NFPA 1975

Standard on

Station/Work Uniforms for Fire and Emergency Services

2004 Edition

This edition of NFPA 1975, *Standard on Station/Work Uniforms for Fire and Emergency Services*, was prepared by the Technical Committee on Special Operations Protective Clothing and Equipment, released by the Technical Correlating Committee on Fire and Emergency Services Protective Clothing and Equipment, and acted on by NFPA at its November Association Technical Meeting held November 15–19, 2003, in Reno, NV. It was issued by the Standards Council on January 16, 2004, with an effective date of February 5, 2004, and supersedes all previous editions.

This edition of NFPA 1975 was approved as an American National Standard on January 16, 2004.

Origin and Development of NFPA 1975

The Technical Committee on Protective Equipment for Fire Fighters began work on NFPA 1975 in 1982 in response to requests from the fire service to establish requirements for flame-resistant station uniform clothing. The first edition was acted on by the membership of the Association at the 1985 Annual Meeting in Chicago, Illinois, and was issued with an effective date of June 26, 1985.

Following the 1985 edition, the name of the technical committee was changed to the Technical Committee on Fire Service Protective Clothing and Equipment. Under the direction of that technical committee, a subcommittee was formed to address station/work uniform concerns. The Subcommittee on Station/Work Uniforms began revision of the 1985 edition of NFPA 1975 in 1988, and the second edition was acted on by the membership of the Association at the 1990 Annual Meeting in San Antonio, Texas, and was issued with an effective date of August 17, 1990.

The Subcommittee on Station/Work Uniforms began an early revision (four-year cycle) of the 1990 edition of NFPA 1975 in December 1991. During 1993, the NFPA restructured the manner in which committees were organized, and all standing subcommittees were eliminated. Within the Technical Committee on Fire Service Protective Clothing and Equipment, the former standing subcommittees were reorganized as task groups to address

specific technical issues, and the technical committee assumed the entire responsibility for NFPA 1975.

The third edition of NFPA 1975 encompassed revised scope and purpose sections to more clearly identify what a station/work uniform is intended to be and that, because of the limited degree of protection it affords, it is not, of itself, a primary protective garment. However, a station/work uniform garment should not cause or contribute to injury from an unexpected thermal exposure. The concept of "dual-purpose" station/work uniform garments that also are designed and certified as primary protective garments was introduced for situations including, but not limited to, wildland fire fighting or emergency medical services. Revisions to certain definitions also strengthened these areas. A new thermal shrinkage test for fabrics was added to the requirements. An increase of the pre-test conditioning by either washing or dry-cleaning was added to assure that treated flame-resistant fabrics will retain their flame-resistant characteristics over the expected life of the garment. The third edition was acted on by the membership of the Association at the Annual Meeting in San Francisco, California, on May 18, 1994, and was issued with an effective date of August 5, 1994.

In 1995, the NFPA Standards Council reorganized the entire project for fire service protective clothing and equipment. The former single Technical Committee on Fire Service Protective Clothing and Equipment was disbanded and a new Project on Fire and Emergency Services Protective Clothing and Equipment with a Technical Correlating Committee and eight technical committees operating within it was established. The responsibility for NFPA 1975 was assigned to the new Technical Committee on Special Operations Protective Clothing and Equipment.

The fourth edition included a major change whereby flame resistant garments were no longer required exclusively; garments were allowed to be made either from flame resistant fabrics or from cotton or wool fabrics. Flame resistance performance and testing was permitted to be specified by the purchaser where desired and would be above the minimum requirements. The heat resistance and thermal shrinkage resistance requirements were retained. The heat resistance and thermal shrinkage resistance performance requirements were combined into a single requirement. The chapter on certification was reformatted by moving product labels and user information into a new Chapter 3. A new Chapter 4 on design requirements was also added.

The 2004 edition of NFPA 1975 once again addresses the basic protection offered by these garments in non-emergency situations and the "user friendliness" of station/work uniform fabrics. This fifth edition includes changes that will distinguish between thermally stable materials and materials that could potentially melt onto skin under conditions of accidental flame or high heat exposure, and provides for verification and certification of station/work uniforms constructed from flame resistant fabrics.

During the adoption process of the 1999 edition (fourth edition) of NFPA 1975, a floor amendment at the 1998 NFPA Fall Meeting removed the requirements for flame resistant fabrics and the specified flame resistance test, and instead permitted nominally 100 percent cotton or nominally 100 percent wool fabrics to be used. This led to fabric thermal stability problems, especially with wool fabrics but also with cotton fabrics that could cause or contribute to injury of the wearer. Because of the very nature of emergency services,

emergency services personnel can be exposed to unknown and unexpected ignition sources during non-emergency situations when primary protective clothing is not being worn. Also, when emergency services personnel are wearing station/work uniforms constructed from these fabrics under primary protective clothing, the possibility of degradation of these fabrics exists and can lead to more severe injury for the wearer.

In response to these problems, the Technical Committee on Special Operations Protective Clothing and Equipment incorporated new thermal stability performance requirements and a new thermal stability test in the fifth edition of NFPA 1975. In addition, the heat and thermal shrinkage resistance performance requirements and test method in the 1999 edition are retained. The Committee has also included *optional* criteria so that organizations that specify flame-resistant fabrics for station/work uniforms can include reference to this optional requirement and test in purchase specifications so that the actual flame resistance can be verified and certified as compliant. This option will also apply to manufacturers who claim that flame-resistant textiles are used in the construction of the station/work uniform. Additional product labeling provides confirmation of compliance with the standard. These changes define acceptable fabrics for station/work uniforms and distinguish between materials that could potentially melt onto skin under conditions of accidental flame or high heat exposure and those that provide thermal stability.

The 2004 edition (fifth edition) has been reformatted into the new style for all NFPA codes and standards and, therefore, the chapter titles and numbering, as well as paragraph numbering, have changed.

In Memoriam, 11 September 2001

We pay tribute to the 343 members of FDNY who gave their lives to save civilian victims on 11 September 2001, at the World Trade Center. They are true American heroes in death, but they were also American heroes in life. We will keep them in our memory and in our hearts. They are the embodiment of courage, bravery, and dedication. May they rest in peace.

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

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

Committee Scope: This Committee shall have primary responsibility for documents on the design, performance, testing, and certification of protective clothing and protective equipment manufactured for fire and emergency services organizations and personnel, to

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

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

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

operations protective clothing and equipment by fire and emergency services organizations and personnel.

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

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

Chapter 1 Administration

1.1 Scope.

1.1.1 This standard shall specify requirements for the design, performance, testing, and certification of nonprimary protective station/work uniforms and the individual garments comprising station/work uniforms.

1.1.2 This standard shall also specify requirements for thermally stable textiles used in the construction of station/work uniforms.

1.1.3 This standard shall also specify optional requirements where flame resistant textiles are specified or used in construction of station/work uniforms.

1.1.4 This standard shall not specify requirements for clothing that is intended to provide primary protection from given hazard exposures.

1.1.5* Certification of station/work uniforms to the requirements of this standard shall not preclude certification to additional appropriate standards for primary protective clothing where the clothing meets all requirements of each standard.

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

1.2 Purpose.

1.2.1 The purpose of this standard shall be to provide fire and emergency services personnel with station/work uniforms that will not contribute to burn injury severity.

1.2.1.1 To achieve this purpose, this standard shall establish minimum requirements for thermally stable textiles that will not rapidly deteriorate, melt, shrink, or adhere to the

wearer's skin, causing greater, more severe burn injuries.

1.2.1.2 This standard shall also provide optional flame resistance requirements and tests to verify the flame resistance of textiles where the authority having jurisdiction specifies the use of flame resistance textiles for the construction of station/work uniforms, or where the manufacturer represents station/work uniform textiles as flame resistant.

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

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

1.3 Application.

1.3.1 This standard shall apply to the manufacture and certification of new station/work uniforms and the individual garments comprising station/work uniforms.

1.3.2 This standard shall apply to nonprimary protective garments that comprise station/work uniforms.

1.3.3* This standard alone shall not apply to clothing that is intended to provide primary protection from given hazard exposures.

1.3.4 This edition of NFPA 1975 shall not apply to any station/work uniforms manufactured to previous editions of this standard.

1.3.5 This standard shall not apply to any station/work uniforms manufactured to the requirements of any other organization's standards.

1.3.6 This standard shall not apply to the use of station/work uniforms; such use requirements are specified in NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*.

1.3.7 The requirements of this standard shall not apply to accessories that might be attached to any station/work uniforms unless specifically addressed herein.

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 Publication.

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

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program,* 2002 edition.

2.3 Other Publications.

2.3.1 AATCC Publications.

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

AATCC 135, *Dimensional Changes in Automatic Home Laundering of Woven and Knit Fabrics*, 2001.

