Revise the title of this standard to:
Standard on Selection, Care, Use, and Maintenance of Flame-Resistant Garments for Protection of Industrial Personnel Against Short-Duration Thermal Exposures from Fire

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Submittal Date: Tue Sep 25 13:04:55 EDT 2012

Committee Statement and Meeting Notes

Committee Statement: This standard is about the selection, care, use, and maintenance of PPE for protection of industrial personnel from short duration thermal exposures from industrial fires, not from a specific type of fire. "Flash Fires" or more properly vapor cloud fires, are a very small subset of actual fire types experienced in industrial environments with fire hazards. Actual thermal exposures can be in the form of full or partial flame contact or engulfment and/or exposure to the radiant energy from a fire's flame emissive power (e.g., when a worker is not in contact with the flames but is escaping the hazard). The title of this standard is better served by identifying thermal exposures to fire, which encompasses all of the noted hazards and fits with the established scope, rather than singling out a specific fire type (as in the case of "Flash Fires").

Response Message: FR-7-NFPA 2113-2012

Public Input No. 2-NFPA 2113-2012 [Chapter NFPA]
Public Input No. 16-NFPA 2113-2012 [Global Input]
1.1.1*

This standard shall specify the minimum selection, care, use, and maintenance requirements for flame-resistant garments for use by industrial personnel in areas at risk from flash fires or short-duration flame exposure thermal exposures from industrial fires, that are compliant with NFPA 2112, Standard on Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire.

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Submittal Date: Wed Sep 26 17:01:17 EDT 2012

Committee Statement and Meeting Notes

Committee Statement: This standard is about the selection, care, use, and maintenance of PPE for protection of industrial personnel from short duration thermal exposures from industrial fires, not from a specific type of fire. "Flash Fires" or more properly vapor cloud fires, are a very small subset of actual fire types experienced in industrial environments with fire hazards. Actual thermal exposures can be in the form of full or partial flame contact or engulfment and/or exposure to the radiant energy from a fire's flame emissive power (e.g., when a worker is not in contact with the flames but is escaping the hazard). The the scope of this standard is better served by identifying thermal exposures to fire, which encompasses all of the noted hazards and fits with the established scope, rather than singling out a specific fire type (as in the case of "Flash Fires").


Public Input No. 10-NFPA 2113-2012 [Section No. 1.1.1]
1.4 Responsibility.

1.4.1 To ensure the greatest possible protection within the organization for employees in the workplace, the cooperative efforts of both employers and employees shall establish and maintain a safe and healthy work environment.

1.4.2 As a minimum, employers shall be responsible for the following:

1. Performing a hazard analysis of the workplace to identify and control physical and health hazards
2. Identifying and providing appropriate personal protective equipment (PPE) for employees
3. Training employees in the use and care of PPE
4. Maintaining PPE, including replacing worn or damaged PPE
5. Periodically reviewing, updating, and evaluating the effectiveness of the PPE program

1.4.3 As a minimum, employees shall be responsible for the following:

1. Properly wearing PPE
2. Attending training sessions on PPE
3. Ensuring proper care, cleaning, and maintenance of PPE
4. Informing a supervisor of the need to repair or replace PPE

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Submittal Date: Wed Sep 26 11:04:12 EDT 2012

Committee Statement and Meeting Notes

Committee Statement: The Committee wanted to clarify the responsibility of the organization and employee for selection, care, use, cleaning and maintenance of short duration thermal exposure protective garments.

Response Message: FR-14-NFPA 2113-2012
First Revision No. 24-NFPA 2113-2012 [ Section No. 2.4 ]

2.4 References for Extracts in Mandatory Sections.


Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Submittal Date: Thu Oct 11 15:55:31 EDT 2012

Committee Statement and Meeting Notes

Committee Statement: To conform to the NFPA Regulations Governing Committee Projects, referenced publications have been updated and all extracted text has been verified.

Response Message: FR-24-NFPA 2113-2012
3.3.3 Care.

