First Revision No. 98-NFPA 1977-2014 [ Global Input ]

Please delete all section/chapter titles (and surrounding commas) following all cross refs. throughout the document.

Submitter Information Verification

Submitter Full Name: Michael Beady
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Feb 13 16:59:43 EST 2014

Committee Statement

Committee Statement: Update per style
Response Message:
2.3.3 ANSI/ISEA Publications.


Submitter Information Verification

**Submitter Full Name:** David Trebisacci
**Organization:** National Fire Protection Assoc
**Street Address:**
**City:**
**State:**
**Zip:**
**Submittal Date:** Mon Feb 03 17:47:05 EST 2014

Committee Statement
Committee Statement: ANSI/ISEA Z87.1 is routinely being updated based upon the latest technology as well as considerations that are brought forward by three main groups (users, manufacturers, technical/experts). To have NFPA 1977 continue to improve through new editions it is beneficial for the end user to also require eyewear be compliant with the latest edition of Z87.1.

Changes:


Headform is updated from an Alderson 50th percentile form to an EN 168:2001 form allows us to better harmonize with international requirements;

The conical tip was blunted from 1mm to 3.175mm


Headform is updated from an Alderson 50th percentile form to an EN 168:2001 form allows us to better harmonize with international requirements;

The number of impacts was reduced from 20 to 6. This is more consistent with EN 168 and CSA Z94.3 requirements.


Headform is updated from an Alderson 50th percentile form to an EN 168:2001 form allows us to better harmonize with international requirements;

No other changes were made to this test.

A new edition of ANSI/ISEA Z87.1 is expected to be publish in 2015. This means that without updating the edition referenced in NFPA 1977, the standard would reference requirements that have been revised/updated twice.

Response Message: Public Input No. 2-NFPA 1977-2013 [Section No. 2.3.3]
2.3.4 ASTM Publications.
ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, www.astm.org.


Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Tue Feb 04 17:03:26 EST 2014

Committee Statement

Committee Statement:
2. Removes James Machine Slip Test (see related proposals to switch from James machine to SATRA machine).
3. Changes Footwear Abrasion method (see related proposals on footwear abrasion)/

Response Message:
Public Input No. 24-NFPA 1977-2013 [Section No. 2.3.4]
2.3.6 ISO Publications.

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

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


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

ISO 4649, Rubber vulcanized or thermoplastic — Determination of abrasion resistance using a rotating cylindrical drum device, 2010.

ISO 9001, Quality management systems — requirements, 2008.


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


Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City: 
State: 
Zip: 
Submittal Date: Tue Feb 04 17:14:12 EST 2014

Committee Statement

Committee Statement: Adds new proposed footwear abrasion method. See related footwear abrasion proposals.

Response Message: 

Public Input No. 26-NFPA 1977-2013 [Section No. 2.3.6]
First Revision No. 4-NFPA 1977-2014 [ New Section after 3.3.23 ]

| 3.3.24* Gusset. The relatively flexible material in protective footwear that joins the upper quarter and the tongue to provide expansion when donned. |

Supplemental Information

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<th>Description</th>
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Submitter Information Verification

- **Submitter Full Name:** David Trebisacci
- **Organization:** National Fire Protection Assoc
- **Street Address:**
- **City:**
- **State:**
- **Zip:**
- **Submittal Date:** Tue Feb 04 17:21:38 EST 2014

Committee Statement

- **Committee Statement:** New Annex A material will also be added
- **Response Message:**
A.3.3.X Gusset.

The gusset generally lacks some layers used in footwear upper construction or might include different layers for flexibility. The gusset is not observable from the front if the footwear is donned or laced up.
### First Revision No. 97-NFPA 1977-2014 [ New Section after 3.3.58.1 ]

#### 3.3.41 Peak.
The part of the helmet extending forward over the wearer's forehead.

### Submitter Information Verification

**Submitter Full Name:** David Trebisacci  
**Organization:** National Fire Protection Assoc  
**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submittal Date:** Tue Feb 11 10:17:06 EST 2014

### Committee Statement

**Committee**  
**Statement:** The technical committee is defining peak as the term is used in the standard.
First Revision No. 5-NFPA 1977-2014 [ Section No. 3.3.58.2 ]

3.3.60.2* Minor Seam.
Remaining seam assemblies that are not classified as Major, Major A, or Major B major seams.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Tue Feb 04 17:53:01 EST 2014

Committee Statement

Committee Statement: The terms Major A and Major B are not utilized in this standard.

Response Message:
Public Input No. 3-NFPA 1977-2013 [Section No. 3.3.58.2]
**3.3.69**  Tongue.
The part of the protective footwear that is provided for lace up protective footwear with a closure that extends from the vamp to the top line of the footwear between sides of the footwear upper and is exposed to the exterior environment when the footwear is correctly donned.

**3.3.70**  Top Line.
The top edge of protective footwear that includes the tongue, gusset, quarter, collar, and shaft.

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**Supplemental Information**

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**Submitter Information Verification**

**Submitter Full Name:** David Trebisacci  
**Organization:** National Fire Protection Assoc  
**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submittal Date:** Tue Feb 04 18:00:41 EST 2014

**Committee Statement**

**Committee Statement:** New Annex A material will also be added.  
**Response Message:**
A.3.3.X Tongue.

The tongue might be made of the same composite as the footwear upper or of a similar material composite as the gusset.
3.3.92 Wrist Crease.
The transverse crease of the wrist located adjacent to the palm and measured at the point closest to the palm.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Tue Feb 04 18:09:03 EST 2014

Committee Statement

Committee Statement: Definition is replaced with a procedure to determine the wrist crease in Ch. 6. See related proposal.
Response Message:

Public Input No. 30-NFPA 1977-2013 [Section No. 3.3.88]
First Revision No. 8-NFPA 1977-2014 [ Section No. 4.1.8 ]

4.1.8
The certification organization shall not issue any new certifications to the 2005 2011 edition of this standard on or after the NFPA effective date for the 2011 2016 edition, which is January 3, 2011 (DATE).

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Feb 04 18:27:33 EST 2014

Committee Statement

Committee Statement: Revises dates to reflect new edition. Standards Council will determine the effective date of the standard.
Response Message:

Public Input No. 32-NFPA 1977-2013 [Section No. 4.1.8]
4.1.9
The certification organization shall not permit any manufacturer to continue to label any protective clothing and equipment certified as compliant with the 2005 2011 edition of this standard on or after September 1, 2011 (ISSUE DATE PLUS 12 MONTHS).

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Tue Feb 04 18:30:14 EST 2014

Committee Statement

Committee Statement: Revised dates to reflect new edition. Standards Council will determine issuance date.
Response Message: Public Input No. 33-NFPA 1977-2013 [Section No. 4.1.9]
4.1.10
The certification organization shall require manufacturers to remove all certification labels and product labels indicating compliance with the 2005 2011 edition of this standard from all protective clothing and equipment that are under the control of the manufacturer on September 1, 2011 (ISSUE DATE PLUS 12 MONTHS), and the certification organization shall verify that this action is taken.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Tue Feb 04 18:35:11 EST 2014

Committee Statement

Committee Statement: Revised dates to reflect current edition. Allows for 12 months for manufacturers to certify to new edition. Standards Council will determine issuance date.

Response Message:

Public Input No. 34-NFPA 1977-2013 [Section No. 4.1.10]
4.4.1 All protective clothing and equipment labeled as being compliant with this standard shall undergo recertification on an annual basis. This recertification shall include the following:

(1) Inspection and evaluation to all design requirements as required by this standard on all manufacturer models and components

(2) Testing to all performance requirements as required by this standard on all manufacturer models and components with the following protocol:

(a) Where a test method incorporates testing both before and after the laundering preconditioning specified in 8.1.2 and the test generates quantitative results, recertification testing shall be limited to the conditioning that yielded the worst-case test result during the initial certification for the model or component.

(b) Where a test method incorporates testing both before and after laundering preconditioning specified in 8.1.2 and the test generates nonquantitative results (e.g., pass/fail for melt/drip), recertification shall be limited to a single conditioning procedure in any given year. Subsequent annual recertifications shall cycle through the remaining conditioning procedures to ensure that all required conditionings are included over time.

(c) Where a test method requires the testing of three specimens, a minimum of one specimen shall be tested for annual recertification. For conductive heat resistance testing of gloves, three specimens shall be tested.

(d) Where a test method requires the testing of five or more specimens, a minimum of two specimens shall be tested for annual recertification.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Feb 04 18:38:17 EST 2014

Committee Statement

Committee Statement: The technical committee has determined that it is necessary to increase the number of specimens tested to account for material variability.

Response Message:
4.5 Manufacturer’s Quality Assurance Program.

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

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

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

4.5.3.1
Registration to the requirements of ISO 9001, Quality management systems—requirements, shall be conducted by a registrar that is accredited for personal protective equipment in accordance with ISO 62, General requirements for bodies operating assessment and certification/registration of quality systems. The registrar shall affix the accreditation mark on the ISO registration certificate.

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

4.5.4
The operation of the quality assurance program shall evaluate and test compliant product production against this standard to ensure that production remains in compliance.

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

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

4.5.6
Where manufacturers make custom-sized or specially fitted gloves for accommodating the special needs of individual firefighters, the manufacturer shall employ the same manufacturing methods as used for making required glove sizes.

4.5.6.1
The manufacturer shall notify the certification organization as required in 4.2.8 and shall obtain written approval from the certification organization prior to proceeding with any modifications to an existing certified glove design.

4.5.6.2
Where gloves are provided with a moisture barrier, custom-fitting gloves shall be individually evaluated to verify the integrity of the glove moisture barrier using air or other similar method to ensure that the glove is constructed in a leak-free manner.

Supplemental Information

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Submitter Information Verification

Submitter Full Name: David Trebisacci  
Organization: National Fire Protection Assoc

Committee Statement

Committee Statement: Updated language to be consistent with other NFPA standards in this project (e.g. 1971). Allows for the compliance of gloves for special needs users (also in NFPA 1971). A Word Document with the Annex items is attached.

Response Message:  
Public Input No. 35-NFPA 1977-2013 [Section No. 4.5]
A.4.5.4

For example, such a situation can exist when a product is wholly manufactured and assembled by one or more entities for a separate entity that, in turn, puts its name and label on the product, a practice known as “private labeling,” and markets and sells the product as its own.

A.4.5.5

Subcontractors should be considered to be, but not limited to, a person or persons, or a company, firm, corporation, partnership, or other organization having an agreement with or under contract with the compliant product manufacturer to supply or assemble the compliant product or portions thereof.
5.1.1.8
At least the following information shall also be printed legibly on the product label, with all letters at least 2.16 mm (⅛ in.) high:

1. Manufacturer's name, identification, or designation
2. Manufacturer's address
3. Country of manufacture
4. Manufacturer's garment identification number, lot number, or serial number
5. Month and year of manufacture (not coded)
6. Model or style name, number, or design
7. Size, using the garment sizes specified in 6.1.15
8. Garment materials and percent content
9. Cleaning precautions

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Feb 04 18:52:42 EST 2014

Committee Statement

Committee Statement: The change of 2.0mm to 1.6mm will bring consistency between NFPA 1977 and NFPA 1951, This will aid with the labeling of elements certified to multiple standards. 1/16 inch is equivalent to 1.58mm.

Response Message:
Public Input No. 4-NFPA 1977-2013 [Section No. 5.1.1.8]
5.2.1.8
At least the following information shall also be printed legibly on the product label, with all letters at least 2.16 mm (⅛ in.) high:

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

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Feb 04 18:53:36 EST 2014

Committee Statement

Committee Statement: The change of 2.0mm to 1.6mm will bring consistency between NFPA 1977 and NFPA 1951, This will aid with the labeling of elements certified to multiple standards. 1/16 inch is equivalent to 1.58mm.

Response Message: Public Input No. 5-NFPA 1977-2013 [Section No. 5.2.1.8]
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 \( \frac{1}{16} \) 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

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Feb 04 18:54:16 EST 2014

Committee Statement

Committee Statement: The change of 2.0mm to 1.6mm will bring consistency between NFPA 1977 and NFPA 1951, This will aid with the labeling of elements certified to multiple standards. 1/16 inch is equivalent to 1.58mm.

Response Message: 
Public Input No. 6-NFPA 1977-2013 [Section No. 5.3.1.8]
First Revision No. 16-NFPA 1977-2014 [ Section No. 5.4.1.8 ]

5.4.1.8
At least the following information shall also be printed legibly on the product label, with all letters at least 2.16 mm (⅛ in.) high:

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

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Feb 04 18:55:00 EST 2014

Committee Statement

Committee Statement: The change of 2.0mm to 1.6mm will bring consistency between NFPA 1977 and NFPA 1951. This will aid with the labeling of elements certified to multiple standards. 1/16 inch is equivalent to 1.58mm.

Response Message:

Public Input No. 7-NFPA 1977-2013 [Section No. 5.4.1.8]
5.5.1.8
At least the following information shall also be printed legibly on the product label, with all letters at least 2.16 mm (1/8 in.) high:

(1) Manufacturer's name
(2) Manufacturer's address
(3) Country of manufacture
(4) Manufacturer's number, lot, or serial number
(5) Month and year of manufacture (not coded)
(6) Model or style name, number, or design
(7) Identification of the compliant helmet(s) with which the face/neck shroud was certified

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Tue Feb 04 18:55:35 EST 2014

Committee Statement

Committee Statement: The change of 2.0mm to 1.6mm will bring consistency between NFPA 1977 and NFPA 1951. This will aid with the labeling of elements certified to multiple standards. 1/16 inch is equivalent to 1.58mm.

Response Message: Public Input No. 8-NFPA 1977-2013 [Section No. 5.5.1.8]
5.6.1.8
At least the following information shall also be printed legibly on the product label, with all letters at least 2 \(\frac{1}{16}\) in. high:

1. Manufacturer's name
2. Manufacturer's address
3. Country of manufacture
4. Manufacturer's number, lot, or serial number
5. Month and year of manufacture
6. Model or style name, number, or design

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Feb 04 18:56:09 EST 2014

Committee Statement

Committee Statement: The change of 2.0mm to 1.6mm will bring consistency between NFPA 1977 and NFPA 1951. This will aid with the labeling of elements certified to multiple standards. 1/16 inch is equivalent to 1.58mm.

Response Message: 

Public Input No. 9-NFPA 1977-2013 [Section No. 5.6.1.8]
5.7.1.8
At least the following information shall also be printed legibly on the product label, with all letters at least 2.1.6 mm (1/16 in.) high:

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

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Tue Feb 04 18:56:41 EST 2014

Committee Statement

Committee Statement: The change of 2.0mm to 1.6mm will bring consistency between NFPA 1977 and NFPA 1951. This will aid with the labeling of elements certified to multiple standards. 1/16 inch is equivalent to 1.58mm.

Response Message:
Public Input No. 10-NFPA 1977-2013 [Section No. 5.7.1.8]
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 1/4 \( \text{mm} \) 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

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Tue Feb 04 18:57:06 EST 2014

Committee Statement

Committee Statement: The change of 2.0mm to 1.6mm will bring consistency between NFPA 1977 and NFPA 1951. This will aid with the labeling of elements certified to multiple standards. 1/16 inch is equivalent to 1.58mm.

Response Message:

Public Input No. 11-NFPA 1977-2013 [Section No. 5.8.1.8]
First Revision No. 21-NFPA 1977-2014 [Section No. 5.9.1.8]

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<tr>
<td>(2) Manufacturer's address</td>
</tr>
<tr>
<td>(3) Country of manufacture</td>
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<tr>
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<td>(5) Month and year of manufacture (not coded)</td>
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<td>(6) Model or style name, number, or design</td>
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<td>(7) Size</td>
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<tr>
<td>(8) Cleaning precautions</td>
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Submitter Information Verification

Submitter Full Name: David Trebisacci  
Organization: National Fire Protection Assoc  
Street Address:  
City:  
State:  
Zip:  
Submittal Date: Tue Feb 04 18:57:45 EST 2014

Committee Statement

Committee Statement: The change of 2.0mm to 1.6mm will bring consistency between NFPA 1977 and NFPA 1951, This will aid with the labeling of elements certified to multiple standards. 1/16 inch is equivalent to 1.58mm.

