

2009 Fall Revision Cycle

Report on Proposals

A compilation of NFPA® Technical Committee Reports on Proposals for public review and comment

Public Comment Deadline: March 6, 2009

NOTE: The proposed NFPA documents addressed in this Report on Proposals (ROP) and in a follow-up Report on Comments (ROC) will only be presented for action at the NFPA June 2010 Association Technical Meeting to be held June 7–11, 2010, at Mandalay Bay Convention Center in Las Vegas, NV, when proper Amending Motions have been submitted to the NFPA by the deadline of October 23, 2009. Documents that receive no motions will not be presented at the meeting and instead will be forwarded directly to the Standards Council for action on issuance. For more information on the rules and for up-to-date information on schedules and deadlines for processing NFPA documents, check the NFPA website (www.nfpa.org) or contact NFPA Standards Administration.



National Fire Protection Association®

1 BATTERYMARCH PARK, QUINCY, MA 02169-7471

Information on NFPA Codes and Standards Development

I. Applicable Regulations. The primary rules governing the processing of NFPA documents (codes, standards, recommended practices, and guides) are the *NFPA Regulations Governing Committee Projects (RGCPs)*. Other applicable rules include *NFPA Bylaws*, *NFPA Technical Meeting Convention Rules*, *NFPA Guide for the Conduct of Participants in the NFPA Standards Development Process*, and the *NFPA Regulations Governing Petitions to the Board of Directors from Decisions of the Standards Council*. These rules and regulations are contained in the *NFPA Directory*. For copies of the *Directory*, contact Codes and Standards Administration at NFPA Headquarters; these documents are also available on the NFPA website at “www.nfpa.org.”

The following is general information on the NFPA process. All participants, however, should refer to the actual rules and regulations for a full understanding of this process and for the criteria that govern participation.

II. Technical Committee Report (TCR). The Technical Committee Report is defined as “the Report of the Technical Committee and Technical Correlating Committee (if any) on a document. A Technical Committee Report consists of the Report on Proposals (ROP), as modified by the Report on Comments (ROC), published by the Association” (see 1.4 of *RGCPs*).

III. Step 1: Report on Proposals (ROP). The ROP is defined as “a report to the Association on the actions taken by Technical Committees and/or Technical Correlating Committees, accompanied by a ballot statement and one or more proposals on text for a new document or to amend an existing document” (see 1.4 of *RGCPs*). Any objection to an action in the ROP must be raised through the filing of an appropriate Comment for consideration in the ROC or the objection will be considered resolved.

IV. Step 2: Report on Comments (ROC). The ROC is defined as “a report to the Association on the actions taken by Technical Committees and/or Technical Correlating Committees accompanied by a ballot statement and one or more comments resulting from public review of the Report on Proposals (ROP)” (see 1.4 of *RGCPs*). The ROP and the ROC together constitute the Technical Committee Report. Any outstanding objection following the ROC must be raised through an appropriate Amending Motion at the Association Technical Meeting or the objection will be considered resolved.

V. Step 3a: Action at Association Technical Meeting. Following the publication of the ROC, there is a period during which those wishing to make proper Amending Motions on the Technical Committee Reports must signal their intention by submitting a Notice of Intent to Make a Motion. Documents that receive notice of proper Amending Motions (Certified Amending Motions) will be presented for action at the annual June Association Technical Meeting. At the meeting, the NFPA membership can consider and act on these Certified Amending Motions as well as Follow-up Amending Motions, that is, motions that become necessary as a result of a previous successful Amending Motion. (See 4.6.2 through 4.6.9 of *RGCPs* for a summary of the available Amending Motions and who may make them.) Any outstanding objection following action at an Association Technical Meeting (and any further Technical Committee consideration following successful Amending Motions, see *RGCPs* at 4.7) must be raised through an appeal to the Standards Council or it will be considered to be resolved.

VI. Step 3b: Documents Forwarded Directly to the Council. Where no Notice of Intent to Make a Motion is received and certified in accordance with the Technical Meeting Convention Rules, the document is forwarded directly to the Standards Council for action on issuance. Objections are deemed to be resolved for these documents.

VII. Step 4a: Council Appeals. Anyone can appeal to the Standards Council concerning procedural or substantive matters related to the development, content, or issuance of any document of the Association or on matters within the purview of the authority of the Council, as established by the *Bylaws* and as determined by the Board of Directors. Such appeals must be in written form and filed with the Secretary of the Standards Council (see 1.6 of *RGCPs*). Time constraints for filing an appeal must be in accordance with 1.6.2 of the *RGCPs*. Objections are deemed to be resolved if not pursued at this level.

VIII. Step 4b: Document Issuance. The Standards Council is the issuer of all documents (see Article 8 of *Bylaws*). The Council acts on the issuance of a document presented for action at an Association Technical Meeting within sixty days from the date of the recommendation from the Association Technical Meeting, unless this period is extended by the Council (see 4.8 of *RGCPs*). For documents forwarded directly to the Standards Council, the Council acts on the issuance of the document at its next scheduled meeting, or at such other meeting as the Council may determine (see 4.5.7 and 4.8 of *RGCPs*).

IX. Petitions to the Board of Directors. The Standards Council has been delegated the responsibility for the administration of the codes and standards development process and the issuance of documents. However, where extraordinary circumstances requiring the intervention of the Board of Directors exist, the Board of Directors may take any action necessary to fulfill its obligations to preserve the integrity of the codes and standards development process and to protect the interests of the Association. The rules for petitioning the Board of Directors can be found in the *Regulations Governing Petitions to the Board of Directors from Decisions of the Standards Council* and in 1.7 of the *RGCPs*.

X. For More Information. The program for the Association Technical Meeting (as well as the NFPA website as information becomes available) should be consulted for the date on which each report scheduled for consideration at the meeting will be presented. For copies of the ROP and ROC as well as more information on NFPA rules and for up-to-date information on schedules and deadlines for processing NFPA documents, check the NFPA website (www.nfpa.org) or contact NFPA Codes & Standards Administration at (617-984-7246).

2009 Fall Revision Cycle ROP Contents

by NFPA Numerical Designation

Note: Documents appear in numerical order.

NFPA No.	Type Action	Title	Page No.
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11	P	Standard for Low-, Medium-, and High-Expansion Foam.....	11-1
13E	P	Recommended Practice for Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems.....	13E-1
14	P	Standard for the Installation of Standpipe and Hose Systems.....	14-1
18	P	Standard on Wetting Agents	18-1
37	P	Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines	37-1
45	P	Standard on Fire Protection for Laboratories Using Chemicals.....	45-1
53	P	Recommended Practice on Materials, Equipment, and Systems Used in Oxygen-Enriched Atmospheres	53-1
70B	P	Recommended Practice for Electrical Equipment Maintenance	70B-1
91	P	Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids	91-1
120	P	Standard for Fire Prevention and Control in Coal Mines	120-1
122	P	Standard for Fire Prevention and Control in Metal/Nonmetal Mining and Metal Mineral Processing Facilities.....	122-1
204	P	Standard for Smoke and Heat Venting	204-1
211	P	Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances	211-1
214	P	Standard on Water-Cooling Towers	214-1
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276	N	Standard Method of Fire Test for Determining the Heat Release Rate of Roofing Assemblies with Combustible Above-Deck Roofing Components	276-1
326	P	Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair	326-1
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405	P	Standard for the Recurring Proficiency of Airport Fire Fighters	405-1
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551	P	Guide for the Evaluation of Fire Risk Assessments	551-1
600	R	Standard on Industrial Fire Brigades	600-1
601	R	Standard for Security Services in Fire Loss Prevention	601-1
701	P	Standard Methods of Fire Tests for Flame Propagation of Textiles and Films	701-1
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805	P	Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants.....	805-1
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1250	P	Recommended Practice in Emergency Service Organization Risk Management.....	1250-1
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1581	P	Standard on Fire Department Infection Control Program	1581-1
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**2009 Fall Revision Cycle ROP
Committees Reporting**

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805	Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants	P		805-1
806	Performance-Based Standard for Fire Protection for Advanced Nuclear Reactor Electric Generating Plants	N		806-1
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Fire Service Occupational Safety and Health				
1581	Standard on Fire Department Infection Control Program	P		1581-1
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13E	Recommended Practice for Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems	P		13E-1
1407	Standard for Fire Service Rapid Intervention Crews	N		1407-1
1410	Standard on Training for Initial Emergency Scene Operations	P		1410-1
1452	Guide for Training Fire Service Personnel to Conduct Dwelling Fire Safety Surveys	P		1452-1
Fire Tests				
255	Standard Method of Test of Surface Burning Characteristics of Building Materials	W		255-1
276	Standard Method of Fire Test for Determining the Heat Release Rate of Roofing Assemblies with Combustible Above-Deck Roofing Components	N		276-1
701	Standard Methods of Fire Tests for Flame Propagation of Textiles and Films	P		701-1
Foam				
11	Standard for Low-, Medium-, and High-Expansion Foam	P		11-1
Forest and Rural Fire Protection				
1150	Standard on Foam Chemicals for Fires in Class A Fuels	P		1150-1
Handling and Conveying of Dusts, Vapors, and Gases				
91	Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids	P		91-1
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Mining Facilities				
120	Standard for Fire Prevention and Control in Coal Mines	P		120-1
122	Standard for Fire Prevention and Control in Metal/Nonmetal Mining and Metal Mineral Processing Facilities	P		122-1
Oxygen-Enriched Atmospheres				
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Pre-Incident Planning			
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520	Standard on Subterranean Spaces	P	520-1
Tank Leakage and Repair Safeguards			
326	Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair	P	326-1
329	Recommended Practice for Handling Releases of Flammable and Combustible Liquids and Gases	P	329-1
Water Additives for Fire Control and Vapor Mitigation			
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Water-Cooling Towers			
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Key to Proposal Headings

The first line of every proposal includes the following information:

Document No.	Proposal No.	Log No.	Paragraph Reference	Committee Action
101	6	38	3.4	Accept

Example: 101-6 Log #38
(3.4)

Final Action: Accept

TYPES OF ACTION

P Partial Revision **C** Complete Revision **N** New Document **R** Reconfirmation **W** Withdrawal

The following classifications apply to Committee members and represent their principal interest in the activity of the Committee.

1. **M** Manufacturer: A representative of a maker or marketer of a product, assembly, or system, or portion thereof, that is affected by the standard.
2. **U** User: A representative of an entity that is subject to the provisions of the standard or that voluntarily uses the standard.
3. **IM** Installer/Maintainer: A representative of an entity that is in the business of installing or maintaining a product, assembly, or system affected by the standard.
4. **L** Labor: A labor representative or employee concerned with safety in the workplace.
5. **RT** Applied Research/Testing Laboratory: A representative of an independent testing laboratory or independent applied research organization that promulgates and/or enforces standards.
6. **E** Enforcing Authority: A representative of an agency or an organization that promulgates and/or enforces standards.
7. **I** Insurance: A representative of an insurance company, broker, agent, bureau, or inspection agency.
8. **C** Consumer: A person who is or represents the ultimate purchaser of a product, system, or service affected by the standard, but who is not included in (2).
9. **SE** Special Expert: A person not representing (1) through (8) and who has special expertise in the scope of the standard or portion thereof.

NOTE 1: "Standard" connotes code, standard, recommended practice, or guide.

NOTE 2: A representative includes an employee.

NOTE 3: While these classifications will be used by the Standards Council to achieve a balance for Technical Committees, the Standards Council may determine that new classifications of member or unique interests need representation in order to foster the best possible Committee deliberations on any project. In this connection, the Standards Council may make such appointments as it deems appropriate in the public interest, such as the classification of "Utilities" in the National Electrical Code Committee.

NOTE 4: Representatives of subsidiaries of any group are generally considered to have the same classification as the parent organization.

**FORM FOR COMMENTS ON NFPA REPORT ON PROPOSALS
2009 FALL REVISION CYCLE
FINAL DATE FOR RECEIPT OF COMMENTS: 5:00 pm EST, March 6, 2009**

For further information on the standards-making process, please contact the Codes and Standards Administration at 617-984-7249 or visit www.nfpa.org/codes.

For technical assistance, please call NFPA at 1-800-344-3555.

FOR OFFICE USE ONLY

Log #: _____

Date Rec'd: _____

Please indicate in which format you wish to receive your ROP/ROC electronic paper download
(Note: If choosing the download option, you must view the ROP/ROC from our website; no copy will be sent to you.)

Date 8/1/200X Name John B. Smith Tel. No. 253-555-1234

Company _____ Email _____

Street Address 9 Seattle St. City Tacoma State WA Zip 98402

***If you wish to receive a hard copy, a street address MUST be provided. Deliveries cannot be made to PO boxes.

Please indicate organization represented (if any) Fire Marshals Assn. of North America

1. (a) NFPA Document Title National Fire Alarm Code NFPA No. & Year NFPA 72, 200X ed.

(b) Section/Paragraph 4.4.1.1

2. Comment on Proposal No. (from ROP): 72-7

3. Comment Recommends (check one): new text revised text deleted text

4. Comment (include proposed new or revised wording, or identification of wording to be deleted): [Note: Proposed text should be in legislative format; i.e., use underscore to denote wording to be inserted (inserted wording) and strike-through to denote wording to be deleted (~~deleted wording~~).]

