



Tentative Interim Amendment

## NFPA® 1977

# *Standard on Protective Clothing and Equipment for Wildland Fire Fighting*

## 2016 Edition

**Reference:** Various

### **TIA 16-1**

*(SC 16-4-15 / TIA Log #1216)*

Pursuant to Section 5 of the NFPA *Regulations Governing the Development of NFPA Standards*, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 1977, *Standard on Protective Clothing and Equipment for Wildland Fire Fighting*, 2016 edition. The TIA was processed by the Technical Committee on Wildland Fire Fighting Protective Clothing and Equipment and the Correlating Committee on Fire and Emergency Services Protective Clothing and Equipment, and was issued by the Standards Council on April 6, 2016, with an effective date of April 26, 2016.

A Tentative Interim Amendment is tentative because it has not been processed through the entire standards-making procedures. It is interim because it is effective only between editions of the standard. A TIA automatically becomes a public input of the proponent for the next edition of the standard; as such, it then is subject to all of the procedures of the standards-making process.

1. Add the following references to Subsection 2.3.4 to read as follows:

#### **2.3.4 ASTM Publications.**

ASTM D2256/D2256M, *Tensile Properties of Yarns by the Single-Strand Method*, 2015.

ASTM D7138, *Standard Test Method to Determine Melting Temperature of Synthetic Fibers*, 2008.

2. Delete the references in Subsection 2.3.8 as follows:

#### **2.3.8 U.S. Government Publications – Military Specifications and Commercial Item Descriptions.**

3. Add a new definition and associated Annex as follows:

**3.3.X\* Tex.** A direct yarn size system that identifies the weight in grams for 1000 meters of yarn.

**A.3.3.X Tex.** Low numbers indicate a yarn size that is finer, weaker, and has more yards per pound. Tex size 70/80 is “two times” heavier and stronger than Tex size 35/40; and also has one-half the total length of yarn per pound.

4. Revise Section 6.2 to read as follows:

#### **6.2 Protective Helmet Item Design Requirements.**

...

6.2.13 All thread used to manufacture helmets, excluding that used on the crown straps, shall be made of inherently flame-resistant fiber.

5. Revise Section 6.7 to read as follows:

#### **6.7 Chain Saw Protector Item Design Requirements.**

...

6. Revise Section 7.1 to read as follows:

**7.1 Protective Garment Item Performance Requirements**

...

**7.1.10** All sewing thread utilized in the construction of garments shall be tested for melting temperature as specified in Section 8.9 and shall have a melting temperature not lower than 260°C (500°F).

**7.1.11** All sewing thread utilized in the construction of garments shall be tested for breaking strength as specified in Section 8.35 and shall have a breaking strength not lower than that specified in Table 7.1.11.

**Table 7.1.11 Breaking Strength for Thread Used in Construction of Garments**

Size (Tex)	Breaking Strength		Breaking Strength After Convective Heat Conditioning	
	N	lb	N	lb
≤34	5.8	1.3	1.7	0.4
35-49	8.9	2.0	2.7	0.6
50-69	13.3	3.0	4.0	0.9
70-89	20.0	4.5	6.0	1.3
≥90	24.5	5.5	7.3	1.6

7. Revise Section 7.2 to read as follows:

**7.2 Protective Helmet Item Performance Requirements**

**7.2.1** All sewing thread utilized in the construction of helmets, excluding that used on the crown straps, shall be tested for melting temperature as specified in Section 8.9 and shall have a melting temperature not lower than 260°C (500°F).

**7.2.2** All sewing thread utilized in the construction of helmets, excluding that used on the crown straps, shall be tested for breaking strength as specified in Section 8.35 and shall have a breaking strength not lower than that specified in Table 7.2.2.

**Table 7.2.2 Breaking Strength for Thread Used in Construction of Helmets (Excluding That Used on Crown Straps)**

Size (Tex)	Breaking Strength		Breaking Strength After Convective Heat Conditioning	
	N	lb	N	lb
≤34	5.8	1.3	1.7	0.4
35-49	8.9	2.0	2.7	0.6
50-69	13.3	3.0	4.0	0.9
70-89	20.0	4.5	6.0	1.3
≥90	24.5	5.5	7.3	1.6

8. Revise Section 7.3 to read as follows:

**7.3 Protective Work Glove Item Performance Requirements**

...