Procedures for cleaning, decontamination, and storage of protective clothing and equipment. [1851, 2008 13]
3.3.5 Certification Organization.
An independent, third-party organization that determines product compliance with
the requirements of this standard with a labeling/listing/follow-up program. [1971,
2002, 13]

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Submittal Date: Thu Oct 11 16:12:57 EDT 2012

Committee Statement and Meeting Notes

Committee Statement: To conform to the NFPA Regulations Governing Committee Projects,
referenced publications have been updated and all extracted text has been verified.
Response Message: FR-26-NFPA 2113-2012
First Revision No. 27-NFPA 2113-2012 [Sections 3.3.7, 3.3.8]

3.3.7 Compliance/Compliant.
Meeting or exceeding all applicable requirements of this standard. [1971, 2007 13]

3.3.8 Component(s).
Any material, part, or subassembly used in the construction of the compliant product. [1971, 2007 13]

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Submittal Date: Thu Oct 11 16:13:29 EDT 2012

Committee Statement and Meeting Notes

Committee Statement: To conform to the NFPA Regulations Governing Committee Projects, referenced publications have been updated and all extracted text has been verified.
3.3.14 Fire
A rapid oxidation process, which is a chemical reaction resulting in the evolution of light and heat in varying intensities. [921, 2011]

Committee Statement and Meeting Notes

Committee: A definition of fire is missing from this standard (which offers guidance for the selection of appropriate PPE against this hazard).
Response: FR-9-NFPA 2113-2012
Message: Public Input No. 7-NFPA 2113-2012 [New Section after 3.3.13]
3.3.17* Flash Fire.
A fire that spreads by means of a flame front rapidly through a diffuse fuel, such as dust, gas, or the vapors of an ignitable liquid, without the production of damaging pressure. [921, 2008 11]

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Submittal Date: Thu Oct 11 16:15:01 EDT 2012

Committee Statement and Meeting Notes

Committee Statement: To conform to the NFPA Regulations Governing Committee Projects, referenced publications have been updated and all extracted text has been verified.
3.3.21 Hazard Assessment Analysis.

The process by which an organization identifies hazards in the workplace and then determines appropriate controls, including the use of personal protective equipment (PPE), to eliminate or reduce worker exposure to those hazards.

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Submittal Date: Fri Sep 28 10:24:58 MDT 2012

Committee Statement and Meeting Notes

Committee Statement: The Committee believes that hazard analysis is a more appropriate term than hazard assessment in the context of this standard and is more consistent with industry terminology.

3.3.23 Hazardous Materials Emergencies.
Incidents involving the release or potential release of hazardous materials. [1971, 2007]

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Submittal Date: Thu Oct 11 16:16:04 EDT 2012

Committee Statement and Meeting Notes

Committee Statement: To conform to the NFPA Regulations Governing Committee Projects, referenced publications have been updated and all extracted text has been verified.
Response Message: FR-29-NFPA 2113-2012
3.3.27 Melt.
A response to heat by a material resulting in evidence of flowing or dripping. [1983, 2006 12]

Submitter Information Verification
Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Submittal Date: Thu Oct 11 16:21:55 EDT 2012

Committee Statement and Meeting Notes
Committee Statement: To conform to the NFPA Regulations Governing Committee Projects, referenced publications have been updated and all extracted text has been verified.
Response Message: FR-30-NFPA 2113-2012
3.3.33 Risk.
A combination of the probability and the degree of possible injury or damage to health in a hazardous situation. [79, 2012]

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Submittal Date: Tue Sep 25 10:48:50 EDT 2012

Committee Statement and Meeting Notes

Committee Statement: The standard uses the term risk and the Committee determined that there should be a definition within the standard. The Committee considered the submitter's definition, but believed it is not relevant to the scope of the standard or the context in which the term risked is used. The Committee extracted the definition from NFPA 79, Electrical Standard for Industrial Machinery, as a relevant definition of risk that applies to this standard.

Response Message: FR-1-NFPA 2113-2012

Public Input No. 17-NFPA 2113-2012 [New Section after 3.3.31]
3.3.34 Risk Assessment.
The process by which an organization develops a comprehensive quantitative or qualitative evaluation of the probability and severity of human injury from identified hazards for the implementation of preventive measures.