Delete exception.

5. **Statement of Problem and Substantiation for Comment:** (Note: State the problem that would be resolved by your recommendation; give the specific reason for your Comment, including copies of tests, research papers, fire experience, etc. If more than 200 words, it may be abstracted for publication.)

A properly installed and maintained system should be free of ground faults. The occurrence of one or more ground faults should be required to cause a 'trouble' signal because it indicates a condition that could contribute to future malfunction of the system. Ground fault protection has been widely available on these systems for years and its cost is negligible. Requiring it on all systems will promote better installations, maintenance and reliability.

6. Copyright Assignment

(a) I am the author of the text or other material (such as illustrations, graphs) proposed in this Comment.

(b) Some or all of the text or other material proposed in this Comment was not authored by me. Its source is as follows (please identify which material and provide complete information on its source):

I agree that any material that I author, either individually or with others, in connection with work performed by an NFPA Technical Committee shall be considered to be works made for hire for the NFPA. To the extent that I retain any rights in copyright as to such material, or as to any other material authored by me that I submit for the use of an NFPA Technical Committee in the drafting of an NFPA code, standard, or other NFPA document, I hereby grant and assign all and full rights in copyright to the NFPA. I further agree and acknowledge that I acquire no rights in any publication of the NFPA and that copyright and all rights in materials produced by NFPA Technical Committees are owned by the NFPA and that the NFPA may register copyright in its own name.

Signature (Required) _____

PLEASE USE SEPARATE FORM FOR EACH COMMENT • email: proposals_comments@nfpa.org • NFPA Fax: (617) 770-3500
Mail to: Secretary, Standards Council, National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471

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For technical assistance, please call NFPA at 1-800-344-3555.

FOR OFFICE USE ONLY

Log #: _____

Date Rec'd: _____

Please indicate in which format you wish to receive your ROP/ROC electronic paper download
(Note: If choosing the download option, you must view the ROP/ROC from our website; no copy will be sent to you.)

Date _____ Name _____ Tel. No. _____

Company _____ Email _____

Street Address _____ City _____ State _____ Zip _____

***If you wish to receive a hard copy, a street address **MUST** be provided. Deliveries cannot be made to PO boxes.

Please indicate organization represented (if any) _____

1. (a) NFPA Document Title _____ NFPA No. & Year _____

(b) Section/Paragraph _____

2. Comment on Proposal No. (from ROP): _____

3. Comment Recommends (check one): new text revised text deleted text

4. Comment (include proposed new or revised wording, or identification of wording to be deleted): [Note: Proposed text should be in legislative format; i.e., use underscore to denote wording to be inserted (inserted wording) and strike-through to denote wording to be deleted (~~deleted wording~~).]

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I agree that any material that I author, either individually or with others, in connection with work performed by an NFPA Technical Committee shall be considered to be works made for hire for the NFPA. To the extent that I retain any rights in copyright as to such material, or as to any other material authored by me that I submit for the use of an NFPA Technical Committee in the drafting of an NFPA code, standard, or other NFPA document, I hereby grant and assign all and full rights in copyright to the NFPA. I further agree and acknowledge that I acquire no rights in any publication of the NFPA and that copyright and all rights in materials produced by NFPA Technical Committees are owned by the NFPA and that the NFPA may register copyright in its own name.

Signature (Required) _____

**PLEASE USE SEPARATE FORM FOR EACH COMMENT • email: proposals_comments@nfpa.org • NFPA Fax: (617) 770-3500
Mail to: Secretary, Standards Council, National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471**

10/31/2008

Sequence of Events Leading to Issuance of an NFPA Committee Document

Step 1 Call for Proposals

▼ Proposed new document or new edition of an existing document is entered into one of two yearly revision cycles, and a Call for Proposals is published.

Step 2 Report on Proposals (ROP)

▼ Committee meets to act on Proposals, to develop its own Proposals, and to prepare its Report.

▼ Committee votes by written ballot on Proposals. If two-thirds approve, Report goes forward. Lacking two-thirds approval, Report returns to Committee.

▼ Report on Proposals (ROP) is published for public review and comment.

Step 3 Report on Comments (ROC)

▼ Committee meets to act on Public Comments to develop its own Comments, and to prepare its report.

▼ Committee votes by written ballot on Comments. If two-thirds approve, Report goes forward. Lacking two-thirds approval, Report returns to Committee.

▼ Report on Comments (ROC) is published for public review.

Step 4 Technical Committee Report Session

▼ “*Notices of intent to make a motion*” are filed, are reviewed, and valid motions are certified for presentation at the Technical Committee Report Session. (“Consent Documents” that have no certified motions bypass the Technical Committee Report Session and proceed to the Standards Council for issuance.)

▼ NFPA membership meets each June at the Annual Meeting Technical Committee Report Session and acts on Technical Committee Reports (ROP and ROC) for documents with “certified amending motions.”

▼ Committee(s) vote on any amendments to Report approved at NFPA Annual Membership Meeting.

Step 5 Standards Council Issuance

▼ Notification of intent to file an appeal to the Standards Council on Association action must be filed within 20 days of the NFPA Annual Membership Meeting.

▼ Standards Council decides, based on all evidence, whether or not to issue document or to take other action, including hearing any appeals.

The Technical Committee Report Session of the NFPA Annual Meeting

The process of public input and review does not end with the publication of the ROP and ROC. Following the completion of the Proposal and Comment periods, there is yet a further opportunity for debate and discussion through the Technical Committee Report Sessions that take place at the NFPA Annual Meeting.

The Technical Committee Report Session provides an opportunity for the final Technical Committee Report (i.e., the ROP and ROC) on each proposed new or revised code or standard to be presented to the NFPA membership for the debate and consideration of motions to amend the Report. The specific rules for the types of motions that can be made and who can make them are set forth in NFPA's rules, which should always be consulted by those wishing to bring an issue before the membership at a Technical Committee Report Session. The following presents some of the main features of how a Report is handled.

What Amending Motions Are Allowed. The Technical Committee Reports contain many Proposals and Comments that the Technical Committee has rejected or revised in whole or in part. Actions of the Technical Committee published in the ROP may also eventually be rejected or revised by the Technical Committee during the development of its ROC. The motions allowed by NFPA rules provide the opportunity to propose amendments to the text of a proposed code or standard based on these published Proposals, Comments, and Committee actions. Thus, the list of allowable motions include motions to accept Proposals and Comments in whole or in part as submitted or as modified by a Technical Committee action. Motions are also available to reject an accepted Comment in whole or part. In addition, Motions can be made to return an entire Technical Committee Report or a portion of the Report to the Technical Committee for further study.

The NFPA Annual Meeting, also known as the NFPA World Safety Conference & Exposition®, takes place in June of each year. A second Fall membership meeting was discontinued in 2004, so the NFPA Technical Committee Report Session now runs once each year at the Annual Meeting in June.

Who Can Make Amending Motions. NFPA rules also define those authorized to make amending motions. In many cases, the maker of the motion is limited by NFPA rules to the original submitter of the Proposal or Comment or his or her duly authorized representative. In other cases, such as a Motion to Reject an accepted Comment, or to Return a Technical Committee Report or a portion of a Technical Committee Report for Further Study, anyone can make these motions. For a complete explanation, NFPA rules should be consulted.

The Filing of a Notice of Intent to Make a Motion. Before making an allowable motion at a Technical Report Session, the intended maker of the motion must file, in advance of the session, and within the published deadline, a Notice of Intent to Make a Motion. A Motions Committee appointed by the Standards Council then reviews all notices and certifies all amending motions that are proper. The Motions Committee can also, in consultation with the makers of the motions, clarify the intent of the motions and, in certain circumstances, combine motions that are dependent on each other together so that they can be made in one single motion. A Motions Committee report is then made available in advance of the meeting listing all certified motions. Only these Certified Amending Motions, together with certain allowable Follow-Up Motions (that is, motions that have become necessary as a result of previous successful amending motions) will be allowed at the Technical Committee Report Session.

Consent Documents. Often there are codes and standards up for consideration by the membership that will be noncontroversial and no proper Notices of Intent to Make a Motion will be filed. These "Consent Documents" will bypass the Technical Committee Report Session and head straight to the Standards Council for issuance. The remaining Documents are then forwarded to the Technical Committee Report Session for consideration of the NFPA membership.

Action on Motions at the Technical Committee Report Session. In order to actually make a Certified Amending Motion at the Technical Committee Report Session, the maker of the motion must sign in at least an hour before the session begins. In this way a final list of motions can be set in advance of the session. At the session, each proposed document up for consideration is presented by a motion to adopt the Technical Committee Report on the document. Following each such motion, the presiding officer in charge of the session opens the floor to motions on the document from the final list of Certified Amending Motions followed by any permissible Follow-Up Motions. Debate and voting on each motion proceeds in accordance with NFPA rules. NFPA membership is not required in order to make or speak to a motion, but voting is limited to NFPA members who have joined at least 180 days prior to the session and have registered for the meeting. At the close of debate on each motion, voting takes place, and the motion requires a majority vote to carry. In order to amend a Technical Committee Report, successful amending motions must be confirmed by the responsible Technical Committee, which conducts a written ballot on all successful amending motions following the meeting and prior to the Document being forwarded to the Standards Council for issuance.

Standards Council Issuance

One of the primary responsibilities of the NFPA Standards Council, as the overseer of the NFPA codes and standards development process, is to act as the official issuer of all NFPA codes and standards. When it convenes to issue NFPA documents, it also hears any appeals related to the document. Appeals are an important part of assuring that all NFPA rules have been followed and that due process and fairness have been upheld throughout the codes and standards development process. The Council considers appeals both in writing and through the conduct of hearings at which all interested parties can participate. It decides appeals based on the entire record of the process as well as all submissions on the appeal. After deciding all appeals related to a document before it, the Council, if appropriate, proceeds to issue the document as an official NFPA code or standard. Subject only to limited review by the NFPA Board of Directors, the decision of the Standards Council is final, and the new NFPA code or standard becomes effective twenty days after Standards Council issuance.

Fire and Emergency Services Protective Clothing and Equipment**Les Boord, Chair**

US National Institute for Occupational Safety & Health, PA [E]

William M. Lambert, Secretary

Mine Safety Appliances Company, PA [M]

Leslie Anderson, US Department of Agriculture, MT [E]
Roger L. Barker, North Carolina State University, NC [SE]
Brian D. Berchtold, US Department of the Navy, DE [RT]
Steven D. Corrado, Underwriters Laboratories Inc., NC [RT]
Nicholas J. Curtis, Lion Apparel, Inc., OH [M]
Richard M. Duffy, International Association of Fire Fighters, DC [L]
 Rep. International Association of Fire Fighters
Robert A. Freese, Globe Manufacturing Company, NH [M]
Andy Gbur, Intertek, OH [RT]
Bill Grilliot, Morning Pride Manufacturing, LLC /TFG, OH [M]
 Rep. Fire & Emergency Manufacturers & Services Association Inc.
Kimberly M. Henry, PBI Performance Products, Inc. NC [M]
James S. Johnson, Lawrence Livermore National Laboratory, CA [RT]
Steven B. Lumry, Oklahoma City Fire Department, OK [C]
 Rep. Oklahoma State Firefighters Association
David G. Matthews, Fire & Industrial (P.P.E) Ltd., United Kingdom [SE]
 Rep. International Standards Organization
Gary L. Neilson, Reno Fire Department, NV [U]
Stephen R. Sanders, Safety Equipment Institute (SEI), VA [RT]
Jeffrey O. Stull, International Personnel Protection, Inc., TX [SE]
David Trivette, Tyco/Scott Health & Safety, NC [M]
 Rep. International Safety Equipment Association
Robert D. Tutterow, Jr., Charlotte Fire Department, NC [U]
 Rep. Fire Industry Equipment Research Organization

Jason L. Allen, Intertek, NY [RT]
 (Alt. to Andy Gbur)
Chris Bain, Oklahoma State Firefighters Association, OK [C]
 (Alt. to Steven B. Lumry)
Eric J. Beck, Mine Safety Appliances Company, PA [M]
 (Alt. to William M. Lambert)
Janice C. Bradley, International Safety Equipment Association, VA [M]
 (Alt. to David Trivette)
Patricia A. Freeman, Globe Manufacturing Company, Inc., NH [M]
 (Alt. to Robert A. Freese)
Patricia A. Gleason, Safety Equipment Institute (SEI), VA [RT]
 (Alt. to Stephen R. Sanders)
Mary I. Grilliot, Morning Pride Manufacturing, LLC/TFG, OH [M]
 (Alt. to Bill Grilliot)
William E. Haskell, III, National Institute for Occupational Safety & Health, MA [E]
 (Alt. to Les Boord)
David V. Haston, US Department of Agriculture, CA [E]
 (Alt. to Leslie Anderson)
Jeffrey C. Jung, E. I. Dupont Company, VA [M]
 (Alt. to Kimberly M. Henry)
Karen E. Lehtonen, Lion Apparel, Inc., OH [M]
 (Alt. to Nicholas J. Curtis)
John A. Sharry, Lawrence Livermore National Laboratory, CA [RT]
 (Alt. to James S. Johnson)
Donald B. Thompson, North Carolina State University, NC [SE]
 (Alt. to Roger L. Barker)

Nonvoting

Dean W. Cox, Fairfax County Fire & Rescue Department, VA [U]
Glenn P. Jirka, Miami Township Fire & EMS Division, OH [E]
Stephen J. King, Babylon, NY [SE]
Daniel N. Rossos, Portland Fire & Rescue, OR [U]
Rick L. Swan, IAFF Local 2881/CDF Fire Fighters, CA [L]
Bruce H. Varner, Santa Rosa Fire Department, CA [E]

Staff Liaison: **Bruce W. Teele**

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.