AATCC 158, *Dimensional Changes in Dry-Cleaning in Perchloroethylene: Machine Method*, 2000.

2.3.2 ASTM Publications.

American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D 751, *Standard Test Methods for Coated Fabrics*, 2000.

ASTM D 1683, *Standard Test Method for Failure in Sewn Seams of Woven Fabric*, 1990.

ASTM D 3940, *Standard Test Method for Bursting Strength (Load) and Elongation of Sewn Seams of Knit or Woven Stretch Textile Fabrics*, 1983.

ASTM D 6413, *Flame Resistance of Textiles (Vertical Test)*, 1999.

2.3.3 GSA Publication.

U.S. General Services Administration, 1800 F Street, N.W., Washington, DC 20405.

Single copies of GSA publications generally are available at the General Services Administration Business Centers in cities throughout the United States. They also are available from the U.S. Government Printing Office.

Federal Test Method Standard 191A, *Textile Test Methods*, 1978.

2.3.4 ISO Publications.

International Organization for Standardization, 1, rue de Varembé, Case postale 56, CH-1211 Geneve 20, Switzerland.

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

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

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

ISO 17025, *General requirements for the competence of testing and calibration laboratories*, 1999.

ISO 17493, *Clothing and equipment for protection against heat — Test method for convective heat resistance using a hot air circulating oven*, 2000.

Chapter 3 Definitions

3.1 General.

The definitions contained in this chapter shall apply to the terms used in this standard. Where terms are not included, common usage of the terms shall apply.

3.2 NFPA Official Definitions.

3.2.1* **Approved.** Acceptable to the authority having jurisdiction.

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

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

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

3.2.5 Shall. Indicates a mandatory requirement.

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

3.2.7 Standard. A document, the main text of which contains only mandatory provisions using the word “shall” to indicate requirements and which is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions shall be located in an appendix or annex, footnote, or fine-print note and are not to be considered a part of the requirements of a standard.

3.3 General Definitions.

For the purposes of this standard, the terms defined in this section shall have the meanings stated unless modified by the mandatory requirements of this standard. Where terms are not defined herein, those terms shall have the ordinarily accepted meanings, or the meaning that the text implies. Terms used in the present tense shall include the past and future tense. Terms used in the masculine gender shall include female and neuter genders, terms used in the singular shall include the plural, and terms used in the plural shall include the singular.

3.3.1 Accessories. Any items that are intended to be attached to the certified product that are not necessary to meet the requirements of this standard.

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

3.3.3 Certification Mark or Label. The authorized identification symbol or logo of the certification organization.

3.3.4 Certification Organization. An independent, third-party organization that determines product compliance with the requirements of this standard using a labeling/listing/follow-up program.

3.3.5 Compliant. Meeting or exceeding all applicable requirements of this standard.

3.3.6 Drip. To run or fall in drops or blobs.

3.3.7* Emblems. Shields, heraldry, or printing that designates a governmental entity or a specific organization; rank, title, position, or other professional status that is painted, screened, embroidered, sewn, glued, bonded, or otherwise attached in a permanent manner to station/work uniform garments.

3.3.8 Findings. All materials used in the construction of items, excluding textiles and interlinings.

3.3.9 Flame Resistance. The property of a material whereby combustion is prevented, terminated, or inhibited following application of a flaming or non-flaming source of ignition, with or without subsequent removal of the ignition source. Flame resistance can be an inherent property of the textile material, or it can be imparted by specific treatment.

3.3.10 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.

3.3.11 Garment. See 3.3.23, Station/Work Uniform Garment.

3.3.12 Inherent Flame Resistance. Flame resistance that is derived from the essential characteristics of the fiber or polymer.

3.3.13 Interlining. Any textile that is intended for incorporation into any article of wearing

apparel as a layer between outer and inner layers.

3.3.14 Major Stress Seams. Classes of seams that designate minimum sewn seam requirements.

3.3.14.1 ***Major Stress Seams Class I.*** The seat seams, side seams, and inseams of pants; the seat seams, side seams, inseams, and waist seams in the bottom portion of coveralls; and the yoke(s) seams, side seams, sleeve set and close seams, and shoulder seams for the upper portion of coveralls.

3.3.14.2 ***Major Stress Seams Class II.*** The yoke(s) seams, side seams, sleeve set and close seams, and shoulder seams for knit fabrics and woven shirting fabrics.

3.3.15 Manufacturer. The entity that assumes the liability and provides the warranty for the compliant product.

3.3.16 Melt. A material's response to heat evidenced by softening of the fiber polymer that results in flowing or dripping.

3.3.17 Nonprimary Protective Garment. A garment or clothing that is not designed nor intended to be the barrier of protection from a specific hazard exposure.

3.3.18 Patches. See 3.3.7, Emblems.

3.3.19 Primary Protective Garment. A garment that is designed, certified, and intended to be the barrier of protection from a specific hazard exposure.

3.3.20* Product Label. A label or marking affixed by the manufacturer to each compliant product or product package, and contains compliance statements, certification statements, general information, care, maintenance, or similar data.

3.3.21 Separate. A material response evidenced by splitting or delaminating.

3.3.22 Sewn Seam. A series of stitches joining two or more separate plies of material(s) of planar structure, such as textiles.

3.3.23 Station/Work Uniform Garment. Textile apparel that cover the torso and limbs or parts of limbs, excluding heads, hands, and feet.

3.3.24 Station/Work Uniforms. Nonprimary protective garments certified as compliant with this standard that are intended to be worn by fire and emergency services personnel while on duty.

3.3.25 Textiles. A planar structure material consisting of yarns or fibers.

Chapter 4 Certification

4.1 General.

4.1.1 The process of certification for station/work uniforms as being compliant with NFPA 1975 shall meet the requirements of Section 4.1, General; Section 4.2, Certification Program; Section 4.3, Inspection and Testing; Section 4.4, ISO Registration for Manufacturers;

Section 4.5, Hazards Involving Compliant Product; Section 4.6, Manufacturers' Investigation of Complaints and Returns; and Section 4.7, Manufacturers' Safety Alert and Product Recall Systems.

4.1.2 All compliant station/work uniform garments that are labeled as being compliant with this standard shall meet or exceed all applicable requirements specified in this standard and shall be certified.

4.1.3 Where station/work uniform garments are manufactured with flame resistant textiles, the entire garment shall be certified as compliant with the requirements of Section 7.5, Optional Requirements for Flame-Resistant Station/Work Uniforms, in addition to all other requirements of this standard.

4.1.4 All certification shall be performed by a certification organization that meets at least the requirements specified in Section 4.2, Certification Program, and that is accredited for personal protective equipment in accordance with ISO 65, *General requirements for bodies operating product certification systems*.

4.1.5 Manufacturers shall not claim compliance with a portion(s) or segment(s) of the requirements of this standard and shall not use the name or identification of this standard in any statements about their respective product(s) unless the product(s) is certified as compliant with this standard.

4.1.6 All compliant station/work uniform garments shall be labeled and listed.

4.1.7 All compliant station/work uniform garments shall have a product label that meets the requirements specified in Chapter 5.

4.1.7.1 Where station/work uniform garments are certified as compliant with only the mandatory, nonoptional, requirements of this standard, the product label shall bear the text specified in 5.1.5.1.

4.1.7.2 Where station/work uniform garments are certified as compliant with the optional requirements specified in Section 7.5, Optional Requirements for Flame-Resistant Station/Work Uniforms, in addition to all other requirements of this standard, the product label shall bear the text specified in 5.1.5.2.

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

4.1.9 The certification organization shall not certify any station/work uniforms to the 1999 edition of this standard on or after 1 September 2004.

4.1.10 The certification organization shall not permit any manufacturer to label any station/work uniforms as compliant with the 1999 edition of this standard on or after 1 September 2004.

4.1.11 The certification organization shall require manufacturers to remove all certification labels and product labels indicating compliance with the 1999 edition of this standard from all station/work uniforms that are under the control of the manufacturer on 1 September

2004, and the certification organization shall 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 product being certified.

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

4.2.3 The certification organization shall be accredited for personal protective equipment in accordance with ISO 65, *General requirements for bodies operating product certification systems*.

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

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

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

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

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

4.2.6.1 The certification organization's laboratory facilities shall have a program in place and functioning for calibration of all instruments, and procedures shall be in use to ensure proper control of all testing.

4.2.6.2 The certification organization'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 4.4, ISO Registration for Manufacturers.

4.2.7.1* The certification organization shall require the manufacturer to have a product recall system specified in Section 4.7, Manufacturers' Safety Alert and Product Recall Systems, as part of the manufacturer's quality assurance program.

