1.2 Breaking Strength Test	X		X		
8.1.3 Puncture Propagation Tear Resistance Test	X				
8.1.4 Seam/Closure Breaking Strength Test	X	X	X	X	X
8.1.5 Liquid Absorption Resistance Test	X				
8.1.6 Retroreflectivity Test	X				
8.1.7 Zipper Strength Test	X				
8.1.8 Resistance to Twist of Pull and Slider Test	X				
8.1.9 Opening and Closing of Zippers Test	X				
8.1.10 Corrosion Resistance Test	X				
8.1.11 Label Durability and Legibility Test	X				
Ice suit					
8.3.1 Overall Liquid Integrity Test One	X				
8.3.2 Air Retention Test	X	X	X	X	X
8.3.3 Viral Penetration Resistance Test	X				
8.3.4 Overall Donning Efficiency Test	X				
8.3.5 Thermal Insulation Test	X		X		
8.3.6 Breaking Strength Test	X		X		
8.3.7 Puncture Propagation Tear Resistance Test	X		X		
8.3.8 Seam/Closure Breaking Strength Test	X	X	X	X	X
8.3.9 Liquid Absorption Resistance Test	X		X		
8.3.10 Liquid Penetration Resistance Test	X				
8.3.11 Retroreflectivity Test	X				
8.3.12 Water Penetration and Air Evacuation Test	X				
8.3.13 Buoyancy Test	X				
8.3.14 Corrosion Resistance Test	X				
8.3.15 Label Durability and Legibility Test	X				
8.3.16 Zipper Point Breaking Strength Test	X				
8.3.17 Zipper Leak Resistance Test	X	X	X	X	X

(continues)

Table 5.4.1.1 *Continued*

Product/Test	Initial Certification	Year 2	Year 3	Year 4	Year 5
8.3.18 Opening and Closing of Zippers Test	X				
8.3.19 Zipper Opening and Closing Force Test	X				
Wet suit gloves					
8.5.1 Cut Resistance Test	X			X	
8.5.2 Puncture Resistance Test	X		X		
8.5.3 Abrasion Resistance Test Two	X			X	
8.5.4 Glove Hand Function Test	X				
8.5.5 Grip Test	X				
8.5.6 Glove Donning Test	X				
8.5.7 Corrosion Resistance Test	X				
8.5.8 Label Durability and Legibility Test	X				
Dry suit gloves					
8.6.1 Cut Resistance Test	X			X	
8.6.2 Puncture Resistance Test	X		X		
8.6.3 Abrasion Resistance Test Two	X			X	
8.6.4 Glove Hand Function Test	X				
8.6.5 Grip Test	X				
8.6.6 Glove Donning Test	X				
8.6.7 Corrosion Resistance Test	X				
8.6.8 Liquid Penetration Resistance Test	X				
8.6.9 Viral Penetration Resistance Test	X				
8.6.10 Overall Liquid Integrity Test Two	X		X		
8.6.11 Label Durability and Legibility Test	X				
PFD					
8.10.1 Buoyancy Test — SG3, SG20 of UL 1123	X				
8.10.2 Label Durability and Legibility Test	X				
8.10.3 Corrosion Resistance Test	X				
7.11.1 Water Entry Test — SG3, SG16 of UL 1123	X				
7.11.1 Flotation Stability Test — SG3, SG16 of UL 1123	X				
7.11.1 Buoyancy Distribution Test — SG3, SG19 of UL 1123	X				

(continues)

Table 5.4.1.1 *Continued*

Product/Test	Initial Certification	Year 2	Year 3	Year 4	Year 5
7.11.1 Tensile Strength — SG3, SG24 of UL 1123	X				
7.11.1 750-Pound Shoulder Tensile Test — SG3, SG10, SG24 of UL 1123	X				
7.11.1 730-Pound Harness Strength Test (without accelerated weathering) — SG9 of UL 1123	X				
7.11.1 Pamphlet Strength of Attachment Test — SG3, SG35 of UL 1123	X				
7.11.1 Pull Toggle Security of Attachment — SG7A of UL 1123	X				
Helmet					
8.4.1 Helmet Bucketing Test	X				
8.4.2 Top Impact Resistance Test (Force)	X				
8.4.3 Physical Penetration Resistance Test	X				
8.4.4 Suspension System Retention Test	X				
8.4.5 Retention System Test	X				
8.4.6 Corrosion Resistance Test	X				
8.4.7 Retroreflectivity Test	X				
8.4.8 Label Durability and Legibility Test	X				
8.4.9 Floatability Test	X				
8.4.10 Impact Resistance Test — Acceleration	X	X	X	X	X
8.4.11 Helmet Roll Off Test	X				
7.4.12 Helmet Water Absorption Test	X				
Dry suit					
8.2.1 Air Retention Test	X	X	X	X	X
8.2.2 Overall Liquid Integrity Test One	X				
8.2.3 Overall Donning Efficiency Test	X				
8.2.4 Water Penetration and Air Evacuation Test	X				
8.2.5 Breaking Strength Test	X		X		
8.2.6 Puncture Propagation Tear Resistance Test	X				
8.2.7 Cleaning Shrinkage Resistance Test	X		X		X
8.2.8 Seam Closure Breaking Strength Test	X	X	X	X	X

(continues)

Table 5.4.1.1 *Continued*

Product/Test	Initial Certification	Year 2	Year 3	Year 4	Year 5
8.2.9 Liquid Absorption Resistance Test	X				
8.2.10 Liquid Penetration Resistance Test	X				
8.2.11 Viral Penetration Resistance Test	X				
8.2.12 Zipper Strength Test	X				
8.2.13 Resistance to Twist of Pull and Slider Test	X				
8.2.14 Opening and Closing of Zippers Test	X				
8.2.15 Zipper Point Breaking Strength Test	X				
8.2.16 Zipper Leak Resistance Test	X				
8.2.17 Zipper Opening and Closing Force Test	X				
8.2.18 Retroreflectivity Test	X				
8.2.19 Chemical Permeation Resistance Test	X	3 chem	3 chem	3 chem	3 chem
8.2.20 Closure Penetration Resistance Test	X	3 chem	3 chem	3 chem	3 chem
8.2.21 Corrosion Resistance Test	X				
8.2.22 Closure Penetration Test	X	3 chem	3 chem	3 chem	3 chem
8.2.24 Label Durability and Legibility Test	X				
Wet suit footwear					
8.8.1 Footwear Drainage Test	X				
8.8.2 Abrasion Resistance Test Two (Upper)	X			X	
8.8.3 Cut Resistance Test	X			X	
8.8.4 Puncture Resistance Test (Upper)	X		X		
8.8.5 Abrasion Resistance Test Two (Sole)	X			X	
8.8.6 Puncture Resistance Test (Sole)	X		X		
8.8.7 Slip Resistance Test	X				
8.8.8 Corrosion Resistance Test	X				
8.8.9 Label Durability and Legibility Test	X				
Ice suit footwear					
8.9.1 Abrasion Resistance Test Two (Upper)	X			X	
8.9.2 Cut Resistance Test	X			X	
8.9.3 Puncture Resistance Test (Upper)	X		X		