Response Message: 
Public Input No. 12-NFPA 1977-2013 [Section No. 5.9.1.8]
6.1.7
All snaps shall meet the requirements of NASM 27980, Fastener, Snap, Style 2 (Regular Wire Spring Clamp Type), and MIL-DTL-10884H, Fastener, Snap.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Tue Feb 04 18:58:52 EST 2014

Committee Statement
Committee Statement: FROM NFPA 1971-2013 ROP:
1971-35 Log #91 FAE-SPF Final Action: Accept in Principle
(6.1.5.3)

Submitter: Jeffrey O. Stull, International Personnel Protection, Inc.
Recommendation: Where possible, specific criteria that are part of the design
and construction requirements of MIL-F-10994 should be specified and listed
in order to assess conformity of snaps.
Substantiation: The general reference to a hardware standard is insufficient to
specify the intended design and performance of this item.
Committee Meeting Action: Accept in Principle
Delete existing Section 6.1.5.3, and renumber section accordingly.
Committee Statement: The technical committee agrees that specific
requirements should be referenced for snaps in lieu of the current specified
MIL standard in its entirety. Therefore the technical committee is deleting the
existing Section 6.1.5.3 and will utilize the existing performance requirements
for hardware (which includes snaps) to establish performance requirements.
The current performance requirements in NFPA 1971 mandate corrosion
resistance, heat resistance and functionality after heat resistance. These are the
desirable characteristics for snaps.
Number Eligible to Vote: 30
Ballot Results: Affirmative: 27
Ballot Not Returned: 3 Davis, R., Doan, S., Scianna, M.

Response Message:
Public Input No. 13-NFPA 1977-2013 [Section No. 6.1.7]
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 Gloves shall consist of a composite meeting the performance requirements of Section 7.3.

6.3.2.1 The composite shall be permitted to be configured as a continuous or joined single layer or as continuous or joined multiple layers.

6.3.2.2 Where a glove is made up of multiple layers, all layers shall be individually graded per size.

6.3.3 The glove shall consist of a glove body. Protective work glove bodies gloves 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. See Figure 6.3.3.

Figure 6.3.3 Locating Wrist Crease.

6.3.3.1 The glove shall extend from the tip of the fingers to at least 25 mm (1 in.) beyond the wrist crease.

6.3.3.2 The portion of the glove that extends from the tip of the fingers to 25 mm (1 in.) beyond the wrist crease shall be considered the glove body and shall meet the glove body requirements in Section 7.3.

6.3.3.3 Where present, the portion of the glove that extends from 25 mm (1 in.) beyond the wrist crease up to the end of the entire glove shall be considered the glove interface component and shall meet the glove interface component requirements in Section 7.4.

6.3.3.4
The location of the wrist crease shall be determined by first placing the glove on a measurement board palm down and securing (locking) the fingertips to the board.

**6.3.3.4.1**

A 1 lb weight shall be attached to the end of the glove body or glove interface component. The weight shall not be attached to a knitted wristlet glove interface component. The weight shall be applied evenly across the glove.

**6.3.3.4.2**

Two points shall be marked on the back side of the glove. The location of the points shall be determined by measuring down the following distances, which are provided according to glove size, from the finger crotch of digit two and from the finger crotch of digit three:

1. XS: 9.46 cm (3.72 in.)
2. S: 10.04 cm (3.95 in.)
3. M: 10.68 cm (4.20 in.)
4. L: 11.21 cm (4.42 in.)
5. XL: 11.73 cm (4.62 in.)

**6.3.3.4.3**

A straight line shall be drawn on the back side of the glove using the two points. This line shall be drawn around the side edges of the glove.

**6.3.3.4.4**

The glove shall be removed from the measurement board. A line shall be drawn on the palm side of the glove by connecting the lines from the side edges of the glove.

**6.3.3.4.5**

The resulting straight line around the circumference of the glove shall be the location of the wrist crease.

**6.3.4**

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

**6.3.5 Protective Work Glove Sizing.**

**6.3.5.1**

In order to label or otherwise indicate that a work glove complies with the requirements of this standard, the manufacturer shall provide work gloves in not less than five separate and distinct sizes. For selection of proper glove size, the dimensions for hand circumference and the hand length shall be measured as shown in Figure 6.3.5.1.

**Figure 6.3.5.1 Method of Measuring Hand Dimensions for Selection of Proper Glove.**
6.3.5.1.1
Hand circumference shall be measured by placing a measuring tape on a table or other flat surface with the numerals facing downward.
6.3.5.1.1.1
The subject shall place the right hand, palm down and fingers together, in the middle of the tape so that the tape can pass straight across the metacarpal knuckles.
6.3.5.1.1.2
The circumference shall be measured to the nearest 3 mm (1/8 in.) as shown in Figure 6.3.5.1.

6.3.5.2
To label or otherwise indicate that a work glove complies with the requirements of this standard, the manufacturer shall provide work gloves in not less than five separate and distinct sizes specified in Table 6.3.5.2(a) through Table 6.3.5.2(e). The manufacturer shall provide gloves in each size that at least fit the hand dimension ranges specified in the tables.

Table 6.3.5.2(a) Sizing for Extra Small (XS) Glove
<table>
<thead>
<tr>
<th>Range for hand length:</th>
<th>cm</th>
<th>in.</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.25–17.25</td>
<td>6.40–6.79</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range for hand circumference:</th>
<th>Mid-Size Value</th>
<th>Range to Be Accommodated</th>
</tr>
</thead>
<tbody>
<tr>
<td>cm, in.</td>
<td>cm, in.</td>
<td></td>
</tr>
<tr>
<td>Digit 1 circumference</td>
<td>6.17, 2.43</td>
<td>5.60–6.74, 2.20–2.65</td>
</tr>
<tr>
<td>Digit 2 circumference</td>
<td>6.06, 2.39</td>
<td>5.50–6.63, 2.17–2.61</td>
</tr>
<tr>
<td>Digit 3 circumference</td>
<td>6.08, 2.39</td>
<td>5.53–6.63, 2.18–2.61</td>
</tr>
<tr>
<td>Digit 4 circumference</td>
<td>5.69, 2.24</td>
<td>5.12–6.26, 2.02–2.46</td>
</tr>
<tr>
<td>Digit 5 circumference</td>
<td>5, 1.97</td>
<td>4.48–5.52, 1.76–2.17</td>
</tr>
<tr>
<td>Digit 1 length</td>
<td>4.94, 1.94</td>
<td>4.36–5.52, 1.72–2.17</td>
</tr>
<tr>
<td>Digit 2 length</td>
<td>6.44, 2.54</td>
<td>5.75–7.12, 2.26–2.80</td>
</tr>
<tr>
<td>Digit 3 length</td>
<td>7.29, 2.87</td>
<td>6.71–7.87, 2.64–3.10</td>
</tr>
<tr>
<td>Digit 4 length</td>
<td>6.78, 2.67</td>
<td>6.13–7.42, 2.41–2.92</td>
</tr>
<tr>
<td>Digit 5 length</td>
<td>5.09, 2</td>
<td>4.52–5.66, 1.78–2.23</td>
</tr>
<tr>
<td>Hand circumference</td>
<td>18.25, 7.19</td>
<td>16.34–20.16, 6.43–7.94</td>
</tr>
<tr>
<td>Hand length</td>
<td>16.75, 6.59</td>
<td>16.27–17.23, 6.41–6.78</td>
</tr>
</tbody>
</table>

Table 6.3.5.2(b) Sizing for Small (S) Glove

<table>
<thead>
<tr>
<th>Range for hand length:</th>
<th>cm</th>
<th>in.</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.25–18.25</td>
<td>6.79–7.19</td>
<td></td>
</tr>
<tr>
<td>17.25–21.25</td>
<td>6.79–8.37</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range for hand circumference:</th>
<th>Mid-Size Value</th>
<th>Range to Be Accommodated</th>
</tr>
</thead>
<tbody>
<tr>
<td>cm, in.</td>
<td>cm, in.</td>
<td></td>
</tr>
<tr>
<td>Digit 1 circumference</td>
<td>6.4, 2.52</td>
<td>5.82–6.97, 2.29–2.74</td>
</tr>
<tr>
<td>Digit 2 circumference</td>
<td>6.29, 2.48</td>
<td>5.73–6.85, 2.26–2.70</td>
</tr>
<tr>
<td>Digit 3 circumference</td>
<td>6.31, 2.48</td>
<td>5.76–6.87, 2.27–2.70</td>
</tr>
<tr>
<td>Digit 4 circumference</td>
<td>5.92, 2.33</td>
<td>5.35–6.49, 2.11–2.56</td>
</tr>
<tr>
<td>Digit 5 circumference</td>
<td>5.22, 2.06</td>
<td>4.70–5.74, 1.85–2.26</td>
</tr>
<tr>
<td>Digit 1 length</td>
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<td>4.74–5.89, 1.87–2.32</td>
</tr>
<tr>
<td>Digit 2 length</td>
<td>6.89, 2.71</td>
<td>6.21–7.57, 2.44–2.98</td>
</tr>
<tr>
<td>Digit 3 length</td>
<td>7.71, 3.04</td>
<td>7.13–8.30, 2.81–3.27</td>
</tr>
<tr>
<td>Digit 4 length</td>
<td>7.19, 2.83</td>
<td>6.55–7.03, 2.58–3.08</td>
</tr>
<tr>
<td>Digit 5 length</td>
<td>5.44, 2.14</td>
<td>4.87–6.01, 1.92–2.37</td>
</tr>
<tr>
<td>Hand circumference</td>
<td>19.25, 7.58</td>
<td>17.34–21.16, 6.83–8.33</td>
</tr>
<tr>
<td>Hand length</td>
<td>17.75, 6.99</td>
<td>17.27–18.23, 6.80–7.18</td>
</tr>
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</table>

Table 6.3.5.2(c) Sizing for Medium (M) Glove
## Table 6.3.5.2(d) Sizing for Large (L) Glove

<table>
<thead>
<tr>
<th>Digit 1 circumference</th>
<th>7.01</th>
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<th>6.36–7.65</th>
<th>2.50–3.01</th>
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</thead>
<tbody>
<tr>
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<td>6.82</td>
<td>2.69</td>
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<td>2.48–2.88</td>
</tr>
<tr>
<td>Digit 3 circumference</td>
<td>6.83</td>
<td>2.69</td>
<td>6.26–7.40</td>
<td>2.46–2.91</td>
</tr>
<tr>
<td>Digit 4 circumference</td>
<td>6.34</td>
<td>2.5</td>
<td>5.78–6.90</td>
<td>2.28–2.72</td>
</tr>
<tr>
<td>Digit 5 circumference</td>
<td>5.63</td>
<td>2.22</td>
<td>5.09–6.17</td>
<td>2.00–2.43</td>
</tr>
<tr>
<td>Digit 1 length</td>
<td>5.63</td>
<td>2.22</td>
<td>5.00–6.26</td>
<td>1.97–2.46</td>
</tr>
<tr>
<td>Digit 2 length</td>
<td>7.11</td>
<td>2.8</td>
<td>6.50–7.72</td>
<td>2.56–3.04</td>
</tr>
<tr>
<td>Digit 3 length</td>
<td>8.07</td>
<td>3.18</td>
<td>7.55–8.58</td>
<td>2.97–3.38</td>
</tr>
<tr>
<td>Digit 4 length</td>
<td>7.61</td>
<td>3</td>
<td>7.14–8.08</td>
<td>2.81–3.18</td>
</tr>
<tr>
<td>Digit 5 length</td>
<td>5.78</td>
<td>2.28</td>
<td>5.16–6.41</td>
<td>2.03–2.52</td>
</tr>
<tr>
<td>Hand circumference</td>
<td>20.25</td>
<td>7.97</td>
<td>18.34–22.16</td>
<td>7.22–8.72</td>
</tr>
<tr>
<td>Hand length</td>
<td>18.75</td>
<td>7.38</td>
<td>18.27–19.23</td>
<td>7.19–7.57</td>
</tr>
</tbody>
</table>

## Table 6.3.5.2(e) Sizing for Extra-Large (XL) Glove

<table>
<thead>
<tr>
<th>Digit 1 circumference</th>
<th>7.26</th>
<th>2.86</th>
<th>6.62–7.91</th>
<th>2.61–3.11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digit 2 circumference</td>
<td>7.03</td>
<td>2.77</td>
<td>6.53–7.54</td>
<td>2.57–2.97</td>
</tr>
<tr>
<td>Digit 3 circumference</td>
<td>7.1</td>
<td>2.8</td>
<td>6.53–7.66</td>
<td>2.57–3.02</td>
</tr>
<tr>
<td>Digit 4 circumference</td>
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<td>2.6</td>
<td>6.04–7.16</td>
<td>2.38–2.82</td>
</tr>
<tr>
<td>Digit 5 circumference</td>
<td>5.85</td>
<td>2.3</td>
<td>5.31–6.39</td>
<td>2.09–2.52</td>
</tr>
<tr>
<td>Digit 1 length</td>
<td>5.87</td>
<td>2.31</td>
<td>5.24–6.50</td>
<td>2.06–2.56</td>
</tr>
<tr>
<td>Digit 2 length</td>
<td>7.49</td>
<td>2.95</td>
<td>6.88–8.10</td>
<td>2.71–3.19</td>
</tr>
<tr>
<td>Digit 3 length</td>
<td>8.54</td>
<td>3.36</td>
<td>8.03–9.06</td>
<td>3.16–3.57</td>
</tr>
<tr>
<td>Digit 4 length</td>
<td>8.03</td>
<td>3.16</td>
<td>7.56–8.50</td>
<td>2.98–3.35</td>
</tr>
<tr>
<td>Digit 5 length</td>
<td>6.13</td>
<td>2.41</td>
<td>5.51–6.75</td>
<td>2.17–2.66</td>
</tr>
</tbody>
</table>
### Table 6.3.5.5 Ranges of Hand Dimensions to be Accommodated by Protective Work Glove Sizes

<table>
<thead>
<tr>
<th></th>
<th>cm</th>
<th>in.</th>
<th>cm</th>
<th>in.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Range for hand length:</strong></td>
<td></td>
<td></td>
<td><strong>Range for hand circumference:</strong></td>
<td></td>
</tr>
<tr>
<td>Digit 1 circumference</td>
<td>7.52</td>
<td>2.96</td>
<td>6.87–8.16</td>
<td>2.70–3.21</td>
</tr>
<tr>
<td>Digit 2 circumference</td>
<td>7.25</td>
<td>2.85</td>
<td>6.74–7.76</td>
<td>2.65–3.06</td>
</tr>
<tr>
<td>Digit 3 circumference</td>
<td>7.36</td>
<td>2.9</td>
<td>6.79–7.93</td>
<td>2.67–3.12</td>
</tr>
<tr>
<td>Digit 4 circumference</td>
<td>6.86</td>
<td>2.7</td>
<td>6.30–7.42</td>
<td>2.48–2.92</td>
</tr>
<tr>
<td>Digit 5 circumference</td>
<td>6.06</td>
<td>2.39</td>
<td>5.52–6.60</td>
<td>2.17–2.60</td>
</tr>
<tr>
<td>Digit 1 length</td>
<td>6.11</td>
<td>2.41</td>
<td>5.48–6.75</td>
<td>2.16–2.66</td>
</tr>
<tr>
<td>Digit 2 length</td>
<td>7.86</td>
<td>3.09</td>
<td>7.26–8.47</td>
<td>2.86–3.33</td>
</tr>
<tr>
<td>Digit 3 length</td>
<td>9.02</td>
<td>3.55</td>
<td>8.51–9.54</td>
<td>3.35–3.76</td>
</tr>
<tr>
<td>Digit 4 length</td>
<td>8.44</td>
<td>3.32</td>
<td>7.97–8.91</td>
<td>3.14–3.51</td>
</tr>
<tr>
<td>Digit 5 length</td>
<td>6.48</td>
<td>2.55</td>
<td>5.85–7.10</td>
<td>2.30–2.80</td>
</tr>
<tr>
<td>Hand circumference</td>
<td>22.25</td>
<td>8.76</td>
<td>20.34–24.16</td>
<td>8.01–9.51</td>
</tr>
<tr>
<td>Hand length</td>
<td>20.75</td>
<td>8.17</td>
<td>20.27–21.23</td>
<td>7.98–8.36</td>
</tr>
</tbody>
</table>

**6.3.5.3**
The manufacturer shall provide the purchaser with the hand dimension ranges for protective work gloves specified in **6.3.4.4**.

**6.3.5.4**
The glove size indicated on the label shall be determined by the hand dimensions given in **Table 6.3.5.2(a)** through **Table 6.3.5.2(e)**.

**6.3.5.5**
Custom-sized work gloves outside the ranges specified in this section shall be permitted in addition to the required five sizes.