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

4.2.8 The certification organization and the manufacturer shall evaluate any changes

affecting the form, fit, or function of the compliant product to determine its continued certification to this standard.

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

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

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

4.2.10 The certification organization shall have in place a series of procedures, as specified in Section 4.5, Hazards Involving Compliant Product, that address report(s) of situation(s) in which a compliant product is subsequently found to be hazardous.

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

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

4.3 Inspection and Testing.

4.3.1 For initial certification and recertification of station/work uniforms, 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 the certification organization or a facility accredited by the certification organization for inspections, evaluations, conditioning, and testing in accordance with all requirements pertaining to testing laboratories in ISO 17025, *General requirements for the competence of testing and calibration laboratories*.

4.3.3 All inspections, evaluations, conditioning, or testing conducted by a product manufacturer shall not be used in the certification or recertification process unless the facility for inspections, evaluations, conditioning, or testing has been accredited by the certification organization in accordance with all requirements pertaining to testing laboratories in ISO 17025, *General requirements for the competence of testing and calibration laboratories*.

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

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

4.3.6 Inspection by the certification organization shall include an evaluation of any symbols and pictorial graphic representations used on product labels or in user information, as permitted by in 5.1.7 and 5.2.5, to ensure that the symbols are clearly explained in the product's user information package.

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

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

4.3.9 Testing conducted by the certification organization in accordance with the testing requirements of Chapter 8, for determining product compliance with the applicable performance requirements specified in Chapter 7, shall be performed on samples representative of materials and components used in the actual construction of the station/work uniform garment. The certification organization also shall be permitted to use sample materials cut from a representative product.

4.3.10 Where certification testing includes a station/work uniform garment with one or more accessories, the garment with each accessory shall be certified as complying with Section 6.3.

4.3.11 Any change in the design, construction, or material of a compliant product shall necessitate new inspection and testing to verify compliance to all applicable requirements of this standard that the certification organization determines can be affected by such change. This recertification shall be conducted before labeling the modified product as being compliant with this standard.

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

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

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

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

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

4.4 ISO Registration for Manufacturers.

4.4.1 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.

4.4.2 The manufacturer shall be registered to ISO 9001, *Quality management systems — requirements.*

4.5 Hazards Involving Compliant Product.

4.5.1* The certification organization shall establish procedures to be followed where situation(s) are reported in which a compliant product is subsequently found to be hazardous. These procedures shall comply with the provisions of ISO 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.

4.5.2* 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.

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

4.5.4 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.

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

4.5.6 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.

4.5.7 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.

4.5.8 The certification organization shall require the manufacturer of the compliant product, or the manufacturer of the compliant product component if applicable, to assist the certification organization in the investigation and to conduct its own investigation as specified in Section 4.6, Manufacturers' Investigation of Complaints and Returns.

4.5.9 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.

4.5.10 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.

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

(1) Notification of 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) Notification of 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) Removing the mark of certification from the product.

(4) Where a hazardous condition exists and it is not practical to implement (1), (2), or (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.

4.5.12 The certification organization shall provide a report to the organization or individual identifying the reported hazardous condition and notify that organization or individual of the corrective action indicated, or that no corrective action is indicated.

4.5.13* Where the certification organization deems a change to an NFPA standard(s) is necessary, the certification organization shall also provide a copy of the report and corrective actions indicated to the NFPA and shall also submit either a Public Proposal 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.

4.6 Manufacturers' Investigation of Complaints and Returns.

4.6.1 Manufacturers shall provide corrective action in accordance with ISO 9001, *Quality management systems — requirements*, for investigating written complaints and returned products.

4.6.2 Manufacturers' records of returns and complaints related to safety issues shall be retained for at least 5 years.

4.6.3 Where the manufacturer discovers, during the review of specific returns or complaints, that a compliant product or compliant product component can 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 information about

their review to assist the certification organization with their investigation.

4.7 Manufacturers' Safety Alert and Product Recall Systems.

4.7.1 The manufacturer shall establish a written safety alert system and a written product recall system that describe the procedures to be used in the event that it decides to, or is directed by the certification organization to, either issue a safety alert or conduct a product recall.

4.7.2 The manufacturers' safety alert and product recall system shall provide the following:

(1) The establishment of a coordinator and responsibilities by the manufacturer for the handling of safety alerts and product recalls

(2) A method of notifying all dealers, distributors, purchasers, users, and the NFPA about the safety alert or product recall that can be initiated within 1 week after the manufacturer decides to, or is 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 for documenting the effectiveness of the product recall

(5) A plan for either repairing or replacing the product, or compensating purchasers for returned product

Chapter 5 Labeling and Information

5.1 Product Label Requirements.

5.1.1* Each station/work uniform garment shall have a product label or labels permanently and conspicuously attached to it.

5.1.2 Multiple label pieces shall be permitted if necessary to carry all statements and information required to be on the product label.

5.1.3 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.

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

5.1.5 Where the station/work uniform garment is certified as compliant with only the nonoptional requirements of this standard, and not with the optional flame resistance requirements, the product label specified in 5.1.5.1 shall be used. Where the station/work uniform garment is certified as compliant with the nonoptional requirements of this standard *and also certified as compliant with the optional flame resistance requirements specified in Section 7.5, Optional Requirements for Flame Resistant Station/Work Uniforms*, the

product label specified in 5.1.5.2 shall be used.

5.1.5.1 The following statement shall be printed legibly on the product label. All letters shall be at least 2.5 mm (3/32 in.) high.

"THIS GARMENT MEETS NFPA 1975, STANDARD ON STATION/WORK UNIFORMS FOR FIRE AND EMERGENCY SERVICES, 2004 EDITION. DO NOT REMOVE THIS LABEL."

5.1.5.2 The following statement shall be printed legibly on the product label. All letters shall be at least 2.5 mm (3/32 in.) high.

"THIS GARMENT MEETS NFPA 1975, STANDARD ON STATION/WORK UNIFORMS FOR FIRE AND EMERGENCY SERVICES, 2004 EDITION, AND THE OPTIONAL FLAME RESISTANT TEXTILE REQUIREMENTS OF NFPA 1975. DO NOT REMOVE THIS LABEL."

5.1.6 The following information shall also be printed legibly on the product label. All letters shall be at least 2 mm (1/16 in.) high:

(1) Manufacturer's name

(2) Manufacturer's garment identification number, lot number, or serial number

(3) Country of manufacture

(4) Model name, number, or design

(5) Date of manufacture

(6) Size

(7) Cleaning and drying instructions, including applicable warnings regarding detergents, soaps, cleaning additives, and bleaches

(8) Fiber content and composition

5.1.7 Symbols and other pictorial graphic representations shall be permitted to be used in place of worded statements on the product labels where explanations for symbols and pictorial graphic representations are explained in the user information.

5.2 User Information.

5.2.1 The manufacturer shall provide user information including, but not limited to, warnings, information, and instructions with each station/work uniform garment.

5.2.2 The manufacturer shall attach the required user information, or packaging containing the user information, to the station/work uniform garment in such a manner that it is not possible to use the garment without being aware of the availability of the information.

5.2.3 The required user information, or packaging containing the user information, shall be

attached to the station/work uniform garment so that a deliberate action is necessary to remove it.

5.2.4 The manufacturer shall provide notice that the user information is to be removed only by the end user.

5.2.5 Symbols and other pictorial graphic representations shall be permitted to be used to supplement worded statements or in place of worded statements in the user information where explanations for symbols and pictorial graphic representations are explained in the user information.

5.2.6 The manufacturer shall provide at least the following instructions and information with each station/work uniform garment:

(1) Pre-use information as follows:

- (a) Manufacturer's name and address
- (b) Safety considerations
- (c) Garment marking recommendations and restrictions
- (d) A statement that most performance properties of the garment cannot be tested by the user in the field
- (e) Warranty information

(2) Inspection frequency and details

(3)* Maintenance information as follows:

- (a) Model name, number, or design
- (b) Cleaning instructions
- (c) Methods of repair where applicable
- (d) Decontamination procedures for both chemical and biological contamination

(4) Retirement and disposal criteria and consideration

Chapter 6 Design Requirements

6.1 General.

6.1.1 Station/work uniforms shall have at least the applicable design requirements specified in this section when inspected by the certification organization as specified in Section 4.3, Inspection and Testing.

6.1.2 Station/work uniform garments shall not include clothing items that are intended for use as underwear, socks, dress uniforms, or outerwear.

6.1.3 All station/work uniform hardware shall be examined and shall be free of rough spots, burrs, or sharp edges.

6.1.4 Any metal findings of station/work uniforms shall not come into direct contact with the wearer's body.

6.1.5 Where station/work uniforms are constructed from flame resistant textiles, station/work uniforms shall meet all requirements specified in Section 7.5, Optional Requirements for Flame Resistant Station/Work Uniforms, to be certified as complying with the optional flame resistance requirements.