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Submittal Date: Tue Sep 25 11:02:18 EDT 2012

Committee Statement and Meeting Notes

Committee Statement: The definition supports the addition of "Risk Assessment" language in Chapter 4 to addresses the Committee's desire to include this topic in the standard, see FR-3-NFPA 2113-2012.
Response Message: FR-2-NFPA 2113-2012

Public Input No. 8-NFPA 2113-2012 [New Section after 3.3.31]
4.1 General.
The organization's selection process for flame-resistant garments shall be based on the following:

(1) The conduct of a hazard assessment analysis of the workplace to determine the need for the wearing of flame-resistant garments

(2) An evaluation of flame-resistant garment designs and characteristics to determine the type of flame-resistant garments suitable for protecting workers

(3) The development of specifications for purchasing flame-resistant garments

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Submittal Date: Thu Sep 27 13:14:53 MDT 2012

Committee Statement and Meeting Notes

Committee Statement: The Committee believes that hazard analysis is a more appropriate term than hazard assessment in the context of this standard and is more consistent with industry terminology.
Response Message: FR-16-NFPA 2113-2012
4.2* Workplace Hazard Assessment Analysis.

4.2.1 The organization shall conduct a hazard assessment of the workplace to determine the requirement for wearing flame-resistant garments.

4.2.2 The hazard assessment analysis shall be performed based on a review of the facility to determine if flammable materials are present in quantities that will present a fire hazard and endanger a person.

4.2.3* The general workplace hazard assessment analysis process shall include consideration of the following:

1. Determination of the type of hazard or hazards present in the workplace and the potential magnitude, thermal intensity, and duration of the hazard

2. Determination of the adverse effects of unprotected exposure to the hazards identified

3. Determination of whether other control options (engineering, administrative, and so forth) can be used instead of flame-resistant garments

4. Determination of garment performance characteristics needed for protection

5. Determination of the need for garment decontamination where applicable

6. Determination of ergonomic constraints of work to be performed while wearing the garment

7. Comparison of risks and costs of all options

8. Implementation of selected option(s)

4.2.4 A specific evaluation of the work environment to determine the requirement for wearing flame-resistant garments shall be based on the potential hazards that workers are exposed to as part of their work duties.

4.2.5 Factors in determining if flame-resistant garments are required shall include, but not be limited to, the following:

1. Proximity of the work to be performed to a fire hazard

2. The presence of flammable materials in the environment during process operations

3. The potential for the task being performed to increase the possibility of a flammable release, which could result from a mechanical failure such as a line breaking

4. Operating conditions of the process, for example, the potential for flammable fumes or vapors
The presence of engineering controls designed to reduce exposure to flammable materials present during normal operations

Accident history

Means and duration of egress within potential exposure zone (e.g., location and distance to exits, potential congestion, elevated or restricted areas, connections to lifelines/fall protection, capability of workers to escape)

4.2.6*
The initial review of a facility shall determine if flammable materials are present in quantities necessary to present a fire hazard and endanger a person.

4.2.7
The organization shall reassess the hazard assessment analysis at least every 5 years, or when a significant change is made to the work environment, to verify that the requirements for wearing flame-resistant garments or the levels of protection required have not changed.

A comprehensive risk assessment shall be permitted to be used in combination with a hazard analysis for the purpose of evaluating the work environment for protection strategies and the management of flame-resistant garment use.

4.2.8.1 Where a risk assessment is used in combination with a hazard analysis, it shall include consideration of the following:

(1) The nature of potential fire-related injuries in the work environment

(2) The likelihood of fire-related injuries occurring

(3) The time period over which fire-related injuries might be expected

4.2.8.2* The generation of geographic- or work location–based risk contours, showing the expected frequency of a fire event capable of causing a specified level of injury at specified locations, shall be permitted to be used in conjunction with the fire hazard consequence analysis to assess the implementation of specific engineered and administrative preventive measures and the selection of appropriate flame-resistant personal protective equipment (PPE) or other acceptable risk assessment tools.