**6.3.5.6**
Manufacturers shall be permitted to provide deviations in glove design from the indicated sizing tables for accommodating the special needs of individual firefighters with specific sizing and fit issues, such as missing fingers. Where custom-sized or specially fitted gloves are provided, these gloves shall be subject to the quality assurance evaluation established in **4.5.6**.

**6.3.5.7**
Where custom-sized or specially fitted gloves are provided, the glove size indicated on the label shall be determined by the closest hand dimensions given in **Table 6.3.5.2(a)** through **Table 6.3.5.2(e)**, followed by the word “Custom.”

**6.3.5.8**
The protective work glove size indicated on the product label shall be determined by the hand dimensions given in **Table 6.3.4.4**.
<table>
<thead>
<tr>
<th>Size</th>
<th>Hand Length mm</th>
<th>Hand Length in.</th>
<th>Hand Circumference mm</th>
<th>Hand Circumference in.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small (S) (size 9)</td>
<td>175–185</td>
<td>6.79–7.19</td>
<td>175–215</td>
<td>6.79–8.37</td>
</tr>
</tbody>
</table>

Supplemental Information

File Name | Description
----------|------------------
NFPA_1977_FR_23_Annex_edited.docx |
FR_23_-_-1971_2013_tables.docx |

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Feb 04 19:00:32 EST 2014

Committee Statement

Committee Statement: Add wording already used in other standards to clarify glove areas, wrist crease location, and glove sizing details. Glove size details will be consistent with NFPA 1971. Allows for custom gloves for special needs users. Word Document with Annex item to 6.3.3.4.2 attached.

Response Message:
Public Input No. 36-NFPA 1977-2013 [Section No. 6.3]
A.6.3.3.4.2

The measurements given in 6.3.3.4.2 (a) through (e) are palm lengths and are calculated by subtracting the median length of digit 3 from the median hand length found for each glove size in Table 6.3.5.2(a) through Table 6.3.5.2(e).
### Table 6.3.5.2(a)  Sizing for Extra Small (XS) Glove

<table>
<thead>
<tr>
<th>Range for hand length:</th>
<th>cm</th>
<th>in.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>16.25–17.25</td>
<td>6.40–6.79</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range for hand circumference:</th>
<th>cm</th>
<th>in.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>cm</th>
<th>in.</th>
<th>cm</th>
<th>in.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.17</td>
<td>2.43</td>
<td>5.60–6.74</td>
<td>2.20–2.65</td>
</tr>
<tr>
<td>6.06</td>
<td>2.39</td>
<td>5.50–6.63</td>
<td>2.17–2.61</td>
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<tr>
<td>6.08</td>
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<td>5.53–6.63</td>
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<tr>
<td>5.69</td>
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<td>5.12–6.26</td>
<td>2.02–2.46</td>
</tr>
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<td>1.97</td>
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<td>1.76–2.17</td>
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<td>5.75–7.12</td>
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<td>2.41–2.92</td>
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<td>2.00</td>
<td>4.52–5.66</td>
<td>1.78–2.23</td>
</tr>
<tr>
<td>16.75</td>
<td>6.59</td>
<td>16.27–17.23</td>
<td>6.41–6.78</td>
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### Table 6.3.5.2(b)  Sizing for Small (S) Glove

<table>
<thead>
<tr>
<th>Range for hand length:</th>
<th>cm</th>
<th>in.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17.25–18.25</td>
<td>6.79–7.19</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range for hand circumference:</th>
<th>cm</th>
<th>in.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-Size Value</td>
<td>17.25–21.25</td>
<td>6.79–8.37</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>cm</th>
<th>in.</th>
<th>cm</th>
<th>in.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.40</td>
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<td>2.29–2.74</td>
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<td>2.26–2.70</td>
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<td>6.31</td>
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<td>2.27–2.70</td>
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<td>5.92</td>
<td>2.33</td>
<td>5.35–6.49</td>
<td>2.11–2.56</td>
</tr>
<tr>
<td></td>
<td>cm</td>
<td>in.</td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
<td>------</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td><strong>Digit 5 circumference</strong></td>
<td>5.22</td>
<td>2.06</td>
<td></td>
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<td></td>
</tr>
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<td>2.83</td>
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<td>2.14</td>
<td></td>
</tr>
<tr>
<td><strong>Hand circumference</strong></td>
<td>19.25</td>
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<td></td>
</tr>
<tr>
<td><strong>Hand length</strong></td>
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</table>

Table 6.3.5.2(c) Sizing for Medium (M) Glove

<table>
<thead>
<tr>
<th>Range for hand length:</th>
<th>cm</th>
<th>in.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Range for hand circumference:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>18.25–19.25</td>
<td>7.19–7.58</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>cm</th>
<th>in.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Digit 1 circumference</strong></td>
<td>7.01</td>
<td>2.76</td>
</tr>
<tr>
<td><strong>Digit 2 circumference</strong></td>
<td>6.82</td>
<td>2.69</td>
</tr>
<tr>
<td><strong>Digit 3 circumference</strong></td>
<td>6.83</td>
<td>2.69</td>
</tr>
<tr>
<td><strong>Digit 4 circumference</strong></td>
<td>6.34</td>
<td>2.50</td>
</tr>
<tr>
<td><strong>Digit 5 circumference</strong></td>
<td>5.63</td>
<td>2.22</td>
</tr>
<tr>
<td><strong>Digit 1 length</strong></td>
<td>5.63</td>
<td>2.22</td>
</tr>
<tr>
<td><strong>Digit 2 length</strong></td>
<td>7.11</td>
<td>2.80</td>
</tr>
<tr>
<td><strong>Digit 3 length</strong></td>
<td>8.07</td>
<td>3.18</td>
</tr>
<tr>
<td><strong>Digit 4 length</strong></td>
<td>7.61</td>
<td>3.00</td>
</tr>
<tr>
<td><strong>Digit 5 length</strong></td>
<td>5.78</td>
<td>2.28</td>
</tr>
<tr>
<td><strong>Hand circumference</strong></td>
<td>20.25</td>
<td>7.97</td>
</tr>
<tr>
<td><strong>Hand length</strong></td>
<td>18.75</td>
<td>7.38</td>
</tr>
</tbody>
</table>

Table 6.3.5.2(d) Sizing for Large (L) Glove

<table>
<thead>
<tr>
<th>Range for hand length:</th>
<th>cm</th>
<th>in.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Range for hand circumference:</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>cm</th>
<th>in.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Digit 1 circumference</strong></td>
<td>7.01</td>
<td>2.76</td>
</tr>
<tr>
<td><strong>Digit 2 circumference</strong></td>
<td>6.82</td>
<td>2.69</td>
</tr>
<tr>
<td><strong>Digit 3 circumference</strong></td>
<td>6.83</td>
<td>2.69</td>
</tr>
<tr>
<td><strong>Digit 4 circumference</strong></td>
<td>6.34</td>
<td>2.50</td>
</tr>
<tr>
<td><strong>Digit 5 circumference</strong></td>
<td>5.63</td>
<td>2.22</td>
</tr>
<tr>
<td><strong>Digit 1 length</strong></td>
<td>5.63</td>
<td>2.22</td>
</tr>
<tr>
<td><strong>Digit 2 length</strong></td>
<td>7.11</td>
<td>2.80</td>
</tr>
<tr>
<td><strong>Digit 3 length</strong></td>
<td>8.07</td>
<td>3.18</td>
</tr>
<tr>
<td><strong>Digit 4 length</strong></td>
<td>7.61</td>
<td>3.00</td>
</tr>
<tr>
<td><strong>Digit 5 length</strong></td>
<td>5.78</td>
<td>2.28</td>
</tr>
<tr>
<td><strong>Hand circumference</strong></td>
<td>20.25</td>
<td>7.97</td>
</tr>
<tr>
<td><strong>Hand length</strong></td>
<td>18.75</td>
<td>7.38</td>
</tr>
<tr>
<td>Mid-Size Value</td>
<td>Range to Be Accommodated</td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>--------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>cm</td>
<td>in.</td>
</tr>
<tr>
<td>Digit 1 circumference</td>
<td>7.26</td>
<td>2.86</td>
</tr>
<tr>
<td>Digit 2 circumference</td>
<td>7.03</td>
<td>2.77</td>
</tr>
<tr>
<td>Digit 3 circumference</td>
<td>7.10</td>
<td>2.80</td>
</tr>
<tr>
<td>Digit 4 circumference</td>
<td>6.60</td>
<td>2.60</td>
</tr>
<tr>
<td>Digit 5 circumference</td>
<td>5.85</td>
<td>2.30</td>
</tr>
<tr>
<td>Digit 1 length</td>
<td>5.87</td>
<td>2.31</td>
</tr>
<tr>
<td>Digit 2 length</td>
<td>7.49</td>
<td>2.95</td>
</tr>
<tr>
<td>Digit 3 length</td>
<td>8.54</td>
<td>3.36</td>
</tr>
<tr>
<td>Digit 4 length</td>
<td>8.03</td>
<td>3.16</td>
</tr>
<tr>
<td>Digit 5 length</td>
<td>6.13</td>
<td>2.41</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range for hand length:</th>
<th>cm</th>
<th>in.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20.25–21.25</td>
<td>7.97–8.37</td>
</tr>
</tbody>
</table>

Table 6.3.5.2(e) Sizing for Extra-Large (XL) Glove

<table>
<thead>
<tr>
<th>Mid-Size Value</th>
<th>Range to Be Accommodated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cm</td>
</tr>
<tr>
<td>Digit 1 circumference</td>
<td>7.52</td>
</tr>
<tr>
<td>Digit 2 circumference</td>
<td>7.25</td>
</tr>
<tr>
<td>Digit 3 circumference</td>
<td>7.36</td>
</tr>
<tr>
<td>Digit 4 circumference</td>
<td>6.86</td>
</tr>
<tr>
<td>Digit 5 circumference</td>
<td>6.06</td>
</tr>
<tr>
<td>Digit 1 length</td>
<td>6.11</td>
</tr>
<tr>
<td>Digit 2 length</td>
<td>7.86</td>
</tr>
<tr>
<td>Digit 3 length</td>
<td>9.02</td>
</tr>
<tr>
<td>Digit 4 length</td>
<td>8.44</td>
</tr>
<tr>
<td>Digit 5 length</td>
<td>6.48</td>
</tr>
<tr>
<td>Hand circumference</td>
<td>22.25</td>
</tr>
<tr>
<td>Hand length</td>
<td>20.75</td>
</tr>
</tbody>
</table>
6.4.2
Footwear items shall consist of a sole with heel, upper, and insole, and shank. The quarter section of the boot shall be designed to provide an adjustable, snug fit for support around the ankle and lower leg.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City: 
State: 
Zip: 
Submittal Date: Tue Feb 04 19:07:24 EST 2014

Committee Statement

Committee Statement: There is no performance requirement associated with the shank. The mfr. can call basically anything a shank.
Response Message:
Public Input No. 68-NFPA 1977-2013 [Section No. 6.4.2]
6.4.3

The heel breast shall not be less than 13 mm (½ in.). To determine heel breast height, the boot shall be placed on a flat surface and the heel breast shall be measured from where the heel breast intersects with the sole to where the heel breast intersects with the flat surface. The heel breasting angle shall not be less than 90 degrees nor more than 135 degrees relative to the sole, as shown in Figure 6.4.3.

Figure 6.4.3 Footwear Terms.
<table>
<thead>
<tr>
<th>Committee Statement:</th>
<th>Clarifies how breast height is to be measured. This can be confusing when the footwear contains deep treads.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response Message:</td>
<td>Public Input No. 69-NFPA 1977-2013 [Section No. 6.4.3]</td>
</tr>
</tbody>
</table>
6.4.4.1

The Footwear height shall be determined by measuring inside the boot footwear from the center of the insole at the heel up to a perpendicular reference line extending across the width of the boot footwear 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.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Tue Feb 04 19:09:32 EST 2014

Committee Statement

Committee Statement: Standardized footwear height measurement procedure throughout the project. This does not change the height.
Response Message:

Public Input No. 70-NFPA 1977-2013 [Section No. 6.4.4.1]
First Revision No. 27-NFPA 1977-2014 [ New Section after 6.4.4.2 ]

6.4.4.3
Physical protection shall be continuous circumferentially to within 50 mm (2 in.) of the footwear top line at all locations, with the exception of the tongue, gusset, and the area inside of and within 13 mm (1/2 in.) around pull-up holes that fully penetrate the footwear from outside to inside. The height of physical protection at all locations of the boot, with the exception of the tongue and gusset, shall be no less than 200 mm (8 in.) when measured as described in 6.4.4.1.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Tue Feb 04 19:10:13 EST 2014

Committee Statement

Committee Statement: Modifying language to correlate with the corresponding text in three other documents within the project. No changes are being made to the way the height determination is made. Should the footwear height be greater than 8 inches, this will ensure that the required protection extends to within 2 inches of the top of the footwear.

Response Message:

Public Input No. 71-NFPA 1977-2013 [New Section after 6.4.4.2]
6.4.6  
Where used, there shall be a minimum of four metal stud hooks on each side of the eyewall, and they shall meet the requirements of 7.4.2 and 7.4.8.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:  
City:  
State:  
Zip:  
Submittal Date: Tue Feb 04 19:11:14 EST 2014

Committee Statement

Committee Statement: Stud hooks are not required, therefore discussion is warranted as to whether or not the number of stud hooks required when used is necessary.

Response Message:  
Public Input No. 72-NFPA 1977-2013 [Section No. 6.4.6]
6.4.7
Eyelets shall be constructed of coated steel, solid brass, brass-coated nickel, or nickel.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Tue Feb 04 19:12:05 EST 2014

Committee Statement

Committee Statement: All metal hardware is required to meet the Corrosion Resistance Test, all eyelets in the footwear are required to meet the Eyelet and Stud Post Attachment Test, and all hardware is required to remain functional following the Heat and Thermal Shrinkage Resistance Test. The type of hardware used should not be restricted as long as it meets the applicable requirements. If only metal eyelets are preferred, then the limitation should be to metal rather than the type of metal. Also, if metal eyelets are preferred, then shouldn’t this requirement also apply to stud hooks, stud posts, and lacing loops?

Response Message:
Public Input No. 73-NFPA 1977-2013 [Section No. 6.4.7]
First Revision No. 30-NFPA 1977-2014 [ Section No. 6.6.2 ]

6.6.2
Goggles shall meet the respective requirements for high impact protection of goggles and be marked "Z87+" in accordance with ANSI Z87.1, Occupational and Educational Personal Eye and Face Protection Devices.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Tue Feb 04 19:15:04 EST 2014

Committee Statement

Committee Statement: Updates language to correlate with verbiage in new edition of Z87.1. "Z87+" is high impact protection.

Response Message:

Public Input No. 66-NFPA 1977-2013 [Section No. 6.6.2]
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. (See Figure 6.3.2.)

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.

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

<table>
<thead>
<tr>
<th>Size</th>
<th>Hand Length</th>
<th>Hand Circumference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>in.</td>
</tr>
<tr>
<td>Extra small (XS) (size 8)</td>
<td>165–175</td>
<td>6.40–6.79</td>
</tr>
<tr>
<td>Small (S) (size 9)</td>
<td>175–185</td>
<td>6.79–7.19</td>
</tr>
<tr>
<td>Medium (M) (size 10)</td>
<td>185–195</td>
<td>7.19–7.58</td>
</tr>
<tr>
<td>Large (L) (size 11)</td>
<td>195–205</td>
<td>7.58–7.97</td>
</tr>
<tr>
<td>Extra large (XL) (size 12)</td>
<td>205–215</td>
<td>7.97–8.37</td>
</tr>
</tbody>
</table>

6.8.2 Gloves shall consist of a composite meeting the performance requirements of Section 7.8.

6.8.2.1 The composite shall be permitted to be configured as a continuous or joined single layer or as continuous or joined multiple layers.

6.8.2.2 Where a glove is made up of multiple layers, all layers shall be individually graded per size.

6.8.3
The glove shall consist of a glove body. Protective driving gloves shall be designed so they closely conform to the wrist or are adjustable at the wrist.

6.8.3.1
The glove shall extend from the tip of the fingers to at least 25 mm (1 in.) beyond the wrist crease.

6.8.3.2
The portion of the glove that extends from the tip of the fingers to 25 mm (1 in.) beyond the wrist crease shall be considered the glove body and shall meet the glove body requirements in Section 7.8.

6.8.3.3
Where present, the portion of the glove that extends from 25 mm (1 in.) beyond the wrist crease up to the end of the entire glove shall be considered the glove interface component and shall meet the glove interface component requirements in Section 7.8.