Report of the Technical Committee on

Electronic Safety Equipment

Bruce H. Varner, *Chair*

Santa Rosa Fire Department, CA [E]

Steven B. Lumry, *Secretary*Oklahoma City Fire Department, OK [C]
Rep. Oklahoma State Firefighters Association

Jason L. Allen, Intertek, NY [RT]
Robert J. Athanas, FDNY/SAFE-IR, Incorporated, NY [U]
Nelson P. Bryner, US National Institute of Standards & Technology, MD [RT]
A. Paul Bull, Fairfax County Fire & Rescue Department, VA [U]
John P. Campman, Grace Industries, Inc., PA [M]
Richard W. Duncanson, City of Middletown Fire Department, NY [E]
 Rep. NFPA Fire Service Section
Michael G. Feely, Boston Fire Department, MA [U]
Wayne C. Haase, Summit Safety, Inc., MA [M]
William E. Haskell, III, National Institute for Occupational Safety & Health, MA [E]
Richard Katz, Mine Safety Appliances Company, PA [M]
Karen E. Lehtonen, Lion Apparel, Inc., OH [M]
Michael F. McKenna, Sacramento Metropolitan Fire District, CA [U]
David E. Mills, Underwriters Laboratories Inc., IL [RT]
Lawrence M. Nyberg, Motorola, Inc., IL [M]
Craig Parkulo, Tyco/Scott Health and Safety, NC [M]
Stephen R. Sanders, Safety Equipment Institute (SEI), VA [RT]
Christina Spoons, Westmont Fire Department, IL [C]
Donald H. J. Turno, Savannah River Nuclear Solutions, LLC, SC [U]
Steven H. Weinstein, Sperian Respiratory Protection, CA [M]
 Rep. International Safety Equipment Association
Timothy W. Wolf, Scottsdale Fire Department, AZ [C]

Alternates

Francine K. Amon, US National Institute of Standards & Technology, MD [RT]
 (Alt. to Nelson P. Bryner)
Chris Bain, Oklahoma State Firefighters Association, OK [C]
 (Alt. to Steven B. Lumry)
Janice C. Bradley, International Safety Equipment Association, VA [M]
 (Alt. to Steven H. Weinstein)
Craig Gestler, Mine Safety Appliances Company, PA [M]
 (Alt. to Richard Katz)
Patricia A. Gleason, Safety Equipment Institute (SEI), VA [RT]
 (Alt. to Stephen R. Sanders)
John Jarboe, Grace Industries, Inc., MD [M]
 (Alt. to John P. Campman)
Robert M. Knabbe, FDNY/SAFE-IR, Incorporated, NY [U]
 (Alt. to Robert J. Athanas)
Mark Krizik, Motorola, Inc., IL [M]
 (Alt. to Lawrence M. Nyberg)
Jeffrey L. Landis, Tyco/Scott Health and Safety, NC [M]
 (Alt. to Craig Parkulo)
Thomas S. Martin, Lion Apparel, Inc., OH [M]
 (Alt. to Karen E. Lehtonen)
Chad A. Morey, Intertek-ETL Semko, NY [RT]
 (Alt. to Jason L. Allen)
Timothy R. Rehak, National Institute for Occupational Safety & Health, PA [E]
 (Alt. to William E. Haskell, III)
Steven D. Townsend, City of Carrollton Fire Department, TX [E]
 (Alt. to Bruce H. Varner)

Staff Liaison: **Bruce W. Teele**

Committee Scope: This Committee shall have primary responsibility for documents on the design, performance, testing, and certification of electronic safety equipment used by fire and emergency services personnel during emergency incident operations, and shall also have primary responsibility for documents on the selection, care, and maintenance of electronic safety equipment.

Report of the Technical Committee on Special Operations

Protective Clothing and Equipment

Dean W. Cox, *Chair*

Fairfax County Fire & Rescue Department, VA [U]

Karen E. Lehtonen, *Secretary*

Lion Apparel, Inc., OH [M]

Steven D. Corrado, Underwriters Laboratories Inc., NC [RT]
Shawn G. Davis, Essex-Windsor Emergency Medical Services, Canada [U]
Keith B. Dempsey, City of Dalton Fire Department, GA [C]
James A. Frank, CMC Rescue, Inc., CA [M]
Stephen J. Geraghty, Fire Department City of New York, NY [U]
Daniel J. Gohlke, W. L. Gore and Associates, MD [M]
William E. Haskell, III, National Institute for Occupational Safety & Health, MA [E]
Diane B. Hess, PBI Performance Products, Inc., NC [M]
Steve Hudson, Pigeon Mountain Industries, Inc., GA [M]
H. Dean Paderick, Special Rescue International, VA [SE]
Jack Reall, Columbus Division of Fire, OH [U]
Stephen R. Sanders, Safety Equipment Institute (SEI), VA [RT]
Michael T. Stanhope, Southern Mills, Inc., GA [M]
Doug Stephenson, Walker County Emergency Services, GA [U]
Adam R. Varley, Vartest Laboratories, Inc., NY [RT]

Alternates

Jason L. Allen, Intertek, NY [RT]
 (Voting Alt. to Intertek Rep.)
William A. Fithian, Safety Equipment Institute (SEI), VA [RT]
 (Alt. to Stephen R. Sanders)
Kimberly M. Henry, PBI Performance Products, Inc., NC [M]
 (Alt. to Diane B. Hess)
Chris P. James, Underwriters Laboratories Inc., NC [RT]
 (Alt. to Steven D. Corrado)
Kim Klaren, Fairfax County Fire & Rescue Department, VA [U]
 (Alt. to Dean W. Cox)
Loui McCurley, PMI-West, CO [M]
 (Alt. to Steve Hudson)
Jami Prinzo, Lion Apparel, Inc., OH [M]
 (Alt. to Karen E. Lehtonen)
Stephen G. Rasweiler, Fire Department City of New York, NY [U]
 (Alt. to Stephen J. Geraghty)
Angie M. Shepherd, US National Institute for Occupational Safety & Health, PA [E]
 (Alt. to William E. Haskell, III)

Staff Liaison: **Bruce W. Teele**

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.

Report of the Technical Committee on

Wildland Fire Fighting Protective Clothing and Equipment

Rick L. Swan, Chair

IAFF Local 2881/CDF Fire Fighters, CA [L]
Rep. International Association of Fire Fighters

Dennis K. Davis, Secretary
US Department of Agriculture, MT [RT]

(Alt. to Leslie Anderson)

Mark Y. Ackerman, University of Alberta, Canada [SE]
Jason L. Allen, Intertek, NY [RT]
Leslie Anderson, US Department of Agriculture, MT [E]
Rep. USDA Forest Service
Ron Balchunas, Pennsylvania Bureau of Forestry, PA [C]
James K. Byrnes, Mine Safety Appliances Company, PA [M]
Karen C. Coleman, Southern Mills, Inc., GA [M]
Steven D. Corrado, Underwriters Laboratories Inc., NC [RT]
Tony W. Craven, US Department of Agriculture, WA [L]
Rep. NFFE/IAMAW Forest Service Council
Vincent Diaz, Atlantic Thread & Supply Company Inc., MD [M]
David P. Fanning, E. D. Bullard Company, KY [M]
Thomas Foley, California Dept. of Forestry & Fire Protection, CA [E]
Diane B. Hess, PBI Performance Products, Inc., NC [M]
William A. Hicks, US General Services Administration, TX [U]
James S. Olson, US Department of the Interior, MT [E]
Louis V. Ott, Gentex Corporation, PA [M]
Ruthalene Payne, Artech Footwear Testing Laboratory, VA [RT]
Serge Poulin, Canadian Interagency Forest Fire Centre (CIFFC), Canada [U]
Angie M. Shepherd, US National Institute for Occupational Safety & Health, PA [E]
Michael W. Smith, Nevada Division of Forestry, NV [C]
Rep. National Volunteer Fire Council
Gary C. Wood, North Carolina Division of Forest Resources, NC [C]

Alternates

Stephen L. Derynck, Underwriters Laboratories Inc., NC [RT]
(Alt. to Steven D. Corrado)
Andy Gbur, Intertek, OH [RT]
(Alt. to Jason L. Allen)
Tom E. Langdon, Southern Mills, Inc., GA [M]
(Alt. to Karen C. Coleman)
Robert A. Sallavanti, Gentex Corporation, PA [M]
(Alt. to Louis V. Ott)
Emily H. Sandford, E. D. Bullard Company, KY [M]
(Alt. to David P. Fanning)
Amy E. Ulrich, PBI Performance Products, Inc., NC [M]
(Alt. to Diane B. Hess)

Staff Liaison: **Bruce W. Teele**

Committee Scope: This Committee shall have primary responsibility for documents on protective clothing and protective equipment, except respiratory protective equipment, that provides hand, foot, torso, limb and head protection, as well as interface protection for fire fighters or other emergency services responders during incidents involving wildland fire fighting operations. These operations include the activities of fire suppression and property conservation in forest, brush, grass, ground cover, and other such vegetation that is not within structures but that is involved in fire.

Additionally, this Committee shall have primary responsibility for documents on the selection, care, and maintenance of wildland fire fighting protective clothing and protective equipment by fire and emergency services organizations and personnel.

These lists represent the membership at the time the Committee was balloted on the text of this edition. Since that time, changes in the membership may have occurred. A key to classifications is found at the front of this book.

The Committee on **Protective Clothing and Equipment** is presenting three Reports for adoption, as follows:

The Reports were prepared by the:

- Technical Correlating Committee on Special Operations Protective Clothing and Equipment (FAE-AAC)
- Technical Committee on Special Operations Protective Clothing and Equipment (FAE-ELS)
- Technical Committee on Special Operations Protective Clothing and Equipment (FAE-SCE)
- Technical Committee on Fire and Emergency Services Protective Clothing and Equipment (FAE-WFF)

Report I: The Technical Committee proposes for adoption, a new document to NFPA 1801, **Standard on Thermal Imagers for the Fire Service.**

NFPA 1801 has been submitted to letter ballot of the **Technical Committee on Electronic Safety Equipment**, which consists of 22 voting members; of whom 20 voted affirmatively and 2 ballots were not returned (Duncanson and Mills).

This Report on Proposals has also been submitted to the **Technical Correlating Committee on Fire and Emergency Services Protective Clothing and Equipment** (TCC) in two parts. Part 1 is a letter ballot on the TCC Actions, if any; and Part 2 is an informational letter ballot on the Report as a whole. The TCC, which consists of 20 voting members, voted as follows:

Since there were no TCC Actions, there is no ballot on Part I.
Part 2: 18 voted affirmatively, 1 abstained (Bradley), and 1 ballot was not returned (Barker).

Ms. Bradley abstained with the following statement:

Questions about image validation.

Report II: The Technical Committee proposes for adoption, a new document to NFPA 1952, **Standard on Surface Water Operations Protective Clothing and Equipment.**

NFPA 1952 has been submitted to letter ballot of the **Technical Committee on Special Operations Protective Clothing and Equipment**, which consists of 18 voting members; of whom 13 voted affirmatively, 1 abstained (Gohlke), and 4 ballots were not returned (Paderick, Reall, Stanhope, and Varley).

Mr. Geraghty voted affirmative with the following comment:

I feel all water rescue suits must have visibility markings. Section 6.1.7 states "where visibility markings are provided".

Mr. Gohlke abstained with the following comment:

The THL requirement for dry suits was removed from this document without any conscious action by this committee. Now that this committee has voted to reintroduce the THL requirement for dry suits as an option, it is still not included in this draft. I am mystified.

This Report on Proposals has also been submitted to the **Technical Correlating Committee on Fire and Emergency Services Protective Clothing and Equipment** (TCC) in two parts. Part 1 is a letter ballot on the TCC Actions, if any; and Part 2 is an informational letter ballot on the Report as a whole. The TCC, which consists of 20 voting members, voted as follows:

Part 1: 18 voted affirmatively, and 2 ballot(s) were not returned (Henry and Stull).

Part 2: 18 voted affirmatively, and 2 ballot(s) were not returned (Henry and Stull).

Report III: The Technical Committee proposes for adoption, amendments to NFPA 1977, **Standard on Protective Clothing and Equipment for Wildland Fire Fighting** 2005 edition. NFPA 1977 is published in Volume 12 of the 2008 National Fire Codes and in separate pamphlet form.

NFPA 1977 has been submitted to letter ballot of the **Technical Committee on Wildland Fire Fighting Protective Clothing and Equipment**, which consists of 21 voting members; of whom 15 voted affirmatively, and 6 ballots were not returned (Balchunas, Coleman, Craven, Payne, Shepherd, and Wood).