Supplemental Information

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Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Submittal Date: Thu Sep 27 13:21:11 MDT 2012
Committee Statement: The Committee believes that hazard analysis is a more appropriate term than hazard assessment in the context of this standard and is more consistent with industry terminology. The Committee added in thermal intensity as part of the hazard analysis. The magnitude and duration alone do not account for all the variables that will impact how a worker is affected by an exposure. The magnitude (size) and duration (exposure time) along with the intensity better assesses how much total thermal exposure an individual will experience. Depending on the type of fuel, the amount of oxygen, etc. the thermal intensity of the exposure will vary and the protection level requirements for the protective clothing will also vary.

Response Message: FR-17-NFPA 2113-2012

Committee Notes:

Date Submitted: Oct 11, 2012

By: Duval

Legislative text is shown incorrect.

Public Input No. 4-NFPA 2113-2012 [Section No. 4.2.3]
4.2.8
A comprehensive risk assessment shall be permitted to be used in combination with a hazard analysis for the purpose of evaluating the work environment for protection strategies and the management of flame-resistant garment use.

4.2.8.1
Where a risk assessment is used in combination with a hazard analysis, it shall include consideration of the following:

1. The nature of potential fire-related injuries in the work environment
2. The likelihood of fire-related injuries occurring
3. The time period over which fire-related injuries might be expected

4.2.8.2
The generation of geographic- or work location–based risk contours, showing the expected frequency of a fire event capable of causing a specified level of injury at specified locations, shall be permitted to be used in conjunction with the fire hazard consequence analysis to assess the implementation of specific engineered and administrative preventive measures and the selection of appropriate flame-resistant personal protective equipment (PPE) or other acceptable risk assessment tools.

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Submittal Date: Tue Sep 25 11:09:56 EDT 2012

Committee Statement and Meeting Notes

Committee Statement: The addition of "Risk Assessment" language to the standard addresses the Committees desire to include this topic into this edition. The new text is worded such that the implementation of a risk assessment is optional, but if executed identifies general features that should be utilized in industrial risk calculations. The Committee added in references to an appropriate literature resource in the annex.

Response Message: FR-3-NFPA 2113-2012

Committee Notes:

Date Submitted
By
Oct 11, 2012
Duval Should be all underlined as it is new text.

Public Input No. 9-NFPA 2113-2012 [New Section after 4.2.7]
5.1.7*
Other personal protective equipment (PPE) shall be worn if determined as necessary from a review of the potential hazards to which workers are exposed from the hazard assessment analysis.

Submitter Information Verification
Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Submittal Date: Fri Sep 28 10:28:04 MDT 2012

Committee Statement and Meeting Notes
Committee Statement: The Committee believes that hazard analysis is a more appropriate term than hazard assessment in the context of this standard and is more consistent with industry terminology.
Response Message: FR-20-NFPA 2113-2012
A.1.1.1

The use of garments providing protection against flash fires short-duration thermal exposures from fire should be incorporated into a proper safety program that also utilizes appropriate administrative and engineering controls in addition to proper, safe work procedures.

Flame-resistant garments are available from a variety of manufacturers, in a range of items (e.g., coveralls, pants, shirts, vests, parkas, rainwear, disposable garments, aprons, etc.). Flame-resistant garments are made out of a variety of either inherently flame-resistant fabrics or fabrics that have been treated with a flame retardant.

NFPA 2112–compliant clothing is intended to reduce the probability and extent of burn injury during exposure or escape.
A.3.3.17 Flash Fire.