6.8.3.4
The location of the wrist crease shall be determined as specified in 6.3.3.4.

6.8.4
All thread used to manufacture protective driving gloves shall be made of inherently flame-resistant fiber.

6.8.5
Glove sizing shall be in accordance with 6.3.5.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Feb 04 19:16:42 EST 2014

Committee Statement

Committee Statement: Adds wording already in use in NFPA 1971 to clarify glove areas, location of wrist crease, and glove sizing details.
Response Message: Public Input No. 37-NFPA 1977-2013 [Section No. 6.8]
7.1.15
Garment zippers shall be tested for the crosswise breaking strength of chain; crosswise breaking strength of separating unit; holding strength of stops, retainers, and separating units; operating force; and slider lock strength requirements of Commercial Item Description as specified in A-A-55634A, Zippers (Fasteners, Slide Interlocking), and shall have the crosswise breaking strength of chain meet or exceed the crosswise breaking strength of chain requirements specified in A-A-55634A.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Feb 05 07:41:30 EST 2014

Committee Statement

Committee Statement: Replaces the individual zipper requirements with the requirement in NFPA 1971. Also adds the slider lock strength requirement. This will clarify the requirements and maintain consistency between documents.

Response Message:
Public Input No. 14-NFPA 1977-2013 [Section No. 7.1.15]
First Revision No. 33-NFPA 1977-2014 [Section No. 7.1.16]

7.1.16
Zippers shall be tested for the crosswise breaking strength of separating unit as specified in A-A-55634A, Zippers (Fasteners, Slide Interlocking), and shall have the breaking strength of separating unit meet or exceed the crosswise breaking strength of separating unit requirements specified in A-A-55634A.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Wed Feb 05 07:43:06 EST 2014

Committee Statement

Committee Statement: See FR 32.
Response Message:
Public Input No. 15-NFPA 1977-2013 [Section No. 7.1.16]
7.1.17
Zippers shall be tested for the holding strengths of stops, retainers, and separating units as specified in A-A-55634A, Zippers (Fasteners, Slide Interlocking), and shall have the holding strengths of stops, retainers, and separating units meet or exceed the holding strengths of stops, retainers, and separating units requirements specified in A-A-55634A.

7.1.18
Zippers shall be tested for the operating force as specified in A-A-55634A, Zippers (Fasteners, Slide Interlocking), and shall have the operating force meet or exceed the operating force requirements specified in A-A-55634A.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Feb 05 07:46:10 EST 2014

Committee Statement

Committee Statement: See FR 32.
Response Message:
Public Input No. 16-NFPA 1977-2013 [Sections 7.1.17, 7.1.18]
7.2.5
Helmets shall be tested for heat resistance as specified in Section 8.4, Heat and Thermal Shrinkage Resistance Test, and shall not have any deformation of the brim or peak exceeding 25 percent of its original length.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Wed Feb 05 07:50:31 EST 2014

Committee Statement

Committee Statement: The technical committee wanted to clarify the current text in paragraph 7.2.5.
Response Message:
7.3.2 Protective work gloves, glove body composites and glove interface component composites, including, but not limited to, trim, external labels, and external tags, but excluding hook and loop fasteners where not in direct contact with the skin, shall be tested for flame resistance as specified in Section 8.20, Protective Glove Flame Resistance Test, shall not melt or drip, shall not have any afterflame of more than 2 seconds, and shall not have any char length in excess of 100 mm (4 in.), and the consumed materials shall not exceed 5.0 percent of the specimen’s original weight.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Wed Feb 05 07:53:40 EST 2014

Committee Statement

Committee Statement: Clarifies the parts of the glove that shall be tested.
Response Message:

Public Input No. 38-NFPA 1977-2013 [Section No. 7.3.2]
7.3.5
Protective work glove body composites 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 20 mm (1.0 in.).

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Feb 05 08:02:57 EST 2014

Committee Statement

Committee Statement: Correlating the cut resistance requirements in NFPA 1977 to all other standards in the project. In the last revision cycle of NFPA 1977, the ASTM F 1790 test method was updated to the 2005 edition, but at that time it was not realized that the method was changed in a manner to make it more severe. As a result, a TIA was submitted to reduce the weight used in the test for gloves. No other adjustment was made. Since that time, this same change was made in other standards within the project either through TIA’s or during revision cycles. However, along with the weight reductions, the requirement was also reduces from 25 mm to 20 mm.

Response Message:
Public Input No. 39-NFPA 1977-2013 [Section No. 7.3.5]
First Revision No. 38-NFPA 1977-2014 [Section No. 7.3.6]

7.3.6
Protective work glove body composites 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).

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc

Committee Statement

Committee Statement: Clarifies that the glove body is the portion of the glove to be tested.

Response Message:
Public Input No. 40-NFPA 1977-2013 [Section No. 7.3.6]
First Revision No. 39-NFPA 1977-2014 [Section No. 7.3.8]

7.3.8
Protective work gloves shall be tested for grip, as specified in Section 8.26, Grip Test, and shall not have a percentage drop of barehanded control value of not less than 90 force of more than 30 percent in any 0.2-second interval.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Wed Feb 05 08:06:47 EST 2014

Committee Statement

Committee Statement: Aligns grip test with NFPA 1971-2013 and NFPA 1951-2013 and aligns wetting method with NFPA 1951-2013 and NFPA 1999-2013. The current rope grip test is variable and subjective. The proposed test method provides a more consistent way of identifying gloves that have very slippery surfaces that when wet may cause a complete loss of gripping ability.

Response Message:

Public Input No. 90-NFPA 1977-2013 [Section No. 7.3.8]
7.3.11
Protective work gloves shall be tested using the torque test specified in Section 8.34, and shall have an average percent of bare-handed control not less than 80 percent.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
City:
State:
Zip:
Submittal Date: Wed Feb 05 08:07:36 EST 2014

Committee Statement

Committee Statement: The torque test which is used in NFPA 1971-2013 and NFPA 1951-2013 provides a less variable subjective of grip strength than the current grip test.
## 7.4.1
Protective footwear shall be tested for resistance to heat as specified in Section 8.4, Heat and Thermal Shrinkage Resistance Test, and, excluding laces, shall have no part of the footwear melt, shall have no delamination separation of any part of the footwear, and shall have all hardware remain functional.

### Submitter Information Verification

- **Submitter Full Name:** David Trebisacci
- **Organization:** National Fire Protection Assoc
- **Street Address:**
- **City:**
- **State:**
- **Zip:**
- **Submittal Date:** Wed Feb 05 08:08:26 EST 2014

### Committee Statement

- **Committee Statement:** Separation is the term and criteria used for evaluation in the test method. Also, this is the term and criteria used for heat resistance in other standards (NFPA 1971, 1951).

- **Response Message:**

**Public Input No. 75-NFPA 1977-2013 [Section No. 7.4.1]**
First Revision No. 42-NFPA 1977-2014 [Section No. 7.4.3]

7.4.3
Protective footwear shall be tested for resistance to cut as specified in Section 8.23, Cut Resistance Test, and shall have a distance of blade travel greater than 25 mm (1.0 in.).

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Feb 05 08:09:17 EST 2014

Committee Statement

Committee Statement: Correlating the cut resistance requirements in NFPA 1977 to all other standards in the project. In the last revision cycle of NFPA 1977, the ASTM F 1790 test method was updated to the 2005 edition, but at that time it was not realized that the method was changed in a manner to make it more severe. As a result, a TIA was submitted to reduce the weight used in the test for gloves. No other adjustment was made. Since that time, this same change was made in other standards within the project either through TIA’s or during revision cycles. However, along with the weight reductions, the requirement was also reduces from 25 mm to 20 mm. NFPA 1977 is the only standard within the project where this change was not incorporated.

Response Message:
Public Input No. 62-NFPA 1977-2013 [Section No. 7.4.3]
7.4.5
Protective footwear sole and heel composites, excluding the sole and heel
composites of caulked boots, shall be tested for resistance to abrasion as specified
in Section 8.18, Protective Footwear Abrasion Test, and shall have an abrasion
resistance rating of not less than 100 NBS index and the relative volume loss shall
not be greater than 250 mm$^3$.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City: 
State: 
Zip: 
Submittal Date: Wed Feb 05 08:11:34 EST 2014

Committee Statement

Committee Statement: Aligning with footwear abrasion test in NFPA 1971-2013 and NFPA 1951-
2013. With the current abrasion test, the drum with sandpaper rotates and the
sample remains stationary. This creates some issues because the rubber
leaves residue on the paper for successive runs. With the proposed method,
the drum rotates and the sample traverses across the drum providing a
cleaner sandpaper surface throughout the test run. Further, the data collected
for the current test involves a height measurement gauge that is difficult to
read where the proposed test involves a weight and density measurement on
a scale which is less subject to user error.

Response Message:
Public Input No. 79-NFPA 1977-2013 [Section No. 7.4.5]
7.4.7

Footwear soles and heels Protective footwear, excluding caulked footwear, shall be tested for slip resistance as specified in Section 8.33, Slip Resistance Test, and shall have a minimum static coefficient of friction value of 0.5 or greater.

Submitter Information Verification

Submitter Full Name: David Trebisacci
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Street Address:  
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Zip:  
Submittal Date: Wed Feb 05 08:13:33 EST 2014

Committee Statement

Committee Statement: Proposing full footwear slip test instead of slip testing of sole and heel portions. Also aligning with footwear slip test in NFPA 1971-2013, NFPA 1951-2013, NFPA 1999-2013, and NFPA 1992-2012 except that in this proposal the newly published ASTM F 2913 method has been referenced directly whereas in the other standards the method is a variation of ISO 13287 to reflect the draft ASTM F 2913 (because at that time ASTM F2913 was not yet published).

This method will be slightly different from what went into the other standards in that:

1) preconditioning of the specimen and test surface is slightly different (scrub brush and detergent (ASTM) vs. light sanding and alcohol (ISO))

2) the actual reading is 0.1ms (ASTM) vs. avg 0.1-0.3ms

3) lasts are slightly different (SATRA vs. EN)

the above differences are minor and it was the intent to reference the ASTM in the other documents - but it was not published in time.

Also, the current standard has been withdrawn by ASTM.

Response Message:

Public Input No. 82-NFPA 1977-2013 [Section No. 7.4.7]
### First Revision No. 45-NFPA 1977-2014 [Section No. 7.4.9]

**7.4.9**

*Footwear*

Protective footwear shall be tested for resistance to flame as specified in Section 8.14, Flame Resistance Test for Protective Footwear, and shall not have an afterflame greater than 2 seconds, shall not melt or drip, and shall not exhibit any burn-through.

---

**Submitter Information Verification**

<table>
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<tr>
<th>Field</th>
<th>Information</th>
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</thead>
<tbody>
<tr>
<td>Submitter Full Name</td>
<td>David Trebisacci</td>
</tr>
<tr>
<td>Organization</td>
<td>National Fire Protection Assoc</td>
</tr>
<tr>
<td>Street Address</td>
<td></td>
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<td>City</td>
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<td>Submittal Date</td>
<td>Wed Feb 05 08:14:32 EST 2014</td>
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**Committee Statement**

Committee Statement: Aligning with footwear flame test in NFPA 1971-2013 and NFPA 1951-2013. This flame test allows all materials of the footwear (excluding laces) to be evaluated. This also reduces the amount of variability that is seen when using a burner to test different portions of the outsole. Laces are being excluded as they are in the Heat Resistance test of NFPA 1977-2011.

**Response Message:**

Public Input No. 84-NFPA 1977-2013 [Section No. 7.4.9]
7.5.12 Zippers shall be tested for the crosswise breaking strength of chain as specified in A-A-55634A, Zippers (Fasteners, Slide Interlocking), and shall have the crosswise breaking strength of chain meet or exceed the crosswise breaking strength of chain requirements specified in A-A-55634A.

7.5.12.1 Zippers shall be tested for the crosswise breaking strength of separating unit as specified in A-A-55634A, Zippers (Fasteners, Slide Interlocking), and shall have the breaking strength of separating unit meet or exceed the crosswise breaking strength of separating unit requirements specified in A-A-55634A.

7.5.12.2 Zippers shall be tested for the holding strengths of stops, retainers, and separating units as specified in A-A-55634A, Zippers (Fasteners, Slide Interlocking), and shall have the holding strengths of stops, retainers, and separating units meet or exceed the holding strengths of stops, retainers, and separating units requirements specified in A-A-55634A.
First Revision No. 47-NFPA 1977-2014 [ Section No. 7.8.2 ]

7.8.2  Protective driving gloves, excluding glove body composites and glove interface component composites, including, but not limited to, trim, external labels, and external tags, but excluding hook and loop fasteners where not in direct contact with the skin, shall be tested for flame resistance as specified in Section 8.20, Protective Glove Flame Resistance Test, shall not melt or drip, shall not have any afterflame of more than 2 seconds, and shall not have any char length in excess of 100 mm (4 in.), and the consumed materials shall not exceed 5 percent of the specimen's original weight.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
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Submittal Date: Wed Feb 05 08:18:18 EST 2014

Committee Statement

Committee Statement: Clarifies the part of the glove to be tested.
Response Message:
Public Input No. 41-NFPA 1977-2013 [Section No. 7.8.2]
7.8.4 Protective driving glove body composites 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 20 mm (1.0 in.).

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Wed Feb 05 08:19:07 EST 2014

Committee Statement

Committee Statement: Correlating the cut resistance requirements in NFPA 1977 to all other standards in the project. In the last revision cycle of NFPA 1977, the ASTM F 1790 test method was updated to the 2005 edition, but at that time it was not realized that the method was changed in a manner to make it more severe. As a result, a TIA was submitted to reduce the weight used in the test for gloves. No other adjustment was made. Since that time, this same change was made in other standards within the project either through TIA’s or during revision cycles. However, along with the weight reductions, the requirement was also reduces from 25 mm to 20 mm. NFPA 1977 is the only standard within the project where this change was not incorporated.

Response Message:
Public Input No. 42-NFPA 1977-2013 [Section No. 7.8.4]
First Revision No. 49-NFPA 1977-2014 [Section No. 7.8.6]

7.8.6
Protective driving gloves shall be tested for grip as specified in Section 8.26, Grip Test, and shall not have a percentage drop of barehanded control value of not less than 110 force of more than 30 percent in any 0.2-second interval.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Feb 05 08:19:55 EST 2014

Committee Statement

Committee Statement: Aligns grip test with NFPA 1971-2013 and NFPA 1951-2013 and aligns wetting method with NFPA 1951-2013 and NFPA 1999-2013. The current rope grip test is variable and subjective. The proposed test method provides a more consistent way of identifying gloves that have very slippery surfaces that when wet may cause a complete loss of gripping ability.

Response Message:
Public Input No. 91-NFPA 1977-2013 [Section No. 7.8.6]
First Revision No. 50-NFPA 1977-2014 [ New Section after 7.8.8 ]

7.8.9
Protective driving gloves shall be tested using the torque test specified in Section 8.34, and shall have an average percent of bare-handed control not less than 80 percent.

Submitter Information Verification
Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc

Committee Statement
Committee Statement: The torque test which is used in NFPA 1971-2013 and NFPA 1951-2013 provides a less variable subjective of grip strength than the current grip test.

Response Message:
Public Input No. 96-NFPA 1977-2013 [New Section after 7.8.8]
7.9.2 Load-carrying equipment hardware and closure systems shall be tested for resistance to heat as specified in Section 8.4, Heat and Thermal Shrinkage Resistance Test, shall not melt, drip, separate, or ignite, and shall have hardware and closure systems that release the item from the “as worn” position shall remain functional; and fire shelter attachment hardware shall remain functional.

Submitter Information Verification

Submitter Full Name: David Trebisacci
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Street Address: 
City: 
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Submittal Date: Wed Feb 05 08:23:00 EST 2014

Committee Statement

Committee Statement: The technical committee wanted to clarify the performance requirements of the load carrying equipment and to clarify which hardware is to be evaluated.

Response Message:
7.9.4
Where visibility markings are used on load-carrying equipment, visibility markings shall be tested for retroreflectivity as specified in Section 8.16, Retroreflectivity Test and shall have a coefficient of retroreflection ($R_{A}$) of not less than 100 cd/lux/m$^2$ (100 cd/fc/ft$^2$).

Submitter Information Verification

Submitter Full Name: David Trebisacci
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Street Address:
City:
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Submittal Date: Wed Feb 05 08:28:04 EST 2014

Committee Statement

Committee Statement: There is currently no performance requirement contained in the standard. This requirement is the same as the helmet visibility marking.
Response Message: Public Input No. 65-NFPA 1977-2013 [Section No. 7.9.4]
8.1.1 Room Temperature Conditioning Procedure for Protective Garments, Helmets, Gloves, Footwear, Goggles, and Chain Saw Protectors; Leg Protector Specimens; Load-Carrying Equipment; and Visibility Markings.