This Report on Proposals has also been submitted to the **Technical Correlating Committee on Fire and Emergency Services Protective Clothing and Equipment** (TCC) in two parts. Part 1 is a letter ballot on the TCC Actions, if any; and Part 2 is an informational letter ballot on the Report as a whole. The TCC, which consists of 20 voting members, voted as follows:
Part 1: 19 voted affirmatively, and 1 ballot was not returned (Barker).
Part 2: 19 voted affirmatively, and 1 ballot was not returned (Barker).

Sequence 1977-1 was not used.

1977-2 Log #CP1 FAE-WFF **Final Action: Accept**
(Entire Document)

Submitter: Technical Committee on Wildland Fire Fighting Protective Clothing and Equipment,

Recommendation: Review entire document to: 1) Update any extracted material by preparing separate proposals to do so, and 2) review and update references to other organizations documents, by preparing proposal(s) as required.

Substantiation: To conform to the NFPA Regulations Governing Committee Projects.

Committee Meeting Action: Accept

1977-3 Log #CP4 FAE-WFF **Final Action: Accept**
(3.3, 5.3, 5.8, 6.3, 6.8, 7.3 and 7.8)

Submitter: Technical Committee on Wildland Fire Fighting Protective Clothing and Equipment,

Recommendation: REVISE SECTIONS 5.3, 6.3, AND 7.3, PROTECTIVE WORK GLOVES; ADD NEW SECTIONS 5.8, 6.8, AND 7.8, PROTECTIVE DRIVING GLOVES, AS FOLLOWS:

SECTION 3.3, DEFINITIONS:

Add new 3.3.XX to read: Wildland Fire Fighting Protective Driving Gloves. The items of protective clothing that provide protection to the hands and wrists, and dexterity and grip to the hands that is critical to operating fire fighting vehicles and special equipment during wildland fire fighting operations. (renumber existing 3.3.102 through 3.3.112).

Revise 3.3.104 to read: Wildland Fire Fighting Protective Work Gloves. The items of protective clothing that provide protection to the hands and wrists while directly engaged in wildland fire fighting operations.

REVISE SECTION 5.3 TO READ:

5.3 Protective Work Gloves.

5.3.1 Product Label Requirements.

5.3.1.1 Each protective work glove shall have a product label or labels permanently and conspicuously attached. At least one product label shall be conspicuously located on or inside each work glove when the glove is properly assembled with all components in place.

5.3.1.2 Configuration of the product label and attachment of the product label shall not interfere with the legibility of any printed portion of the product label.

5.3.1.3 Multiple label pieces shall be permitted in order to carry all the statements, symbols, and information required to be on the product label.

5.3.1.4* 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.

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

5.3.1.6 Symbols and other pictorial graphic representations shall be permitted to be used to supplement or in place of worded statements on the product label(s) where explanations for symbols and pictorial graphic representations are explained in the user information.

5.3.1.7 The following statement shall be printed legibly on the work glove product label, and all letters shall be at least 2.5 mm (3/32 in.) high:

“THIS WILDLAND FIRE FIGHTING PROTECTIVE WORK GLOVE MEETS THE WORK GLOVE REQUIREMENTS OF NFPA 1977, STANDARD ON PROTECTIVE CLOTHING AND EQUIPMENT FOR WILDLAND FIRE FIGHTING, 2010 EDITION.

DO NOT REMOVE THIS LABEL.”

5.3.1.8 At least the following information shall also be printed legibly on the work glove product label, with all letters at least 2 mm (1/16 in.) high:

- (1) Manufacturer's name, identification, or designation
- (2) Manufacturer's address
- (3) Country of manufacture
- (4) Manufacturer's glove identification number, lot number, or serial number
- (5) Month and year of manufacture (not coded)
- (6) Model or style name, number, or design
- (7) Glove size or size range
- (8) Cleaning precautions

5.3.2 User Information.

5.3.2.1 The protective work glove manufacturer shall provide at least the user information that is specified in 5.3.2.5 with each work glove pair.

5.3.2.2 The protective work glove manufacturer shall attach the required user information or packaging containing the user information to the work glove pair in such a manner that it is not possible to use the work gloves without being aware of the availability of the information.

5.3.2.3 The required user information or packaging containing the user information shall be attached to the work glove pair so that a deliberate action is necessary to remove it. The protective work glove manufacturer shall provide notice that the user information is to be removed ONLY by the end user.

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

5.3.2.5 The protective work glove manufacturer shall provide at least the following instructions and information with each work glove pair:

- (1) Pre-use information
 - (a) Safety considerations
 - (b) Limitations of use
 - (c) Glove marking recommendations and restrictions
 - (d) A statement that most performance properties of the glove cannot be tested by the user in the field
 - (e) Warranty information
- (2) Preparation for use
 - (a) Sizing/adjustment
 - (b) Recommended storage practices
- (3) Inspection frequency and details
- (4) Donning/doffing
 - (a) Donning and doffing procedures
 - (b) Sizing and adjustment procedures
 - (c) Interface issues
- (5) Proper use consistent with NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, and 29 CFR 1910.132, *Personal Protective Equipment*
 - (a) Maintenance and cleaning
 - (a) Cleaning instructions and precautions with a statement advising users not to use gloves that are not thoroughly cleaned and dried
 - (b) Maintenance criteria and methods of repair where applicable
 - (7) Retirement and disposal criteria and considerations

5.3.2.6 The protective work glove manufacturer shall make available to prospective purchasers and the purchaser a chart illustrating the hand dimension ranges specified in 6.3.4.4.

ADD NEW SECTION 5.8 TO READ (renumber current Section 5.8 as Section 5.9):

5.8 Protective Driving Gloves.

5.8.1 Product Label Requirements.

5.8.1.1 Each protective driving glove shall have a product label or labels permanently and conspicuously attached. At least one product label shall be conspicuously located on or inside each driving glove when the glove is properly assembled with all components in place.

5.8.1.2 Configuration of the product label and attachment of the product label shall not interfere with the legibility of any printed portion of the product label.

5.8.1.3 Multiple label pieces shall be permitted in order to carry all the statements, symbols, and information required to be on the product label.

5.8.1.4* 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.

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

5.8.1.6 Symbols and other pictorial graphic representations shall be permitted to be used to supplement or in place of worded statements on the product label(s) where explanations for symbols and pictorial graphic representations are explained in the user information.

5.8.1.7 The following statement shall be printed legibly on the driving glove product label, and all letters shall be at least 2.5 mm (3/32 in.) high:

“THIS PROTECTIVE DRIVING GLOVE MEETS THE DRIVING GLOVE REQUIREMENTS OF NFPA 1977, STANDARD ON PROTECTIVE CLOTHING AND EQUIPMENT FOR WILDLAND FIRE FIGHTING, 2010 EDITION.

DO NOT REMOVE THIS LABEL.”

5.8.1.8 At least the following information shall also be printed legibly on the driving glove product label, with all letters at least 2 mm (1/16 in.) high:

- (1) Manufacturer's name, identification, or designation
- (2) Manufacturer's address
- (3) Country of manufacture
- (4) Manufacturer's glove identification number, lot number, or serial number
- (5) Month and year of manufacture (not coded)
- (6) Model or style name, number, or design
- (7) Glove size or size range
- (8) Cleaning precautions

5.8.2 User Information.

5.8.2.1 The protective driving glove manufacturer shall provide at least the user information that is specified in 5.8.2.5 with each driving glove pair.

5.8.2.2 The protective driving glove manufacturer shall attach the required user information or packaging containing the user information to the driving glove pair in such a manner that it is not possible to use the driving gloves without being aware of the availability of the information.

5.8.2.3 The required user information or packaging containing the user information shall be attached to the driving glove pair so that a deliberate action is necessary to remove it. The protective driving glove manufacturer shall provide notice that the user information is to be removed **ONLY** by the end user.

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

5.8.2.5 The protective driving glove manufacturer shall provide at least the following instructions and information with each driving glove pair:

- (1) Pre-use information
 - (a) Safety considerations
 - (b) Limitations of use
 - (c) Glove marking recommendations and restrictions
 - (d) A statement that most performance properties of the glove cannot be tested by the user in the field
 - (e) Warranty information
- (2) Preparation for use
 - (a) Sizing/adjustment
 - (b) Recommended storage practices
- (3) Inspection frequency and details
- (4) Donning/doffing
 - (a) Donning and doffing procedures
 - (b) Sizing and adjustment procedures
 - (c) Interface issues
- (5) Proper use consistent with NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*; and 29 CFR 1910.132, *Personal Protective Equipment*
- (6) Maintenance and cleaning
 - (a) Cleaning instructions and precautions with a statement advising users not to use driving gloves that are not thoroughly cleaned and dried
 - (b) Maintenance criteria and methods of repair where applicable
- (7) Retirement and disposal criteria and considerations

5.8.2.6 The manufacturer shall make available to prospective purchasers and the purchaser a chart illustrating the hand dimension ranges specified in 6.8.4.4.

REVISE SECTION 6.3 TO READ:

6.3 Protective Work Glove Item Design Requirements.

6.3.1 Protective work glove items shall have at least the applicable design requirements specified in this section where inspected by the certification organization as specified in Section 4.3.

6.3.2 Protective work glove bodies shall be designed so they closely conform to the wrist or shall be adjustable at the wrist, and shall extend a minimum of 25 mm (1 in.) past the wrist crease. The location of the wrist crease shall be the distal crease formed by the gathered skin adjacent to the palm on wrist flexion with the hand facing downward; and the wrist crease shall be near the back of the hand on wrist extension with the hand facing upward as shown in Figures 6.3.2A and 6.3.2B.

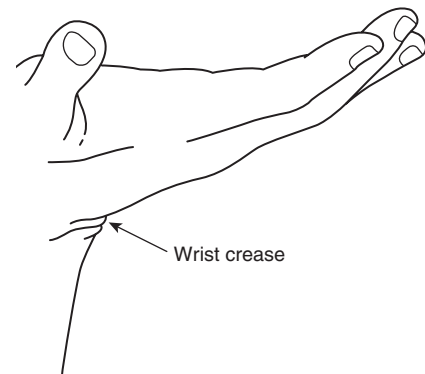


FIGURE 6.3.2(a) Locating Wrist Crease - Hand Turned Upward.

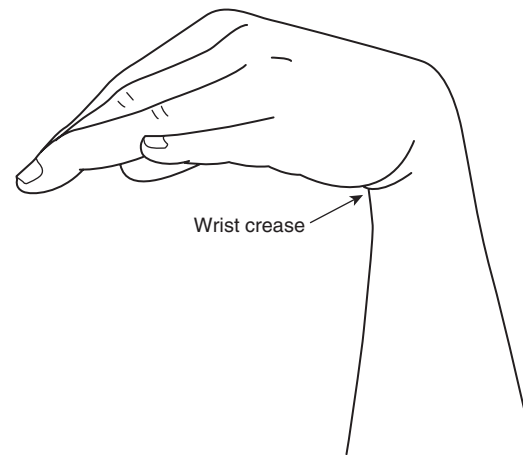


FIGURE 6.3.2(b) Locating Wrist Crease - Hand Turned Downward.

6.3.3 All thread used to manufacture protective work gloves shall be made of inherently flame-resistant fiber.

6.3.4 Protective Work Glove Sizing.

6.3.4.1 In order to label or otherwise indicate that a protective work glove complies with the requirements of this standard, the manufacturer shall provide work gloves in not less than five separate and distinct sizes.

6.3.4.2 The manufacturer shall provide the purchaser with the hand dimension ranges for protective work gloves specified in 6.3.4.4.

6.3.4.3 Additional protective work glove sizes outside the ranges specified in this section shall be permitted in addition to the required five sizes.

6.3.4.4 The protective work glove size indicated on the product label shall be determined by the hand dimensions given in Table 6.3.4.4.

Size	Hand Length mm	(in.)	Hand Circumference mm	(in.)
Extra small (XS) (Size 8)	165–175	(6.40–6.79)	165–205	(6.40–7.97)
Small (S) (size 9)	175–185	(6.79–7.19)	175–215	(6.79–8.37)
Medium (M) (size 10)	185–195	(7.19–7.58)	185–225	(7.19–8.76)
Large (L) (size 11)	195–205	(7.58–7.97)	195–235	(7.58–9.15)
Extra large (XL) (size 12)	205–215	(7.97–8.37)	205–245	(7.97–9.55)

ADD NEW SECTION 6.8 (replacing existing Section 6.8 to be renumbered 6.9) to read:

6.8 Protective Driving Glove Item Design Requirements.

6.8.1 Protective driving glove items shall have at least the applicable design requirements specified in this section where inspected by the certification organization as specified in Section 4.3.

6.8.2 Protective driving glove bodies shall be designed so they closely conform to the wrist or shall be adjustable at the wrist, and shall extend a minimum of 25 mm (1 in.) past the wrist crease. The location of the wrist crease shall be the distal crease formed by the gathered skin adjacent to the palm on wrist flexion with the hand facing downward; and the wrist crease shall be near the back of the hand on wrist extension with the hand facing upward as shown in Figures 6.8.2A and 6.8.2B.