6.1.6 Where station/work uniforms are constructed from flame resistant textiles, the garments shall be stitched with thread of an inherently flame resistant fiber.

6.2 Configuration.

6.2.1 Station/work uniform garments designed for the upper torso shall be permitted to be configured as follows:

(1) Shirt, with collar, full-length front opening, either long sleeve or short sleeve

(2) Polo or golf-style shirt, with collar, pullover with partial front opening, either long sleeve or short sleeve

(3) Tee shirt, pullover without front opening, without collar, either long sleeve or short sleeve

(4) Sweatshirt, pullover, with or without collar, either long sleeve or short sleeve

6.2.2 Station/work uniform garments designed for the lower torso shall be permitted to be configured as follows:

(1) Pants, extending from the waist to the ankles

(2) Shorts, extending from the waist to a point at or above the knee

6.3 Accessories.

6.3.1 Where accessories are attached or are intended to be attached to any station/work uniform garment, the station/work uniform garment shall meet all of the design and performance requirements specified in Chapters 6 and 7 of this standard with accessories in place.

6.3.2 In all cases, accessories shall not degrade the performance of the station/work uniform garment.

Chapter 7 Performance Requirements

7.1* Heat and Thermal Shrinkage Resistance.

7.1.1 Textiles, excluding interlinings, shall be tested individually for heat resistance as specified in Section 8.2, Heat and Thermal Shrinkage Resistance Test, and shall not melt, drip, separate, or ignite, and shall not shrink more than 10 percent in any direction.

7.1.2 Findings — excluding both emblems and collar stays, elastic, and hook and pile fasteners when placed where they will not come into direct contact with the body — shall be tested individually for heat resistance as specified in Section 8.2, Heat and Thermal Shrinkage Resistance Test, and shall not melt, drip, separate, or ignite.

7.2* Thermal Stability.

7.2.1 Textiles, excluding interlinings, shall be tested individually for thermal stability as specified in Section 8.3, Thermal Stability Test One, and shall not melt, ignite, stick to itself, or stick to the glass plates.

7.2.2* All thread utilized in the station/work uniform garments shall be tested for heat resistance as specified in Section 8.7, Thread Heat Resistance Test, and shall not melt.

7.3* Seam Strength.

7.3.1 Class I major stress seams of woven fabrics shall be tested for seam strength as specified in Section 8.4, Seam Breaking Strength Test, and shall have a minimum breaking strength of 245 N (55 lb) for either thread or fabric.

7.3.2 Class II major stress seams of woven fabrics shall be tested for seam strength as specified in Section 8.4, Seam Breaking Strength Test, and shall have a minimum breaking strength of 180 N (40 lb) for either thread or fabric.

7.3.3 Class I and II major stress seams of knit fabrics shall be tested for seam strength as specified in Section 8.4, Seam Breaking Strength Test, and shall have a minimum burst strength of 180 N (40 lb) for either thread or fabric.

7.4* Product Label Printing Durability.

Product labels shall be tested for printing durability as specified in Section 8.5, Label Print Durability Test, and shall be legible.

7.5* Optional Requirements for Flame Resistant Station/Work Uniforms.

7.5.1* Where station/work uniforms are represented as being flame resistant, textiles, excluding interlinings, emblems, labels, elastic, hook and pile fastener, and closure tape, shall be tested individually for flame resistance as specified in Section 8.6, Flame Resistance Test, and shall have an average char length of not more than 150 mm (6 in.), shall have an average afterflame of not more than 2.0 seconds, and shall not melt or drip.

7.5.2* Where station/work uniforms are represented as being flame resistant, small textile items, excluding interlinings, emblems, labels, elastic, hook and pile fastener, and closure tape, that are not large enough to meet the specimen requirements specified in 8.6.3.1 shall be tested for flame resistance as specified in Section 8.6, Flame Resistance Test, and shall not be totally consumed, shall not have afterflame of more than 2.0 seconds, and shall not melt or drip.

Chapter 8 Test Methods

8.1 Sample Preparation Procedures.

8.1.1 Application.

8.1.1.1 The sample preparation procedures contained in this section shall apply to each test method in this chapter, as specifically referenced in the sample preparation section of each test method.

8.1.1.2 Only the specific sample preparation procedure or procedures referenced in the sample preparation section of each test method shall be applied to that test method.

8.1.2 Room Temperature Conditioning Procedure.

8.1.2.1 Specimens shall be conditioned at a temperature of 21°C, ±3°C (70°F, ±5°F) and a relative humidity of 65 percent, ±5 percent, until equilibrium is reached, as determined in accordance with Section 4 of Federal Test Method 191A, *Textile Test Methods*, or for at least 24 hours, whichever is shortest.

8.1.2.2 Specimens shall be tested within 5 minutes after removal from conditioning.

8.1.3 Washing and Drying Procedure.

8.1.3.1 Samples being tested to the base, nonoptional, requirements only shall be subjected to 25 cycles of washing and drying in accordance with the procedure specified in AATCC 135, *Dimensional Changes in Automatic Home Laundering of Woven and Knit Fabrics*, using Machine Cycle 1, Wash Temperature V, and Drying Procedure Ai.

8.1.3.2 Samples being tested to the optional requirements for flame resistant station/work uniforms shall be subjected to 100 cycles of washing and drying in accordance with the procedure specified in AATCC 135, *Dimensional Changes in Automatic Home Laundering of Woven and Knit Fabrics,* using Machine Cycle 1, Wash Temperature V, and Drying Procedure Ai.

8.1.3.3 A 1.8 kg, ±0.1 kg (4 lb, ±0.2 lb) load shall be used.

8.1.3.4 A laundry bag shall not be used.

8.1.4 Commercial Dry-Cleaning Procedure.

8.1.4.1 Samples being tested to the base, non-optional, requirements only shall be subjected to 25 cycles of dry cleaning as specified in the procedures of Sections 9.2 and 9.3 of AATCC 158, *Dimensional Changes in Dry-Cleaning in Perchloroethylene: Machine Method*.

8.1.4.2 Samples being tested to the optional requirements for flame resistant station/work uniforms shall be subjected to 50 cycles of dry cleaning as specified in the procedures of Sections 9.2 and 9.3 of AATCC 158, *Dimensional Changes in Dry-Cleaning in Perchloroethylene: Machine Method.*

8.2 Heat and Thermal Shrinkage Resistance Test.

8.2.1 Application.

8.2.1.1 This test method shall apply to textiles and findings.

8.2.1.2 Modifications to this test method for testing textiles shall be as specified in 8.2.8.

8.2.1.3 Modifications to this test method for findings shall be as specified in 8.2.9.

8.2.2 Sample Preparation.

8.2.2.1 Samples for preconditioning shall be a 1 m (1 yd) square of textile.

8.2.2.2 Separate samples shall be preconditioned according to 8.1.3 when the manufacturer designates that the garments are to be washed.

8.2.2.3 Separate samples shall be preconditioned according to 8.1.4 when the manufacturer designates that the garments are to be dry-cleaned.

8.2.3 Specimens.

8.2.3.1 Heat resistance testing only shall be conducted on a minimum of three specimens for each finding not excluded in 7.1.2.

8.2.3.2 Both heat and thermal shrinkage resistance testing shall be conducted on a minimum of three specimens for each textile.

8.2.3.3 Specimens shall be tested both before and after the preconditioning specified in either 8.2.2.2 or 8.2.2.3.

8.2.3.4 All specimens shall be conditioned as specified in 8.1.2 prior to testing.

8.2.4 Apparatus. The test oven shall be as specified in ISO 17493, *Clothing and equipment for protection against heat — Test method for convective heat resistance using a hot air circulating oven*.

8.2.5 Procedure. Testing shall be performed in accordance with ISO 17493, *Clothing and equipment for protection against heat — Test method for convective heat resistance using a hot air circulating oven*, using the following parameters:

(1) Procedure 7.1 in ISO 17493 for flat textile and other sheet materials shall be used.

(2) The test temperature shall be 260°C, +6/-0°C (500°F, +10/-0°F).