**7.3.10** All sewing thread utilized in the construction of protective work gloves shall be tested for melting temperature as specified in Section 8.9 and shall have a melting temperature not lower than 260°C (500°F).

**7.3.11** All sewing thread utilized in the construction of protective work gloves shall be tested for breaking strength as specified in Section 8.35 and shall have a breaking strength not lower than that specified in Table 7.3.11.

**Table 7.3.11 Breaking Strength for Thread Used in Construction of Protective Work Gloves**

Size (Tex)	Breaking Strength		Breaking Strength After Convective Heat Conditioning	
	N	lb	N	lb
≤34	5.8	1.3	1.7	0.4
35-49	8.9	2.0	2.7	0.6
50-69	13.3	3.0	4.0	0.9
70-89	20.0	4.5	6.0	1.3
≥90	24.5	5.5	7.3	1.6

9. Revise Section 7.4 to read as follows:

**7.4 Protective Footwear Item Performance Requirements**

...

**7.4.11** All sewing thread exposed to the exterior of footwear shall be tested for melting temperature as specified in Section 8.9 and shall have a melting temperature not lower than 260°C (500°F).

**7.4.12** All sewing thread exposed to the exterior of footwear shall be tested for breaking strength as specified in Section 8.35 and shall have a breaking strength not lower than that specified in Table 7.4.12.

**Table 7.4.12 Breaking Strength for Thread Exposed to Exterior of Footwear**

Size (Tex)	Breaking Strength		Breaking Strength After Convective Heat Conditioning	
	N	lb	N	lb
≤34	5.8	1.3	1.7	0.4
35-49	8.9	2.0	2.7	0.6
50-69	13.3	3.0	4.0	0.9
70-89	20.0	4.5	6.0	1.3
≥90	24.5	5.5	7.3	1.6

10. Revise Section 7.5 to read as follows:

**7.5 Protective Face/Neck Shroud Item Performance Requirements**

...

**7.5.9** All sewing thread utilized in the construction of protective face/neck shrouds shall be tested for melting temperature as specified in Section 8.9 and shall have a melting temperature not lower than 260°C (500°F).

**7.5.10** All sewing thread utilized in the construction of protective face/neck shrouds shall be tested for breaking strength as specified in Section 8.35 and shall have a breaking strength not lower than that specified in Table 7.5.10.

**Table 7.5.10 Breaking Strength for Thread Used in Construction of Protective Face/Neck Shrouds**

Size (Tex)	Breaking Strength		Breaking Strength After Convective Heat Conditioning	
	N	lb	N	lb
≤34	5.8	1.3	1.7	0.4
35-49	8.9	2.0	2.7	0.6
50-69	13.3	3.0	4.0	0.9
70-89	20.0	4.5	6.0	1.3
≥90	24.5	5.5	7.3	1.6

11. Revise Section 7.6 to read as follows:

**7.6 Protective Goggle Item Performance Requirements**

...

**7.6.2** All sewing thread utilized in the construction of protective goggles shall be tested for melting temperature as specified in Section 8.9 and shall have a melting temperature not lower than 232°C (450°F).

**7.6.3**

12. Revise Section 7.7 to read as follows:

**7.7 Chain Saw Protector Item Performance Requirements**

...

**7.7.4** All sewing thread utilized in the construction of chain saw protectors shall be tested for melting temperature as specified in Section 8.9 and shall have a melting temperature not lower than 232°C (450°F).

13. Revise Section 7.8 to read as follows:

### 7.8 Protective Driving Gloves Item Performance Requirements

...

**7.8.8** All sewing thread utilized in the construction of protective driving gloves shall be tested for melting temperature as specified in Section 8.9 and shall have a melting temperature not lower than 260°C (500°F).

**7.8.9** All sewing thread utilized in the construction of protective driving gloves shall be tested for breaking strength as specified in Section 8.35 and shall have a breaking strength not lower than that specified in Table 7.8.9.

**Table 7.8.9 Breaking Strength for Thread Used in Construction of Protective Driving Gloves**

Size (Tex)	Breaking Strength		Breaking Strength After Convective Heat Conditioning	
	N	lb	N	lb
≤34	5.8	1.3	1.7	0.4
35–49	8.9	2.0	2.7	0.6
50–69	13.3	3.0	4.0	0.9
70–89	20.0	4.5	6.0	1.3
≥90	24.5	5.5	7.3	1.6

14. Revise Section 7.9 to read as follows:

### 7.9 Load-Carrying Equipment Item Performance Requirements

...