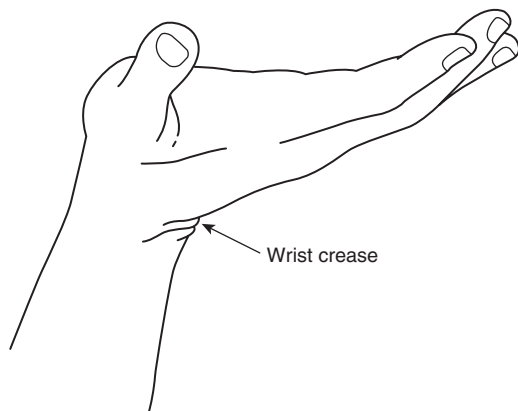


FIGURE 6.8.2(a) Locating Wrist Crease - Hand Turned Upward.

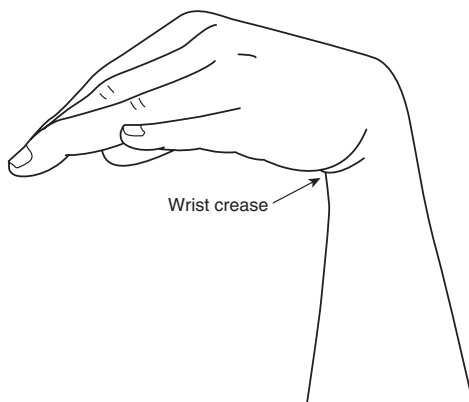


FIGURE 6.8.2(b) Locating Wrist Crease - Hand Turned Downward.

6.8.3 All thread used to manufacture protective driving gloves shall be made of inherently flame-resistant fiber.

6.8.4 Sizing.

6.8.4.1 In order to label or otherwise indicate that a protective driving glove complies with the requirements of this standard, the manufacturer shall provide driving gloves in not less than five separate and distinct sizes.

6.8.4.2 The manufacturer shall provide the purchaser with the hand dimension ranges specified in 6.8.4.4.

6.8.4.3 Additional protective driving glove sizes outside the ranges specified in this section shall be permitted in addition to the required five sizes.

6.8.4.4 The protective driving glove size indicated on the product label shall be determined by the hand dimensions given in Table 6.8.4.4.

See Table 6.8.4.4 on the next page

REVISE SECTION 7.3 TO READ:

7.3 Protective Work Glove Item Performance Requirements.

7.3.1 Protective work gloves shall be tested for heat resistance as specified in Section 8.4, Heat and Thermal Shrinkage Resistance Test, and shall not separate, melt, ignite, or drip, shall not shrink more than 10 percent in either direction after testing, shall be able to be donned, and shall be flexible.

7.3.2 Protective work gloves shall be tested for flame resistance as specified in Section 8.20, Protective Glove Flame Resistance Test, and shall not melt or drip, shall not have any afterflame of more than 2 seconds, shall not have any char length in excess of 100 mm (4 in.), and the consumed materials shall not exceed 50 percent of the specimen's original weight.

7.3.3 Protective work gloves shall be tested for resistance to conductive heat as specified in Section 8.21, Conductive Heat Resistance Test, and shall have a second-degree burn time of not less than 7 seconds, and the pain time shall not be less than 4 seconds.

7.3.4 Protective work gloves shall be tested for thermal protective performance (TPP) as specified in Section 8.22, Thermal Protective Performance Test, and shall have an average TPP of not less than 20.

7.3.5 Protective work gloves shall be tested for resistance to cutting as specified in Section 8.23, Cut Resistance Test, and shall have a distance of blade travel greater than 25 mm (1 in.).

7.3.6 Protective work gloves shall be tested for resistance to puncture as specified in Section 8.24, Puncture Resistance Test, and shall have a puncture force of not less than 40 N (8.8 lbf).

7.3.7 Protective work gloves shall be tested for dexterity as specified in Section 8.25, Dexterity Test, and shall have an average percent of bare-handed control not exceeding 200 percent.

7.3.8 Protective work gloves shall be tested for grip as specified in Section 8.26, Grip Test, and shall demonstrate a weight-pulling capacity of not less than 90 percent of the bare-handed control values.

Table 6.8.4.4 Ranges of Hand Dimensions to be Accommodated by Protective Driving Glove Sizes

Size	Hand Length		Hand Circumference	
	mm	(in.)	mm	(in.)
Extra small (XS) (Size 8)	165–175	(6.40–6.79)	165–205	(6.40–7.97)
Small (S) (size 9)	175–185	(6.79–7.19)	175–215	(6.79–8.37)
Medium (M) (size 10)	185–195	(7.19–7.58)	185–225	(7.19–8.76)
Large (L) (size 11)	195–205	(7.58–7.97)	195–235	(7.58–9.15)
Extra large (XL) (size 12)	205–215	(7.97–8.37)	205–245	(7.97–9.55)

7.3.9 All protective work glove product labels shall be tested for legibility as specified in Section 8.31, Label Durability and Legibility Test 1, and shall not be torn, shall remain in place, and shall be legible to the unaided eye.

7.3.10 All sewing thread utilized in the construction of protective work gloves shall be tested for resistance to melting as specified in Section 8.9, Thread Heat Resistance Test, and shall not ignite, melt, or char.

ADD NEW SECTION 7.8 (replacing existing Section 7.8 to be renumbered as 7.9) to read:

7.8 Protective Driving Gloves Item Performance Requirements.

7.8.1 Protective driving gloves shall be tested for heat resistance as specified in Section 8.4, Heat and Thermal Shrinkage Resistance Test, and shall not separate, melt, ignite, or drip, shall not shrink more than 10 percent in either direction after testing, shall be able to be donned, and shall be flexible.

7.8.2 Protective driving gloves shall be tested for flame resistance as specified in Section 8.20, Protective Glove Flame Resistance Test, and shall not melt or drip, shall not have any afterflame of more than 2 seconds, shall not have any char length in excess of 100 mm (4 in.), and the consumed materials shall not exceed 50 percent of the specimen’s original weight.

7.8.3 Protective driving gloves shall be tested for thermal protective performance (TPP) as specified in Section 8.22, Thermal Protective Performance Test, and shall have an average TPP of not less than 10.

7.8.4 Protective driving gloves shall be tested for resistance to cutting as specified in Section 8.23, Cut Resistance Test, and shall have a distance of blade travel greater than 25 mm (1 in.).

7.8.5 Protective driving gloves shall be tested for dexterity as specified in Section 8.25, Dexterity Test, and shall have an average percent of bare-handed control not exceeding 110 percent.

7.8.6 Protective driving gloves shall be tested for grip as specified in Section 8.26, Grip Test, and shall demonstrate a weight-pulling capacity of not less than 110 percent of the bare-handed control values.

7.8.7 All protective driving glove product labels shall be tested for legibility as specified in Section 8.31, Label Durability and Legibility Test 1, and shall not be torn, shall remain in place, and shall be legible to the unaided eye.

7.8.8 All sewing thread utilized in the construction of protective driving gloves shall be tested for resistance to melting as specified in Section 8.9, Thread Heat Resistance Test, and shall not ignite, melt, or char.

Substantiation: Add requirements for a protective driving glove for operators of apparatus during fire fighting operations.

Committee Meeting Action: Accept

1977-4 Log #CP3 FAE-WFF **Final Action: Accept**
(3.3 Various Definitions)

Submitter: Technical Committee on Wildland Fire Fighting Protective Clothing and Equipment,

Recommendation: REVISE SECTION 3.3, GENERAL DEFINITIONS, AS FOLLOWS:

Delete the following definitions:

- 3.3.1 Back Length.
- 3.3.2 Back Rise.
- 3.3.3 Bottom Circumference.
- 3.3.9 Chest Circumference.
- 3.3.12 Collar Length.

- 3.3.13 Collar Width.
- 3.3.17 Crown.
- 3.3.18 Crown Straps.
- 3.3.19 Cuff.
- 3.3.20 Cuff Circumference.
- 3.3.23 Eyelets.
- 3.3.24 Eyerow.
- 3.3.31 Front Length.
- 3.3.32 Front Rise.
- 3.3.33 Front Waist Pocket(s).
- 3.3.42 Helmet Shell.
- 3.3.44 Inseam Length.
- 3.3.48 Knee Circumference.
- 3.3.49 Liner.
- 3.3.55 Nape Device.
- 3.3.56 Neck Circumference.
- 3.3.77 Seat Circumference.
- 3.3.79 Sewn Seam Strength.
- 3.3.81 Shell.
- 3.3.84 Sleeve Length.
- 3.3.89 Thigh Circumference.
- 3.3.90 Throat.
- 3.3.91 Top Line.
- 3.3.95 Vertical Circumference.
- 3.3.96 Waist Circumference.
- 3.3.97 Wear Surface.

Revise the following definitions: (Numbers shown correspond with the 2005 edition of NFPA 1977. Following the revisions to Section 3.3, all definitions will have to be renumbered including the associated annex items.)

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

3.3.5 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 of on the methods the manufacturer uses to determine continued compliance of labeled and listed products with the requirements of this standard.

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

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

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

Delete annex A.3.3.15

3.3.22 Ease. The size requirements and tolerance of garments that allows good fit and does not inhibit the natural body movements or the performance of job-related tasks.

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

3.3.28 Follow-Up Program. The sampling, inspections, tests, or other measures conducted by a 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 the this standard.

3.3.36 Goggle Clip. The component of the helmet that retains the strap of the goggles or headlamp.

3.3.37* Goggles. See 3.3.106, Wildland Fire Fighting Protective Goggles.

3.3.37 See ANSI Standard Z87.1 for guidance on eye and face protection.

3.3.50 Lining. Any material that is permanently attached and used to cover or partially cover the inside surface area of a protective garment.

3.3.51 Load Carrying Protective Equipment. See 3.3.109, Wildland Fire

Fighting Protective Load Carrying Equipment.

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

3.3.54 Melt. A response to heat by a material resulting in evidence of flowing or dripping, causing a change from solid to liquid, or become consumed.

3.3.55 Nape Device. A component used to aid in helmet retention, located below the Bitragon Inion Arc used to aid in helmet retention.

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

A.3.3.59 The product label is not the certification organization's label, symbol, or identifying mark; however, the certification organization's label, symbol, or identifying mark is attached to or part of the product label.

3.3.73 Radiant Protective Performance (RPP). A numerical value indicating the resistance of materials to a radiant heat exposure. The resistance of a material to radiant heat, measured in seconds, when exposed to a vertically-oriented radiant heat source, positioned at a specific horizontal distance from the vertical placement of the protective material, sufficient to cause a second-degree burn to human tissue.

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

3.3.75 Sample. (1) The ensemble, element, item, or component, or composite that is conditioned for testing. (See also definition of Specimen.) (2) Ensembles, elements, items, or components that are randomly selected from the manufacturer's production line, from the manufacturer's inventory, or from the open market.

3.3.76 Seams.

3.3.76.1 Seam Assembly. The structure obtained when fabrics materials are joined by means of a seam.

3.3.76.2* Seams; Major (Major). Those Seam assemblies where rupture exposes the wearer to immediate danger.

3.3.76.3* Seams; Minor (Minor). Those Seam assembly constructions where rupture does not expose the wearer to immediate danger. Remaining seam assemblies that are not classified as Major, Major A, or Major B seams.

3.3.78 Separate/Separation. A material response evidenced by splitting or delaminating.

3.3.85 Specimen. The conditioned ensemble, element, item, or component that is tested. Specimens are taken from samples. (See also definition of Sample).

3.3.88 Thermal Protective Performance (TPP). A numerical value indicating the resistance of materials to a convective and radiant heat exposure.

3.3.92 Trim. See definition for Visibility Markings. Material attached to the exterior surface of protective clothing or equipment to enhance visibility. Retroreflective materials enhance night time visibility, and fluorescent materials enhance daytime visibility.

3.3.99 Wildland Fire Fighting Chain Saw Protectors. The items of protective equipment that provide protection to the legs, or to the lower torso and legs, excluding the ankles and feet.

Revise 3.3.104 to read: Wildland Fire Fighting Protective Work Gloves.

The items of protective clothing that provide protection to the hands and wrists while directly engaged in wildland fire fighting operations.

3.3.109 Wildland Fire Fighting Load Carrying Equipment. The item of protective equipment that is worn by the wildland fire fighter to facilitate the carrying of gear.

3.3.106* Wildland Fire Fighting Protective Goggles. The items of protective equipment that provide protection to the eyes and a portion of the face.

A.3.3.106 See ANSI Standard Z87.1 for specific requirements for eye and face protection. Goggles could be a stand-alone item of protective clothing or equipment.

3.3.112 Wildland Fire Fighting Protective Trousers. The A protective garment items that provide protection to the lower torso and legs, excluding the feet.

ADD THE FOLLOWING NEW DEFINITIONS: (Following the revisions and additions to Section 3.3, all definitions will have to be renumbered including any associated annex items.)

Add new 3.3.XX to read: Visibility Markings. Retroreflective and fluorescent conspicuity enhancements. Retroreflective enhancements improve night time conspicuity, and fluorescent enhancements improve day time conspicuity.

Add new 3.3.XX to read: Wildland Fire Fighting Protective Driving Gloves. The items of protective clothing that provide protection to the hands and wrists, and dexterity and grip to the hands that is critical to operating fire fighting vehicles and special equipment during wildland fire fighting operations. (renumber existing 3.3.102 through 3.3.112).