8.1.1.1 Protective garments, helmets, gloves, footwear, goggles, and chain saw leg protector specimens, and load-carrying equipment, and visibility marking specimens shall be conditioned at a temperature of 21°C, ±3°C (70°F, ±5°F), and a relative humidity of 65 percent, ±5 percent, until equilibrium is reached, as determined in accordance with ASTM D 1776, Standard Practice for Conditioning Textiles for Testing, or for at least 24 hours, whichever is shorter.

8.1.1.2 Protective helmets and goggles shall be conditioned at a temperature of 21°C, ±3°C (70°F, ±5°F), and a relative humidity of 25 percent to 50 percent for at least 4 hours.

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

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Feb 05 08:32:10 EST 2014

Committee Statement

Committee Statement: Aligns the preconditioning of helmets and goggles with NFPA 1971. The 65% RH requirements is generally for textiles. ANSI Z89.1 requires 55 +/- 5 % RH.

Response Message: Public Input No. 63-NFPA 1977-2013 [Section No. 8.1.1]
8.1.2 Laundering Preconditioning for Textile Fabrics and Glove Wristlet Materials.

8.1.2.1* Textile fabrics specified to be laundered shall be laundered and dried for testing in accordance with the procedures specified in Machine Cycle 1, Wash Temperature V, and Drying Procedure Ai, of AATCC 135, Dimensional Changes of Fabrics after Home Laundering.

8.1.2.2 A 1.8 kg ±0.1 kg (4 lb ±0.2 lb) load shall be used. A laundry bag shall not be used.

8.1.3 Washing and Drying Procedure for Gloves, Glove Pouches, and Glove Swatches.

8.1.3.1 A front-loading washer/extractor shall be used. The capacity shall be 16 kg (35 lb) or 22.6 kg (50 lb).

8.1.3.2 The wash cycle procedure and water levels specified in Table 8.1.3.2(a) and Table 8.1.3.2(b) shall be followed. The G force shall not exceed 100 G throughout the wash cycle.

Table 8.1.3.2(a) Wash Cycle Procedure for Gloves, Glove Pouches, and Glove Swatches.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Time (min)</th>
<th>±3°</th>
<th>±5°F</th>
<th>Water Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suds using AATCC detergent #1993, 1.0 g/gal water</td>
<td>10</td>
<td>49</td>
<td>120</td>
<td>Low*</td>
</tr>
<tr>
<td>Drain</td>
<td>1</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Carry-over</td>
<td>5</td>
<td>49</td>
<td>120</td>
<td>Low*</td>
</tr>
<tr>
<td>Drain</td>
<td>1</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Rinse</td>
<td>2</td>
<td>38</td>
<td>100</td>
<td>High*</td>
</tr>
<tr>
<td>Drain</td>
<td>1</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Rinse</td>
<td>2</td>
<td>38</td>
<td>100</td>
<td>High*</td>
</tr>
<tr>
<td>Drain</td>
<td>1</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Rinse</td>
<td>2</td>
<td>38</td>
<td>100</td>
<td>High*</td>
</tr>
<tr>
<td>Drain</td>
<td>1</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Extract</td>
<td>5</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

*See Table 8.1.3.2(b) for high and low water levels.

Table 8.1.3.2(b) Water Level for Gloves, Glove Pouches, and Glove Swatches

Wash Cycle Procedure.

<table>
<thead>
<tr>
<th>Low Water Level 1 cm (3/8 in.)</th>
<th>High Water Level 1 cm (3/8 in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>cm</td>
<td>cm</td>
</tr>
<tr>
<td>20</td>
<td>30.5</td>
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<tr>
<td>7.9</td>
<td>12</td>
</tr>
</tbody>
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8.1.3.3
Samples shall be washed and dried for a total of five cycles.

8.1.3.4
The wash load shall be at two-thirds the rated capacity of the washer and not exceeded.

8.1.3.5
Samples shall be dried using a tumble dryer with a stack temperature of 38°C to 49°C (100°F to 120°F) when measured on an empty load 20 minutes into the drying cycle.

8.1.3.6
Gloves, glove pouches, and glove swatches shall be tumbled for 60 minutes and removed immediately at the end of the drying cycle. At the conclusion of the final drying cycle, gloves and glove pouches shall be dried on a forced-air, non-tumble drying mechanism operated at 10°C ± 5°C above current room temperature until dry but not for less than 8 hours. Glove swatches that are not dry at the conclusion of the fifth drying cycle shall be hung until fully dry.

Supplemental Information

<table>
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<th>File Name</th>
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Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:    
City:                      
State:       
Zip:                        
Submittal Date: Wed Feb 05 08:41:40 EST 2014

Committee Statement

Committee Statement: This proposal aligns the glove wash/dry preconditioning method with other standards in the project (1971, 1951, 1999). This changes the machine from residential to commercial front load washer/extractor. This method is thought to be more appropriate for leather.

Response Message: Public Input No. 43-NFPA 1977-2013 [Section No. 8.1.2]
<table>
<thead>
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<th>Operation</th>
<th>Time (min)</th>
<th>Temperature</th>
<th>Water Level</th>
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<tbody>
<tr>
<td>Suds using AATCC detergent #1993, 1.0 g/gal water</td>
<td>10</td>
<td>±3°C 49 ±5°F 120</td>
<td>Low*</td>
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<tr>
<td>Drain</td>
<td>1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Carry-over</td>
<td>5</td>
<td>±3°C 49 ±5°F 120</td>
<td>Low*</td>
</tr>
<tr>
<td>Drain</td>
<td>1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Rinse</td>
<td>2</td>
<td>±3°C 38 ±5°F 100</td>
<td>High*</td>
</tr>
<tr>
<td>Drain</td>
<td>1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Rinse</td>
<td>2</td>
<td>±3°C 38 ±5°F 100</td>
<td>High*</td>
</tr>
<tr>
<td>Drain</td>
<td>1</td>
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<tr>
<td>Rinse</td>
<td>2</td>
<td>±3°C 38 ±5°F 100</td>
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<tr>
<td>Drain</td>
<td>1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Extract</td>
<td>5</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

*See Table 8.1.3.2(b) for high and low water levels.
8.1.7 Pouch or Swatch Construction for Glove Composite Samples.

8.1.7.1 Swatches shall be used for single-layer composites. Pouches shall be used for multilayer composites. The swatch or pouch shall be 200 mm × 200 mm (8 in. × 8 in.). A smaller swatch or pouch size shall be permitted provided that the resulting test specimens are of sufficient size for the test; however, the pouch size shall not be reduced for the test specified in Section 8.22.2.

8.1.7.2 Glove composite swatches shall be constructed to simulate the actual layers of the glove body or glove interface component, arranged in proper order.

8.1.7.3 The glove composite swatches shall be stitched on all four sides using the same thread as used in the glove construction.

8.1.7.4 Pouches shall be made of two glove composite swatches.

8.1.7.4.1 The two glove composite swatches shall be of the same materials and construction.

8.1.7.4.2 The two glove composite swatches shall then be sewn together, inner liner to inner liner, on three sides using the same thread as used in the glove construction.

8.1.7.5 Glove composite swatches and pouches shall be permitted to not be stitched or to have reduced stitching if laundering preconditioning is not required on the composite samples.

Submitter Information Verification

Submitter Full Name: David Trebisacci
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Submittal Date: Wed Feb 05 09:09:25 EST 2014

Committee Statement

Committee Statement: Provides clear instruction on the preparation of glove samples.
Response Message:

Public Input No. 45-NFPA 1977-2013 [New Section after 8.1.4]
First Revision No. 57-NFPA 1977-2014 [ New Section after 8.1.4 ]

8.1.8 Wet Conditioning Procedure for Whole Gloves.

8.1.8.1 Test subjects shall be selected so that their hand dimensions are as close as possible to the midrange for hand length and hand circumference for size small and size large gloves as specified in Table 6.3.5.2(b) and Table 6.3.5.2(d).

8.1.8.2 The wrist crease location shall be marked as described in 6.8.3.3 through 6.8.3.9 on each specimen around the entire glove 0/-3 mm (0/-0.25 in.). In the same manner, the water height line shall then be marked on each specimen 25 mm 0/-3 mm (1 in. 0/-0.25 in.) below (toward the fingers) the location of the wrist crease around the entire glove.

8.1.8.3 The test subject shall don the test specimen gloves.

8.1.8.4 The test subject shall immerse the donned specimens straight down into two containers of water at a temperature of 21°C ± 3°C (70°F ± 5°F) to the water height line for 15 seconds 1.5/-0 seconds.

8.1.8.5 The glove specimens shall then be tested within 1 minute.

Submitter Information Verification

Submitter Full Name: David Trebisacci
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Submittal Date: Wed Feb 05 09:10:53 EST 2014

Committee Statement

Committee Statement: Aligns grip test with NFPA 1971-2013 and NFPA 1951-2013 and aligns wetting method with NFPA 1951-2013 and NFPA 1999-2013. The current rope grip test is variable and subjective. The proposed test method provides a more consistent way of identifying gloves that have very slippery surfaces that when wet may cause a complete loss of gripping ability.

Response Message:

Public Input No. 92-NFPA 1977-2013 [New Section after 8.1.4]
8.1.6* Glove Test Areas.
The glove test areas shall be as described in this subsection and as shown in Figure 8.1.6, with the glove test area abbreviations designated as follows:

(1) P: palm; B: back; S: side
(2) A-P: Palm side of hand from finger crotch line to 1/3 of the way down (grasp area)
(3) B-P: Palm side of hand from 1/3 of the way down (grasp area) to the wrist crease
(4) C-P: Palm side of hand from the wrist crease to 25 mm (1 in.) past the wrist crease
(5) D-P: Palm side of thumb
(6) E-P: Palm side of tip of thumb
(7) F-P: Palm side of index finger
(8) G-P: Palm side of fingertip of index finger
(9) H-P: Palm side of nonindex fingers
(10) I-P: Palm side of fingertip of nonindex fingers
(11) A-PS: Sides of hand adjacent to area A-P
(12) B-PS: Outside of hand adjacent to area B-P
(13) C-PS: Sides of hand adjacent to area C-P
(14) D-PS: Outside of thumb adjacent to area D-P
(15) E-PS: Inside of thumb adjacent to area D-P
(16) F-PS: Outside of index finger adjacent to area F-P
(17) H-PS: Between fingers adjacent to areas F-P and H-P
(18) I-PS: Outside of and adjacent to the smallest finger
(19) A-B: Back side of hand from finger crotch line to 1/3 of the way down (knuckle area)
(20) B-B: Back side of hand from 1/3 of the way down (knuckle area) to the wrist crease
(21) C-B: Back side of hand from the wrist crease to 25 mm (1 in.) past the wrist crease
(22) D-B: Back side of thumb
(23) E-B: Back side of tip of thumb
(24) F-B: Back side of index finger
(25) G-B: Back side of fingertip of index finger
(26) H-B: Back side of nonindex fingers
(27) I-B: Back side of fingertip of nonindex fingers
(28) A-BS: Sides of hand adjacent to area A-B
(29) B-BS: Outside of hand adjacent to area B-B
(30) C-BS: Sides of hand adjacent to area C-B
(31) D-BS: Outside of thumb adjacent to area D-B
(32) E-BS: Inside of thumb adjacent to area D-B
(33) F-BS: Outside of index finger adjacent to area F-B
(34) H-BS: Between fingers adjacent to areas F-B and H-B
(35) I-BS: Outside of and adjacent to the smallest finger

**Figure 8.1.6 Glove Test Areas.**

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**Supplemental Information**

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<thead>
<tr>
<th>File Name</th>
<th>Description</th>
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**Submitter Information Verification**

**Submitter Full Name:** David Trebisacci  
**Organization:** National Fire Protection Assoc  
**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submittal Date:** Wed Feb 05 08:56:19 EST 2014

**Committee Statement**
Committee Statement: Providing chart to determine glove test areas in testing. This is the same basic chart that is now used in NFPA 1971-2013, NFPA 1951-2013, and NFPA 1999-2013. Adding specimen instructions for Conductive Heat which is the only test that defines that only certain areas of the glove be tested. All other glove composite tests apply to all areas of the glove. Additional specimen instructions align with other standards in the project and provides uniform wording for instructions. Figure 8.1.18 from the 2013 edition of NFPA 1971 needs to be added and renumbered accordingly. An Annex item associated with glove test areas is also to be added.

Response Message: Public Input No. 46-NFPA 1977-2013 [New Section after 8.1.4.12.2]
A.8.1.6

When a glove is two-dimensional rather than three-dimensional (the glove in Figure 8.1.6 is three-dimensional), then the same methodology should be applied to the two-dimensional glove. For example, if there are requirements for the sides of the fingers, then the area of the glove that would cover the sides of the fingers should be considered for these requirements even though the glove does not have forchettes.

When wearing a correctly sized glove and laying the gloved hand completely flat on an even, flat surface, the portion of the glove that comes in contact with the even, flat surface should be considered the palm test areas of the glove. The layers immediately above the palm areas should be considered the areas next to the palm areas.

The finger sides should include the interior side areas of the small, ring, middle, and index fingers for a glove, which are hidden from sight, as observed both from the glove palm and glove back sides, when an individual wearing a correctly sized glove has his or her fingers completely closed.

The back area is intended to include all parts of the glove that are not defined as the palm area or the side areas. The layers immediately beneath the back areas should be considered the side areas next to the back areas.
8.2.2.2
Samples shall be conditioned as tested before and after five laundering cycles as specified in 8.1.2, then preconditioned as specified in 8.1.1.

Submitter Information Verification

Submitter Full Name: David Trebisacci
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Street Address:
City:
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Submittal Date: Wed Feb 05 09:14:18 EST 2014

Committee Statement

Committee Statement: The proposed text is identical to that of Section 8.2.3 in NFPA 1977-2005. I recall the TC making a change in the 2011 edition to bring the laundering conditions in NFPA 1977 in line with those found in NFPA 1971. That change was affected in Section 8.1.2 which addresses laundering conditions (wash temps, etc.). However, I believe the number of required cycles was inadvertently dropped from the 2011 edition and should be reinstated to five cycles in the next edition to reflect the likely actual testing protocol being used today.

Response Message:

Public Input No. 99-NFPA 1977-2014 [Section No. 8.2.2.2]
8.3.1.2
Modifications to this test method for testing woven textile materials shall be as specified in 8.3.8 8.3.9.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Wed Feb 05 16:16:09 EST 2014

Committee Statement

Committee Statement: Editorial correction.
Response Message:
First Revision No. 60-NFPA 1977-2014 [ Section No. 8.3.1.3 ]

8.3.1.3
Modifications to this test method for testing knit textile materials shall be as specified in 8.3.9 8.3.10.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
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Submittal Date: Wed Feb 05 16:18:01 EST 2014

Committee Statement

Committee Statement: Editorial correction.
Response Message:
8.3.1.4
Modifications to this test method for testing nonwoven textile materials shall be as specified in 8.3.10 8.3.11.

Submitter Information Verification

Submitter Full Name: David Trebisacci  
Organization: National Fire Protection Assoc  
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Submittal Date: Wed Feb 05 16:19:17 EST 2014  

Committee Statement

Committee Statement: Editorial correction.  
Response Message:
8.3.1.5
Modifications to this test method for testing visibility marking materials shall be as specified in 8.3.11 8.3.12.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
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Submittal Date: Wed Feb 05 16:20:12 EST 2014

Committee Statement

Committee Statement: Editorial correction.
Response Message:
8.3.1.6
Modifications to this test method for testing lettering, including transfer film, shall be as specified in 8.3.12 8.3.13.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address: 
City: 
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Zip: 
Submittal Date: Wed Feb 05 16:21:03 EST 2014

Committee Statement

Committee Statement: Editorial correction.
Response Message:
First Revision No. 64-NFPA 1977-2014 [ Section No. 8.3.1.7 ]

8.3.1.7
Modifications to this test method for testing small specimens not meeting the specimen size requirements of 8.3.2.1 shall be as specified in 8.3.13 8.3.14 .

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Wed Feb 05 16:22:13 EST 2014

Committee Statement

Committee Statement: Editorial correction.
Response Message:
8.4.5 Apparatus.

8.4.5.1 The test oven shall be a horizontal-flow circulating oven with minimum interior dimensions so that the specimens can be suspended and are at least 50 mm (2 in.) from any interior oven surface and other test specimens.

8.4.5.2 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.