A flash fire requires an ignition source and a hydrocarbon or an atmosphere containing combustible, finely divided particles (e.g., coal dust or grain) having a concentration greater than the lower explosive limit of the chemical. Both hydrocarbon and dust flash fires can generate temperatures from 538°C to 1038°C (1000°F to 1900°F) about 500°C to 1500°C. The intensity of a flash fire depends on the size of the gas or vapor cloud, multiple factors, including, but not limited to, type of fuel, heat release rate, environmental conditions, size, and type of the space. When ignited, the flame front expands outward in the form of a fireball depending on the preceding factors. The resulting effect of the fireball's energy with respect to radiant heat significantly enlarges the hazard areas around the gas released. Additional information describing flash fires is provided in Assessing Flame-Resistant Clothing Use, CMA Manager's Guide.
A.4.2

An example of a suitable hazard and risk assessment is provided in Assessing Flame-Resistant Clothing Use, CMA Manager's Guide. This publication includes checklists for assessment of flammable liquid or gas and combustible dust flash fire hazards. Information and examples regarding hazard analysis and risk assessment can be found in the following publications: Guidelines for Chemical Process Quantitative Risk Analysis (CCPS), JOIFF Handbook on Personal Protective Equipment (PPE) to protect against Heat and Flame, and NFPA 550, Guide to the Fire Tree Concepts.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Submittal Date: Tue Sep 25 12:32:47 EDT 2012

Committee Statement and Meeting Notes

Committee Statement: The Committee updated references to information and examples regarding hazard analysis and risk assessment.
Response Message: FR-5-NFPA 2113-2012
First Revision No. 12-NFPA 2113-2012 [Section No. A.4.2.3]

A.4.2.3

These hazards include, but are not limited to, the following:

(1) Exposure to flash radiant and convective energy from fires
(2) Generation of static electricity on garments or other personal protective equipment (PPE) worn by workers
(3) Physical hazards
(4) Person-position hazards (work near waterways, on elevated platforms, or near roadways)
(5) Hazards created by the wearing of PPE

Also, the hazard classification of the work area needs to be determined, for example, chemical, electrical, or explosion.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Submittal Date: Tue Sep 25 15:11:47 EDT 2012

Committee Statement and Meeting Notes

Committee Statement: Actual thermal exposures can be in the form of full or partial flame contact or engulfment and/or exposure to the radiant and convective energy from a fire's flame emissive power (e.g., when a worker is not in contact with the flames but is escaping the hazard). This explanatory section is better served by expressing the hazard as an exposure to flames or intense radiant energy.

Response Message: FR-12-NFPA 2113-2012

Committee Notes:

Date Submitted By
Oct 11, 2012 Duval Legislative text is shown incorrectly.

Public Input No. 14-NFPA 2113-2012 [Section No. A.4.2.3]
A.4.2.5(1)
Short-duration flame exposures can arise from other numerous fire types in industrial environments. These fires include, but are not limited to, vapor cloud fires, jet flames fires, liquid fires (pool fires or running liquid fires), solids fires (fires of solid materials or dust fires), and fires associated with oxygen. Short-duration thermal exposures can also arise from the radiant energy generated by these fires (radiated by the flame front).

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Submittal Date: Tue Sep 25 15:19:40 EDT 2012

Committee Statement and Meeting Notes

Committee Statement: A short duration thermal exposure can come from both flame contact / engulfment and radiant energy (emitted by the fire's flame front). The corrected text makes this clarification (and places vapor cloud fires into perspective within the standard).


Committee Notes:

Date Submitted By
Oct 11, 2012 Duval Legislative text shown incorrectly.

Public Input No. 15-NFPA 2113-2012 [Section No. A.4.2.5(1)]
First Revision No. 18-NFPA 2113-2012 [ New Section after A.4.2.6 ]

A.4.2.8.2
See A.4.2 for references to information on and examples of risk assessments.

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Submittal Date: Thu Sep 27 13:37:24 MDT 2012

Committee Statement and Meeting Notes

Committee Statement: The Committee added in references to an appropriate literature resource in the annex.

Committee Notes:

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<td>Double check that the annex is the correct section.</td>
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A.4.3
The flame-resistant garments addressed in NFPA 2112, Standard on Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire, provide a level of protection against unplanned exposure to fire [testing done at an intensity of 84 kW/m² (2.0 cal/cm² · sec) and cumulative energy of 252 kJ/m² (6 cal/cm²)] for relatively short periods of time. This standard directs end users to conduct a hazard assessments analysis for the appropriate tasks and work environments prior to selecting flame-resistant garments. The protection identified in NFPA 2112 might not be appropriate for the thermal hazards faced or meet the PPE requirements of applicable OSHA regulations.