**7.9.3** All sewing thread utilized in the construction of load-carrying equipment shall be tested for melting temperature as specified in Section 8.9 and shall have a melting temperature not lower than 232°C (450°F).

15. Revise Subsection 8.1.3 to read as follows:

#### 8.1.3 Convective Heat Conditioning Procedure for Visibility Markings and Thread Utilized in Garments, Helmets, Gloves, Footwear, and Face/Neck Shrouds.

**8.1.3.1** Samples shall be conditioned by exposing them to the procedure specified in 8.4.6 with the following modifications:

(1) The oven test temperature in 8.4.6.4 shall be stabilized as, and the test exposure time shall be as follows:

(a) For visibility markings, the temperature shall be 140°C, +6°/-0°C (285°F, +10°/-0°F), and the test exposure shall be 10 minutes, +15/-0 seconds.

(b) For thread utilized in garments, helmets, gloves, footwear, and face/neck shrouds, the temperature shall be 260°C, +6°/-0°C (500°F, +10°/-0°F), and the test exposure shall be 15 minutes, +15/-0 seconds.

(2) The test exposure time shall begin when the test thermocouple reading has stabilized at the required test exposure temperature.

(3) The requirements of 8.4.6.5 and 8.4.6.6 shall be disregarded.

16. Revise Section 8.9 to read as follows:

### 8.9 Thread Melting Test.

**8.9.1 Application.** This test method shall apply to each type of thread used in the construction of garments, helmets, gloves, footwear, face/neck shrouds, goggles, chain saw protectors, and load-carrying equipment.

#### 8.9.2 Samples.

**8.9.2.1** Samples for conditioning shall be 150 mm (6 in.) or greater in length.

**8.9.2.2** Samples shall be conditioned as specified in 8.1.1.

#### 8.9.3 Specimens.

**8.9.3.1** Specimens for testing shall be the same as the samples for conditioning.

**8.9.3.2** Testing shall be conducted on three different specimens of each thread type.

**8.9.4 Apparatus.** The apparatus shall be as specified in ASTM D7138, *Standard Test Method to Determine Melting Temperature of Synthetic Fibers*.

**8.9.5 Procedure.** Thread heat resistance tests shall be performed as specified in ASTM D7138, *Standard Test Method to Determine Melting Temperature of Synthetic Fibers*.

**8.9.6 Report.** The melting temperature shall be recorded and reported for each specimen.

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

17. Add a new Section 8.35 to read as follows:

**8.35 Thread-Breaking Strength Test.**

**8.35.1 Application.** This test method shall apply to each type of thread used in the construction of garments, helmets, gloves, footwear, face/neck shrouds, and goggles.

**8.35.2 Samples.**

**8.35.2.1** Samples for conditioning shall be 1 m (1 yd) or greater in length,

**8.35.2.2** Samples shall be conditioned as specified in 8.1.1.

**8.35.2.3** Additional samples shall be conditioned as specified in 8.1.3 followed by 8.1.1.

**8.35.3 Specimens.**

**8.35.3.1** Specimens for testing shall be 254 mm (10 in.) or greater in length.

**8.35.3.2** Testing shall be conducted on three specimens in each condition.

**8.35.3.3** The smallest size in each size range shall be permitted to be representative of all sizes in the range.

**8.35.4 Apparatus.** The apparatus shall be as specified in ASTM D 2256/D 2256M, *Tensile Properties of Yarns by the Single-Strand Method*.

**8.35.5 Procedure.**

**8.35.5.1** Breaking strength tests shall be performed in accordance with ASTM D 2256/D 2256M, *Tensile Properties of Yarns by the Single-Strand Method*, Configuration A, Straight.

**8.35.6 Report.**

**8.35.6.1** The breaking strength shall be recorded and reported for each specimen.

**8.35.6.2** The average breaking strength shall be recorded and reported for each condition for all specimens tested.

**8.35.7 Interpretation.** The average breaking strength for each condition shall be used to determine pass or fail performance.

18. Delete Annex paragraphs A.8.9.4.1 and A.8.9.4.3(2).

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(Note: For further information on NFPA Codes and Standards, please see [www.nfpa.org/codelist](http://www.nfpa.org/codelist))

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