(3) Specimen marking and measurements shall be conducted in accordance with the procedure specified in AATCC 135, *Dimensional Changes in Automatic Home Laundering of Woven and Knit Fabrics.*

8.2.6 Report.

8.2.6.1 Observations of ignition, melting, dripping, or separation for each specimen shall be recorded and reported.

8.2.6.2 The percent change in the width and length dimensions of each textile specimen shall be calculated and recorded.

8.2.6.3 Results shall be reported as the average of all three specimens in each direction.

8.2.7 Interpretation.

8.2.7.1 Any evidence of ignition, melting, dripping, or separation on any specimen shall constitute failing performance.

8.2.7.2 The average percent shrinkage change in each direction shall be used to determine pass/fail.

8.2.7.3 Failure in any one direction constitutes failure for the entire sample.

8.2.8 Specific Requirements for Testing Textiles.

8.2.8.1 Each specimen shall be 380 mm × 380 mm, ±13 mm (15 in. × 15 in., ±½ in.).

8.2.8.2 Testing shall be performed as specified in 8.2.2 through 8.2.7.

8.2.9 Specific Requirements for Testing Findings.

8.2.9.1 Specimens shall be in the center of 150 mm × 150 mm, ±13 mm (6 in. × 6 in., ±½ in.) pieces of the garment textile.

8.2.9.2 Hardware shall be affixed in a fashion representative of their use in the finished product.

8.2.9.3 Testing shall be performed as specified in 8.2.2 through 8.2.7.

8.2.9.4 Thermal shrinkage shall not be measured.

8.3 Thermal Stability Test One.

8.3.1 Application. This test method shall apply to textiles.

8.3.2 Sample Preparation.

8.3.2.1 Samples for preconditioning shall be a 1 m (1 yd) square of textile.

8.3.2.2 Where the manufacturer designates that the garments are to be washed, separate samples shall be preconditioned according to 8.1.3.

8.3.2.3 Where the manufacturer designates that the garments are to be dry-cleaned, separate samples shall be preconditioned according to 8.1.4.

8.3.3 Specimens.

8.3.3.1 Thermal stability testing shall be conducted on a minimum of three specimens for each textile.

8.3.3.2 Specimens shall be cut from the preconditioned sample.

8.3.3.3 Specimens shall be tested after the preconditioning specified in either 8.3.2.2 or 8.3.2.3.

8.3.3.4 All specimens shall be conditioned as specified in 8.1.2 prior to testing.

8.3.4 Apparatus.

8.3.4.1 The test oven shall be as specified in ISO 17493, *Clothing and equipment for protection against heat — Test method for convective heat resistance using a hot air circulating oven*.

8.3.4.2 Clean borosilicate glass plates measuring 100 mm × 100 mm × 3 mm (4 in. × 4 in. × ⅛ in.) shall be used.

8.3.5 Procedure. Specimens shall be tested according to ASTM D 751, *Standard Test Methods for Coated Fabrics*, using the Procedures for Blocking Resistance at Elevated Temperatures (Sections 89 to 93), with the following modifications:

(1) The glass plates specified in 8.3.4.2 shall be used.

(2) A test temperature of 265°C, +3/-0°C (510°F, +5/-0°F) shall be used.

(3) The specimens shall cool a minimum of 1 hour after removal of the glass plates from the oven.

(4) In removing specimens from the glass plates, observations shall be made whether each specimen sticks to the glass plates, sticks to itself when unfolded, or shows evidence of melting or ignition.

8.3.6 Report.

8.3.6.1 The condition of each specimen shall be recorded and reported.

8.3.6.2 Where specimens show no damage, the condition shall be recorded as "no damage."

8.3.6.3 Where specimens stick to the glass plates, stick to itself when unfolded, or show evidence of melting or ignition, the applicable condition shall be recorded.

8.3.7 Interpretation. Observations of any sticking, melting, or ignition for any specimen shall constitute failure for the textile being tested.

8.4 Seam Breaking Strength Test.

8.4.1 Application. This test method shall apply to seam assemblies for garments.

8.4.2 Sample Preparation.

8.4.2.1 Samples shall be a straight seam cut from a finished garment or shall be prepared by joining two pieces of the garment textile.

8.4.2.2 Where the sample is prepared by joining two pieces of woven textile, the textile shall be joined as specified in 8.2.1.2 of ASTM D 1683, *Standard Test Method for Failure in Sewn Seams of Woven Fabrics*.

8.4.2.3 Where the sample is prepared by joining two pieces of knit or woven stretch textiles, the textiles shall be joined as specified in 7.2.2 of ASTM D 3940, *Standard Test Method for Bursting Strength (Load) and Elongation of Sewn Seams of Knit or Woven Stretch Textile Fabrics*.

8.4.3 Specimens.

8.4.3.1 A minimum of five seam specimens representative of type of major stress seam in the garment shall be tested.

8.4.3.2 Specimens to be tested shall be the same thread, seam type, and stitch type used in the finished garment.

8.4.3.3 All specimens shall be conditioned as specified in 8.1.2 prior to testing.

8.4.4 Procedure.

8.4.4.1 All woven seam assemblies shall be tested in accordance with ASTM D 1683, *Standard Test Method for Failure in Sewn Seams of Woven Fabric.* The test machine shall be operated at a rate of 305 mm/min (12 in./min).

8.4.4.2 All knit seam assemblies shall be tested in accordance with ASTM D 3940, *Standard Test Method for Bursting Strength (Load) and Elongation of Sewn Seams of Knit and Woven Stretch Textile Fabrics.*

8.4.5 Report.

8.4.5.1 The seam breaking strength for each seam specimen shall be recorded and reported.

8.4.5.2 The average seam breaking strength for each seam type shall also be recorded and reported.

8.4.6 Interpretation. The average seam breaking strength for each seam type shall be used to determine pass/fail performance.

8.5 Label Print Durability Test.

8.5.1 Application. This test method shall apply to garment labels.

8.5.2 Sample Preparation.

8.5.2.1 Samples for preconditioning shall be specimens of labels attached in the center of a 1 m (1 yd) square of garment textile.

8.5.2.2 Samples shall be preconditioned according to 8.1.3 where the manufacturer designates that the garments are to be washed.

8.5.2.3 Samples shall be preconditioned according to 8.1.4 where the manufacturer designates that the garments are to be dry-cleaned.

8.5.3 Specimens.

8.5.3.1 A minimum of three different specimens shall be tested.

8.5.3.2 Specimens of product labels shall be attached to garment textile.

8.5.3.3 Specimens shall be tested after the preconditioning specified in either 8.5.2.2 or 8.5.2.3.

8.5.3.4 All specimens shall be conditioned as specified in 8.1.2 prior to testing.

8.5.4 Procedure. Specimens shall be examined at a distance of 305 mm (12 in.) by the unaided eye with 20/20 vision, or vision corrected to 20/20.

8.5.5 Report. The legibility of each specimen shall be recorded and reported as pass/fail.

8.5.6 Interpretation. Any one specimen failing the test shall constitute failing performance for the test.

8.6 Flame Resistance Test.

8.6.1 Application.

8.6.1.1 This test method shall apply to flame resistant textiles.

8.6.1.2 Modifications to this test method for testing woven textile materials shall be as specified in 8.6.8.

8.6.1.3 Modifications to this test method for testing knit textile materials shall be as specified in 8.6.9.

8.6.1.4 Modifications to this test method for testing nonwoven textile materials shall be as specified in 8.6.10.

8.6.1.5 Modifications to this test method for testing small specimens not meeting the specimen size requirements of 8.6.3.1 shall be as specified in 8.6.11.

8.6.2 Sample Preparation.

8.6.2.1 Samples for preconditioning shall be 1 m (1 yd) square of each textile material.

8.6.2.2 Separate samples shall be preconditioned according to 8.1.3 when the manufacturer designates that the garments are to be washed.

8.6.2.3 Separate samples shall be preconditioned according to 8.1.4 when the manufacturer designates that the garments are to be dry-cleaned.

8.6.3 Specimens.

8.6.3.1 Specimens shall consist of a 75 mm × 305 mm (3 in. × 12 in.) rectangle with the long dimension parallel to either the warp or filling, the wale or course, or machine or cross machine direction of the material.

8.6.3.2 Each individual layer of multilayer material systems or composites shall be separately tested.

8.6.3.3 Specimens shall be tested after the preconditioning specified in either 8.6.2.2 or 8.6.2.3.

8.6.3.4 All specimens shall be conditioned as specified in 8.1.2 prior to testing.

8.6.4 Apparatus. The test apparatus specified in ASTM D 6413, *Flame Resistance of Textiles (Vertical Test)*, shall be used.

8.6.5 Procedure.

8.6.5.1 Flame resistance testing shall be performed in accordance with ASTM D 6413, *Flame Resistance of Textiles (Vertical Test)*.

8.6.5.2 Each specimen shall be examined for evidence of melting or dripping.

8.6.6 Report.

8.6.6.1 Afterflame time and char length shall be recorded and reported for each specimen.

8.6.6.2 The average afterflame time and char length for each material shall be calculated, recorded, and reported.

8.6.6.3 The afterflame time shall be reported to the nearest 0.2 second and the char length to the nearest 3 mm (⅛ in.).

8.6.6.4 Observations of melting or dripping for each specimen shall be recorded and reported.

8.6.7 Interpretation.

8.6.7.1 Pass/fail performance shall be based on any observed melting or dripping, the average afterflame time, and average char length.