Add new 3.3.XX to read: Winter Liner. An optional component layer that provides added insulation against cold.

Throughout the document, change "cold weather liner" to read to "winter liner."

(see 7.1.7.1 and A.3.3.76.3)

Substantiation: Revise definitions to eliminate requirements contained in definitions, clarify other definitions, and add new definitions to the standard complement.

Committee Meeting Action: Accept

1977-5 Log #4 FAE-WFF
(5.9, 6.10, 7.9, 8.38 (New))

Final Action: Reject

NOTE:This proposal appeared as Comment 1977-29 (Log #174) which was held from the F04 ROC on Proposal 1977-1.

Submitter: Jeffrey O. Stull, International Personnel Protection, Inc.

Recommendation: Add labeling/information, design, and performance requirements for Wildland Protective Air-Purifying Respirators as follows:

5.9 Air-Purifying Respirator.

5.9.1 Product Labeling Requirements.

5.9.1.1 Each air-purifying respirator shall have a product label or labels permanently and conspicuously attached. At least one product label shall be conspicuously located on each air-purifying respirator when the air-purifying respirator is properly assembled with all components in place.

5.9.1.2 Configuration of the product label and attachment of the product label shall not interfere with the legibility of any printed portion of the product label.

5.9.1.3 Multiple label pieces shall be permitted in order to carry all statements and information required to be on the product label.

5.9.1.4* 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.

5.9.1.5 All worded portions of the require product label shall be printed at least in English.

5.9.1.6 Symbols and other pictorial graphic representation shall be permitted to be used to supplement worded statements on the product label(s).

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

"THIS WILDLAND FIRE FIGHTING AIR-PURIFYING RESPIRATOR MEETS THE AIR-PURIFYING RESPIRATOR REQUIREMENTS OF NFPA 1977, STANDARD ON PROTECTIVE CLOTHING AND EQUIPMENT FOR WILDLAND FIRE FIGHTING, 2005 EDITION."

5.9.1.8 At least the following information shall also be printed legibly on the product label with all letters at least 2 mm (1/16 in.) high:

(a) Manufacturer's name, identification, or designation

(b) Manufacturer's address

(c) Country of manufacture

(d) Manufacturer's shroud identification number, lot number, or serial number

(e) Month and year of manufacture (not coded)

(f) Model or style name, number, or design

(g) Size

(h) Cleaning precautions

(i) The following statement: "DO NOT REMOVE THIS LABEL"

5.9.2 User Information.

5.9.2.1 the air-purifying respirator manufacturer shall provide at least the user information that is specified in 5.9.2.4 with each air-purifying respirator.

5.9.2.2 The air-purifying respirator manufacturer shall attach the required user information, or packaging containing the user information, to the shroud in such a manner that it is not possible to use the air-purifying respirator without being aware of the availability of the information.

5.9.2.3 The required user information, or packaging containing the user information, shall be attached to the air-purifying respirator so that a deliberate action is necessary to remove it. The air-purifying respirator manufacturer shall provide notice that the user information is to be removed ONLY by the end user.

5.9.2.4 The air-purifying respirator manufacturer shall provide at least the following instructions and information with each air-purifying respirator.

(a) Pre-use information

1. Safety considerations

2. Limitations of use.

3. Shroud marking recommendations and restrictions

4. A statement that most performance properties of the chain saw leg protector cannot be tested by the user in the field.

5. Warranty information

(b) Preparation for use

1. Sizing/adjustment

2. Recommended storage practices

(c) Inspection frequency and details

(d) Don/doff

1. Donning and doffing procedures

2. Sizing and adjustment procedures

3. Interface issues

(e) Proper use consistent with NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, and Title 29, Code of Federal Regulations, Part 1910.132, "Personal Protective Equipment"

(f) Maintenance and cleaning

1. Cleaning instructions and precautions with a statement advising users not to use chainsaw leg protectors that are not thoroughly cleaned and dried

2. Maintenance criteria ad methods of repair where applicable

3. Decontamination procedures

(g) Retirement and disposal criteria and considerations

6.10 Air-Purifying Respirator Design Requirements.

6.10.1 Air-Purifying respirators shall be NIOSH certified to the requirements

for air-purifying respirators contained in 42 CFR Part 84.

6.10.2 The air-purifying respirators shall be equipped with canisters or cartridges rated for the removal of carbon monoxide and particulates with a minimum rated service life of 8 hours.

6.10.3 Air-purifying respirators shall be equipped with an end-service indicator meeting the requirements of 42 CFR Part 84 for air-purifying respirators.

7.9 Air-Purifying respirator performance Requirements.

7.9.1 Air-purifying respirators shall be tested for heat resistance as specified in Section 8.38, Respirator Heat Resistance Test, and shall not separate, melt, drip, or ignite.

7.9.2 Any textile material used in the construction of the air-purifying respirator shall be tested for flame resistance as specified in Section 8.3, Flame Resistance Test One, and shall not be totally consumed, shall not have an afterflame time of more than 2 seconds, and shall not melt or drip.

8.38 Respirator heat Resistance Test.

8.38.1 Application. This test method shall apply to the air-purifying respirators.

8.38.2 Specimens. Heat resistance testing shall be conducted on at least three specimens. Specimens shall consist of all components in placed for the air-purifying respirator arranged in the order and orientation as worn.

8.38.3 Sample Preparation. Specimens to be tested shall be conditioned as specified in 8.1.1.

8.38.4 apparatus.

8.38.4.1 The test oven shall be a horizontal flow circulating oven with minimum interior dimensions such that the specimen shall be at least 51 mm (2.0 in) room any interior oven surface.

8.38.4.2 The test oven shall have an airflow rate of 38 m/min to 76 m/min (125 ft/min to 250 ft/min at the standard temperature and pressure of 21°C (70°F) at 1 atmosphere, measured at the center point of the oven.

8.38.4.3 A test thermocouple shall be positioned so that it is level with the horizontal centerline of a mounted sample specimen. The thermocouple shall be equidistant between the vertical centerline of a mounted specimen placed in the middle of the oven and the oven wall where the air flow enter the test chamber. The thermocouple shall be an exposed bead, Type J or K, No. 30 AWG thermocouple. The test oven shall be heated and the test thermocouple stabilized at 260°C +6/-0°C (500°F, +10/-0°F) for a period of not less than 30 minutes.

8.38.5 Procedure.

8.38.5.1 Sample air-purifying respirators shall be mounted in accordance with the on a room temperature nonconductive headform in the “as worn” position. The headform with air-purifying respirator shall be placed in the center of the test oven with the centerline of the front of the helmet facing the air flow.

8.38.5.2 The oven door shall not remain open more than 15 seconds. The air circulation shall be shut off while the door is open and turned on when the door is closed. The total oven recovery time after door is closed shall not exceed 30 seconds.

8.38.5.3 The specimen, mounted as specified, shall be exposed in the test oven for 5 minutes, +0.15/-0 min. The test exposure time shall begin when test thermocouple recovers to a temperature of 260°C, +6/-0°C (500°F, +10/-0°F).

8.38.5.4 Immediately after the specified exposure, the specimen shall be removed and examined for evidence of ignition, melting, dripping, or separation.

8.38.5.5 After the specified exposure, the specimen shall also be measured to determine pass/fail.

8.38.6 Report. Observations of ignition, melting, dripping, or separation shall be reported for each specimen.

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

Substantiation: I do not agree on the committee's handling of Proposal Log #22. Despite the development of respiratory performance criteria being outside the scope of the committee, the industry continues to be plagued by the offering or products with erroneous, ill-founded, and dangerous claims for firefighter respiratory protection during wildland fires. The refusal of the Technical Committee on Respiratory Protective Equipment to deal with this issue is not justification to ignore this protection need. Specific labeling, design and performance criteria are proposed for air-purifying respirators meeting NIOSH requirements and additional criteria appropriate for wildland fire fighting.

Committee Meeting Action: Reject

Committee Statement: The Standards Council has assigned wildland fire fighting respirators to the Technical Committee on Respiratory Protection Equipment.

1977-6 Log #3 FAE-WFF **Final Action: Accept in Principle (Chapter 6)**

TCC Action: The TCC directs the TC to reinstate paragraph 6.1.16 (action on Log #3) and also provide annex text regarding compliance with ANSI 107 and federal regulations.

The TCC directs the TC to amend text in 6.1.16, 7.1.12, and 7.1.13 to use the term “visibility markings” in place of “trim.”

NOTE: This proposal appeared as Comment 1977-30 (Log #43d) which was held from the F04 ROC on Proposal 1977-2.

Submitter: Technical Correlating Committee on Fire and Emergency Services Protective Clothing and Equipment,

Recommendation: In Chapter 6, the TCC endorses the approach to have visibility enhancement as an option and to have the visibility enhancement based on overall garment performance requirements. The TCC directs the TC consider adopting part or all of the visibility enhancement proposed in 6.1.18 of the ROP for NFPA 1951 into NFPA 1977 and to resolve the definitions, labeling, design, performance and testing issues regarding visibility enhancement.

Substantiation: The TCC is highlighting this proposed change to gather public input during the Public Comment period and to remind the TC to fully address visibility enhancement items throughout the document.

Committee Meeting Action: Accept in Principle

1. Delete 6.1.16 (2005 edition).

2. Add new 1.1.8 to read:

1.1.8* This standard shall not specify requirements for any visibility markings.

3. Add new A.1.1.8 to read:

Because this standard does not specify or establish requirements for visibility enhancement, the authority having jurisdiction should conduct a risk assessment and determine the level of visibility required for wildland fire fighting protective clothing based on the anticipated use of such garments during these incidents. Where the authority having jurisdiction anticipates visibility hazards, such as darkness, obscuration (smoke, fog, dust), and proximity to traffic, moving machinery, or heavy equipment operation, the authority having jurisdiction should be aware of various types of visibility markings. In the case of personnel operating in proximity to traffic, moving machinery, or heavy equipment in operation the authority having jurisdiction needs to understand that special high visibility markings are required by U.S. Federal Regulation 29CFR 634 that requires compliance with ANSI/ISEA 107, American National Standard for High Visibility Safety Apparel and Headwear, are the type of garments that should be used.

Committee Statement: The Committee has followed the approach taken by NFPA 1951 and has proposed the text for the scope statement and Annex text. This is a complicated issue with conflicting regulations and standards, and will be resolved by FHWA, the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), and ANSI/ISEA 107 and ANSI/ISEA 207.

1977-7 Log #CP5 FAE-WFF **Final Action: Accept (Chapter 6)**

TCC Action: The TCC directs the TC to re-evaluate the sizing requirements for garments contained in Chapter 6 to permit design flexibility for manufactures to meet user needs. The current level of garment sizing specificity is felt to be design restrictive.

Submitter: Technical Committee on Wildland Fire Fighting Protective Clothing and Equipment,

Recommendation:

REVISE SECTION 6.1 AS FOLLOWS:

Chapter 6 Design Requirements

6.1 Protective Garment Item Design Requirements.

6.1.1 Garment items shall have at least the applicable design requirements specified in this section where inspected by the certification organization as specified in Section 4.3.

6.1.2 All collars on jackets, shirts, and one-piece garments shall remain upright after extension into a vertical position.

6.1.3 Jackets, shirts, and one-piece garments shall not have turn-up cuffs. Sleeve cuffs shall have a closure system that can be adjusted to provide a snug and secure fit around the wrist while wearing a glove that is compliant with the glove requirements of this standard.

6.1.4 Where provided, all pockets that open to the exterior of garments, other than front waist pockets, shall have a cover or closure system. Front waist pockets are slanted or side seam opening pockets that open to the exterior, located at or near the front waist of a garment.

6.1.5 Any pass-through openings in garments shall have a means of fastening them in a closed position.

6.1.6 Bottoms of upper torso garments, other than cold weather outerwear, shall be designed so that the bottom edge conforms to the respective front and back lengths specified in Table 6.1.17.3(a). No portion of the bottom garment edge shall be less than the respective minimum front and back length measurement. This requirement shall not apply to cold weather outerwear.

6.1.6.1 With an upper torso garment, other than cold weather outerwear, prepared as specified in 6.1.17.7, a line shall be formed between the two lowest points on the garment bottom edge. Minimum front and back lengths shall extend to that line as a minimum.

6.1.7 All snaps shall meet the requirements of MS 27980F, *Fasteners, Snap, Style 2, of Fasteners, Snap*, MIL-F-10884G.

6.1.8 Fastener tape shall meet the requirements of A-A-55126, *Fastener Tapes, Hook and Pile, Synthetic*.

6.1.9 Zippers shall meet the requirements of V-F-106F, *Fasteners, Slide, Interlocking*.

6.1.10 All thread used to manufacture garments shall be made of inherently flame-resistant fiber.

6.1.11 All garments that encompass the neck area shall have a closure system at the neckline.

6.1.12 All closure systems shall not come into direct contact with the body.

6.1.13 Hardware of any garment shall not come into direct contact with the wearer's body.

6.1.14 All garment hardware finish shall be free of rough spots, burrs, or sharp edges.

6.1.15 One-piece garment torso closure systems shall extend from the top of crotch area to top of garment at the neck.

6.1.16 Where visibility enhancements are used on garments, the visibility enhancements shall be distributed over the exterior of the garment to provide 360-degree visibility of the wearer.