(continues)

Table 5.4.1.1 *Continued*

Product/Test	Initial Certification	Year 2	Year 3	Year 4	Year 5
8.9.4 Abrasion Resistance Test Two	X			X	
8.9.5 Puncture Resistance Test (Sole)	X		X		
8.9.6 Slip Resistance Test	X				
8.9.7 Liquid Penetration Resistance Test	X				
8.9.8 Viral Penetration Resistance Test	X				
8.9.9 Corrosion Resistance Test	X				
8.9.10 Label Durability and Legibility Test	X				
8.9.11 Thermal Insulation Test	X		X		
Dry suit footwear					
8.8.1 Footwear Drainage Test	X				
8.8.2 Abrasion Resistance Test Two (Upper)	X			X	
8.8.3 Cut Resistance Test	X			X	
8.8.4 Puncture Resistance Test (Upper)	X		X		
8.8.5 Abrasion Resistance Test Two (Sole)	X			X	
8.8.6 Puncture Resistance Test (Sole)	X		X		
8.8.7 Slip Resistance Test	X				
8.8.8 Corrosion Resistance Test	X				
8.8.9 Label Durability and Legibility Test	X				
Integrated boot material					
Abrasion Resistance Test Two (Upper)	X			X	
Cut Resistance Test	X		X		
Puncture Resistance Test (Upper)	X		X		
Abrasion Resistance Test (Sole)	X			X	
Puncture Resistance Test (Sole)	X		X		
Slip Resistance Test	X				
Corrosion Resistance Test	X				
Label Durability and Legibility Test	X				

Chapter 6 Surface Water Operations PPE Labeling and Information (NFPA 1952)

6.1 Product Label Requirements.

6.1.1* Each item of protective clothing and equipment shall have a product label or labels permanently and conspicuously located inside each product when the product is properly assembled with all layers and components in place.

6.1.2 Multiple label pieces shall be permitted in order to carry all statements and information required to be on the product label. However, all label pieces comprising the product label shall be located adjacent to each other.

6.1.3* The certification organization's label, symbol, or identifying mark shall be permanently attached to the product label or shall be part of the product label. All letters shall be at least 2.5 mm ($\frac{3}{32}$ in.) high. The label, symbol, or identifying mark shall be at least 6 mm ($\frac{1}{4}$ in.) in height and shall be placed in a conspicuous location.

6.1.4 All worded portions of the required product label shall be printed at least in English.

6.1.5 Symbols and other pictorial graphic representations shall be permitted to be used to supplement worded statements on the product label(s). Such graphic representations shall be consistent and clearly communicate the intended message.

6.1.6 The following statement shall be printed legibly on the product label:

THIS SURFACE WATER OPERATIONS [insert appropriate item term] MEETS THE REQUIREMENTS OF NFPA 1955 (1952), [insert edition year] EDITION.

DO NOT REMOVE THIS LABEL!

6.1.6.1 The appropriate term for the item type (suit type, helmet, glove type, footwear type, personal flotation device) shall be inserted in the compliance statement text where indicated.

6.1.6.2 All letters shall be at least 2.5 mm ($\frac{3}{32}$ in.) in height.

6.1.7 Where dry suits are certified as compliant with the nonoptional requirements of this standard and also certified as compliant with the optional protection against chemical hazards specified in 8.2.19, the following statement shall be printed legibly on the product label:

THIS SURFACE WATER OPERATIONS [insert appropriate item term] MEETS THE REQUIREMENTS OF NFPA 1955 (1952), [insert edition year] EDITION, AND THE OPTIONAL PROTECTION AGAINST CHEMICAL HAZARDS REQUIREMENTS OF NFPA 1955.

DO NOT REMOVE THIS LABEL!

6.1.7.1 All letters shall be at least 2.5 mm ($\frac{3}{32}$ in.) high.

6.1.8 The following information shall also be printed legibly on the product label. All letters shall be at least 1.6 mm ($\frac{1}{16}$ in.) high.

- (1) Manufacturer's name, identification, or designation
- (2) Manufacturer's address
- (3) Country of manufacture
- (4) Manufacturer's identification number, lot number, or serial number

- (5) Month and year of manufacture (not coded)
- (6) Model name, number, or design
- (7) Size
- (8) Materials of construction of the composite
- (9) Cleaning precautions
- (10) For suits, the clo value specified in 8.1.2 or 8.3.5
- (11) Total heat loss (THL) as required by 7.2.11

6.1.9 Supplementary Product Labels.

6.1.9.1 Where the protective clothing items consist of items or layers that can be separated from each other, each separable layer shall have a supplementary product label permanently attached.

6.1.9.2 Supplementary product labels shall also meet the requirements of 6.1.4 and 6.1.5.

6.2 User Information.

6.2.1 The manufacturer shall provide user information including, but not limited to, warnings, information, and instructions with each item.

6.2.2 The manufacturer shall attach the required user information, or packaging containing the user information, to the item in such a manner that it is not possible to use the item without being aware of the availability of the information.

6.2.3 The required user information, or packaging containing the user information, shall be attached to the item so that a deliberate action is necessary to remove it. The product manufacturer shall provide notice that the user information is to be removed ONLY by the end user.