8.6.7.2 Failure in either direction shall constitute failure of the material.

8.6.8 Specific Requirements for Testing Woven Textile Materials.

8.6.8.1 Five specimens from each of the warp and filling directions shall be tested.

8.6.8.2 No two warp specimens shall contain the same warp yarns, and no two filling specimens shall contain the same filling yarns.

8.6.8.3 Samples for conditioning shall be at least a 1 m (1 yd) square of each material.

8.6.8.4 Testing shall be performed as specified in 8.6.2 through 8.6.7.

8.6.9 Specific Requirements for Testing Knit Textile Materials.

8.6.9.1 Five specimens from each of the two directions shall be tested.

8.6.9.2 Samples for conditioning shall include material that is a minimum of 75 mm × 305 mm (3 in. × 12 in.).

8.6.9.3 Testing shall be performed as specified in 8.6.2 through 8.6.7.

8.6.10 Specific Requirements for Testing Nonwoven Textile Materials.

8.6.10.1 Five specimens from each of the machine and cross machine directions shall be tested.

8.6.10.2 Samples for conditioning shall be at least a 1 m (1 yd) square of each material.

8.6.10.3 Testing shall be performed as specified in 8.6.2 through 8.6.7.

8.6.11 Specific Requirements for Testing Small Textile Materials.

8.6.11.1 Five specimens attached to the textile layer as used in the station/work garments

shall be tested.

8.6.11.2 The specimens shall be attached to the textile layer such that the bottom exposure edge of the item coincides with the bottom exposure edge of the textile support layer.

8.6.11.3 Samples for conditioning shall be a 1 m (1 yd) square of the textile layer on which the small specimens are attached.

8.6.11.4 Testing shall be performed as specified in 8.6.2 through 8.6.7; however, char length shall not be measured.

8.7 Thread Heat Resistance Test.

8.7.1 Application. This test method shall apply to each type of thread used in the construction of station/work uniforms.

8.7.2 Sample Preparation. Samples for conditioning shall be 150 mm (6 in.) or greater lengths of thread.

8.7.3 Specimens.

8.7.3.1 A total of three different specimens of each thread type shall be tested.

8.7.3.2 All specimens shall be conditioned as specified in 8.1.2 prior to testing.

8.7.4 Apparatus.

8.7.4.1 An electrically heated stage, having a circular depression large enough to insert a micro cover glass shall be used. The stage shall have a variable transformer controlling the rate of heat input into the stage.

8.7.4.2 The following equipment shall also be used:

(1) Armored stem thermometer with a range of 20°C to 160°C, accurate to 0.5°C

(2) Armored stem thermometer with a range of 150°C to 300°C, accurate to 1°C

(3) A low-powered magnifying glass

(4) Two micro cover glasses

(5) Spatula, pick needle or other instrument for applying pressure to the cover glasses

(6) Soxhlet extraction apparatus

8.7.4.3 The following reagents shall be used:

(1) Chloroform, USP

(2)* U.S. Pharmacopeia reference standards for melting point for calibrating the apparatus

8.7.5 Procedure.

8.7.5.1 The specimen shall be extracted with chloroform for a minimum of 20 extractions in a Soxhlet extractor and dried. The specimen shall then be cut into lengths of 2 mm ($\frac{1}{16}$ in.) or less.

8.7.5.2 The apparatus shall be calibrated by determining the melting point of a pure material of known melting point. The melting point of the pure material shall be in the range of the melting point of the fiber being tested. The value obtained shall agree within 1°C of the known value.

8.7.5.3 If the approximate melting point of the specimen is not known before testing, it shall be determined by a trial run.

8.7.5.4 In subsequent determinations immediately following the trial run or initial determination, the stage in each case shall be cooled to at least 50°C below the expected melting point, before the specimen is placed for testing.

8.7.5.5 The specimen shall be placed in a small mound on a cover glass and covered with another cover glass. The two cover glasses shall be pressed together and placed in the circular depression on the stage. The temperature of the stage shall be raised to within 15°C of the expected melting point, and thereafter at a rate of 3°C to 4°C per minute. At this rate of temperature rise, a slight pressure shall be applied on the upper glass cover by pressing with a spatula, pick needle, or other instrument, so that the complete fiber is in contact with the cover glass.

8.7.5.6 The specimen shall be observed with the aid of a magnifying glass, and the melting point taken as the temperature at which flow of the specimen is observed. At the observed melting point, the temperature shall be read to the nearest degree C.

8.7.6 Report.

8.7.6.1 The melting point of the sample unit shall be the average of the results obtained from the specimens tested and shall be reported to the nearest degree C.

8.7.6.2 The pass/fail results for each specimen tested shall be recorded and reported.

8.7.7 Interpretation. One or more thread specimens failing this test shall constitute failing performance for the thread type.

Annex A Explanatory Material

Annex A is not a part of the requirements of this NFPA document but is included for informational purposes only. This annex contains explanatory material, numbered to correspond with the applicable text paragraphs.

A.1.1.5 Station/work uniforms that are certified as compliant only with NFPA 1975 are not primary protective garments and cannot be relied on to provide protection from specific hazards, such as those encountered during structural or wildland fire fighting. Other standards are written for garments that provide primary protection for specific hazards to which fire fighters can be exposed while participating in emergency operations or training. However, compliant station/work uniforms could also be certified to another standard for primary protective garments and thus be both a primary protective garment for the specific hazard that the other standard addresses and a station/work uniform that is compliant with NFPA 1975. Station/work uniforms that receive such dual certification (to NFPA 1975 and

to a primary protective garment standard) would always exceed the minimum requirements of NFPA 1975. Examples of primary protective garment standards include, but are not limited to, NFPA 1951, *Standard on Protective Ensemble for USAR Operations*; NFPA 1977, *Standard on Protective Clothing and Equipment for Wildland Fire Fighting*; NFPA 1994, *Standard on Protective Ensembles for Chemical/Biological Terrorism Incidents*; and NFPA 1999, *Standard on Protective Clothing for Emergency Medical Operations*.

A.1.2.3 The purchaser should provide the vendor with a detailed specification for the specific performance and design criteria. In addition to the performance requirements specified in Chapter 7 and to ensure that station/work uniforms are ordered and manufactured in a consistent manner, purchasers should consider the development of a detailed purchase specification that should include the following:

(1) Compliance of the garments with NFPA 1975

(2) Reference item numbers for each item required by the purchase specification

(3) Additional material/component requirements

(4) Individual sizing. A station/work uniform that restricts movement or conflicts with the function of primary protective garments increases the risk of injury. ASTM F 1731, *Practice for Body Measurement and Sizing of Fire and Rescue Services Uniforms and Other Thermal Hazard Protective Uniforms*, can be useful for sizing station/work uniforms.

(5) Color

(6) Number of units

(7) Special service requirements

(8) Pockets or emblems (number, type, and detailed description of placement)

(9) Special wrapping and packaging requirements

(10) Shipment terms and conditions

(11) Manufacturer's warranty

Where the purchaser specifies additional requirements that exceed those of NFPA 1975, the purchaser should consider requiring the vendor to provide test data that demonstrates garment compliance with the additional requirements of the purchasing agreement. Test methods and test procedures should be discussed and agreed on by the purchaser and vendor as part of the specifications acceptance process.

To facilitate effective and consistent communications between the purchaser and the vendor, specific contact persons should be designated to address such issues as contract requirements, order status, delivery schedules, and problem resolution.

The purchaser should develop a coordinated system to maintain records on purchase order details and specifications, testing results for any requested performance criteria that exceeds the requirements of NFPA 1975, vendor performance, delivery schedules, and invoice inventory. The purchase specifications and the system should provide the procedures needed

to address compliance or noncompliance with the purchasing contract.

A.1.3.3 See A.1.1.5.

A.3.2.1 Approved. The National Fire Protection Association does not approve, inspect, or certify any installations, procedures, equipment, or materials; nor does it approve or evaluate testing laboratories. In determining the acceptability of installations, procedures, equipment, or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure, or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization that is concerned with product evaluations and is thus in a position to determine compliance with appropriate standards for the current production of listed items.

A.3.2.2 Authority Having Jurisdiction (AHJ). The phrase "authority having jurisdiction," or its acronym AHJ, is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

A.3.2.4 Listed. The means for identifying listed equipment may vary for each organization concerned with product evaluation; some organizations do not recognize equipment as listed unless it is also labeled. The authority having jurisdiction should utilize the system employed by the listing organization to identify a listed product.

