



8 Things Oil & Gas Workers Should Know About Flash Fires

The potential exists for flash fires in the oil and gas industry. Flash fires are sudden, intense fires caused by ignition of flammable substances in air.

While flash fires cannot be completely prevented, oil and gas workers can take strategic precautionary steps to give themselves a few seconds of escape if a flash fire occurs. Below are eight critical things that oil and gas workers should know about flash fires, from their cause and duration to adequate personal protective apparel.

1. Flash fires are short and intense

A flash fire is a rapidly moving flame front that spreads through a diffuse fuel. It goes without saying that workers in the oil and gas industries are at a much higher risk for flash fires, due to the nature of the materials and liquids around which they operate. When a flash fire occurs, it is generally of a short duration and fuel limited.

2. Flash fires have various causes

Fire is a complex chemical chain reaction that requires three components to occur: a thermal source, or heat, oxygen and fuel. The fuel could be any number of hydrocarbons typically found in the oil and gas environment. Even combustible dust may be fuel for a flash fire. Once the fuel and air are in the correct mixture, ignition can occur from various heat sources, such as welding, tool sparks, running engines, etc.

As flash fires and fuel-fed fires present different hazards, they each require different levels of flame resistant (FR) personal protective equipment (PPE).

3. Flash fires are different from fuel-fed fires

Flash fires and fuel-fed fires are two different hazards, and it's critical to distinguish between the two for various safety reasons. Flash fires are fuel-limited, have a typical momentary duration of only a few seconds and self-extinguish. On the other hand, fuel-fed fires last much longer and will burn as long as there is a fuel source present.

As flash fires and fuel-fed fires present different hazards, they each require different levels of flame resistant (FR) personal protective equipment (PPE). Fuel-fed fires require primary protective apparel, such as turnout gear, which is heavier in construction. Secondary apparel, or daily wear FR, can help minimize burn injuries from flash fires and is available in comfortable, breathable constructions that allow wearers to work comfortably throughout their day.

That said, it's vital for oil and gas technicians to adequately understand the specific hazards they face on the job, and whether their hazards align with flash fires or fuel-fed fires. Those who work ding denim. Qualified safety personnel must perform a hazard assessment in that work environment to determine the level of PPE required.

4. Flash fire injury can be increased by non-flame resistant clothing

The very science of a flame has three basic steps:

1. The initial flame causes material (for example, non-FR clothing) to break down, or

decompose, into smaller molecules that are vaporized into gaseous fuel.

2. The fuel reacts with oxygen in the air to produce light, heat and reactive molecules, called radicals.

3. The produced heat and radicals lead to further decomposition of the material (for example, non-FR clothing) and the production of additional fuel – furthering the chain reaction of the fire triangle.

In the event of a momentary flash fire, everyday non-flame resistant work clothes can act as fuel and ignite and will continue to burn even after the source of ignition has been removed. This is where the saying “Stop, Drop, and Roll” comes into play as a person's non-FR clothing will remain on fire until they put the clothing fire out. A clothing fire can continue to burn well after the brief flash fire event is over, resulting in more extensive burn injuries on skin clothed with non-FR fabric.

5. Flash fire injury can be reduced by flame resistant clothing

FR apparel provides two key roles in protecting oil and gas workers:

1. Self-extinguishes to mitigate burn injuries when the source of ignition is removed
2. Provides insulation to reduce probability of a second-degree burn

The combustion process has many intricate layers, presenting various opportunities for FR apparel to snuff out the flame. Unlike standard, non-FR clothing, FR apparel is uniquely

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engineered to interrupt one or more of the fundamental steps required for flames to propagate. Simply stated, FR apparel removes the fuel out of the fire triangle.

Developing a thorough, researched PPE program with trusted flame-resistant fabric for everyday wear is critical to protect yourself, and your team members, against potential injuries from unexpected flash fires. It's as simple as selecting to wear a different work shirt, but as meaningful as helping protect one's life.

6. Not all FR clothing is suited to protect against flash fires

Determining which FR apparel is best suited for your specific hazard and work environment is a significant task, but there are industry standards available to aid in this process. The National Fire Protection Association (NFPA) created guidelines and standards to aid the industry. NFPA 2112 is the industry standard on flame resistant garments for protection of industrial personnel against flash fire, providing clear testing guidelines.

One requirement of NFPA 2112 is for flash fire testing to be conducted at three seconds with a pass/fail criteria of 50 percent total body burn under the testing protocols of ASTM F1930 (Standard Test Method for Evaluation of Flame Resistant Clothing for Protection Against Flash Fire Simulations Using an Instrumented Manikin).

NFPA 2113 is the Standard on Selection, Care, Use, and Maintenance of Flame-Resistant Garments for Protection of Industrial Personnel

Against Short-Duration Thermal Exposures from Fire. NFPA 2113 has a wealth of information, most notably language around a workplace hazard analysis.

It's important to reference standards appropriate to NFPA 2112 and flash fire hazards. FR apparel standards for other hazards, such as arc flash (AR), use categories as metrics, such as Category 2 PPE. FR apparel engineered for arc flash and FR apparel engineered for flash fire possess different properties, which sometimes do not translate across the hazards, so looking for the appropriate certification for flash fire hazards is a critical step in selecting the most effective PPE to minimize burn injury.

7. Not all FR apparel provides the same protection

Fabric is the single most important aspect of a garment when it comes to FR protection. There is a vast range of FR fabric available, however, each FR fabric performs differently. It's critical to have a deep understanding of the FR fabric manufacturer—its reputation, history, and technology—and the specific science used to give your FR garment protective properties.

Unfortunately, FR qualities are not visible, so you must verify the performance of your FR apparel. For oil and gas workers exposed to flash fire hazard, having a daily workwear garment certified to NFPA 2112 is a necessary starting point.

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However, since all fabrics with less than 50 percent burn can be certified, it is important to know the actual body burn percentage of the ASTM F1930 test. Fabrics can be certified with 50 percent total body burn or 10 percent, and these differences should be understood.

Oil and gas workers routinely work in areas where the flash fire hazard exist. Understanding the risks at hand, the various facets of flash fires and trusted ways to protect oneself are the first steps in creating a safer work environment for these key industries.

8. Proper maintenance is key to FR apparel performance

Care and maintenance not only extends the life of FR apparel—it is essential to allowing the garments to protect oneself to its fullest capability in the event of a flash fire. Keep FR apparel well maintained, patched with the correct FR fabric when needed, and as clean as possible, as flammable contaminants can compromise its performance. Check with your FR fabric or garment provider for proper care and maintenance instructions. Some job sites may prevent clothing from being totally spotless, but for dirtier tasks, consider wearing a disposable FR coverall over daily FR apparel to reduce soiling.

About the Author

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Scott Francis has been involved with the safety industry since 1991 and has extensive experience with protective apparel fabrics and programs. He participates in numerous industry organizations and addresses trade associations regarding hazard protection, electric arc and flash fire hazards, body burn injury, the protective performance of FR clothing and related topics.

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