6.2.4* The item manufacturer shall provide instructions and information regarding at least the following with each item:

- (1) Pre-use information, including the following:
 - (a) Safety considerations
 - (b) Limitations of use
 - (c) Marking recommendations and restrictions
 - (d) A statement that most performance properties of the item cannot be tested by the user in the field
 - (e) Warranty information
- (2) Preparation for use, including the following:
 - (a) Sizing/adjustment
 - (b) Recommended storage practices
- (3) Inspection, including inspection frequency and details
- (4) Don/doff, including the following:
 - (a) Donning and doffing procedures
 - (b) Sizing and adjustment procedures
 - (c) Interface issues
- (5) Use, including proper use consistent with national/federal, state/provincial, and local jurisdiction laws/ordinances.
- (6) For surface water operations, use consistent with NFPA 2500, Chapter 16.
- (7) For fire departments, use consistent with NFPA 1500.
- (8) Maintenance and cleaning, including the following:
 - (a) Cleaning instructions and precautions with a statement advising users not to use suits that are not thoroughly cleaned and dried
 - (b) Inspection details
 - (c) Maintenance criteria and methods of repair where applicable

- (d) Decontamination procedures for both chemical and biological contamination
- (9) Retirement and disposal, including criteria and considerations

Chapter 7 Surface Water Operations PPE Design Requirements (NFPA 1952)

7.1* Surface Water Operations Protective Wet Suit Design Requirements.

7.1.1 Protective wet suits shall have at least the applicable design requirements specified in this section where inspected by the certification organization as specified in Section 4.3, Inspection and Testing.

7.1.2 Protective wet suits shall be permitted to be single-layer or multiple-layer suits.

7.1.3 Where multiple layers are necessary to meet the requirements of this standard, the protective wet suit shall have a means for securing the layers together.

7.1.4 The protective wet suit shall cover the wearer's upper torso and arms to the neck and wrist, and lower torso and legs to the ankle.

7.1.5 All protective wet suit hardware finish shall be free of rough spots, burrs, or sharp edges.

7.1.6 Protective wet suit metal components and closure systems shall not come in direct contact with the body.

7.1.7 Visibility Markings. Where visibility markings are provided for protective wet suits, the markings shall meet the following criteria:

- (1) They shall be Type 1 retroreflective material approved by the USCG in accordance with 46 CFR 164.018, "Retroreflective Material for Lifesaving Equipment."
- (2) They shall provide visibility of the wearer to include arms, and front and back of the upper torso.
- (3) They shall have a minimum area of 0.04 m² (62 in.²).
- (4) They shall have a retroreflective surface not less than 25 mm (1 in.) wide.
- (5) They shall appear to be continuous for the length of the markings, with gaps between areas of retroreflectivity of not more than 6 mm (¼ in.).

7.1.8* Protective Wet Suit Sizing.

7.1.8.1 Protective wet suit chest circumferences shall be provided in circumferences from 760 mm to 1475 mm (30 in. to 58 in.) in 50 mm (2 in.) increments or shall be cut to order.

7.1.8.2 Protective wet suit sleeve lengths shall be provided in lengths from 760 mm to 915 mm (30 in. to 36 in.) in 25 mm (1 in.) increments or shall be cut to order.

7.1.8.3 Protective wet suit waist circumferences shall be provided in circumferences from 660 mm to 1270 mm (26 in. to 50 in.) in 50 mm (2 in.) increments or shall be cut to order.

7.1.8.4 Protective wet suit inseam lengths shall be provided in lengths from 660 mm to 915 mm (26 in. to 36 in.) in 25 mm (1 in.) increments or shall be cut to order.

7.1.8.5 Men's and women's sizing shall be accomplished by the use of individual patterns for men's and women's wet suits.

7.2* Surface Water Operations Protective Dry Suit Design Requirements.

7.2.1 Protective dry suits shall have at least the applicable design requirements specified in this section where inspected by the certification organization as specified in Section 4.3, Inspection and Testing.

7.2.2 Protective dry suits shall be permitted to be single-layer or multiple-layer suits.

7.2.3 Where multiple layers are necessary to meet the requirements of this standard, the protective dry suit shall have a means for securing the layers together.

7.2.4 Protective dry suits shall be designed to cover the wearer's upper torso to the neck and the arms to the wrist; shall cover the wearer's lower torso, legs, and feet; and shall be designed with size-adjustable seals at the neck or face and at the wrists.

7.2.5 Protective dry suits shall be designed with an integrated bootie that shall cover the entire foot.

7.2.6 Protective dry suits shall be designed to accommodate gloves, which shall be permitted to be a separate item or a detachable item of the dry suit.

7.2.7 Where dry suits are designed to accommodate a hood, the hood shall be permitted to be a separate item or a detachable item of the dry suit. Where hoods are provided, the hood shall provide protection to at least the head and neck.

7.2.8 All protective dry suit hardware finish shall be free of rough spots, burrs, or sharp edges.

7.2.9 Protective dry suit metal components and closure systems shall not come in direct contact with the body.

7.2.10 Protective dry suits shall be reinforced at buttocks, forearms, elbow, and knees.

7.2.11* When the manufacturer designates a dry suit as "breathable," the total heat loss shall be measured as specified in Section 9.39, Total Heat Loss Test, and the result shall be printed on the product label as required by 6.1.8(11).

7.2.12 Where visibility markings are provided for protective dry suits, the markings shall meet the following criteria:

- (1) They shall be Type 1 retroreflective material approved by the USCG in accordance with 46 CFR 164.018.
- (2) They shall provide visibility of the wearer to include arms, and front and back of the upper torso.
- (3) They shall have a minimum area of 0.04 m² (62 in.²).
- (4) They shall have a retroreflective surface not less than 25 mm (1 in.) wide.
- (5) They shall appear to be continuous for the length of the markings, with gaps between areas of retroreflectivity of not more than 6 mm (¼ in.).

7.2.13* Protective Dry Suit Sizing.

7.2.13.1 Protective dry suit chest circumferences shall be provided in circumferences from 760 mm to 1475 mm (30 in. to 58 in.) in 100 mm (4 in.) increments or shall be cut to order.

7.2.13.2 Protective dry suit sleeve lengths shall be provided in lengths from 760 mm to 915 mm (30 in. to 36 in.) in 50 mm (2 in.) increments or shall be cut to order.

7.2.13.3 Protective dry suit waist circumferences shall be provided in circumferences from 660 mm to 1270 mm (26 in. to 50 in.) in 100 mm (4 in.) increments or shall be cut to order.

7.2.13.4 Protective dry suit inseam lengths shall be provided in lengths from 660 mm to 915 mm (26 in. to 36 in.) in 50 mm (2 in.) increments or shall be cut to order.

7.2.13.5 Men's and women's sizing shall be accomplished by the use of individual patterns for men's and women's dry suits.

7.3* Surface Water Operations Protective Ice Suit Design Requirements.