8.4.5.3 A test thermocouple shall be positioned so that it is level with the horizontal centerline of a mounted sample specimen.

8.4.5.4 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 airflow enters the test chamber.

8.4.5.5 The thermocouple shall be an exposed bead, Type J or Type K, No. 30 AWG thermocouple.

8.4.5.6 Unless otherwise specified for the specific item, 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.
First Revision No. 66-NFPA 1977-2014 [ Section No. 8.4.6 ]

8.4.6 Procedure.
Testing shall be performed in accordance with ASTM F2894, *Standard Test Method for Evaluation of Materials, Protective Clothing and Equipment for Heat Resistance Using a Hot Air Circulating Oven*, using the following parameters:

(1) The test temperature shall be 260°C, 6/−0°C (500°F, 10/−0°F).

(2) The optional stretching frame shall be used when evaluating knit materials.

8.4.6.1 Specimen marking and measurements shall be conducted in accordance with the procedure specified in AATCC 135, *Dimensional Changes of Fabrics After Home Laundering*.

8.4.6.2 The specimen shall be suspended at the top and centered in the oven so that the entire specimen is not less than 50 mm (2 in.) from any oven surface or other specimen, and airflow is parallel to the plane of the material.

8.4.6.3 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 the door is closed shall not exceed 30 seconds.

8.4.6.4 The specimen, mounted as specified, shall be exposed in the test oven for 5 minutes, +15/−0 seconds. The test exposure time shall begin when the test thermocouple recovers to a temperature of 260°C, +6/−0°C (500°F, +10/−0°F) or other temperature specific to the item as specified.

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

8.4.6.6 After the specified exposure, the specimen also shall be measured to determine pass/fail. Knit fabric shall be pulled to its original dimensions and shall be allowed to relax for 1 minute prior to measurement to determine pass/fail.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Feb 05 16:29:47 EST 2014

Committee Statement
**Committee Statement:** ASTM F2894 was developed to address many of the calibration and procedural issues found in ISO 17493, and previously described by this section in detail. ASTM F2894 addresses all the subparts of the previous section 8.4.6, including the stretching of the knit specimens to their original dimensions (although optional in F2894, thus the modification to require it for knit specimens).

**Response Message:**
Public Input No. 102-NFPA 1977-2014 [Section No. 8.4.6]
8.4.12.6
The length of the brim or peak shall be the shortest distance from each point to the center of the radius on the top side of the brim or peak where they intersect the dome of the helmet. These distances shall be measured and recorded as the original lengths.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Feb 05 16:34:38 EST 2014

Committee Statement

Committee Statement: This additional language clarifies the conduct and intent of the test method.
Response Message:
First Revision No. 68-NFPA 1977-2014 [ Section No. 8.4.12.10 ]

8.4.12.11
The vertical distance from the marked points to the base plane shall be measured, recorded, and compared with the measurements recorded in 8.4.12.5 and 8.4.12.6 to determine pass/fail.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Feb 05 16:38:31 EST 2014

Committee Statement

Committee Statement: This additional text provides the correct paragraph references.
Response Message:
8.4.13.2
Specimen gloves shall be in size small and size large.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Feb 05 16:44:04 EST 2014

Committee Statement

Committee Statement: Glove size is not currently provided.
Response Message: Public Input No. 47-NFPA 1977-2013 [New Section after 8.4.13.1]
8.4.13.5
The opening of the glove shall be clamped together, and the specimen shall be suspended by the clamp in the oven so that the entire glove is not less than 50 mm (2 in.) from any oven surface or other specimen and airflow is parallel to the plane of the material. **One to three glove specimens shall be placed in the test oven at one time.** The glove specimens shall be suspended such that each specimen is the same distance from the airflow source, so that no glove sample is blocking the airflow to other glove samples.

**Submitter Information Verification**

Submitter Full Name: David Trebisacci  
Organization: National Fire Protection Assoc  
Street Address:  
City:  
State:  
Zip:  
Submittal Date: Wed Feb 05 16:45:28 EST 2014

**Committee Statement**

Committee Statement: Adding specifications for how many gloves can be tested at one time and the orientation of the specimens inside of the oven. This correlates with the glove test methodology in NFPA 1971.

Response Message:

Public Input No. 48-NFPA 1977-2013 [Section No. 8.4.13.4]
8.4.14 Specific Testing Requirement for Protective Footwear.

8.4.14.1 Samples for conditioning shall be whole boots. Footwear specimens shall include a sole, a heel, and an upper.

8.4.14.2 Conditioning shall be performed as specified in 8.1.1.

8.4.14.3 The footwear specimen shall be size 9.

8.4.14.4 Footwear specimens shall be filled with 4 mm ($\frac{3}{16}$ in.) perforated soda-lime glass beads. Any and any closures shall be fastened.

8.4.14.5 The test thermocouple shall be positioned so that it is level with the horizontal centerline of a footwear test specimen. The thermocouple shall be equidistant between the vertical centerline of a footwear test specimen placed in the middle of the oven and the oven wall where the airflow enters the test chamber.

8.4.14.6 The minimum dimensions for the test oven specified in 8.4.5.1 shall be 610 mm × 610 mm × 610 mm (24 in. × 24 in. × 24 in.).

8.4.14.7 The protective footwear test specimen shall be placed in the center of the test oven with the centerline of the front of the specimen facing the airflow.

8.4.14.8 Following removal from the oven, the specimen shall be allowed to cool at room temperature for not less than 5 minutes, $+15^\circ$ $-0$ seconds.

8.4.14.9 Within 10 minutes, $15^\circ-0$ seconds, after removal from the oven, the inside and outside of the test specimen shall be examined for evidence of melting, separation, and functionality of hardware on the footwear. Footwear separation of 1.4 mm × 18 mm (0.55 in. × 0.71 in.) or more in any orientation shall be recorded and reported.

8.4.14.10 Each tested specimen shall be reconditioned as specified in 8.1.1 and then re-examined the inside and outside re-examined for melting, separation, and functionality of hardware on the footwear. The functionality of each part of the footwear shall be reported as pass or fail. Failure of any one part shall constitute failure for the entire sample.

8.4.14.11 The functionality of each part of the footwear shall be reported as pass or fail. Failure of any one part shall constitute failure for the entire sample.

8.4.14.12 Testing shall be performed as specified in 8.4.2 through 8.4.8. Thermal shrinkage shall not be measured.

Submitter Information Verification
Committee Statement

Clarifies procedure and the determination of separation. This is consistent with the language in NFPA 1971, 1951.

Public Input No. 76-NFPA 1977-2013 [Section No. 8.4.14]
8.4.15.8
The functionality of fire shelter attachment hardware and the hardware that releases the item from the "as worn" position shall be reported as pass or fail. Failure of any one of these hardware items shall constitute failure for the entire sample.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Feb 05 16:51:33 EST 2014

Committee Statement

Committee Statement: This change makes the specific requirements in the test method consistent with the performance requirement of 7.9.2. See also FR 51.
Response Message:
Public Input No. 20-NFPA 1977-2013 [Section No. 8.4.15.8]
8.7.4.1
Specimens shall be tested using five cycles of Machine Cycle I, Wash Temperature IV V, and Drying Procedure Ai of AATCC 135, Dimensional Changes of Fabrics After Home Laundering.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Feb 05 16:54:22 EST 2014

Committee Statement

Committee Statement: Makes the wash and dry method for cleaning shrinkage consistent with the method specified for flame, heat and thermal shrinkage, label legibility, THL, etc. This changes the wash temp from 49 to 60C and the drying setting from Perm Press to Cotton Sturdy (Normal). This makes this test consistent with NFPA 1971, and NFPA 1951.

Response Message:

Public Input No. 18-NFPA 1977-2013 [Section No. 8.7.4.1]
8.14 Flame Resistance Test for Protective Footwear.
8.14.1 Application.
This test method shall apply to protective footwear.
8.14.2 Samples.
8.14.2.1 Samples for conditioning shall be whole boots with laces in place complete footwear. 
8.14.2.2 Samples shall be conditioned as specified in 8.1.1.
8.14.3 Specimens.
8.14.3.1 Specimens for testing shall be the same as samples for conditioning.
8.14.3.2 Testing shall be conducted on three specimens of complete footwear items.
8.14.4 Apparatus.
8.14.4.1 The test apparatus shall consist of a burner, crucible tongs, support stand, utility clamp, stopwatch, butane gas, gas regulator valve system, and measuring scale and meet the following specifications: fuel pan, movable shutter(s), specimen holder, n-heptane, ignition source, and timing device.

- The burner shall be a high-temperature, liquefied-type Fisher burner.
- The stopwatch or other timing device shall measure the burning time to the nearest 0.1 second.
- The butane shall be of commercial grade, 99.0 percent pure or better.
- The gas regulator system shall consist of a control valve system with a delivery rate designed to furnish gas to the burner under a pressure of 17.3 kPa, ±1.7 kPa (2.5 psi, ±0.25 psi) at the reducing valve. The flame height shall be adjusted at the reducing valve to produce a pressure of 0.7 kPa, ±0.07 kPa (0.1 psi, ±0.01 psi).

8.14.4.1.1 The fuel pan shall be 305 mm × 457 mm × 63.5 mm (12 in. × 18 in. × 2.5 in.).
8.14.4.1.2 The movable shutter(s) shall be located at a height of 255 mm (10 in.), ± 13 mm (1/2 in.), above the surface of the water and n-heptane fluid as measured before ignition. The shutter(s) shall be of a size sufficient to cover the surface area of the fuel pan and shall be capable of being fully retracted or fully extended within 1 second.
8.14.4.1.3 The specimen holder shall be capable of suspending the specimen over the flame in a manner such that the holder does not impede the flames.
8.14.4.1.4 A stopwatch or other device shall measure the burning time to the nearest 0.1 second.
8.14.4.2
A freestanding flame height indicator shall be used to assist in adjusting the burner flame height. The indicator shall mark a flame height of 75 mm (3 in.) above the top of the burner.

8.14.4.3

A specimen support assembly shall be used to support the footwear specimen above the burner flame.

8.14.5  Procedure.

8.14.5.1

The burner shall be ignited, and the test flame shall be adjusted to a height of 75 mm (3 in.) with the gas on/off valve fully open and the air supply completely and permanently off, so that the flame height is closely controlled. The test shall be conducted in a draft-free area.

8.14.5.2

The 75 mm (3 in.) flame height shall be obtained by adjusting the orifice in the bottom of the burner so that the top of the flame is level with the marked flame height indicator. The fuel pan shall be level.

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 (1 1/2 in.) at the angles in the areas shown in Figure 8.14.5.3. All materials on the exterior of the specimen that were not exposed to the burner flame in the five test sites specified in Figure 8.14.5.3 shall be exposed to the burner flame, and the requirements specified in 8.14.5.5, 8.14.5.6, and 8.14.5.7 shall apply. Water shall be placed in the fuel pan to a height of 13 mm (1/2 in.).

Figure 8.14.5.3 Test Areas.

8.14.5.4

The burner flame shall be applied to the specimen for 12 seconds. After 12 seconds, the burner shall be removed. A sufficient amount of n-heptane shall be added to the fuel pan such that it will burn freely for 1.5 to 2 minutes.

8.14.5.5

The afterflame time shall be measured as the time, in seconds to the nearest 0.2 second, that the specimen continues to flame after the burner is removed from the flame. The specimen shall be mounted in the specimen holder as follows:

(1) The toe shall be at an angle of 7.5 degrees, ± 2.5 degrees, above the heel.

(2) The height of the lowest edge of the specimen shall be 305 mm (12 in.), 0/-25 mm (0/-1 in.), from the surface of the water and n-heptane fluid as measured before ignition.

(3) The heel-toe axis of the specimen shall be parallel with the 457 mm (18 in.) side of the fuel pan.

8.14.5.6
Following the flame exposure, the specimen shall be removed and examined for burn-through. With the shutter retracted, the n-heptane shall be ignited using a suitable ignition source.

8.14.5.6.1
Where paper or other material is used to ignite the n-heptane, it shall not be left in the fuel pan, where it can disturb the flame pattern.

8.14.5.7
Each layer of the specimen shall be examined for melting or dripping. The n-heptane shall burn freely for 1 minute, ± 5 seconds.

8.14.5.8
The shutter(s) shall be positioned above the flame.

8.14.5.9
The specimen shall be positioned above the shutter(s) over the approximate center of the flame area.

8.14.5.10
The shutter(s) shall be retracted and specimen flame exposure shall commence not longer than 1 minute 15 seconds from ignition.

8.14.5.11
The specimen shall be exposed to the flame for 12 seconds ± 0.2 second.

8.14.5.12
Following flame exposure, the shutter(s) shall be repositioned above the flame.

8.14.5.13
Water shall be placed in the fuel pan to a height of 13 mm ( 1/8 in.).


8.14.6.1
The afterflame time shall be recorded and reported for each specimen.

8.14.6.2
The average afterflame time shall be recorded and reported.

8.14.6.3
The afterflame time shall be reported to the nearest 0.2 second.

8.14.6.4
Observations of burn-through, melting, or dripping for each specimen shall be recorded and reported.

8.14.7 Interpretation.

8.14.7.1
Pass or fail performance shall be based on average afterflame time.

8.14.7.2
Any observed burn-through, melting, or dripping shall constitute failure of the test sample.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address: City:
State:
Zip:
Submittal Date: Wed Feb 05 16:58:31 EST 2014

Committee Statement
Committee Statement: Aligning with footwear flame test in NFPA 1971-2013 and NFPA 1951-2013. This flame test allows all materials of the footwear to be evaluated. This also reduces the amount of variability that is seen when using a burner to test different portions of the outsole. Laces are being excluded as they are in the Heat Resistance test of NFPA 1977-2011.

Response Message: Public Input No. 85-NFPA 1977-2013 [Section No. 8.14]
First Revision No. 75-NFPA 1977-2014 [ Section No. 8.16.4.3.2 ]

8.16.4.3.2
Specimens of visibility markings used on helmets shall be tested for retroreflectivity only after the convective heat exposure as specified in 8.4.11 8.4.12.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Feb 05 17:00:44 EST 2014

Committee Statement

Response Message:
Public Input No. 19-NFPA 1977-2013 [Section No. 8.16.4.3.2]
8.17.5.4*

The force applied to the retention system shall be slowly increased to 225 N ± 5 N (50 lbf ± 1 lbf). The force shall be increased smoothly from 45 N to 225 N (10 lbf to 50 lbf) at a rate between 9 N/sec and 45 N/sec (2 lbf/sec and 10 lbf/sec).

Supplemental Information

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Submitter Information Verification

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<thead>
<tr>
<th>Submitter Full Name:</th>
<th>David Trebisacci</th>
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<tr>
<td>Organization:</td>
<td>National Fire Protection Assoc</td>
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<td>Submittal Date:</td>
<td>Wed Feb 05 17:01:47 EST 2014</td>
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Committee Statement

| Committee Statement: | Correlates language with NFPA 1971. Provides further explanation on the conduct of the test. Related Annex A text will be added. |
|---------------------|-----------------------------------------------------------------------------------------------------------------
| Response Message: | Public Input No. 98-NFPA 1977-2013 [New Section after 8.17.5.3] |
The retention system test measures vertical movement. When a load is applied, the helmet can shift from its original horizontal plane position. If this occurs, the helmet should be secured in such a manner that the horizontal plane position is maintained, but the vertical movement is not influenced. This could be accomplished with a securing mechanism for the brim that moves vertically with the helmet.
First Revision No. 77-NFPA 1977-2014 [ Section No. 8.18 ]

8.18 Protective Footwear Abrasion Test.
8.18.1 This test shall apply to protective footwear sole/heel compounds.
8.18.2 Samples.
8.18.2.1 Samples for conditioning shall be complete footwear soles with heel as specified in ISO 4649, *Rubber, vulcanized or thermoplastic — Determination of abrasion resistance using a rotating cylindrical drum device*.
8.18.2.2 Samples shall be conditioned as specified in 8.1.1.
8.18.3 Specimens.
8.18.3.1 Specimens for testing shall be the same as samples for conditioning.
8.18.3.2 Testing shall be conducted on a minimum of three specimens of footwear soles with heels sole/heel compound specimens.
8.18.4 Procedure.
8.18.5 Report.
The abrasion resistance rating relative volume loss of each specimen shall be recorded and reported.
8.18.6 Interpretation.
One or more footwear specimens failing this test shall constitute failing performance.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Feb 05 17:06:55 EST 2014

Committee Statement
Committee Statement: Aligning with footwear abrasion test in NFPA 1971-2013 and NFPA 1951-2013. With the current abrasion test, the drum with sandpaper rotates and the sample remains stationary. This creates some issues because the rubber leaves residue on the paper for successive runs. With the proposed method, the drum rotates and the sample traverses across the drum providing a cleaner sandpaper surface throughout the test run. Further, the data collected for the current test involves a height measurement gauge that is difficult to read where the proposed test involves a weight measurement on a scale which is less subject to user error.