A.3.3.7 Emblems. Emblems or patches used on station/work uniforms are not included in the test requirements of this standard. Users are cautioned that emblems or patches with thick adhesive backings could melt and contribute to burn injury. In particular, users are cautioned about using large emblems or patches on station/work uniforms because these items are not tested for heat or flame resistance.

A.3.3.20 Product Label. The product label is not the certification organization's label, symbol, or identifying mark; however, the certification organization's label, symbol, or identifying mark can be attached to it or be part of the product label.

A.4.1.8 The NFPA, from time to time, has received complaints that certain items of fire and emergency services protective clothing or protective equipment might be carrying labels falsely identifying them as compliant with an NFPA standard. The requirement for placing the certification organization's mark on or attached to the product label is to help ensure that the purchaser can readily determine compliance of the respective product through independent third-party certification.

NFPA advises those purchasing station/work uniforms or garments to be aware of the

following.

For station/work uniforms and garments to meet the requirements of NFPA 1975, *Standard on Station/Work Uniforms for Fire and Emergency Services*, they must be certified by an independent third-party certification organization. *In addition, the item must carry the label, symbol, or other identifying mark of that certification organization*.

Any station/work uniform garment that does not bear the mark of an independent third-party certification organization is NOT COMPLIANT with NFPA 1975, even if the product label states that the garment is compliant.

For further information about certification and product labeling, Chapter 4 and Chapter 5 of NFPA 1975 should be referenced. Also, the definitions for *labeled* and *listed* in Section 3.2 and the definition *certification/certified* in Section 3.3 should be reviewed.

Third-party certification is an important means of ensuring the quality of fire and emergency services protective clothing and equipment. To be certain that an item is properly certified, labeled, and listed, the NFPA strongly recommends that prospective purchasers require appropriate evidence of certification for the specific product and model from the manufacturer before purchasing. Prospective purchasers should also contact the certification organizations and request copies of the certification organization's "list" of certified products to the appropriate NFPA standard. This "listing" is a requirement of third-party certification by this standard and is a service performed by the certification organization.

All NFPA standards on fire and emergency services protective clothing and equipment require that the item be certified by an independent third-party certification organization and, as with NFPA 1975 station/work uniform garments, all items of fire and emergency services protective clothing and equipment must carry the label, symbol, or other identifying mark of that certification organization.

Any item of protective clothing or protective equipment covered by an NFPA standard that does not bear the mark of an independent third-party certification organization is NOT COMPLIANT with the appropriate NFPA standard, even if the product label states that the item is compliant.

A.4.2.1 The certification organization should have sufficient breadth of interest and activity so that the loss or award of a specific business contract would not be a determining factor in the financial well-being of the agency.

A.4.2.5 The contractual provisions covering certification programs should contain clauses advising the manufacturer that if requirements change, the product should be brought into compliance with the new requirements by a stated effective date through a compliance review program involving all currently listed products.

Without these clauses, certifiers would not be able to move quickly to protect their name, marks, or reputation. A product safety certification program would be deficient without these contractual provisions and the administrative means to back them up.

A.4.2.6 Investigative procedures are important elements of an effective and meaningful product safety certification program. A preliminary review should be carried out on products

submitted to the agency before any major testing is undertaken.

A.4.2.7.1 For further information and guidance on recall programs, see 21 CFR 7, Subpart C.

A.4.2.9 Such inspections should include, in most instances, witnessing of production tests. With certain products, the certification organization inspectors should select samples from the production line and submit them to the main laboratory for countercheck testing. With other products, purchasing samples in the open market for test purposes might be desirable.

A.4.5.1 ISO 27, *Guidelines for corrective action to be taken by a certification body in the event of misuse of its mark of conformity,* is a component of accreditation of certification organizations specified in 4.1.4 and 4.2.3 of this standard. Those paragraphs contain a mandatory reference to ISO 65, *General requirements for bodies operating product certification systems,* in which ISO 27 is referenced.

A.4.5.2 By definition, a hazard might involve a condition that can be imminently dangerous to the end-user. With this thought in mind, the investigation should be started immediately and completed in as timely a manner as is appropriate considering the particulars of the hazard being investigated.

A.4.5.11 The determination of the appropriate corrective action for the certification organization to initiate should take into consideration the severity of the product hazard and its potential consequences to the safety and health of end users. The scope of testing and evaluation should consider, among other things, testing to the requirements of the standard to which the product was listed as compliant, the age of the product, the type of use and conditions to which the compliant product has been exposed, care and maintenance that has been provided, the use of expertise on technical matters outside the certification organization's area of competence, and product hazards caused by circumstances not anticipated by the requirements of the applicable standard. As a guideline for determining which is more appropriate, a safety alert or a product recall, the following product hazard characteristics are provided, which are based on 42 CFR 84, Subpart E, §84.41:

(1) ***Critical*:** A product hazard that judgment and experience indicate is likely to result in a condition immediately hazardous to life or health (IHLH) for individuals using or depending on the compliant product. If an IHLH condition occurs, the user will sustain, or will be *likely* to sustain, an injury of a severity that could result in loss of life, or result in significant bodily injury or loss of bodily function, either immediately or at some point in the future.

(2) ***Major A*:** A product hazard, other than *Critical*, that is likely to result in failure to the degree that the compliant product does not provide any protection or reduces protection, *and is not detectable to the user*. The phrase *reduces protection* means the failure of specific protective design(s) or feature(s) that results in degradation of protection in advance of reasonable life expectancy to the point that continued use of the product is *likely* to cause physical harm to the user, or where continued degradation could lead to IHLH conditions.

(3) ***Major B*:** A product hazard, other than *Critical* or *Major A*, that is likely to result in

reduced protection and is detectable to the user. The phrase *reduces protection* means the failure of specific protective design(s) or feature(s) that results in degradation of protection in advance of reasonable life expectancy to the point that continued use of the product is *likely* to cause physical harm to the user, or where continued degradation could lead to IHLH conditions.

(4) ***Minor*:** A product hazard, other than *Critical, Major A*, or *Major B,* that is not likely to materially reduce the usability of the compliant product for its intended purpose or a product hazard that is a departure from the established applicable standard and has little bearing on the effective use or operation of the compliant product for its intended purpose.

Where the facts are conclusive, based on characteristics of the hazard classified as indicated previously, the certification organization should consider initiating the following corrective actions with the authorized and responsible parties:

(1) ***Critical*** product hazard characteristics: product recall

(2) ***Major A*** product hazard characteristics: product recall or safety alert, depending on the nature of the specific product hazard

(3) ***Major B*** product hazard characteristics: safety alert or no action, depending on the nature of the specific product hazard

(4) ***Minor*** product hazard characteristic: no action

A.4.5.13 Reports, proposals, and proposed TIAs should be addressed to the technical committee that is responsible for the applicable standard and be sent in care of Standards Administration, NFPA, 1 Batterymarch Park, Quincy, MA 02169-7471.

A.5.1.1 See A.4.1.8.

A.5.2.6(3) To avoid possible damage to the garment and possible reduction and loss of inherent or treated flame resistance characteristics of the garment, the manufacturer should be contacted prior to disinfecting or cleaning the garment by a method not prescribed on the product. Station/work uniforms should not be cleaned in home washing machines. See 5.1.6 and 5.2.6 for information regarding how to identify the manufacturer and the garment.

For information on the prevention and transmission of communicable diseases and carcinogens caused by contaminated garments, see NFPA 1581, *Standard on Fire Department Infection Control Program*, and OSHA regulation 29 CFR 1910.1030, or consult the Centers for Disease Control, the local board of public health, the American Medical Association, the U.S. Fire Administration, the Environmental Protection Agency, or the International Association of Fire Fighters.

A.7.1 See Section B.1.

A.7.2 See Section B.2.

A.7.2.2 See Section B.6.

A.7.3 See Section B.3.

A.7.4 See Section B.4.

A.7.5 Two separate test requirements are provided for manufacturers who wish to claim use of flame resistant textile fabrics in their manufacture of station/work uniforms. When the requirements found in 7.2.2, 7.5.1, and 7.5.2 are met, additional label language is used to indicate that the garments are flame resistant.

A.7.5.1 See Section B.5.

A.7.5.2 See Section B.5.

A.8.7.4.3(2) Six standards for use in calibrating melting point apparatus can be obtained from the U.S. Pharmacopeia Reference Standards, 46 Park Avenue, New York, NY 10016.

Annex B Information on Performance Requirements and Test Methods

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

B.1 Heat and Thermal Shrinkage Resistance.