7.3.1 Protective ice suits shall have at least the applicable design requirements specified in this section where inspected by the certification organization as specified in Section 4.3, Inspection and Testing.

7.3.2 Protective ice suits shall be designed to cover the wearer's entire body. The suit shall be permitted to cover the wearer's nose. The suit shall not cover the wearer's eyes.

7.3.3 Protective ice suits shall incorporate a hood, either detachable or integrated, that covers the wearer's neck and head, excluding the face.

7.3.4 Protective ice suits shall be permitted to be single-layer or multiple-layer suits.

7.3.5 Where multiple layers are provided to meet the requirements of this standard, the protective ice suit shall have a means for securing the layers together.

7.3.6 Protective ice suits shall incorporate integrated gloves and footwear of a compatible material that meets the performance requirements for protective ice suits in Chapter 8.

7.3.7 All protective ice suit hardware finish shall be free of rough spots, burrs, or sharp edges.

7.3.8 Protective ice suit metal components and closure systems shall not come in direct contact with the body.

7.3.9 Protective ice suits shall be reinforced at buttocks, forearms, elbow, and knees.

7.3.10 Protective ice suits shall have a means to automatically exhaust air from the lower extremities of the suit.

7.3.11 Visibility markings on protective ice suits shall meet the following criteria:

- (1) They shall be Type 1 retroreflective material that is USCG approved in accordance with 46 CFR 164.018, "Retroreflective Material for Lifesaving Equipment."
- (2) They shall provide visibility of the wearer to include arms, front and back of the upper torso, and head.
- (3) They shall have a minimum area of 0.04 m² (62 in.²).
- (4) They shall have a retroreflective surface not less than 25 mm (1 in.) wide.
- (5) They shall appear to be continuous for the length of the markings, with gaps between areas of retroreflectivity of not more than 6 mm (¼ in.).

7.3.12* Protective Ice Suit Sizing.

7.3.12.1 Protective ice suit chest circumferences shall be provided in circumferences from 760 mm to 1475 mm (30 in. to 58 in.) in 100 mm (4 in.) increments, shall be adjustable from 760 mm to 1475 mm (30 in. to 58 in.), or shall be cut to order.

7.3.12.2 Protective ice suit sleeve lengths shall be provided in lengths from 760 mm to 915 mm (30 in. to 36 in.) in 50 mm (2 in.) increments, shall be adjustable from 760 mm to 915 mm (30 in. to 36 in.), or shall be cut to order.

7.3.12.3 Protective ice suit waist circumferences shall be provided in circumferences from 660 mm to 1270 mm (26 in. to 50 in.) in 100 mm (4 in.) increments, shall be adjustable from 660 mm to 1270 mm (26 in. to 50 in.), or shall be cut to order.

7.3.12.4 Protective ice suit inseam lengths shall be provided in lengths from 660 mm to 915 mm (26 in. to 36 in.) in 50 mm (2 in.) increments, shall be adjustable from 660 mm to 915 mm (26 in. to 36 in.), or shall be cut to order.

7.3.12.5 Men's and women's sizing shall be accomplished by the use of individual patterns for men's and women's ice suits.

7.4 Surface Water Operations Protective Helmet Design Requirements.

7.4.1 Surface water protective helmets shall have at least the applicable design requirements specified in this section where inspected by the certification organization as specified in Section 4.3, Inspection and Testing.

7.4.2 Surface water protective helmets shall be designed to consist of at least a means of absorbing energy and a chinstrap.

7.4.3 The back and sides of the surface water helmet shall extend a minimum of 40 mm (1.57 in.) downward from the reference plane when measured on an ISO J headform 50 mm (2 in.) behind the coronal plane.

7.4.4 Surface water protective helmets shall be permitted to have ventilation holes or shall be permitted to be continuous and tight fitting so that they do not collect water.

7.4.5 All materials used in the construction of the surface water protective helmet that are designed to come in contact with the wearer's head or skin shall be known to be nonirritating to normal skin.

7.4.6 The complete surface water protective helmet shall not weigh more than 710 g (25 oz) when dry.

7.4.7 Surface water protective helmets shall be permitted to have retroreflective visibility markings, fluorescent visibility markings, or both retroreflective and fluorescent visibility markings on the helmet exterior.

7.4.8 Where present, a minimum of 2580 mm² (4 in.²) of retroreflective visibility markings shall be visible when the helmet is viewed from the top, left side, right side, and rear.

7.4.9 Product labels and any other identification labels or markers used on the surface water protective helmet shall be affixed without using materials or methods that would negate the purpose of the design or performance requirements of the helmet.

7.4.10 Surface water protective helmets shall not have hardware that projects more than 2 mm (0.08 in.) beyond the outer surface. All hardware edges shall be smooth and edges shall be rounded to a radius of not less than 1 mm (0.04 in.). All rigid internal projections shall be covered with protective padding.

7.4.11 Surface water protective helmets shall be available in sizes to fit head circumferences of 510 mm to 650 mm (20 in. to 25 in.) when measured at the circumference of the headband.

7.5 Surface Water Operations Protective Wet Suit Glove Design Requirements.

7.5.1 Protective wet suit gloves shall have at least the applicable design requirements specified in this section where inspected by the certification organization as specified in Section 4.3, Inspection and Testing.

7.5.2 Protective wet suit gloves shall consist of a composite that shall be permitted to be configured as a single layer, multiple layers, or multiple gloves that are designed to be worn together. Where the glove is made up of multiple layers or where multiple gloves are used, all layers of the glove or all gloves shall be individually graded per size.

7.5.3 Protective wet suit gloves shall be designed with a cut- and puncture-resistant palm and palmside fingers area.

7.5.4 The protective wet suit glove body shall extend circumferentially not less than 50 mm (2 in.) beyond the wrist crease where measured from the tip of the finger. The location of the wrist crease shall be determined as shown in Figure 7.5.4.

7.5.5 In order to label or otherwise represent a protective wet suit glove as compliant with the requirements of this standard, the manufacturer shall provide gloves in not less than four separate and distinct sizes.

7.5.6 All protective wet suit glove hardware finishes shall be free of rough spots, burrs, or sharp edges.

7.6 Surface Water Operations Protective Dry Suit Glove Design Requirements.

7.6.1 Protective dry suit gloves shall have at least the applicable design requirements specified in this section where inspected by the certification organization as specified in Section 4.3, Inspection and Testing.