Response Message:
Public Input No. 80-NFPA 1977-2013 [Section No. 8.18]
**8.20.2** Samples.

**8.20.2.1** Samples to be conditioned shall be the composite used in actual glove construction consisting of each single layer, with all layers arranged in proper order and stitched along the edges using the same thread as used in the construction of the glove wristlet material or a pouch or swatch as described in 8.1.5.

**8.20.2.2** Three samples shall be conditioned as specified in 8.1.1.

**8.20.2.3** Three additional samples shall be conditioned as specified in 8.1.3 for glove body pouch or swatch specimens or 8.1.2 for glove interface composite wristlet specimens, followed by conditioning as specified in 8.1.1.

---

**Submitter Information Verification**

- **Submitter Full Name:** David Trebisacci
- **Organization:** National Fire Protection Assoc
- **Street Address:**
- **City:**
- **State:**
- **Zip:**

**Submittal Date:** Wed Feb 05 17:09:21 EST 2014

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**Committee Statement**

- **Committee Statement:** Clarifies configuration and number of samples to be conditioned.
- **Response Message:**

  Public Input No. 49-NFPA 1977-2013 [Section No. 8.20.2]
8.20.3 Specimens.

8.20.3.1 Each specimen to be tested shall be a rectangle at least 50 mm (2 in.) wide by 150 mm (6 in.) long. Specimens shall be the composite used in actual glove construction consisting of each single layer, with all layers arranged in proper order. In each test, the specimen's normal outer surface shall be exposed to the flame.

8.20.3.2 Specimens Three specimens shall be tested both before and after being subjected to five laundering cycles as specified in 8.1.2 following the conditioning specified in 8.20.2.2.

8.20.3.3 Testing shall be conducted on three specimens for each material. Three additional specimens shall be tested following the conditioning specified in 8.20.3.3.

8.20.3.4 Where glove construction or a proposed glove construction has stitched-through seams, testing shall be conducted on three additional specimens containing these seams. The seams shall be in the direction of the 150 mm (6 in.) dimension.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organizations: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Feb 05 17:10:18 EST 2014

Committee Statement

Committee Statement: Clarifying number of specimens to be tested.
Response Message:
Public Input No. 50-NFPA 1977-2013 [Section No. 8.20.3]
8.21.2 Samples.

8.21.2.1 Samples for conditioning shall consist of the composite used in the actual glove body construction at the palm of the hand and at the palm side of the fingers, with the layers arranged in the proper order form of a pouch or swatch as described in 8.1.5.

8.21.2.2 Samples shall be permitted to be stitched around the perimeter where multiple layers exist.

8.21.2.3 Three samples shall be conditioned as specified in 8.1.1.

8.21.2.3 Three additional samples shall be conditioned by being subjected to 5 laundering cycles as specified in 8.1.2 8.1.3 , followed by conditioning as specified in 8.1.1.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:  
City:  
State:  
Zip:  
Submittal Date: Fri Feb 07 16:20:41 EST 2014

Committee Statement

Committee Statement: Clarifies instructions on sample configuration. Aligns with other documents in project.
Response Message:  
Public Input No. 51-NFPA 1977-2013 [Section No. 8.21.2]
First Revision No. 81-NFPA 1977-2014 [ Section No. 8.21.3 ]

8.21.3 Specimens.
8.21.3.1 Specimens for testing shall be taken from the samples for conditioning. Specimens shall not include seams in the test area.
8.21.3.2 Specimens for testing shall be representative of the glove body composite construction at glove areas A-B, B-B, C-B, D-P, E-P, F-P, G-P, H-P, and I-P as described in 8.1.6. All variations in composite construction and the order of layering of composite materials shall constitute a new composite and shall be tested separately. Where a composite is identical to another composite except for additional reinforcement layer(s), the composite with no reinforcement layers shall be representative of the composite with reinforcement layer(s). Specimens shall not include seams except in the following cases:

(1) Ridged or similar areas where stitching is used to create specific performance characteristics rather than for glove assembly

(2) Where there are size constraints of a material, making it necessary to allow stitching to create the sample size required

8.21.3.2.1 Stitching shall be of the same type as is used in the actual glove construction.
8.21.3.3 Testing shall be conducted on three specimens following the conditioning specified in 8.21.2.2 8.21.2.3.
8.21.3.4 Testing shall be conducted on three additional specimens following the conditioning specified in 8.21.2.3 8.21.2.4.
8.21.3.5 After conditioning, the pouch and necessary stitching shall be cut to form specimens for testing.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Fri Feb 07 16:26:48 EST 2014

Committee Statement
Committee Statement: Adding specimen instructions for Conductive Heat which is the only test that defines that only certain areas of the glove be tested. All other glove composite tests apply to all areas of the glove. Additional specimen instructions align with other standards in the project and provides uniform wording for instructions.

Response Message: Public Input No. 52-NFPA 1977-2013 [Section No. 8.21.3]
8.21.4.1
Specimens shall be tested in accordance with ASTM F 1060, Standard Test Method for Thermal Protective Performance of Materials for Protective Clothing for Hot Surface Contact, with the following modifications:

1. Specimens shall be tested using an exposure temperature of 280°C (536°F). The pressure applied during the test shall be 3 kPa (0.5 psi).

2. The time in seconds to pain and to second-degree burn (blister) as predicted by the Stoll Human Tissue Burn Tolerance Criteria shall be recorded and reported.

   The overlay shall be positioned on the recorder chart, matching the zero of the overlay with the point on the recorder chart corresponding to the time at which the sensor and specimen were placed in direct contact with the hot plate.

   The horizontal (time) axis shall be placed in line with the initial trace of the pen.

   Exposure time shall be read to the nearest 0.1 second from the overlay chart at the point where the sensor response and the tissue tolerance curves cross.

3. The section of the apparatus lowering the specimen, sensor, and weighed system shall travel at a constant rate of speed.

4. The specimen shall be lowered parallel to the hotplate.

5. The recorder/computer shall be activated automatically by a mechanical or electrical contact when the specimen contacts the hotplate.

6. Specimen size shall be permitted to be larger than 100 mm × 150 mm (4 in. × 6 in.) to accommodate the test apparatus.

Submitter Information Verification

Submitter Full Name: David Trebisacci
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Submittal Date: Fri Feb 07 16:28:16 EST 2014

Committee Statement
<table>
<thead>
<tr>
<th>Committee Statement:</th>
<th>Proposal automates this test to reduce variability. Also removes the requirement to use a chart recorder as test results are often generated via a computer program. Also adding specifications that test specimen size can be larger to better accommodate certain test equipment specimen holder devices, etc. Aligns with other standards in the project.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response Message:</td>
<td>Public Input No. 57-NFPA 1977-2013 [Section No. 8.21.4.1]</td>
</tr>
</tbody>
</table>
First Revision No. 83-NFPA 1977-2014 [Section No. 8.21.6]

8.21.6 Interpretation.
8.21.6.1 Pass or fail determinations shall be based on the average time to pain and the average time to second-degree burn of all specimens tested.
8.21.6.2 If an individual result from any test set varies more than ±8 percent from the other individual results of that test series, the results from the test series shall be discarded and another set of specimens shall be tested.

Submitter Information Verification

Submitter Full Name: David Trebisacci
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Submittal Date: Fri Feb 07 16:29:01 EST 2014

Committee Statement

Committee Statement: The TPP and Conductive Heat Resistance variability requirement was removed in NFPA 1971-2013 for glove composites due to the variable nature of leather which is commonly used in gloves. The composite value may well exceed the requirements but show too high a variation to meet these requirements. If values are under the requirement the average will likely be failing. The current variability requirements are too restrictive for leather composites.

Response Message:
Public Input No. 58-NFPA 1977-2013 [Section No. 8.21.6]
8.22.2 Samples.

8.22.2.1 Samples for conditioning shall consist of the actual glove body composite construction, with the layers arranged in proper order, be in the form of a pouch or swatch as described in 8.1.5.

8.22.2.2 Samples for conditioning shall be a minimum of 200 mm, ±12 mm (8 in., ± 1/2 in.) square. Samples shall be permitted to be stitched around the perimeter where multiple layers exist.

8.22.2.3 Three samples shall be conditioned as specified in 8.1.1.

8.22.2.3 Three additional samples shall be conditioned by being subjected to five laundering cycles, as specified in 8.1.2, followed by conditioning as specified in 8.1.1.

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Submittal Date: Fri Feb 07 16:29:45 EST 2014

Committee Statement

Committee Statement: Clarifies sample configuration to be tested.
Response Message:
Public Input No. 53-NFPA 1977-2013 [Section No. 8.22.2]
8.22.3 Specimens.

8.22.3.1 Specimens for testing shall be taken from the same as samples for conditioning. Specimens shall not include seams in the test area. Specimens shall not be stitched to hold individual layers together during testing.

8.22.3.2 Specimens for testing shall be representative of each glove body composite construction. All variations in composite construction and the order of layering of composite materials shall constitute a new composite and shall be tested separately. Where a composite is identical to another composite except for additional reinforcement layer(s), the composite with no reinforcement layers shall be representative of the composite with reinforcement layer(s). Specimens shall not include seams except in the following cases:

1. Ridged or similar areas where stitching is used to create specific performance characteristics rather than for glove assembly
2. Where there are size constraints of a material, making it necessary to allow stitching to create the sample size required

8.22.3.2.1 Stitching shall be of the same type as is used in the actual glove construction.

8.22.3.3 Three specimens shall be tested following the conditioning specified in 8.22.2.2.

8.22.3.4 Three additional specimens shall be tested following the conditioning specified in 8.22.2.3.
8.22.7 Interpretation.

8.22.7.1 Pass or fail determinations shall be separately based on the average reported TPP rating of all specimens.

8.22.7.2 If an individual result from any test set varies more than ±10 percent from the average result, the results from the test set shall be discarded and another set of specimens shall be tested.

Submitter Information Verification

Submitter Full Name: David Trebisacci  
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Submittal Date: Fri Feb 07 16:33:53 EST 2014

Committee Statement

Committee Statement: The TPP and Conductive Heat Resistance variability requirement was removed in NFPA 1971-2013 for glove composites due to the variable nature of leather which is commonly used in gloves. The composite value may well exceed the requirements but show too high a variation to meet these requirements. If values are under the requirement the average will likely be failing. The current variability requirements are too restrictive for leather composites.

Response Message:

Public Input No. 59-NFPA 1977-2013 [Section No. 8.22.7]
8.23.7  Specific Requirements for Testing Gloves.
8.23.7.1  Samples for conditioning shall consist of the actual glove body composite construction with the layers arranged in proper order be in the form of a pouch or swatch as described in 8.1.5.
8.23.7.2  Samples Specimens for testing shall be permitted to be stitched around the perimeter where multiple layers exist taken from the samples for conditioning.
8.23.7.3  Specimens for testing shall be the same as samples for conditioning representative of each glove body composite construction. All variations in composite construction and the order of layering of composite materials shall constitute a new composite and shall be tested separately. Where a composite is identical to another composite except for additional reinforcement layer(s), the composite with no reinforcement layers shall be representative of the composite with reinforcement layer(s). Specimens shall not include seams except in the following cases:
(1) Ridged or similar areas where stitching is used to create specific performance characteristics rather than for glove assembly
(2) Where there are size constraints of a material, making it necessary to allow stitching to create the sample size required
8.23.7.3.1  Stitching shall be of the same type as is used in the actual glove construction.
8.23.7.4  Cut resistance shall be performed under a load of 100 g (3.5 oz.).

Submitter Information Verification

Submitter Full Name: David Trebisacci
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Submittal Date: Fri Feb 07 16:34:36 EST 2014

Committee Statement

Committee Statement: Clarifies sample configuration and specimens for testing.
Response Message:
Public Input No. 55-NFPA 1977-2013 [Section No. 8.23.7]
8.23.8 Specific Requirements for Testing Footwear Uppers.

8.23.8.1 Samples for conditioning shall consist of either whole footwear items, footwear uppers, or representative composites of the thinnest part of the footwear upper construction, excluding the gusset, with the layers arranged in proper order materials.

8.23.8.2 Samples shall be permitted to be stitched around the perimeter where multiple layers exist.

8.23.8.3 Specimens for testing taken from whole footwear items or footwear uppers shall be the thinnest part of the footwear upper, shall consist of each composite of footwear upper used in the actual footwear construction, excluding the tongue and gusset, with all the layers arranged in proper order. Where a composite is identical to another composite except for additional reinforcement layer(s), the composite with no reinforcement layers shall be tested.

8.23.8.4 Cut resistance shall be performed under a load of 400 g (14 oz.).

Submitter Information Verification

Submitter Full Name: David Trebisacci
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Street Address:
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Submittal Date: Fri Feb 07 16:35:19 EST 2014

Committee Statement

Committee Statement: Clarifies the composition of the specimens are to be tested. This language is consistent with NFPA 1971, 1951
Response Message: Public Input No. 77-NFPA 1977-2013 [Section No. 8.23.8]
8.24.7 Specific Requirements for Testing Gloves.

8.24.7.1 Samples for conditioning shall consist of the actual glove body composite construction with the layers arranged in proper order be in the form of a pouch or swatch as described in 8.1.5.

8.24.7.2 Samples Specimens for testing shall be permitted to be stitched around the perimeter where multiple layers exist taken from the samples for conditioning.

8.24.7.3 Specimens for testing shall be the same as samples for conditioning representative of each glove body composite construction. All variations in composite construction and the order of layering of composite materials shall constitute a new composite and shall be tested separately. Where a composite is identical to another composite except for additional reinforcement layer(s), the composite with no reinforcement layers shall be representative of the composite with reinforcement layer(s). Specimens shall not include seams except in the following cases:

1. Ridged or similar areas where stitching is used to create specific performance characteristics rather than for glove assembly

2. Where there are size constraints of a material, making it necessary to allow stitching to create the sample size required

8.24.7.3.1 Stitching shall be of the same type as is used in the actual glove construction.

Submitter Information Verification

Submitter Full Name: David Trebisacci
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Submittal Date: Fri Feb 07 16:35:54 EST 2014

Committee Statement

Committee Statement: Clarifies the configuration of samples and specimens to be tested.
Response Message:
Public Input No. 56-NFPA 1977-2013 [Section No. 8.24.7]
8.24.8 Specific Requirements for Testing Footwear Uppers.

8.24.8.1 Samples for conditioning shall consist of either whole footwear items, footwear uppers, or representative composites of the thinnest part of the footwear upper construction, excluding the gusset, with the layers arranged in proper order materials.

8.24.8.2 Samples shall be permitted to be stitched around the perimeter where multiple layers exist.

8.24.8.3 Specimens for testing taken from whole footwear items or footwear uppers shall be the thinnest part of the footwear upper shall consist of each composite of footwear upper used in the actual footwear construction, excluding the tongue and gusset, with all the layers arranged in proper order. Where a composite is identical to another composite except for additional reinforcement layer(s), the composite with no reinforcement layers shall be tested.

Submitter Information Verification

Submitter Full Name: David Trebisacci
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Submittal Date: Fri Feb 07 16:36:29 EST 2014

Committee Statement

Committee Statement: Clarifies the composition of the specimens to be tested. Language will be consistent with NFPA 1971, 1951.
Response Message: 
Public Input No. 78-NFPA 1977-2013 [Section No. 8.24.8]
8.25.2.2
Samples shall be preconditioned for five laundering cycles conditioned as specified in 8.1.2 8.1.1.

Submitter Information Verification

Submitter Full Name: David Trebisacci
Organization: National Fire Protection Assoc
Street Address:
City:
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Zip:
Submittal Date: Fri Feb 07 16:37:11 EST 2014

Committee Statement

Committee Statement: This proposal aligns the preconditioning of dexterity specimens with other standards in this project. As received specimens are considered to be the worst case condition for this particular test.

Response Message:
Public Input No. 60-NFPA 1977-2013 [Section No. 8.25.2.2]
8.25.5 Procedures.

8.25.5.1 Testing shall be conducted in accordance with ASTM F 2010, *Standard Test Method for Evaluation of Glove Effects on Wearer Hand Dexterity Using Modified Pegboard Test*.