6.1.17 Size Requirements.

6.1.17.1 The requirements of 6.1.17.3 through 6.1.17.8 shall not apply to cold weather outerwear.

6.1.17.2 Cold weather outerwear shall be provided in a minimum of five distinct sizes ranging from chest size 39 through 59 and sleeve length of 775 mm (30 in.) to 900 mm (35 in.).

6.1.17.3 Manufacturers shall produce garments in accordance with the minimum sizing requirements indicated in Table 6.1.17.3(a), Table 6.1.17.3(b), Table 6.1.17.3(c), and Table 6.1.17.3(d).

See Tables 6.1.17.3(a), 6.1.17.3(b) and 6.1.17.3(c) on pages

6.1.17.4 Size requirements for tall sizes for upper torso measurements as specified in Table 6.1.17.3(a) and Table 6.1.17.3(d) shall have an additional 25 mm (1 in.) added to the sleeve length dimension and an additional 38 mm (1½ in.) added to the front and back length dimensions.

6.1.17.5 Garments shall be permitted for sizes midway between those specified, provided that they meet dimensional requirements that are midway between the respective values for corresponding even sizes specified in Table 6.1.17.3(a), Table 6.1.17.3(b), Table 6.1.17.3(c), and Table 6.1.17.3(d).

6.1.17.6 Garments shall be permitted to be custom made, provided that the individual is measured for all dimensions cited in the sizing tables and that the garment provides the minimum ease specified in Table 6.1.17.6.

6.1.17.7 Garments shall be closed, laid flat, smoothed, and gently stretched when measured as defined in Section 3.3 and as specified in Section 6.1 and in Figure 6.1.17.7(a), Figure 6.1.17.7(b), and Figure 6.1.17.7(c).

(CHANGE TO DRAWING: Delete "A" - (not shown)
Change letters A to I as follows: A = B, B = C, C = D, D = E, E = F, F = G, G = H, H = I

FIGURE 6.1.17.7(a) Upper Torso Measurements [to be used with Table 6.1.17.3(a)].

See Figure and Table 6.1.17.3(a) on page 11

FIGURE 6.1.17.7(b) Lower Torso Measurements [to be used with Table 6.1.17.3(b) and Table 6.1.17.3(c)].

See Table 6.1.17.3(b) on page 12

FIGURE 6.1.17.3(c) One-Piece Garment Torso Measurements [to be used with Table 6.1.17.3(c)].

See Table 6.1.17.3(c) on page 13

See Figure 6.1.17.3(c) on page 14

6.1.17.8 The minimum seam allowance for all major seams shall be at least 10 mm (3/8 in.), and all minor seams shall be at least 6 mm (¼ in.).

Substantiation: Revise Section 6.1 to modify sizing to accommodate a broader number of wildland fire fighters.

Committee Meeting Action: Accept

1977-8 Log #CP6 FAE-WFF **Final Action: Accept**
(6.4.4.1, 6.5.5.1, 6.5.5.2, 8.14.5.3, 8.21.3.1, 8.23.8.2 and 8.24.8.1)

Submitter: Technical Committee on Wildland Fire Fighting Protective Clothing and Equipment.

Recommendation: Revise 6.4.4.1 to read: "6.4.4.1 The height shall be determined by measuring inside the boot from the center of the insole at the heel up to a perpendicular reference line extending across the width of the boot at the lowest point of the top line. The top line shall be the uppermost edge of the protective footwear that includes the quarter, collar, and shaft, but excluding the tongue and gusset.

Revise 6.5.5.1 to read: "The shroud face opening shall not exceed 170 mm (6 ¾ in.) when measured horizontally along the reference plane."

Revise 6.5.5.2 to read: "The bottom of the shroud face opening shall not be less 35 mm (1 3/8 in.) and shall not exceed 50 mm (2 in.) when measured downward from the reference plane at the front midsagittal plane."

Revise 8.14.5.3 to read: "8.14.5.3 With the specimen mounted in the support assembly, the burner shall be moved so that the flame contacts the specimen at a distance of 38 mm (1½ in.) at the angles in the areas shown in Figure 8.14.5.3. Where there are other materials that were not exposed to the burner flame in the five test sites specified in 8.14.5.3, those materials shall be exposed to the burner flame and the provisions of 8.14.5.5, 8.14.5.6, 8.14.5.7, and 8.14.5.8 shall apply.

Revise 8.21.3.1 to read: "8.21.3.1 Specimens shall be tested both before and after being subjected to five laundering cycles as specified in 8.1.2."

Revise 8.23.8.2 to read: "8.23.8.2 Specimens shall be taken from the parts of the footwear upper that provides uniform thickness, and shall not include seams or gusset."

Revise 8.24.8.1 to read: "8.24.8.1 Specimens shall consist of each composite of footwear item used in the actual footwear construction, with the layers arranged in proper order. Specimens shall be taken from the thinnest portion of the footwear upper, excluding gusset."

Substantiation: Revise paragraphs for specificity of requirements to reduce different interpretations.

Committee Meeting Action: Accept

1977-9 Log #1 FAE-WFF **Final Action: Reject**
(Chapter 8)

TCC Action: The TCC directs the TC to revise Chapter 8 to properly identify "samples" and "specimens" throughout the chapter.
NOTE: This proposal appeared as Comment 1977-100 (Log #1) which was held from the F04 ROC on Proposal 1977-2.

Submitter: Daniel J. Gohlke, W.L. Gore & Assoc., Inc.

Recommendation: Reorganize paragraphs on Sample Preparation into the following format.

- X.X.2 Sample Preparation
 - X.X.2.1 What is the sample
 - X.X.2.2 How is it conditioned
 - X.X.2.3 Other information
- X.X.3 Specimens
 - X.X.3.1 What is the specimen
 - X.X.3.2 How many are tested
 - X.X.3.3 Other information

Substantiation: This revision will provide clarity completeness, and consistency in addressing these topics. I am sure you will find, if you undertake this revision. That in many cases this information is presented in an inconsistent and incomplete fashion, leading to variation in understanding what is expected.

Committee Meeting Action: Reject

Committee Statement: The submitter did not give enough information about the variations of what is necessary for samples and specimens to be properly and consistently treated.

Table 6.1.17.3(a) Minimum Sizing Requirements for Protective Upper Torso Garments (in.)

Dimension Measured*	Garment Size						Amount Of Change [†]
	XS	S	M	L	XL	2XL	
Neck Circumference (A)	13–13½	14–14½	15–15½	16–16½	17–17½	18–18½	1
Collar length (B)	14¾	15¾	16¾	17¾	18¾	19¾	1
Collar width (C)	3	3	3	3	3	3	0
Front length (D)	24¾	25¾	26¾	27¾	28¾	29¾	1
Back length (E)	28	29	30	31	32	33	1
Sleeve length (F)	30½	31½	32½	33½	34½	35½	1
Sleeve Cuff Circumference (G)	12½	13	13½	14	14½	15	½
Chest Circumference (H)	39	43	47	51	55	59	4
Waist Circumference (I)	33	37	41	45	49	53	4
Bottom Circumference (J)	38	42	46	50	54	58	4

Note: To convert measurements to millimeters, multiply by 25.4.

*Letters in parentheses refer to Figure 6.1.17.7(a).

[†]The amount of change between two consecutive garment sizes for the dimension measured.

Measurement Details:

A - **Neck Circumference.** Upper torso measurement from folded edge to folded edge at the midpoint of the collar width with the garment front closure closed at the top and the top edges of the collar in horizontal alignment, and multiplied by 2 to obtain the circumference.

B - **Collar Length.** Upper torso garment measurement along top of collar from point-to-point.

C - **Collar Width.** Upper torso garment measurement at center back from top edge of unfolded collar to the bottom collar seam.

D - **Front Length.** Upper torso garment measurement from bottom collar seam to the bottom edge of the garment at front edge.

E - **Back Length.** Upper torso garment measurement at center back from bottom of collar to bottom edge of garment.

F - **Sleeve Length.** Upper torso garment measurement from center back at bottom of collar seam diagonally across back and down sleeve to bottom edge of cuff. In other specified instances, it is a measurement from center sleeve setting seam at shoulder to bottom edge of sleeve.

G - **Sleeve Cuff Circumference.** Measurement of shirt cuff at the end of the sleeve from folded edge to folded edge, and multiplied by 2 to obtain circumference.

H - **Chest Circumference.** Measurement of upper torso garment from folded edge to folded edge, at base of armholes, and multiplied by 2 to obtain circumference.

I - **Waist Circumference.** A garment measurement from top edge of waistband from folded edge to folded edge, and multiplied by 2 to obtain circumference.

J - **Bottom Circumference.** Measurement of upper or lower torso garment along bottom edge of the garment from folded edge to folded edge, and multiplied by 2 to obtain circumference.

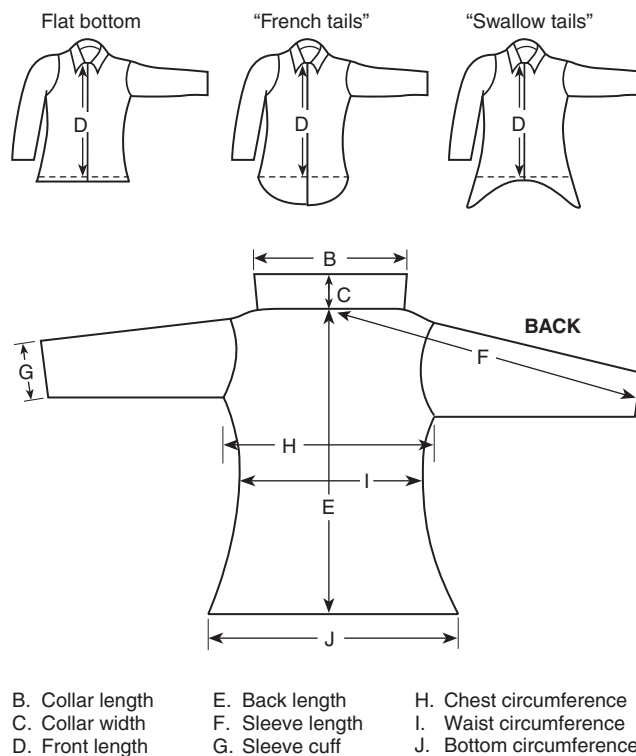


Figure 6.1.17.7(a) Upper Torso Measurements [to be used with Table 6.1.17.3(a)]

CHANGE TO DRAWING: Delete “A” – (not shown)
 Change letters A to I as follows: A = B, B = C, C = D, D = E, E = F, F = G, G = H, H = I

Table 6.1.17.3(b) Minimum Sizing Requirements for Men's Lower Torso Protective Garments (in.)
Garment Size

Dimension Measured*	26	28	30	32	34	36	38	40	Amount of Change [†]
Waist circumference (A)	26	28	30	32	34	36	38	40	2
Seat circumference (B)	37	39	41	43	45	47	49	51	2
Thigh circumference (C)	25	26	27	28	29	30	31	32	1
Knee circumference (D)	17½	18¼	19	19¾	20½	21¼	22	22¾	¾
Leg Cuff circumference (E)	15 1/2	16	16½	17	17½	18	18½	19	½
Front rise circumference (F)	9 7/8	10 3/16	10 1/2	10 3/16	11 1/8	11 7/16	11 3/4	12	5/16
Back rise(G)	15 3/8	15 11/16	16	16 5/16	16 5/8	16 15/16	17 3/4	17 9/16	5/16
Inseam length (H)	Cut to order or provided in 1 in. increments between 28 and 36 in.								

Note: To convert measurements to millimeters, multiply by 25.4.

*Letters in parentheses refer to Figure 6.1.17.7(b).

[†]The amount of change between two consecutive garment sizes for the dimension measured

A - **Waist Circumference.** A garment measurement from top edge of waistband from folded edge to folded edge, and multiplied by 2 to obtain circumference.

B - **Seat Circumference.** Lower torso measurement from 25 mm (1 in.) above bottom of fly curve from folded edge to folded edge, multiplied by 2 to obtain circumference.

C - **Thigh Circumference.** Lower torso garment measurement at crotch line from folded edge to folded edge, and multiplied by 2 to obtain circumference.

D - **Knee Circumference.** Lower torso garment measurement 355 mm (14 in.) below crotch seam, from folded edge to folded edge, and multiplied by 2 to obtain circumference.

E - **Leg Cuff Circumference.** Measurement of pant leg cuff along bottom of opening from folded edge to folded edge, and multiplied by 2 to obtain circumference.

F - **Front Rise.** Lower torso garment measurement from crotch seam to top of waistband at front center.

G - **Back Rise.** Lower torso garment measurement from crotch seam to top of waistband at back center.

H - **Inseam Length.** Lower torso garment measurement along inseam from crotch seam to bottom edge of cuff.