7.6.2 Protective dry suit gloves shall consist of a composite that shall be permitted to be configured as a single layer, multiple layers, or multiple gloves that are designed to be worn together. Where the protective dry suit glove is made up of multiple layers or if multiple gloves are used, all layers of the glove or all gloves shall be individually graded per size.

7.6.3 Protective dry suit gloves shall be designed with a cut- and puncture-resistant palm and palmside fingers area.

7.6.4 The protective dry suit glove body shall extend circumferentially not less than 50 mm (2 in.) beyond the wrist crease where measured from the tip of the finger. The location of the wrist crease shall be determined as shown in Figure 7.5.4.

7.6.5 In order to label or otherwise represent a protective dry suit glove as compliant with the requirements of this standard, the manufacturer shall provide gloves in not less than four separate and distinct sizes.

7.6.6 All protective dry suit glove hardware finishes shall be free of rough spots, burrs, or sharp edges.

7.7 Surface Water Operations Protective Ice Suit Glove Design Requirements.

7.7.1 Protective ice suit gloves shall have at least the applicable design requirements specified in this section where inspected by the certification organization as specified in Section 4.3, Inspection and Testing.

7.7.2 Protective ice suit gloves shall consist of a composite that shall be permitted to be configured as a single layer, multiple layers, or multiple gloves that are designed to be worn together. Where the ice suit glove is made up of multiple layers or if multiple gloves are used, all layers of the glove or all gloves shall be individually graded per size.

7.7.3 Protective ice suit gloves shall be designed with a cut- and puncture-resistant palm and palmside fingers area.

7.7.4 The protective ice suit glove body shall extend circumferentially not less than 50 mm (2 in.) beyond the wrist crease where measured from the tip of the finger. The location of the wrist crease shall be determined as shown in Figure 7.5.4.

7.7.5 In order to label or otherwise represent a protective ice suit glove as compliant with the requirements of this standard, the manufacturer shall provide ice suit gloves in not less than four separate and distinct sizes.

7.7.6 All protective ice suit glove hardware finishes shall be free of rough spots, burrs, or sharp edges.

7.8 Surface Water Operations Protective Wet Suit Footwear Design Requirements.

7.8.1 Protective wet suit footwear shall have at least the applicable design requirements specified in this section where inspected by the certification organization as specified in Section 4.3, Inspection and Testing.

7.8.2 Protective wet suit footwear shall consist of a composite that shall be permitted to be configured as a continuous or joined single layer or continuous or joined multiple layers.

7.8.3 Where the protective wet suit footwear is made up of multiple layers, all layers of the footwear shall be individually graded per size.

7.8.4 Protective wet suit footwear height shall be determined by measuring inside the footwear from the center of the insole at the heel up to a perpendicular reference line extending across the width of the footwear up to the highest point where the footwear composite completely and continuously encircles the leg. Removable insole inserts shall be removed prior to measurement.

7.8.5 All protective wet suit footwear hardware finishes shall be free of rough spots, burrs, or sharp edges.

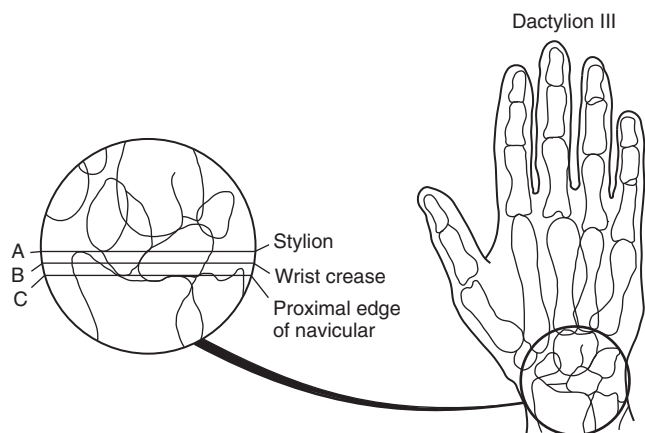


FIGURE 7.5.4 Anatomical Landmarks at Base of Hand, Palm Side Down.

7.9 Surface Water Operations Protective Dry Suit Footwear Design Requirements.

7.9.1 Protective dry suit footwear shall have at least the applicable design requirements specified in this section where inspected by the certification organization as specified in Section 4.3, Inspection and Testing.

7.9.2 Protective dry suit footwear shall consist of a composite that shall be permitted to be configured as a continuous or joined single layer or continuous or joined multiple layers.

7.9.3 Where the protective dry suit footwear is made up of multiple layers, all layers of the footwear shall be individually graded per size.

7.9.4 Protective dry suit footwear height shall be determined by measuring inside the footwear from the center of the insole at the heel up to a perpendicular reference line extending across the width of the footwear up to the highest point where the footwear composite completely and continuously encircles the leg. Removable insole inserts shall be removed prior to measurement.

7.9.5 All protective dry suit footwear hardware finishes shall be free of rough spots, burrs, or sharp edges.

7.10 Surface Water Operations Protective Ice Suit Footwear Design Requirements.

7.10.1 Protective ice suit footwear shall have at least the applicable design requirements specified in this section where inspected by the certification organization as specified in Section 4.3, Inspection and Testing.

7.10.2 Protective ice suit footwear shall consist of a composite that shall be permitted to be configured as a continuous or joined single layer or continuous or joined multiple layers.

7.10.3 Where the protective ice suit footwear is made up of multiple layers, all layers of the footwear shall be individually graded per size.

7.10.4 Protective ice suit footwear height shall be determined by measuring inside the footwear from the center of the insole at the heel up to a perpendicular reference line extending across the width of the footwear up to the highest point where the footwear composite completely and continuously encircles the leg. Removable insole inserts shall be removed prior to measurement.

7.10.5 All protective ice suit footwear hardware finishes shall be free of rough spots, burrs, or sharp edges.

7.11 Surface Water Operations Protective Personal Flotation Device Design Requirements.

7.11.1 Protective personal flotation devices shall be certified to UL 1123, *Marine Buoyant Devices*, as defined in Supplement SG, Type V Rescuer's Harness PFD's, excluding Markings – SG 11.

7.11.2 Protective personal flotation devices shall be available in a range of chest sizes from 760 mm to 1475 mm (30 in. to 58 in.).

7.11.3 Personal flotation devices (PFDs) shall have visibility markings on the exterior of the shell. A minimum of 200 cm² (31 in.²) of retroreflective visibility markings shall be visible when the PFD is viewed from the front, and a minimum of

200 cm² (31 in.²) retroreflective visibility markings shall be visible when the PFD is viewed from the rear.