Flame-resistant garments can reduce the severity of burn injury as a result of a fire but cannot completely prevent an injury. Testing of selected garments and material systems is recommended at the hazard levels identified in the hazard assessment analysis, so that overall performance can be understood, especially in situations where egress times are approximate or the nature of the hazard might change.

Note that garments that continue to burn after a fire incident are hazardous. NFPA 2112 was developed specifically to minimize this hazard.

NFPA 2112 specifies several requirements for flame-resistant garments in terms of flame resistance, heat resistance, thermal shrinkage, and body burn prediction to a specific exposure. Descriptions of these performance requirements are provided in Annex B.

One requirement that warrants additional explanation is the manikin test requirement. This test involves placement of a flame-resistant garment on a manikin with exposure to a 3-second duration, 84 kW/m² (2.0 cal/cm² · sec) intensity engulfment "jet" fire. The test is used as a qualification of garment fabric performance, not the garment design, since a standard garment design is used for evaluating the fabric. The standard garment is a coverall with a front slide fastener (zipper) closure and no pockets. Flame-resistant garments with different designs are not evaluated using this test. Organizations should judge the performance of their garment designs by comparing their design with that of the standard garment design or conduct independent testing. Garment designs that provide different areas of body coverage, have different closure systems, or have pockets can demonstrate lesser or better performance than the standard garment design.

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Submittal Date: Fri Sep 28 10:31:45 MDT 2012

Committee Statement and Meeting Notes
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<th><strong>Committee Statement:</strong></th>
<th>The Committee believes that hazard analysis is a more appropriate term than hazard assessment in the context of this standard and is more consistent with industry terminology.</th>
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<td><strong>Response Message:</strong></td>
<td>FR-21-NFPA 2113-2012</td>
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A.5.1.7
Organizations should recognize the need for wearing other types of PPE while wearing flame-resistant garments. Other types of PPE include, but are not limited to, head protection, eye and face protection, foot protection, fall protection, personal flotation devices, high-visibility garments, and other types of garments. As with the use of flame-resistant garments, the selection of other PPE should be based on the hazard assessment analysis. It is also important that the other selected PPE be compatible with and not adversely affect the performance properties of the flame-resistant garments. (See A.5.1.8.)

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Submittal Date: Fri Sep 28 10:38:26 MDT 2012

Committee Statement and Meeting Notes

Committee Statement: The Committee believes that hazard analysis is a more appropriate term than hazard assessment in the context of this standard and is more consistent with industry terminology.
A.5.2

Employees should be required to wear flame-resistant garments in facilities or areas where any of the following materials or conditions are present:

1. Materials having a degree of hazard of 4 when ranked in accordance with NFPA 704, *Standard System for the Identification of the Hazards of Materials for Emergency Response*, where flammable vapors are present in normal operations

2. Materials having a degree of hazard of 3 when ranked in accordance with NFPA 704, at temperatures above their flash points where flammable vapors are present in normal operations

3. Materials having a degree of hazard of 2 or 1 when ranked in accordance with NFPA 704, when heated above their boiling points where flammable vapors are present in normal operations

4. Combustible dust (components present in the material where particle size is less than 75 microns, required ignition energy is less than 100 mJ, and moisture content is less than 10 percent), where such dust is present in normal operation

Flame-resistant garments should be required for specific tasks for employees working in areas meeting any of the following process hazards and performing a task where the assessment hazard analysis indicates that the work increases the possibility of loss of containment of the material:

1. Processes involving materials having a degree of hazard of 4 when ranked in accordance with NFPA 704, where flammable vapors will be present only if loss of containment occurs

2. Processes involving materials having a degree of hazard of 3 when ranked in accordance with NFPA 704, at temperatures above their flash points where flammable vapors will be present only if loss of containment occurs

