



Designation: **F1449 – 08 (Reapproved 2015) F1449 – 20**

Standard Guide for Industrial Laundering of ~~Flame, Thermal, and Arc~~ Resistant ~~Care and Maintenance of Flame Resistant or Arc~~ Rated Clothing¹

This standard is issued under the fixed designation F1449; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide provides recommendations for the care and maintenance of clothing that is ~~flame, thermal, and arc resistant~~ flame resistant or arc rated.

1.2 These recommendations address the ~~Industrial Laundering process~~ industrial laundering process. Industrial laundering is an effective cleaning process for flame resistant or arc rated clothing; follow all label care instructions. The National Institute for Occupational Safety and Health (NIOSH) recommends leaving clothing soiled with hazardous chemicals at work to be laundered by the employer or, if such clothing is washed at home, to launder separately from the family wash.

~~NOTE 1—The National Institute for Occupational Safety and Health (NIOSH) recommends leaving clothing soiled with hazardous chemicals at work to be laundered by the employer, or if such clothing is washed at home, to launder separately from the family wash.~~

1.2.1 This guide does not apply to dry cleaning of ~~flame, thermal, and arc resistant~~ flame resistant or arc rated clothing. For more information on dry cleaning, follow label instructions or contact your garment supplier. Dry cleaning indicates cleaning by a professional dry cleaner.

~~NOTE 2—Dry cleaning indicates cleaning by a professional dry cleaner.~~

1.2.2 This guide does not apply to home laundering of ~~flame, thermal, and arc resistant~~ flame resistant or arc rated clothing. For more information on home laundering, follow label instructions or contact your garment supplier. Home laundering indicates laundering in a home laundering machine. For more information on home laundering, see Guide F2757.

~~NOTE 3—Home laundering indicates laundering in a home laundering machine.~~

1.3 It is important that potentially flammable contaminants are removed from garments during the wash process. If flammable contaminants are not removed, the flame resistance of the garment ~~will~~ may be compromised. ~~(See Effective Note 1.)~~ cleaning and proper maintenance of the protective characteristics of flame resistant or arc rated clothing should include consideration of cleaning, repair, and replacement.

~~NOTE 4—Effective cleaning and proper maintenance of the protective characteristics of flame, thermal and arc resistant protective clothing should include consideration of the services a professional processor can supply.~~

1.3.1 To reduce the potential of employees wearing garments contaminated with flammable substances, the end user should analyze the soil conditions to which a wearer may be exposed, along with the effectiveness of the industrial wash procedure. If it is deemed ineffective, effective solutions should be pursued (dry cleaning, surfactants, disposable FR coveralls, etc.).

1.4 It is important that the processes and materials used to launder flame resistant garments are compatible with the FR materials to ensure that the FR protection of the garment is not compromised during the laundering process.

1.5 It is the responsibility of the end user to determine if their laundering method is the appropriate care and maintenance procedure for their application. (See [Appendix X1](#) and [X1.1](#).)

1.6 This guide does not apply to specialized protective garments such as specialized firefighter turnout gear and proximity firefighter ensembles.

1.7 This guide also identifies inspection criteria that are significant to the performance of ~~flame, thermal, and arc resistant~~ flame resistant or arc rated clothing.

¹ This guide is under the jurisdiction of ASTM Committee F23 on Personal Protective Clothing and Equipment and is the direct responsibility of Subcommittee F23.80 on Flame and Thermal.

Current edition approved July 1, 2015/April 1, 2020. Published July 2015/May 2020. Originally approved in 1992. Last previous edition approved in 2008/2015 as F1449 – 08; F1449 – 08 (2015). DOI: 10.1520/F1449-08R15; 10.1520/F1449-20.

1.8 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.9 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

D123 [Terminology Relating to Textiles](#)

F1494 [Terminology Relating to Protective Clothing](#)

[F2757 Guide for Home Laundering Care and Maintenance of Flame Resistant or Arc Rated Clothing](#)

2.2 Other References:

[Textile Laundering Technology Handbook—2005 Handbook—2005 Edition](#) by Dr. Charles Riggs, Ph.D. and Michael Klipper
NIOSH, [Protecting Workers’ Families, A Research Agenda Report of the Workers’ Family Protection Task Force—February, Force—February 2002](#)

3. Terminology

3.1 Definitions:

3.1.1 *care and maintenance, n*—effective cleaning to remove soil and maximize use life of garments while maintaining (not removing) protective properties and procedures for inspection, repair, and removal from service.

3.1.2 *end user, n*—the entity or organization whose employees ultimately wear the ~~flame, thermal, and arc resistant~~flame resistant or arc rated clothing.

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*—the mechanical means by which the garment is put in its final state (for example, pressing, drying, tunneling).

3.1.5 *laundry wash formula, n*—the details related to procedures, cycle times, temperatures, and chemicals used in the laundering process.

3.1.6 *processing launderer (processor), n*—the party performing the operation of cleaning or repairing, or both, of the ~~flame, thermal, and arc resistant~~flame resistant or arc rated clothing.

3.1.7 *soil, n*—foreign substances ~~that may be on garments,~~on garments which are not part of the garment construction or materials.

3.1.8 *soil level, n*—the amount of soil on a garment (very light, light, medium, heavy, and very heavy) are subjective categories of soil levels commonly used in the laundry industry; the definition of each category depends on the soils, fabric type, garment construction, and fabric release properties. (Refer to “The Textile Laundering Technology Handbook” in Section 2, Referenced Documents.)

4. Summary of Guide

4.1 This guide provides guidelines for use by suppliers of the ~~flame, thermal,~~flame resistant and arc ~~resistant~~rated clothing (including the fabric and fibers used in its construction), processors, and end users to effectively care for and maintain ~~flame, thermal, and arc resistant~~flame resistant or arc rated clothing. The guidelines include:

4.1.1 A listing of elements to consider when developing wash procedures and formulas for processor(s).

4.1.2 Recommendations for removing ~~flame, thermal, and arc resistant~~flame resistant or arc rated clothing from service.

4.1.3 Recommendations for the repair, modification, and fit of ~~flame, thermal,~~flame resistant and arc ~~resistant~~rated clothing.

5. Significance and Use

5.1 This guide identifies the responsibilities of the fiber, fabric, and clothing manufacturers, as well as the processor, the processor’s chemical supplier, and the end user.

5.2 This guide describes the key components involved in a an industrial laundry program for the care and maintenance of ~~flame, thermal,~~flame resistant and arc ~~resistant~~rated clothing.

5.3 The guidelines in this standard will provide a processor assistance to develop a processing system that maintains the ~~flame, thermal, and arc resistant~~ characteristics of the flame resistant or arc rated clothing during its useful service life.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard’s Document Summary page on the ASTM website.