7.11.4 All protective personal flotation device hardware finishes shall be free of rough spots, burrs, or sharp edges.

Chapter 8 Surface Water Operations PPE Performance Requirements (NFPA 1952)

8.1 Surface Water Operations Protective Wet Suit Performance Requirements.

8.1.1 Protective wet suits shall be tested for donning efficiency as specified in Section 9.4, Overall Donning Efficiency Test, and shall be donned in 3 minutes or less.

8.1.2 Protective wet suit materials shall be tested for snag resistance strength as specified in Section 9.8, Puncture Propagation Tear Resistance Test, and shall have a puncture resistance of not less than 25 N (5.5 lbf).

8.1.3 All protective wet suit seam assemblies shall be tested for seam strength as specified in Section 9.11, Seam/Closure Breaking Strength Test, and shall demonstrate a breaking strength of 158 N (35 lbf) or greater for each seam type.

8.1.4 Protective wet suit materials shall be tested for water absorption resistance as specified in Section 9.12, Liquid Absorption Resistance Test, and shall not have a water absorption greater than 10 percent.

8.1.5 Where protective wet suit visibility markings are specified, the visibility markings shall be tested for retroreflectivity as specified in Section 9.15, Retroreflectivity Test, and shall have a total coefficient of retroreflection (R_{t}) of not less than 100 cd/lux/m² (cd/ft²).

8.1.6 Protective wet suit zippers shall be tested for strength as specified in Section 9.29, Zipper Strength Test, and shall have a minimum strength of 222 N (50 lbf).

8.1.7 Protective wet suit zippers shall be tested for resistance to twist as specified in Section 9.30, Resistance to Twist of Pull and Slider Test, and shall have a minimum force of 0.79 N-m (7 lbf-in.).

8.1.8 Protective wet suit zippers shall be tested for operability as specified in Section 9.31, Opening and Closing of Zippers Test, and shall have a minimum force of 67 N (15 lbf).

8.1.9 All protective wet suit metal hardware and hardware that includes metal parts shall be tested for corrosion resistance as specified in Section 9.16, Corrosion Resistance Test, and shall not have metals that are inherently resistant to corrosion show more than light surface-type corrosion or oxidation, shall not have ferrous metals show corrosion of the base metal, and shall have all hardware items remain functional.

8.1.10 Protective wet suit product labels shall be tested for legibility as specified in Section 9.17, Label Durability and Legibility Test, and shall not be torn, shall remain in place, and shall be legible to the unaided eye.

8.1.11 Protective wet suit closures other than zippers shall be tested for strength as specified in Section 9.11, Seam/Closure Breaking Strength Test, and shall have a breaking strength of not less than 158 N (35 lbf).

8.2 Surface Water Operations Protective Dry Suit Performance Requirements.

8.2.1 Protective dry suits shall be tested for air penetration resistance as specified in Section 9.2, Air Retention Test, and shall not show any sign of leakage.

8.2.2 Protective dry suits shall be tested for liquid penetration resistance as specified in Section 9.3, Overall Liquid Integrity Test One, and shall not allow liquid penetration.

8.2.3 Protective dry suits shall be tested for donning efficiency as specified in Section 9.4, Overall Donning Efficiency Test, and shall be donned in 3 minutes or less.

8.2.4 Protective dry suits shall be tested for water penetration and air evacuation as specified in Section 9.32, Water Penetration and Air Evacuation Test, and shall not allow water ingress while allowing for evacuation of air from the suit.

8.2.5 Protective dry suit materials, dry suit bootie materials, and dry suit hood materials shall be tested for strength as specified in Section 9.7, Breaking Strength Test, and shall have a breaking strength of not less than 445 N (100 lbf).

8.2.6 Protective dry suit materials, dry suit bootie materials, and dry suit hood materials shall be tested for snag resistance as specified in Section 9.8, Puncture Propagation Tear Resistance Test, and shall have a puncture resistance of not less than 25 N (5.5 lbf).

8.2.7 Protective dry suit materials shall be individually tested for cleaning shrinkage resistance as specified in Section 9.10, Cleaning Shrinkage Resistance Test, and shall not shrink more than 5.0 percent in either direction.

8.2.8 Protective dry suit seam assemblies, dry suit bootie seam assemblies, and dry suit hood seam assemblies shall be tested for seam strength as specified in Section 9.11, Seam/Closure Breaking Strength Test, and shall have a seam breaking strength of not less than 158 N (35 lbf) for each seam type.

8.2.9 Protective dry suit materials, dry suit bootie materials, and dry suit hood materials shall be tested for water absorption resistance as specified in Section 9.12, Liquid Absorption Resistance Test, and shall not have a water absorption greater than 10 percent.

8.2.10 Protective dry suit materials and seams, dry suit bootie materials and seams, and dry suit hood materials and seams shall be tested for liquid penetration resistance as specified in Section 9.13, Liquid Penetration Resistance Test, and shall not show any chemical penetration.

8.2.11 Protective dry suit materials and seams, dry suit bootie materials and seams, and dry suit hood materials and seams shall be tested for biopenetration resistance as specified in Section 9.14, Viral Penetration Resistance Test, and shall not show any viral penetration.

8.2.12 Protective dry suit zippers shall be tested for strength as specified in Section 9.29, Zipper Strength Test, and shall have a minimum strength of 222 N (50 lbf).

8.2.13 Protective dry suit zippers shall be tested for resistance to twist as specified in Section 9.30, Resistance to Twist of Pull and Slider Test, and shall have a minimum force of 0.79 N-m (7 lbf-in.).

8.2.14 Protective dry suit zippers shall be tested for operability as specified in Section 9.31, Opening and Closing of Zippers Test, and shall have a minimum force of 67 N (15 lbf).

8.2.15 Protective dry suit zippers shall be tested for point breaking strength as specified in Section 9.37, Zipper Point Breaking Strength Test, and shall have a minimum strength of 440 N (90 lbf).

8.2.16 Protective dry suit zippers shall be tested for resistance to leakage as specified in Section 9.38, Zipper Leak Resistance Test, and shall not allow any water ingress.

8.2.17 Protective dry suit zippers shall be tested for opening and closing force as specified in Section 9.35, Zipper Opening and Closing Force Test, and shall have a minimum strength as defined in Table 8.2.17.

