NFPA® 2112

Standard on Flame-Resistant Clothing for Protection of Industrial Personnel Against Short-Duration Thermal Exposures from Fire

2023 Edition

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An International Codes and Standards Organization

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NFPA® 2112

Standard on

Flame-Resistant Clothing for Protection of Industrial Personnel Against Short-Duration Thermal Exposures from Fire

2023 Edition

This edition of NFPA 2112, *Standard on Flame-Resistant Clothing for Protection of Industrial Personnel Against Short-Duration Thermal Exposures from Fire*, was prepared by the Technical Committee on Flash Fire Protective Garments. It was issued by the Standards Council on June 16, 2022, with an effective date of July 6, 2022, and supersedes all previous editions.

This document has been amended by one or more Tentative Interim Amendments (TIAs) and/or Errata. See "Codes & Standards" at www.nfpa.org for more information.

This edition of NFPA 2112 was approved as an American National Standard on July 6, 2022.

Origin and Development of NFPA 2112

The NFPA Standards Council established the Technical Committee on Flash Fire Protective Garments in 1998. Between February and August of 1999, the technical committee developed two draft standards: NFPA 2112 and NFPA 2113, *Standard on Selection, Care, Use, and Maintenance of Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire*, which were then released for public proposals and comments. NFPA 2112 specifies the minimum design, performance, certification requirements, and test methods for flame-resistant garments for use in areas at risk from flash fires. The first editions of NFPA 2112 and NFPA 2113 were approved by the NFPA membership at the May 2001 NFPA World Fire Safety Congress and were issued by the Standards Council in July 2001.

The 2007 edition revised the scope to clarify that the standard applies to the performance of fabrics and components of garments and not the garment itself. The scope was also modified to indicate that NFPA 2112 does not apply to single-use or limited-use garments. The committee pursued the development of separate documents to address the design, testing, certification, selection, and use of those garments. This revision also incorporated updates to reference test methods and the method for calculating total heat flux.

The 2012 edition updated the term *thermal protective performance* to *heat transfer performance* and incorporated ASTM F2700, *Standard Test Method for Unsteady-State Heat Transfer Evaluation of Flame Resistant Materials for Clothing with Continuous Heating*, as the test method. The test method previously shown in the standard was removed, because it duplicated the ASTM F2700 method. A definition for *cold weather insulation material* and testing requirements were added to ensure that garments incorporating such insulation material are properly tested and certified. The 2012 edition clarified certain aspects of the laundering requirements to prevent the presence of residual detergent during testing.

For the 2018 edition, the technical committee refined the term *flash fire* to *short duration thermal exposure from fire*, which is a more descriptive term for the hazard that the standards address. Revisions were made to change the terms. The term *inherent flame resistance* also was added to the standard from NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*.

New garments were added to the standard, including shrouds/hoods/balaclavas as one item, and gloves. Shrouds/hoods/balaclavas were defined to cover those items intended to protect the head and/or neck. Gloves were defined as garments designed to protect the hands and wrist. The technical committee decided to include only performance and construction requirements for these garments without an ASTM F1930, *Standard Test Method for Evaluation of Flame Resistant Clothing for Protection Against Fire Simulations Using an Instrumented Manikin*, style test. These requirements

include, but are not limited to, construction, thermal shrinkage, heat transfer protective performance, flame resistance, thread, hardware, and interlinings.

TIA 12-2 was issued to address cold weather insulation and interlining for the 2012 edition. Prior to the issuance of the TIA, testing for afterflame, fire resistance, and thermal shrinkage had been performed on materials in a configuration not representative of that seen in application. Typically, these materials serve as internal insulation when used in garments in the field, and therefore not directly exposed to fire. However, during testing, the materials had been directly exposed to fire, which resulted in restricted use of cold weather gear without adding additional safety to the garments.

The TIA incorporated modifications to the testing requirements for cold weather and interlining materials for the 2012 edition to allow the use of these materials in NFPA 2112 gear. For the 2018 edition, the technical committee incorporated these allowances for the performance and testing requirements.

New requirements were added for emblems that are represented as flame resistant. Separate testing requirements were added to confirm that the fire-resistant emblems provide the desired performance. Reflective striping also now needs to be tested for flame resistance.

Finally, due to a concern about variability in the ASTM F1930 testing standard, the technical committee added two requirements to the testing apparatus to address variability. First, the lab must verify the response from the sensors to a heat flux before being mounted on the manikin. Second, the TC has added a requirement for two standard reference garments which are constructed of known materials with known results. Before a lab can certify results for the manikin test, the lab must test the reference garments and attain results within a predisposed range.

For the 2023 edition, the technical committee has added a new definition and requirements for venting material. Certification requirements have been added to the standard to properly document testing laboratories where fabric components are tested. Additionally, new annual recertification requirements have been added for samples of products compliant with this standard.

Test methods have been updated by the committee to include specific requirements for testing specimens from whole knitted gloves, as well as new requirements on the standard garment design and updated procedures for the manikin test.

TIA 18-1 was issued for the 2018 edition to address the COVID-19 pandemic and the need for industrial workers to wear cloth face coverings in the performance of their duties as dictated by federal, state, or local authorities. The inclusion of flame-resistant cloth face coverings was intended to aid in worker safety under the circumstances of the global pandemic in the personal protection against airborne pathogens. For the 2023 edition, the technical committee has incorporated these updates but changed the term “cloth face covering” to “barrier face covering” to align with the definition provided in ASTM F3502.

New requirements also have been added to ensure barrier face coverings are certified, labeled, and listed in the same manner as other clothing items covered in the standard.