3. Processes involving materials having a degree of hazard of 2 or 1 when heated above their boiling points when ranked in accordance with NFPA 704, where flammable vapors will be present only if loss of containment occurs and experience indicates a frequency of incidents due to equipment design or arrangement

4. Processes involving combustible dust [components present in the material where particle size is less than 75 microns, required ignition energy is less than 100 mJ (1 micron (µ) = 10⁻⁶ m), and moisture content is less than 10 percent], where such dust is present in enclosed systems and loss of containment is required to generate a dust cloud

Examples of combustible dust environments include locations of operations where charging equipment is used with dusty materials, locations where dust is present on equipment or structural members, and areas where filter bags in dust collectors are changed.

Additional information is offered in *Assessing Flame-Resistant Clothing Use, CMA Manager’s Guide*. 

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**First Revision No. 23-NFPA 2113-2012 [Section No. A.5.2]**
Engineering controls designed to reduce exposure to materials present in normal operation and experience should be considered in the evaluation of areas or tasks requiring the wearing of flame-resistant garments. Where multiple tasks require the wearing of flame-resistant garments, consideration should be given to standardization of the garment as normal work wear for the area.

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Submittal Date: Fri Sep 28 10:39:57 MDT 2012

Committee Statement and Meeting Notes

Committee Statement: The Committee believes that hazard analysis is a more appropriate term than hazard assessment in the context of this standard and is more consistent with industry terminology.
Response Message: FR-23-NFPA 2113-2012
First Revision No. 31-NFPA 2113-2012 [ Section No. C.1.1 ]

C.1.1 NFPA Publications.
National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.


Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Submittal Date: Thu Oct 11 16:37:24 EDT 2012

Committee Statement and Meeting Notes

Committee Statement: To conform to the NFPA Regulations Governing Committee Projects, referenced publications have been updated and all extracted text has been verified.
Response Message: FR-31-NFPA 2113-2012
First Revision No. 35-NFPA 2113-2012 [ New Section after C.1.2.1 ]

C.1.2.2  AIChE Publications.
American Institute of Chemical Engineers, 345 East Street, New York, NY 10017.

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Submittal Date: Thu Oct 11 16:51:22 EDT 2012

Committee Statement and MeetingNotes

Committee Statement: The Committee updated reference information and examples regarding hazard analysis and risk assessment.
First Revision No. 32-NFPA 2113-2012 [ Section No. C.1.2.3 ]

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<td>Chemical Manufacturers Association (now American Chemistry Council), 1300 Wilson Boulevard, Arlington, VA 22209.</td>
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<td>Submittal Date:</td>
<td>Thu Oct 11 16:42:36 EDT 2012</td>
</tr>
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**Committee Statement and Meeting Notes**

| Committee Statement: | This document is no longer referenced in the annex material, as such it has been moved to C.2. |
| Response:            | FR-32-NFPA 2113-2012 |
C.1.2.6  Other Publications.

Submitter Information Verification

Submitter Full Name: Derek Duval
Organization: National Fire Protection Assoc
Submittal Date: Wed Oct 31 12:10:18 EDT 2012

Committee Statement and Meeting Notes

Committee Statement: The Committee updated reference information and examples regarding hazard analysis and risk assessment.
C.2.1 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.


Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Submittal Date: Thu Oct 11 16:45:08 EDT 2012

Committee Statement and Meeting Notes

Committee Statement: To conform to the NFPA Regulations Governing Committee Projects, referenced publications have been updated and all extracted text has been verified.

Response Message: FR-34-NFPA 2113-2012
First Revision No. 33-NFPA 2113-2012 [ New Section after C.2.2.3 ]

C.2.2.4 CMA Publications.

Chemical Manufacturers Association (now American Chemistry Council), 1300 Wilson Boulevard, Arlington, VA 22209.


Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Submittal Date: Thu Oct 11 16:44:14 EDT 2012

Committee Statement and Meeting Notes

Committee Statement: This document is no longer referenced in the annex material, as such it has been moved to C.2.
Response Message: FR-33-NFPA 2113-2012