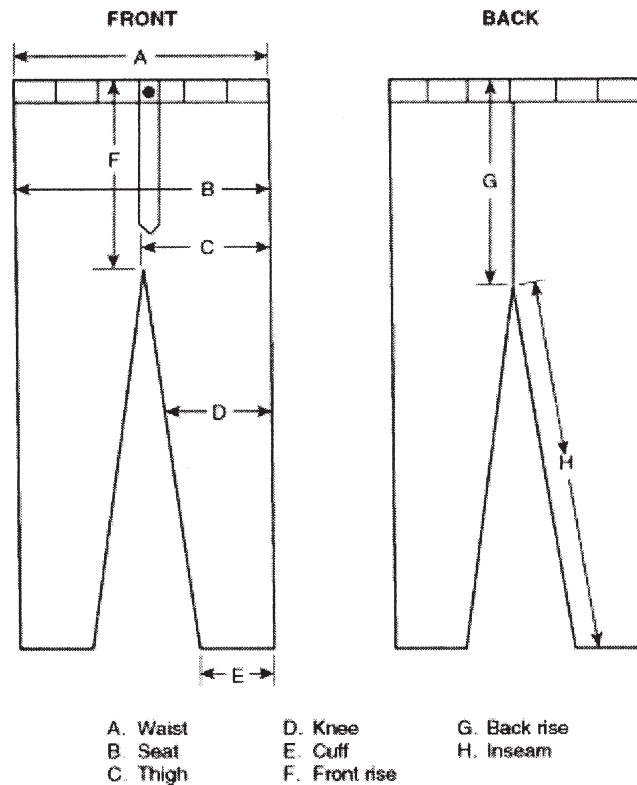


Figure 6.1.17.7(b) Lower Torso Measurements [to be used with Table 6.1.17.3(b)]
[Existing: CHANGE only: E. Sleeve Cuff, J. Leg Cuff]

Table 6.1.17.3(c) Minimum Sizing Requirements for Women's Lower Torso Protective Garments (in.)

Dimension Measured*	23	25	27	29	31	33	35	37	Amount of Change [†]
Waist circumference (A)	23	25	27	29	31	33	35	37	2
Seat circumference (B)	37	39	41	43	45	47	49	51	2
Thigh circumference (C)	25	26	27	28	29	30	31	32	1
Knee circumference (D)	17½	18¼	19	19¾	20½	21¼	22	22¾	¾
Leg Cuff circumference (E)	17½	18	18½	19	19½	20	20½	21	½
Front rise circumference (F)	11-1/8	11-7/16	11¾	12-1/6	12-3/8	12-11/16	13	13-5/16	5/16
Back rise (G)	16-11/16	17	17-5/16	17-5/8	17-15/16	18¼	18-9/16	18-7/8	5/16
Inseam length (H)	Cut to order or provided in 1 in. increments between 28 and 36 in.								

Note: To convert measurements to millimeters, multiply by 25.4.

*Letters in parentheses refer to Figure 6.1.17.7(b).

[†]The amount of change between two consecutive garment sizes for the dimension measured.

A - **Waist Circumference.** A garment measurement from top edge of waistband from folded edge to folded edge, and multiplied by 2 to obtain circumference.

B - **Seat Circumference.** Lower torso measurement from 25 mm (1 in.) above bottom of fly curve from folded edge to folded edge, and multiplied by 2 to obtain circumference.

C - **Thigh Circumference.** Lower torso garment measurement at crotch line from folded edge to folded edge, and multiplied by 2 to obtain circumference.

D - **Knee Circumference.** Lower torso garment measurement 355 mm (14 in.) below crotch seam, from folded edge to folded edge, and multiplied by 2 to obtain circumference.

E - **Leg Cuff Circumference.** Measurement of pant leg cuff along bottom of opening from folded edge to folded edge, and multiplied by 2 to obtain circumference.

F - **Front Rise.** Lower torso garment measurement from crotch seam to top of waistband at front center.

G - **Back Rise.** Lower torso garment measurement from crotch seam to top of waistband at back center.

H - **Inseam Length.** Lower torso garment measurement along inseam from crotch seam to bottom edge of cuff.

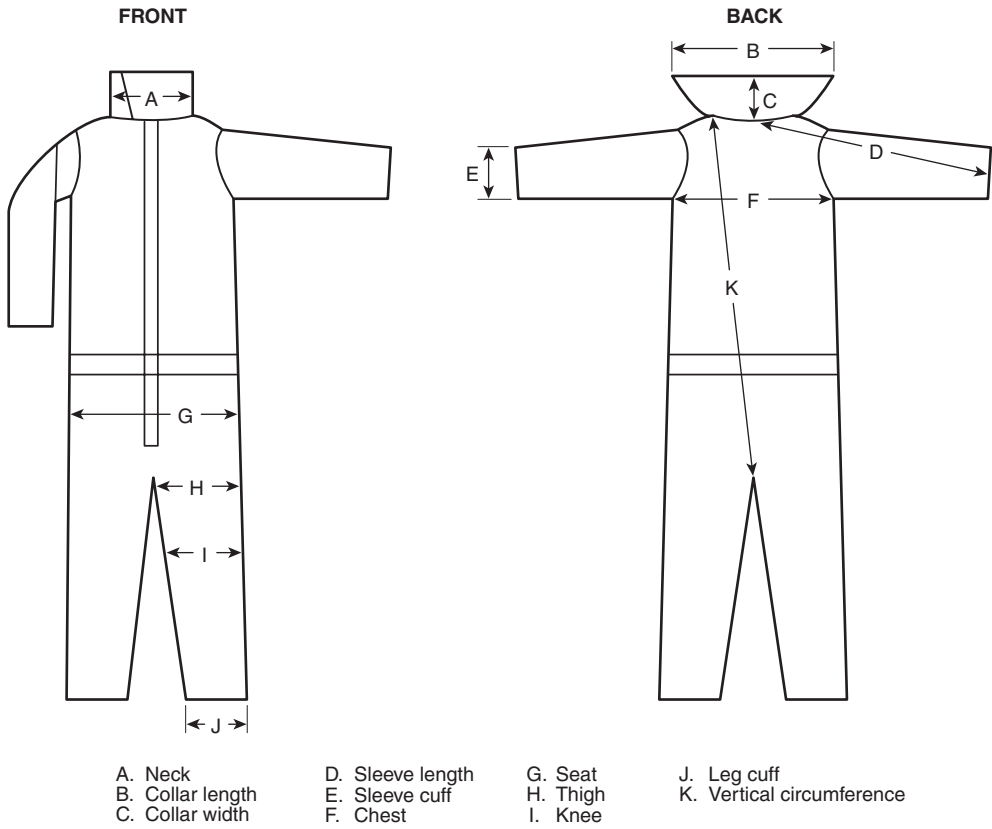


Figure 6.1.17.7(c) One-Piece Garment Torso Measurements [to be used with Table 6.1.17.3(c)]

1977-10 Log #2 FAE-WFF
(8.4.11.3)

Final Action: Reject

TCC Action: The TCC directs the TC to apply heat resistant requirements for the entire helmet.

The TCC directs the TC to provide substantiation, at least in the form of annex text, which justifies the use of different test temperatures for heat resistance evaluations of different wildland fire fighting protective clothing items.

NOTE: This proposal appeared as Comment 1977-119 (Log #11) which was held from the F04 ROC on Proposal 1977-1.

Submitter: Thomas H. Stachler, Morning Pride Manufacturing/Total Fire Group

Recommendation: Revise text to read as follows:

8.4.11.3 A liner, ear flaps, or a similar device shall be deployed to protect the suspension, if necessary. (Delete paragraph 8.4.1.3; renumber subsequent paragraphs in 8.4.11)

Substantiation: Helmets are only tested for heat resistance at a temperature of 177°C (350°F). All materials exposed to oven temperatures should be able to sustain this temperature without adverse effects.

Committee Meeting Action: Reject

Committee Statement: The performance requirement applies to the brim or peak of the helmet shell. In the text method in Section 8.4, paragraph 8.4.11.3 allows the testing lab to protect the suspension system, as it is not being tested, and could affect the evaluation of the required performance if the suspension was compromised. The test method provides for consistent testing of helmets.

1977-11 Log #5 FAE-WFF
(8.23.7.3)

Final Action: Accept

Submitter: Leslie Anderson, US Department of Agriculture

Recommendation: Modify paragraph 8.23.7.3 to read as follows:

8.23.7.3 Cut resistance shall be performed under a load of 100 g (3.5 ounces).

Substantiation: The NFPA 1977 Technical committee endorsed the change in the test methods to satisfy standardized testing protocols as requested by the Technical Correlating Committee. Subsequent examination of the standard has raised safety concerns. Gloves that meet the cut resistance standard could lead to reduced hand function and increased hand fatigue, both of which could lead to loss of control of hand tools or chain saws. Loss of control of these tools could lead to serious injury.

Committee Meeting Action: Accept

1977-12 Log #CP7 FAE-WFF
(A.1.2.1)

Final Action: Accept

Submitter: Technical Committee on Wildland Fire Fighting Protective Clothing and Equipment,

Recommendation: REVISE A.1.2.1 TO READ:

A.1.2.1 Personal protective clothing must strike a balance between protection and worker comfort. Wildland fire fighters regularly face working conditions characterized by work periods of 12 to 16 hours in deserts and high mountains, in temperatures from below freezing to above 49°C (120°F), and in relative humidity ranging from very dry to very humid. Their proximity to the fire can be as close as a few feet to as far as several miles away.

The work done by the wildland fire fighter involves manual labor. Fire lines are constructed with hand tools that are used to cut, dig, and scrape. Portable power equipment is carried to and used on the fire line. Hose lines are also carried and pulled to the fire to provide water. Mechanized equipment such as bulldozers and tractor plows are used where possible.

The goal of this standard is to provide the fire fighter thermal protection against external heat sources using flame-resistant protective clothing and equipment without inducing an internal heat load that is harmful or impedes performance. Clothing should be flame resistant so that it does not contribute to burns resulting primarily from radiant heat and limited convective heat (directly flame contact).

Multiple garment layers can provide more protection in a “burnover” situation than single garment layers. However, Australian researchers have concluded that most of the fire fighters’ heat load comes not from the fire but from the fire fighters’ own physical exertion. The average metabolic heat load in one study was more than twice the combined heat load from the fire and the weather, (Budd et al., 1997a) Calculations of heat exchange showed that to maintain thermal equilibrium fire fighters have to evaporate sweat at an average rate of about 1 liter per hour, and as a result require clothing that is sufficiently light, loose, and well ventilated to permit such high rates of evaporation. Tests in a climatic chamber confirmed that clothing that did not meet these requirements hindered evaporation, trapped metabolic heat, and caused greater cardiovascular strain, discomfort, and fatigue. (Budd et al.,

1997b)

Total heat loss (THL) requirements cited in this standard are measured through a single layer of material, representative only of those areas of the garment without multiple layers. But, some styles of garments worn by wildland fire fighters have large areas covered by multiple layers of cloth, mainly in pockets, and in areas where additional protection from abrasion or heat is desired, such as in the knee, thigh, seat, and elbow. In some cases upwards of 30 percent of a wildland fire fighting garment will be constructed of more than one layer. The Technical Committee chose to test THL only on the single layer, but to provide this additional information to help guide agencies in their garment selections.

In choosing garments for wildland fire fighters, authorities or agencies having jurisdiction should consider whether or not to limit the use of garments with large areas of multilayered cloth. Be aware that additional layers of material can reduce heat loss from the garment. As the area of a garment covered by extra layers increases, the heat loss that occurs while wearing the garment decreases, potentially raising the likelihood of heat stress, cardiovascular strain, and fatigue in personnel.

Those working close to a fire can be affected by radiant heat and sometimes convective heat. The radiant protective performance (RPP) requirements in this standard recognize that the lower torso is more often subject to abrasion, puncture, and tearing forces. Therefore, the authority or agency having jurisdiction should consider that a heavier fabric is needed for lower torso garments.

Other factors that can reduce the likelihood of heat stress include acclimatization and aerobic fitness.

Wearing undergarments under wildland garments can increase comfort by reducing chafing. Undergarments should be made of natural fiber materials such as cotton, silk, or wool, or of flame resistant materials such as aramid. Synthetic fibers such as polyester, polypropylene, nylon, spandex, etc. should not be worn under wildland fire fighting garments as such materials will melt at relatively low temperatures. Melted material can stick to skin and can lead to more severe injuries in the event of a burnover. Tests show that a blend of cotton with up to 50% polyester may also be worn without danger of melting.

(1997a) Budd, G.M., Brotherhood, J.R., Hendrie, A.L., Jeffery, S.E., Beasley, F.A., Costin, B.P., Wu Zhiem, Baker, M.M., Cheney, N.P., Dawson, M.P., 1997. Project Aquarius. 6. Heat load from exertion, weather, and fire in men suppressing wildland fires. *Int. J. Wildland Fire* 6(2), 119-131.

(1997b) Budd, G.M., Brotherhood, J.R., Hendrie, A.L., Jeffery, S.E., Beasley, F.A., Costin, B.P., Wu Zhiem, Baker, M.M., Hoschke, B.N., Holcombe, B.V., Cheney, N.P., Dawson, M.P., 1997. Project Aquarius. 13. The thermal burden of high insulation and encapsulation in wildland firefighters’ clothing. *Int. J. Wildland Fire* 7(2), 207-218.

Substantiation: Revise Annex text to update it with the most recent studies and to provide better protection information for wildland fire fighters and agencies.

Committee Meeting Action: Accept