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Standard Specification for Retained Sewn Seam Strength After Exposures to Hot Air and Open Flame¹

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INTRODUCTION

Sewn seam strength of flame resistant textile products is a critical measurement of structural integrity. This is particularly important for flame resistant (FR) personal protective clothing and equipment (PPE), which is designed to provide safety to any worker who may, during the service life of the PPE, experience multiple short term exposures to high heat. While “new” FR protective clothing items can provide the wearer with protection that meets a specific performance requirement, it is useful to know what the cumulative effects of repeated exposures to high heat can do to the integrity of the sewn seams used to construct protective clothing items. In addition, it is useful to know how the cumulative exposures can affect the sewn seam strength performance of the PPE when exposed to an open flame for a short period of time.

During normal use, some FR specialized clothing items can, for short durations, be repeatedly exposed to high heat. While the cumulative effect of repeated short duration exposures to high heat is known to result in a loss of fabric strength, these same exposures can also result in a loss of sewing thread break strength. This loss of break strength can result in lower retained sewn seam strength that can put the wearer at potential risk of injury if the garment is too weak to maintain integrity of the structure.

While there are recognized minimum sewn seam strength values required for new FR garments, never exposed to heat or flame hazard, this standard is intended to measure the retained sewn seam strength after repeated exposures to high heat and a subsequent exposure to open flame.

These data may be useful as additional information for agencies that want criteria to establish selection, care, maintenance and retirement/replacement of FR protective clothing.

1. Scope

1.1 This specification covers the retained sewn seam strength of flame resistant fabric subassemblies after repeated short duration exposures to hot air or repeated short-duration exposures to hot air and subsequent short-term exposures to open-flame impingement.

1.1.1 This specification is used to determine minimum retained sewn seam strength after these exposures.

1.2 This standard is not intended to serve as a detailed manufacturing or purchasing specification, but can be referenced in purchase contracts to ensure that minimum performance requirements are met.

1.3 Controlled laboratory tests used to determine compliance with the performance requirements of this standard shall not be deemed as establishing performance levels for all situations to which wearers of FR protective clothing are potentially exposed.

1.4 Mandatory requirements are indicated by use of shall; recommendations and advising information is indicated by should.

1.5 *This standard is used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions, but does not by itself incorporate all factors required for fire hazard or fire risk assessment of the materials, products, or assemblies under actual fire conditions.*

1.6 *Fire testing is inherently hazardous. Adequate safeguards for personnel and property shall be employed in conducting these tests.*

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