8.2.18 Where protective dry suit visibility markings are specified, the visibility markings shall be tested for retroreflectivity as specified in Section 9.15, Retroreflectivity Test, and shall have a total coefficient of retroreflection (R_a) of not less than 100 cd/lux/m² (cd/ft²).

8.2.19 Dry suits and dry suit booties that are intended to provide protection against chemical hazards shall have materials and seams tested for permeation resistance after flexing and abrading as specified in Section 9.41, Chemical Permeation Resistance Test, and the average cumulative permeation mass shall not exceed 6.0 µg/cm².

8.2.20 Dry suits and dry suit booties that are intended to provide protection against chemical hazards shall have materials and seams tested for penetration resistance as specified in Section 9.40, Closure Penetration Resistance Test, and shall show no penetration.

Table 8.2.17 Zipper Force Test Strengths

Conditioning	Minimum Strength (N)
8.1.2, Room Temperature Conditioning Procedure	The opening and closing force shall not exceed 9 (40) and 11 (50) at the top stop.
720 hours of salt spray with 5 percent sodium chloride (ASTM B117) 24 hours under 4 in. (100 mm) head of No. 2 marine diesel oil at 64°F–68°F (18°C–20°C)	The opening and closing force shall not exceed 39 (175).
8 hours at room temperature ^{a,b} ; 149°F (65°C) for 8 hours ^{a,b} ; 8 hours at room temperature ^{a,b} ; and –22°F (–30°C) for 8 hours ^{a,b,c}	The opening and closing force shall not exceed 13 (60).

^aThe exposure sequence shall be performed five times.

^bPrior to exposures, the sample shall be folded in half lengthwise to form a radius of not more than 0.9 in. (25 mm).

^cThe test shall be performed no less than 10 minutes after being removed from exposure.

8.2.21 All metal hardware and hardware that includes metal parts shall be tested for corrosion resistance as specified in Section 9.16, Corrosion Resistance Test, shall not have metals that are inherently resistant to corrosion show more than light surface-type corrosion or oxidation, shall not have ferrous metals show corrosion of the base metal, and shall have all hardware items remain functional.

8.2.22 Closures used in dry suits that are intended to provide protection against chemical hazards shall be tested for chemical penetration resistance as specified in Section 9.40, Closure Penetration Resistance Test, and shall exhibit no penetration.

8.2.23 Protective dry suit product labels shall be tested for legibility as specified in Section 9.17, Label Durability and Legibility Test, and shall not be torn, shall remain in place, and shall be legible to the unaided eye.

8.2.24 Protective dry suit closures other than zippers shall be tested for strength as specified in Section 9.11, Seam/Closure Breaking Strength Test, and shall have a breaking strength of not less than 158 N (35 lbf).

8.3 Surface Water Operations Protective Ice Suit Performance Requirements.

8.3.1 Protective ice suits shall be tested for liquid penetration resistance as specified in Section 9.3, Overall Liquid Integrity Test One, and shall not allow liquid penetration.

8.3.2 Protective ice suits shall be tested for air penetration resistance as specified in Section 9.2, Air Retention Test, and shall not show any sign of leakage.

8.3.3 Protective ice suit materials and seams and ice suit hood materials and seams shall be tested for biopenetration resistance as specified in Section 9.14, Viral Penetration Resistance Test, and shall not show any viral penetration.

8.3.4 Protective ice suits shall be tested for donning efficiency as specified in Section 9.4, Overall Donning Efficiency Test, and shall be donned in 3 minutes or less.

8.3.5* Protective ice suit and protective ice suit hood materials shall be tested for thermal insulation as specified in Section 9.5, Thermal Insulation Test, and shall have a clo value of at least 2.

8.3.6 Protective ice suit and protective ice suit hood materials shall be tested for strength as specified in Section 9.7, Breaking Strength Test, and shall have a breaking strength of not less than 445 N (100 lbf).

8.3.7 Protective ice suit and protective ice suit hood materials shall be tested for snag resistance strength as specified in Section 9.8, Puncture Propagation Tear Resistance Test, and shall have a puncture resistance of not less than 25 N (5.5 lbf).

8.3.8 Protective ice suit and protective ice suit hood seam assemblies shall be tested for seam strength as specified in Section 9.11, Seam/Closure Breaking Strength Test, and shall demonstrate a breaking strength of 158 N (35 lbf) or greater for each seam type.

8.3.9 Protective ice suit and protective ice suit hood materials shall be tested for water absorption resistance as specified in Section 9.12, Liquid Absorption Resistance Test, and shall not have a water absorption greater than 10 percent.

8.3.10 Protective ice suit materials and seams and ice suit hood materials and seams shall be tested for liquid penetration resistance as specified in Section 9.13, Liquid Penetration Resistance Test, and shall not show any chemical penetration.

8.3.11 Protective ice suit visibility markings shall be tested for retroreflectivity as specified in Section 9.15, Retroreflectivity Test, and shall have a total coefficient of retroreflection (R_a) of not less than 100 cd/lux/m² (cd/ft²).

8.3.12 Protective ice suits shall be tested for water penetration and air evacuation as specified in Section 9.32, Water Penetration and Air Evacuation Test, and shall not allow water ingress while allowing for evacuation of air from the suit.

8.3.13 Protective ice suits shall be tested for buoyancy as specified in Section 9.34, Buoyancy Test, and the adjusted buoyancy shall be at least 100 N (22 lb) and the measured buoyancy shall not be reduced by more than 5 percent after 24 hours submersion in fresh water.

8.3.14 All protective ice suit metal hardware and hardware that includes metal parts shall be tested for corrosion resistance as specified in Section 9.16, Corrosion Resistance Test, and shall not have metals that are inherently resistant to corrosion show more than light surface-type corrosion or oxidation, shall not have ferrous metals show corrosion of the base metal, and shall have all hardware items remain functional.

8.3.15 All protective ice suit product labels shall be tested for legibility as specified in Section 9.17, Label Durability and Legibility Test, and shall not be torn, shall remain in place, and shall be legible to the unaided eye.

8.3.16 Protective ice suit zippers shall be tested for point breaking strength as specified in Section 9.37, Zipper Point Breaking Strength Test, and shall have a minimum strength of 440 N (90 lbf).

8.3.17 Protective ice suit zippers shall be tested for resistance to leakage as specified in Section 9.38, Zipper Leak Resistance Test, and shall not allow any water ingress.

8.3.18 Protective ice suit zippers shall be tested for operability as specified in Section 9.31, Opening and Closing of Zippers Test, and shall have a minimum force of 67 N (15 lbf).

