



Standard Guide for Care and Maintenance of Flame Resistant and Thermally Protective Clothing¹

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^{ε1} NOTE—Keywords were added editorially in June 2000.

1. Scope

1.1 This guide provides suggestions for care and maintenance of protective clothing that is both flame resistant and thermally protective.

1.2 These suggestions cover processing by laundering.

1.2.1 This guide does not provide detailed suggestions for dry cleaning. For more information contact your processor; his dry cleaning equipment supplier and solvent supplier; and the fiber, fabric, and garment manufacturers.

1.2.2 This guide does not apply to home laundering of protective garments. Follow label direction or contact garment supplier.

1.3 This guide identifies inspection criteria that are significant to proper performance of protective clothing.

2. Referenced Documents

2.1 ASTM Standards:

F 1002 Performance Specification for Protective Clothing for Use by Workers Exposed to Specific Molten Substances and Related Thermal Hazards²

3. Terminology

3.1 *Definitions of Terms Specific to This Standard*—The following terms have been defined specifically as they relate to this guide:

3.1.1 *care and maintenance, n*—effective cleaning to remove soil and maximize use life of garments while maintaining (not removing) protective properties.

3.1.2 *end user, n*—for the purpose of this guide, this term is used to identify specifically the party requiring protective clothing (for example, the employer of the person wearing the garment).

3.1.3 *finish, n*—a chemical or mechanical modification, or both, of the fabric for a specific performance result.

3.1.4 *finishing technique, n*—as applies to laundry and dry cleaning procedures, the mechanical means by which the garment is put in its final state (for example, pressing, drying,

wrinkle removal, etc.).

3.1.5 *laundry formula, n*—a list of chemicals, amounts, and procedures used in a laundry operation.

3.1.6 *processor, n*—as applies to garment maintenance, the party performing the care and maintenance operation.

4. Summary of Guide

4.1 This guide provides guidelines for use by suppliers, processors, and the end user to effectively maintain protective clothing and to provide means of determining when such items should be removed from service. This guide includes the following:

4.1.1 Classification of garments by fiber, fabric, and finish.

4.1.2 Classification of garments by degree and type of soil.

4.1.3 Recommendation of processing method (laundry or dry clean) (see 1.2.1).

4.1.3.1 Recommendation of laundry formula to employ.

4.1.4 Recommendation of finishing technique.

4.1.5 Recommendations for removing garments from service.

5. Significance and Use

5.1 This guide identifies the responsibilities of both the processor and the processor's chemical supplier, the fiber and fabric suppliers, the end user, and the garment manufacturers.

5.2 This guide provides category designations to relate to degree of soil and type of use for protective garments.

6. Procedure

6.1 The fiber, fabric, and garment manufacturers should provide advice on the compatibility of the performance characteristics with intended use and maintenance needs.

6.2 The processor and, if appropriate, the processor's chemical supplier and the end user should classify garments by fiber, fabric, and finish (see Table 1).

6.3 This guide establishes the following categories for segregating garments by characteristics significant to maintenance:

6.3.1 Garments constructed exclusively of fabric from inherently flame-resistant fibers that are tolerant to high-laundry and finishing temperatures.

6.3.2 Garments constructed exclusively of fabrics from

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² *Annual Book of ASTM Standards*, Vol 11.03.

TABLE 1 Fabric Matrix^A

Fabric ^B	Table 2	Table 3	Table 4	Tumble (<165°F)	Dry ^C (>165°F)	Steam Hot Air Dry ^D (on Hanger)	Hot Head ^E Press
SEF modacrylic	no	yes	yes	yes	no	no	no
Nomex III aramid fiber	yes	yes	yes	yes	no	yes	yes
Kevlar aramid fiber/pbi PBI fiber	yes	yes	yes	yes	yes	yes	yes
PFR rayon/pbi BI fiber	yes	yes	yes	yes	no	yes	yes
VINEX (vinal rayon blend)	no	yes	yes	yes	no	no	no
Zirpro FR wool	no	yes	yes	yes	no	yes	yes
Zirpro FR wool/PFR rayon	no	yes	yes	yes	no	yes	yes
KERMEL/FR Viscose	no	yes	yes	yes	no	yes	yes

^A This table reflects manufacturer's recommendation at the time of issue. Contact manufacturer for current information.

^B If not listed contact fabric supplier.

^C Stack temperature measured at exit of dryer.

^D Fabric temperature should not be greater than 280°F.

^E Press head temperature should not be greater than 315°F.

inherently flame-resistant fibers that are not tolerant to high-laundry and finishing temperatures.

6.3.3 Garments constructed exclusively of fabrics that are chemically treated to produce the flame and thermal-resistant characteristic.

6.3.4 Garments constructed of mixtures of fabrics of one or more of the above types.

6.3.5 Garments with specific label instructions, (for example, "Dry Clean Only", "Do Not Wash", "Do Not Dry Clean").

6.4 The processor, and if appropriate the processor's chemical supplier and end user, should consider the garment degree and type of soiling and its compatibility with the cleaning system utilized to maintain the protective characteristics originally established for the garment.

6.5 This practice suggests wash procedures for the processor, and if appropriate, the processor's chemical supplier and end user to employ for garment processing. (See Table 2, Table

3, and Table 4.)

6.5.1 If garment cannot be cleaned using a heavy-duty wash, a presoak operation should be considered as an optional part of a wash operation.

6.5.2 Using the appropriate table, select a wash procedure to meet the maintenance requirements.

6.5.3 Using the appropriate table, select the chemical formula to use in the wash procedure of 6.5.2.

6.5.4 Using Table 1, select the finishing technique to employ.

6.5.5 Use of the data from Tables 1-4 should be governed by recognition that the information presented therein is strictly an example to illustrate conditions that have been employed in specific instances. The sequence of operations, times, and temperatures are cited as sample values.

6.5.6 Since proper loading of the washer is essential to effective processing of protective garments appropriate consideration of load size should be coordinated with the machine

TABLE 2 Example of Heavy Soil Formula

Operations (Chemicals)	Colors			oz/cwt ^A	Whites		
	Time, min	Temperature, °F	Level		Time, min	Temperature, °F	Level
Flush	2	hot ^B	high	—	2	hot	high
Break ^{C,D}	15	160	low	—	15	160	low
Sodium meta silicate				10			
Sodium tripoly phosphate				4			
Non-ionic surfactant				8			
Flush	2	hot	high	—	2	hot	high
Suds ^{C,D}	7	160	low	—	7	160	low
Sodium meta silicate				6			
Sodium tripoly phosphate				2			
Non-ionic surfactant				4			
Flush	—	—	—	—	2	hot	high
Flush	—	—	—	—	2	150	high
Bleach ^E	—	—	—	^E	8	150	low
Rinse	2	145	high	—	2	135	high
Rinse	2	130	high	—	2	118	high
Rinse	2	115	high	—	2	100	high
Rinse	2	100	high	—	—	—	—
Sour/softener ^F	5	100	low	—	5	100	low
Sodium silicofluoride or ammonium silicofluoride				½			

^A Oz/cwt apply to both colors to left and whites to right.

^B "Hot" indicates plant hot water only typically 150 to 160°F.

^C A liquid surfactant with a supplemental solvent may be necessary for very heavy petroleum based soils.

^D Usual procedure is to use 2/3 the total chemical in the break and 1/3 in the suds.

^E Chlorine type bleach is NOT to be used. Oxygen bleach only.

^F Follow fabric manufacturer's recommendation on use of fabric softener for compatibility.