8.25.5.2 Test subjects shall be selected so that their hand dimensions are as close as possible to the midrange for hand length and hand circumference for size small and size large gloves as specified in Table 6.3.5.2(b) and Table 6.3.5.2(d). At least three test subjects shall be selected for both size small and size large.

Submitter Information Verification

Submitter Full Name: David Trebisacci
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Submittal Date: Fri Feb 07 16:37:59 EST 2014

Committee Statement

Committee Statement: This proposal clarifies that test subjects should have the appropriate hand size and that three test subjects should be selected.
Response Message:

Public Input No. 61-NFPA 1977-2013 [Section No. 8.25.5]
8.26 Grip Test.
8.26.1 Application.
8.26.1.1 This test method shall apply to protective gloves.
8.26.1.2 This test method shall apply to each protective glove material and construction combination.
8.26.2 Samples.
8.26.2.1 Samples for conditioning shall be whole glove glove pairs, in new, “as distributed” condition.
8.26.2.2 Sample glove pairs shall be preconditioned for five laundering cycles, as specified in 8.1.2, followed by conditioning as specified in 8.1.1.
8.26.2.3 Sample glove pairs shall not receive special softening treatment.
8.26.3 Specimens.
8.26.3.1 Specimens for testing shall be the same as samples for conditioning.
8.26.3.2 Testing shall occur on a minimum of three glove pair specimens each for size small and size large.
8.26.3.3 Specimen glove pairs shall be tested after wet conditioning as specified in 8.1.2.
8.26.4 Apparatus.
Grip testing shall be evaluated with the use of a 10 mm (\(\frac{3}{8}\) in.) diameter, three-strand, prestretched polyester rope attached to a calibrated force measuring device. The apparatus shall consist of a pulling device that is a 3.2 cm (1\(\frac{1}{4}\) in.) diameter fiberglass pole attached to an overhead calibrated force measuring device in such a fashion that pulls on the pole will be perpendicular to the ground and downward in direction. This pole shall be used until surface degradation occurs. The force measuring system shall provide a graphical plot of force vs. time.
8.26.5 Procedure.
8.26.5.1 Test subjects shall be selected so that their hand dimensions are as close as possible to the middle of the mid range for hand length and hand circumference for size small and size large gloves, as specified in the tables provided for Table 6.3.5.2(b) and Table 6.3.5.2(d). At least three test subjects shall be selected for both size small and size large gloves in 6.3.5.5.
8.26.5.2 Each test subject shall make three successive attempts to exert as much horizontal pulling force as possible using the dry rope and force measuring device, using both hands, one in front of the other. Thumbs shall not overlap the fingers, and both feet shall be firmly planted on the ground. The average horizontal pulling force over the three attempts shall be the barehanded control value. The gloves shall be conditioned by the wetting procedure specified in 8.26.5.3, before each set of three pulls by the test subject as described in 8.26.5.4.
8.26.5.3  
Conditioned sample gloves shall be tested on a dry rope and then on a wet rope. For the wet rope testing, the rope shall be subjected to wet conditioning by immersion in room temperature water at 21°C, ±3°C (70°F, ±5°F) for 2 minutes, followed by horizontal drip-drying for 5 minutes. The pulling device shall be wet conditioned before each individual pull by wiping with a damp rag.

8.26.5.4  
Each test subject shall test a minimum of three pairs of sample gloves using the method specified in 8.26.5.2. Test subjects shall attempt one trial with each pair of gloves. A trial shall consist of three successive attempts. The average horizontal pulling force over the three attempts shall be the pulling force with gloves. The average horizontal pulling force shall be calculated, recorded, and reported for each glove pair. The test subject and the test subject's hand shall be positioned as shown in Figure 8.26.5.4(a) and Figure 8.26.5.4(b), and as described in 8.26.5.4.2 and 8.26.5.4.3.

Figure 8.26.5.4(a) Position of Test Subject Body, Arms, and Hands with Respect to Pole. (Courtesy of Intertek Testing Services.)

Figure 8.26.5.4(b) Close-up of Position of Test Subject's Hands on Pole. (Courtesy of Intertek Testing Services.)
8.26.5.4.1
The test subject shall stand facing the pole with feet shoulder-width apart.

8.26.5.4.2
While wearing specimen gloves, the test subject shall grasp the pole with the bottom of the bottom hand at a height equal to the height of the subject.

8.26.5.4.3
The test subject's hands shall be stacked on each other and the thumbs shall not overlap the fingers.

8.26.5.4.4
The test subject's body shall be distanced from the pole so that the forearms are approaching vertical and in plane with the pole.

8.26.5.4.5
The test subject's elbows shall be shoulder-width apart, rotated neither fully in (arms parallel to the pole) nor fully out (arms perpendicular to the pole).

8.26.5.5
The average pulling force with gloves over the three trials for each size and each rope condition shall be calculated, recorded, and reported. The average pulling force with gloves for each size and each rope condition shall be compared with the barehanded control value. The test subject shall pull the pole with as much pulling force as possible in a smooth, steady, swift, and nonjerking action for \(5 \frac{1}{4}\) seconds. The test subject shall minimize forward or backward movement during the pull as much as possible. The test subject shall not bend the knees or pull down with body weight during the pull. The test subject shall continue to pull until the test facilitator instructs the test subject to end the pull at \(5 \frac{1}{4}\) seconds.

8.26.5.6
The percentage of barehanded control value shall be calculated as follows: The test subject shall repeat the pull described in 8.38.5.5 for a total of three pulls.

\[
\text{Percentage of bare-handed control value} = \frac{PF_g}{CV_b} \times 100
\]

where:
\(PF_g\) = average pulling force with gloves
\(CV_b\) = barehanded control value
### 8.26.6 Report.
The percentage of barehanded control value shall be recorded and reported for each specimen glove size and each rope condition. Any drop in force greater than 30% in any 0.2-second interval, as measured in the force-vs.-time graphical plot, shall be recorded and reported.

### 8.26.7 Interpretation.

#### 8.26.7.1
The percentage of barehanded control value for each size and each rope condition shall be used to determine pass or fail performance. Any drop in force greater than 30% in any 0.2-second interval shall constitute failing performance.

#### 8.26.7.2
Failure of either size or rope condition during any pull shall constitute failure of the test.

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### Submitter Information Verification

**Submitter Full Name:** David Trebisacci  
**Organization:** National Fire Protection Assoc  
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**Submittal Date:** Fri Feb 07 16:38:49 EST 2014

### Committee Statement

**Committee Statement:** Aligns grip test with NFPA 1971-2013 and NFPA 1951-2013 and aligns wetting method with NFPA 1951-2013 and NFPA 1999-2013. The current rope grip test is variable and subjective. The proposed test method provides a more consistent way of identifying gloves that have very slippery surfaces that when wet may cause a complete loss of gripping ability. Will need to add Figures 8.38.5.4 (A) and (B) from NFPA 1971 2013 edition following 8.26.5.4.

**Response Message:** 
Public Input No. 93-NFPA 1977-2013 [Section No. 8.26]
8.28 Footwear Conductive Heat Resistance Test.

8.28.1 Application.
This test method shall apply to protective footwear.

8.28.2 Samples.
8.28.2.1 Samples for conditioning shall be whole footwear with removable insoles in place.
8.28.2.2 Samples shall be conditioned as specified in 8.1.1.

8.28.3 Specimens.
8.28.3.1 Specimens for testing shall be the same as samples for conditioning.
8.28.3.2 Testing shall be conducted on a minimum of three specimens.

8.28.4 Apparatus.
8.28.4.1 The apparatus shall consist of an iron plate electric hotplate measuring 25 mm × 150 mm × 460 mm (1 in. × 6 in. × 18 in.) 305 mm × 305 mm (12 in. × 12 in.) and an oven capable of heating the plate to maintaining a temperature of 500°C (932°F), a Type J or Type K thermocouple thermocouples, and a meter to read the thermocouple temperature temperatures.

8.28.5 Procedure.
8.28.5.1 The thermocouple thermocouples shall be affixed taped to the insole surface of the specimen next to the foot, directly above the ball of the foot. The thermocouple shall be taped to the surface with electrical tape to hold it onto the insole surface in the following locations, as shown in Figure 8.28.5.1.

1. Directly above the center of the ball of the footwear
2. Directly above the center of the heel of the footwear
3. Directly above the toe-to-heel center of the arch of the footwear, at the inside junction between the upper and the sole

Figure 8.28.5.1 Thermocouple Locations.
8.28.5.2
The plate shall be heated to a temperature of 500°C, ±10°C (932°F, ±18°F) and shall maintain this temperature throughout the test period.

8.28.5.3
The specimen shall be filled with 4.55 kg (10 lb) of 10 mm (¾ in.) steel balls. The weight of the steel balls shall be evenly distributed inside the boot. The specimen shall be placed on the plate in the upright position for 30 seconds, 2/−0 seconds.

8.28.5.4
The thermocouple temperature shall be recorded 30 seconds, +2/−0 seconds, after the specimen is placed on the heated metal plate hotplate.
8.28.6 Report.

8.28.6.1 The temperature at 30 seconds of exposure shall be recorded and reported for each area of the footwear insole for each specimen.

8.28.6.2 The average temperature at 30 seconds of exposure for each area of the footwear insole for all specimens shall also be calculated, recorded, and reported.

8.28.7 Interpretation.

8.28.7.1 The average temperature at 30 seconds of exposure for each area of the insole for all specimens shall be used to determine pass or fail performance.

Submitter Information Verification

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Submittal Date: Fri Feb 07 17:07:05 EST 2014

Committee Statement


The technical committee decided that the current time and temperature requirements should remain as written.

Will need to add Figure 8.8.5.1 from NFPA 1971 2013 Edition and insert following 8.28.5.1.

Response Message:
Public Input No. 81-NFPA 1977-2013 [Section No. 8.28]
8.31.8.5
For the drying cycles of the laundering durability test specified in 8.41.4.1.1, gloves shall be tumble dried for 60 minutes and shall be removed immediately at the end of the drying cycle. At the conclusion of the final drying cycle, the gloves shall be dried on a forced-air, non–tumble drying mechanism operated at 10°C, ± 5°C, above current room temperature for 8 hours, ± 45 minutes.

Submitter Information Verification

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Submittal Date: Fri Feb 07 17:24:38 EST 2014

Committee Statement

Committee Statement: This proposal aligns the glove drying method with other standards in the project (1971, 1951, 1999) to allow for the use of the Williams dryer.

Response Message:

Public Input No. 89-NFPA 1977-2013 [New Section after 8.31.8.4]
8.33 Slip Resistance Test.
8.33.1 Application.
This test method shall apply to the footwear sole and heel section.
8.33.2 Samples.
8.33.2.1 Samples shall be footwear sole and heel sections whole footwear items in men's size 9D, medium width.
8.33.2.2 Samples shall be conditioned as specified in 8.4.1 ASTM F 2913, Standard Test Method for Measuring the Coefficient of Friction for Evaluation of Slip Performance of Footwear and Test Surfaces/Flooring Using a Whole Shoe Tester.
8.33.3 Specimens.
A minimum of three sole specimens and three heel specimens and shall be tested.
8.33.3.1 Specimens shall be the whole footwear in men's size 9D, medium width.
8.33.3.2 At least three specimens shall be tested.
8.33.4 Procedure.
Slip resistance testing shall be performed in accordance with ASTM F 489, Standard Test Method for Static Coefficient of Friction of Shoe Sole and Heel Materials as Measured by the James Machine, in a dry condition. ASTM F 2913, Standard Test Method for Measuring the Coefficient of Friction for Evaluation of Slip Performance of Footwear and Test Surfaces/Flooring Using a Whole Shoe Tester, in the following configurations (references to any other flooring and/or contaminate within ASTM F 2913 shall not apply):

(1) Footwear shall be tested both in the forepart and heel positions.
(2) Footwear shall be tested in the wet condition.
(3) Footwear shall be tested on a quarry tile surface that meets the specifications of ASTM F 2913 and shall be calibrated in accordance with ASTM F 2913. The calibration frequency of 10 tests specified in ASTM F 2913 shall be equivalent to 50 test runs.

8.33.5 Report.
8.33.5.1 The static coefficient of friction of each specimen under dry conditions shall be recorded and reported.
8.33.5.2 The average static coefficient of friction of each specimen under dry conditions all specimens for each configuration shall be calculated, recorded, and reported.
8.33.6 Interpretation.
One or more footwear specimens failing this test shall constitute failing performance. The average coefficient of friction for each configuration shall be used to determine pass/fail performance.
8.34 Torque Test.
8.34.1 Application.
This test method shall apply to protective gloves.
8.34.2 Samples.
8.34.2.1 Samples for conditioning shall be whole gloves.
8.34.2.2 Sample glove pairs shall be preconditioned as specified in 8.1.1.
8.34.3 Specimens.
8.34.3.1 A minimum of three glove specimens each for size small and size large shall be used for testing.
8.34.3.2 Right-hand specimen gloves shall be used for right-hand dominant test subjects while left-hand specimen gloves shall be used for left-hand dominant test subjects.
8.34.3.3 Each specimen glove shall be tested in new, "as distributed" condition.
8.34.3.4 Specimen gloves shall be tested for each material and construction combination.
8.34.4 Apparatus.
Torque testing shall be evaluated with the use of a 1 3/8 in. diameter solid acrylic cylinder securely centered on a calibrated digital torque meter capable of measuring up to 10.0 N-m (88.5 in. lbf).
8.34.5 Procedure.
8.34.5.1 Test subjects shall be selected so that their hand dimensions are as close as possible to the midrange for hand length and hand circumference for size small and size large gloves as specified in Table 6.3.5.2(b) and Table 6.3.5.2(d). At least three test subjects shall be selected for both size small and size large.
8.34.5.2 While standing, each test subject shall grasp the cylinder so that the wrist creates a straight line with the hand. The elbow shall be against the side of the body, creating a right angle, throughout the duration of the test.
8.34.5.3 For right-hand-dominant test subjects, the direction mode on the torque device shall be set to "open," or counterclockwise, and set to "close," or clockwise, for left-hand-dominant test subjects.
8.34.5.4 Each test subject shall make five successive attempts to twist the cylinder in the appropriate direction exerting as much force as possible. The range of motion of the subject's wrist shall indicate the end of the twisting cycle. The average maximum force over the five attempts shall be the bare-handed control value.
8.34.5.5 Each test subject shall test one sample glove using the method specified in 8.34.5.2 through 8.34.5.4. Test subjects shall attempt one trial with the glove. A trial shall consist of five successive attempts. The average maximum twisting force over the five attempts shall be the twisting force with the glove. The average twisting force shall be calculated, recorded, and reported.
8.34.5.6 The average twisting force shall be compared with the bare-handed control value for each glove.
8.34.5.7 The percentage of bare-handed control value shall be calculated as follows:

\[
\text{Percent of bare-handed control value} = \left(\frac{TF_a \times 100}{CV_b}\right)
\]
where:

\[ TF_a \] = average twisting force with gloves
\[ CV_b \] = bare-handed control value

8.34.5.8
The average maximum twisting force with gloves over the three trials for each size shall be calculated, recorded, and reported.

8.34.6 Report
The percentage of bare-handed control value shall be recorded and reported for each specimen glove size.

8.34.7 Interpretation.
8.34.7.1
The percentage of bare-handed control value for size small and size large shall be used to determine pass or fail performance.

8.34.7.2
Failure of either size shall constitute failure of the test.

Submitter Information Verification

Submitter Full Name: David Trebiscacci
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Submitter Information Verification

Submittal Date: Fri Feb 07 17:26:17 EST 2014

Committee Statement
Committee Statement: Proposing full footwear slip test instead of slip testing of sole and heel portions. Also aligning with footwear slip test in NFPA 1971-2013, NFPA 1951-2013, NFPA 1999-2013, and NFPA 1992-2012 except that in this proposal the newly published ASTM F 2913 method has been referenced directly whereas in the other standards the method is a variation of ISO 13287 to reflect the draft ASTM F 2913 (because at that time ASTM F2913 was not yet published).

This method will be slightly different from what went into the other standards in that:

1) preconditioning of the specimen and test surface is slightly different (scrub brush and detergent (ASTM) vs. light sanding and alcohol (ISO))

2) the actual reading is 0.1ms (ASTM) vs. avg 0.1-0.3ms

3) lasts are slightly different (SATRA vs. EN)

the above differences are minor and it was the intent to reference the ASTM in the other documents - but it was not published in time.

Also, the current standard has been withdrawn by ASTM.

The torque test which is used in NFPA 1971-2013 and NFPA 1951-2013 provides a less variable subjective of grip strength than the current grip test.

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