8.3.19 Protective ice suit zippers shall be tested for opening and closing force as specified in Section 9.35, Zipper Opening and Closing Force Test and shall have a minimum strength as defined in Table 8.2.17.

8.3.20 Protective dry suit zippers shall be tested for strength as specified in Section 9.29, Zipper Strength Test, and shall have a minimum strength of 222 N (50 lbf).

8.3.21 Protective ice suit zippers shall be tested for strength as specified in Section 9.30, Resistance to Twist of Pull and Slider Test, and shall have a minimum force of 0.79 N-m (7 lbf-in.).

8.3.22 Protective ice suit closures other than zippers shall be tested for strength as specified in Section 9.11, Seam/Closure Breaking Strength Test, and shall have a breaking strength of not less than 158 N (35 lbf).

8.4 Surface Water Operations Protective Helmet Performance Requirements.

8.4.1 Protective helmets shall be tested for top impact resistance as specified by Section 9.18, Top Impact Resistance Test

(Force), and shall not transmit an average force of more than 3780 N (850 lbf). No individual specimen shall transmit a force of more than 4450 N (1000 lbf).

8.4.2 Protective helmets shall be tested for physical penetration resistance as specified in Section 9.19, Physical Penetration Resistance Test, and shall exhibit no electrical or physical contact between the penetration striker and the headform.

8.4.3 Protective helmets shall be tested for retention system and chin strap efficiency as specified in Section 9.20, Retention System Test, and the retention system shall not break or show any slip or stretch greater than 20 mm ($1\frac{1}{16}$ in.). Chinstraps shall have a width not less than 15 mm (0.6 in.) under a load of 250 N (56 lbf).

8.4.4 All protective helmet metal hardware and hardware that includes metal parts shall be tested for corrosion resistance as specified in Section 9.16, Corrosion Resistance Test, and shall not have metals that are inherently resistant to corrosion show more than light surface-type corrosion or oxidation, shall not have ferrous metals show corrosion of the base metal, and shall have all hardware items remain functional.

8.4.5 Where helmet visibility markings are specified, the visibility markings shall be tested for retroreflectivity as specified in Section 9.15, Retroreflectivity Test, and shall have a total coefficient of retroreflection (R_a) of not less than 100 cd/lux/m² (cd/ft²), and shall be designated as fluorescent.

8.4.6 Specimens of all protective helmet product labels shall be tested for legibility as specified in Section 9.17, Label Durability and Legibility Test, and shall not be torn, shall remain in place, and shall be legible to the unaided eye.

8.4.7 Protective helmets shall be tested for impact acceleration as specified in Section 9.36 Impact Resistance Test — Acceleration, and shall not transmit a force of more than 200 Gn (1961 m/s², 6435 ft/s²).

8.4.8 Protective helmets shall be tested for stability as specified in Section 9.6, Helmet Roll Off Test.

8.4.8.1 The retention system shall remain intact.

8.4.8.2 The helmet shall not fully expose the coronal plane of the headform.

8.4.9 Protective helmets shall be tested for water absorption as specified in Section 9.9, Helmet Water Absorption Test, and shall not weigh more than 110 percent of the original dry weight.

8.5 Surface Water Operations Protective Wet Suit Glove Performance Requirements.

8.5.1 Protective wet suit glove palm composite materials and palmside finger composite materials shall be tested for resistance to cut as specified in Section 9.22, Cut Resistance Test, and shall have a distance of blade travel not less than 20 mm ($\frac{3}{4}$ in.).

8.5.2 Protective wet suit glove palm composite materials and palmside finger composite materials shall be tested for puncture resistance as specified in Section 9.23, Puncture Resistance Test, and shall not puncture under an applied force of 12 N (2.7 lbf).

8.5.3 Protective wet suit glove palm composite materials, palmside finger composite materials, and back-of-hand composite

materials shall be tested for abrasion resistance as specified in Section 9.24, Abrasion Resistance Test Two, and shall not wear through.

8.5.4 Wet suit protective gloves shall be tested for hand function as specified in Section 9.25, Glove Hand Function Test, and shall not have an average percent of barehand control exceeding 150 percent.

8.5.5 Wet suit protective gloves shall be tested for grip as specified in Section 9.26, Grip Test, and shall have a weight-pulling capacity not less than 120 percent of the barehand control values.

8.5.6 Wet suit protective gloves shall be tested for ease of donning as specified in Section 9.27, Glove Donning Test, and shall have a final donning time less than 20.0 seconds, shall have no detachment of the glove liner, and shall allow full insertion of all digits.

8.5.7 All wet suit protective glove metal hardware and hardware that includes metal parts shall be tested for corrosion resistance as specified in Section 9.16, Corrosion Resistance Test, and shall not have metals that are inherently resistant to corrosion show more than light surface-type corrosion or oxidation, shall not have ferrous metals show corrosion of the base metal, and shall have all hardware items remain functional.

8.5.8 Wet suit protective glove product labels shall be tested for legibility as specified in Section 9.17, Label Durability and Legibility Test, and shall not be torn, shall remain in place, and shall be legible to the unaided eye.

8.6 Surface Water Operations Protective Dry Suit Glove Performance Requirements.

8.6.1 Protective dry suit glove palm composite materials and palmside finger composite materials shall be tested for resistance to cut as specified in Section 9.22, Cut Resistance Test, and shall have a distance of blade travel not less than 20 mm ($\frac{3}{4}$ in.).

8.6.2 Protective dry suit glove palm composite materials and palmside finger composite materials shall be tested for puncture resistance as specified in Section 9.23, Puncture Resistance Test, and shall not puncture under an applied force of 12 N (2.7 lbf).

8.6.3 Protective dry suit glove palm composite materials, palmside finger composite materials, and back-of-hand composite materials shall be tested for abrasion resistance as specified in Section 9.24, Abrasion Resistance Test Two, and shall not wear through.

8.6.4 Dry suit protective gloves shall be tested for hand function as specified in Section 9.25, Glove Hand Function Test, and shall not have an average percent of barehand control exceeding 150 percent.

8.6.5 Dry suit protective gloves shall be tested for grip as specified in Section 9.26, Grip Test, and shall have a weight-pulling capacity not less than 120 percent of the barehand control values.

8.6.6 Dry suit protective gloves shall be tested for ease of donning as specified in Section 9.27, Glove Donning Test, and shall have a final donning time less than 20 seconds, shall have