B.1.1 Test Method Cited. Test method appears in Section 8.2; ISO 17493 is used. Conditioning is by laundering per AATCC 135 (Machine Cycle 1, Wash Temperature V, Drying Procedure Ai) or dry-cleaning per Sections 9.2 and 9.3 of AATCC 158.

B.1.2 Description of Test Method. Material specimens are suspended in a forced air–circulating oven at 260°C (500°F) both before and after 25 wash/dry cycles or dry-cleaning cycles, whichever practice is specified for the material. Following a 5-minute exposure, the sample is removed and visually examined for evidence of melting, dripping, separation, or ignition. Samples that demonstrate such behavior fail the test. Material specimens are also measured and marked for size. Following the oven exposure, the dimensions of the material specimens are compared to the original dimensions.

B.1.3 Application of Test Method. The purpose of the test is to prevent materials or components that ignite, melt, drip, or separate during exposure to high heat from being used in station/work uniforms. This test also examines what happens to a material after exposure to high temperatures. Thermal shrinkage of fabric greater than 10 percent can contribute to burn injury severity due to increased heat transfer, restriction of body movement, or the breaking open of fabric.

B.2 Thermal Stability.

B.2.1 Test Method Cited. Test method appears in Section 8.3; Method 1 uses a modified form of ASTM D 751; Method 2 uses a modified form of ASTM F 1939. Conditioning is by laundering per AATCC 135 (Machine Cycle 1, Wash Temperature V, Drying Procedure Ai) or dry-cleaning per Sections 9.2 and 9.3 of AATCC 158.

B.2.2 Description of Test Method. Material specimens are folded twice and pressed

between glass plates that are then put in a forced air-circulating oven at 265°C (510°F). Where station/work uniforms are not represented as being flame resistant, testing is conducted before 25 wash/dry cycles or dry-cleaning cycles, whichever practice is specified for the material. Where station/work uniforms are represented as being flame resistant, testing is conducted after 100 wash/dry cycles or dry cleaning cycles, whichever practice is specified for the material. Following a 6-hour exposure, the specimens between the glass plates are removed from the oven and allowed to cool. Specimens are then removed from the glass plates and examined for evidence of sticking to themselves, sticking to the plates, melting, or igniting. Samples that demonstrate such behavior fail the test.

B.2.3 Application of Test Method. The purpose of the test is to prevent the use of material that could stick to the wearer's skin or underclothing during a high heat or flame exposure.

B.3 Seam Strength.

B.3.1 Test Method Cited. Test method appears in Section 8.4 and uses ASTM D 1683 for woven fabrics or ASTM D 3940 for knit fabrics. Conditioning is by laundering per AATCC 135 (Machine Cycle 1, Wash Temperature V, Drying Procedure Ai) or dry-cleaning per Sections 9.2 and 9.3 of AATCC 158.

B.3.2 Description of Test Method. Two different methods are used; one for woven fabrics and the second for knit fabrics. The strength of a woven material seam is measured in the same way as material tensile strength. In this test, a material seam specimen is placed between two grips in a tensile testing machine and pulled until it breaks. A burst test is used for knit seams, where the material seam specimen is placed on a tensile machine with a 25-mm (1-in.) diameter ball and a circular clamp. The tensile testing machine is used to push the ball through the specimen. The force at which the specimen breaks is the seam strength. The seam strength is measured before laundering.

B.3.3 Application of Test Method. Different seam strength requirements are used for different material types and portions of the station/work uniform. NFPA 1975 requires that critical trouser or lower coverall seams have a seam strength of 55 lb or greater. Shirt or upper coverall seams must have a seam strength of 40 lb or greater. Knit material seams must have a seam strength of 40 lb or greater.

B.4 Label Print Durability.

B.4.1 Test Method Cited. Test method appears in Section 8.5. Conditioning is by laundering per AATCC 135 (Machine Cycle 1, Wash Temperature V, Drying Procedure Ai) or dry-cleaning per Sections 9.2 and 9.3 of AATCC 158.

B.4.2 Description of Test Method. Labels must contain the required language as stated in NFPA 1975. They are subjected to 25 wash/dry cycles or dry-cleaning cycles, as appropriate for the material, and then examined for legibility.

B.4.3 Application of Test Method. This requirement checks for label durability. Following this test, the labels must remain legible from a distance of at least 305 mm (12 in.).

B.5 Flame Resistance.

B.5.1 Test Method Cited. Test method appears in Section 8.6, and ASTM D 6413 is used. Conditioning is by laundering per AATCC 135 (Machine Cycle 1, Wash Temperature V, Drying Procedure Ai), or dry-cleaning per Sections 9.2 and 9.3 of AATCC 158.

B.5.2 Description of Test Method. A 75 mm × 305 mm (3 in. × 12 in.) material specimen is placed in a holder that is suspended vertically over a 38 mm (1½-in.) high flame. The flame is produced by a methane gas source. The material is placed in contact with the flame at the flame's midpoint for a period of 12 seconds. After exposure to the flame, the amount of time during which the specimen continues to burn (afterflame) is recorded. The length of the burn, or char length, then is measured by attaching a weight to tear the specimen and measuring the length of the tear along the burn line. Notations are recorded if any melting or dripping is observed. Samples are tested in this manner both before and after 25 wash/dry cycles or 25 dry-cleaning cycles, whichever practice is specified for the material.

B.5.3 Application of Test Method. This test is used to determine how readily materials ignite and how long they continue to burn after removal of the ignition source. Materials cannot have an average afterflame time greater than 2 seconds, or a char length greater than 150 mm (6 in.), or exhibit any melting or dripping. Char length is an indicator of thermal stability. This test is not representative of all types of flame contact to which personnel might be exposed.

B.6 Thread Melting Resistance.

B.6.1 Test Method Cited. Test method appears in Section 8.7.

B.6.2 Description of Test Method. A small segment of thread used in the stitching of station/work uniforms is placed in a flask containing an organic solvent and heated. (The solvent extracts substances that would interfere with the test.) Next, the extracted thread segment is put in a device that slowly heats the thread. The temperature at which the thread begins to melt is the melting temperature.

B.6.3 Application of Test Method. Thread used in station/work uniforms must withstand temperatures of up to 260°C (500°F). If the melting temperature is less than 260°C (500°F), the thread fails the test. The temperature, 260°C (500°F), is consistent with the heat resistance test.

Annex C Informational References

C.1 Referenced Publications.

The following documents or portions thereof are referenced within this standard for informational purposes only and are thus not part of the requirements of this document unless also listed in Chapter 2.

C.1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1581, *Standard on Fire Department Infection Control Program*, 2000 edition.

NFPA 1951, *Standard on Protective Ensemble for USAR Operations*, 2001 edition.

NFPA 1977, *Standard on Protective Clothing and Equipment for Wildland Fire Fighting*, 1998 edition.

NFPA 1994, *Standard on Protective Ensembles for Chemical/Biological Terrorism Incidents*, 2001 edition.

NFPA 1999, *Standard on Protective Clothing for Emergency Medical Operations*, 2003 edition.

C.1.2 Other Publications.

C.1.2.1 AATCC Publications. American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, NC 27709.

AATCC 135, *Dimensional Changes in Automatic Home Laundering of Woven and Knit Fabrics*, 1987.

AATCC 158, *Dimensional Changes in Dry-Cleaning in Perchloroethylene: Machine Method*, 1990.

C.1.2.2 ASTM Publications. American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D 751, *Standard Test Methods for Coated Fabrics*, 2000.

ASTM D 1683, *Standard Test Method for Failure in Sewn Seams of Woven Fabric*, 1990.

ASTM D 3940, *Standard Test Method for Bursting Strength (Load) and Elongation of Sewn Seams of Knit or Woven Stretch Textile Fabrics*, 1983.

ASTM D 6413, *Flame Resistance of Textiles (Vertical Test)*, 1999.

ASTM F 1731, *Standard Practice for Body Measurement and Sizing of Fire and Rescue Services Uniforms and Other Thermal Hazard Protective Uniforms*, 2002.

ASTM F 1939, *Standard Test Method for Radiant Protective Performance of Flame Resistant Clothing Materials*, 1999a.

C.1.2.3 ISO Publications. International Organization for Standardization, 1, rue de Varembé, Case postale 56, CH-1211 Geneve 20, Switzerland.

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

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

ISO 17493, *Clothing and equipment for protection against heat — Test method for convective heat resistance using a hot air circulating oven*, 2000.

C.1.2.4 U.S. Government Publications. U.S. Government Printing Office, Washington, DC 20402.

Title 21, Code of Federal Regulations, Part 7, Subpart C.

Title 29, Code of Federal Regulations, Part 1910.1030, 6 March 1992.

Title 42, Code of Federal Regulations, Part 84, Subpart E.

C.2 Informational References. (Reserved)

C.3 References for Extracts. (Reserved)