

BETTER MRO



Safety Hot Work Safety: Curbing the Risks of Flame-Generating Tools

James Langford | Nov 02, 2023

Getting a hot work permit to tackle routine maintenance in a manufacturing facility might sound like another layer of red tape—if you don't consider the deadly risks that the paperwork is meant to curb.

Welding, soldering and other types of hot work—basically any task that involves open flames or generates sparks or heat—led to an average 3,396 building fires each year from 2017 to 2021—more than half of them in businesses, according to a *report* from the National Fire Protection Association.

Some 52 percent of the blazes were linked to welding, while another 25 percent involved cutting torches, illustrating why the association calls for permits in places where hot work isn't done regularly in its *Standard 51B*, which is included by reference in *U.S. Occupational Safety and Health Administration rule 1910.252* covering welding and brazing work.

The permits, generally issued by a supervisor, aren't required for areas such as a welding shop, where hot work is performed routinely, because a variety of safeguards should already be in place there to comply with relevant federal and state regulations.

"Hot work continues to be one of the most significant industrial hazards facing the world," Holly Burgess and Matthew Barker of the National Fire Protection Association warned in a *blog post in October*. Techniques used in such tasks "have the potential to ignite flammable materials, gas or vapors in the surrounding environment, leading to fires or explosions if proper precautions are not taken."

In March, for example, a Buffalo, New York, firefighter was killed when a building partially collapsed during a *four-alarm fire* that federal investigators said started when flames from a propane torch ignited material in a costume shop. A month later, two people were injured in Missouri when they cut into a metal drum that exploded, according to the post.

One extreme case captured worldwide attention: In *August 2020*, an explosion that killed 218 people in the port city of Beirut, Lebanon, and left 300,000 people homeless was later tied to welding repairs on a building where a large number of fireworks had been stored along with thousands of tons of explosive ammonium nitrate, the same material used in the *1995 bombing* of a federal building in Oklahoma City.

Hot Work Deaths

In the U.S., the government's *Chemical Safety and Hazard Investigation Board* says hot work is among the most common causes of worker death in cases it investigates, with many accidents caused by hot work near tanks or containers with flammable materials.

"When you are performing hot work, there is potential to bring together the three parts of the fire triangle: oxygen, fuel and an ignition source," the fire protection association warns.

Two parts of that triangle are virtually inescapable: The Earth's atmosphere is rich in oxygen, and it's present everywhere hot work is done. Ignition sources, meanwhile, come from the hot work itself: flames or sparks generated by welding, cutting and burning as well as heat radiating through the air or metal surfaces.

The piece of the triangle that's more controllable during hot work is fuel sources, or combustible materials from insulation and roofing materials to flammable liquids such as paint or cleaning solvents, and rags, paper and dust. One that's often overlooked, according to the fire protection association, is the object that's being maintained or repaired.

3 Steps to Minimize Fire Hazards

To avoid fires, explosions and the related risks of injuries and fatalities, a permit should be completed prior to any hot work, the organization says.

That helps to ensure that workers and managers alike follow the fire protection association's *three simple steps* to minimize fire hazards:

- **Recognize:** Determine whether fire risks exist before starting work.
- **Evaluate:** Determine what hazards are present: flammable and combustible liquids and gases, for instance, or materials that might catch fire.
- **Control:** Take appropriate steps to eliminate or minimize the hazards.

Areas where hot work is done can be protected with equipment such as welding pads, blankets and curtains as well as by removing any combustible materials within a 35-foot radius of the work, the organization notes.

Since fires can start even after a hot job is finished, the National Fire Protection Association requires a fire watch to remain in the area for at least an hour following completion of the work.

"The permit-authorizing individual could require the fire watch to remain on site longer," the group notes, "depending on the conditions of the work site."

Items that commonly catch fire during hot work on business sites include organic materials such as crops, grass and shrubs (32 percent of cases), signs and recreational material (19 percent); liquids, piping or filters (13 percent); and garments or other soft goods (7 percent), according to the association's report.

Cutting or welding too close to combustible materials was the cause of 32 percent of the blazes from 2017 to 2021, while placing heat sources too close to flammable items sparked another 21 percent. Smaller numbers of fires were started by an arc or spark from operating equipment and incorrect use of tools.

Hot Work Permit No. _____

ABC Biofuel Company			
NO WORK IS ALLOWED EXCEPT THAT WHICH IS SHOWN ON	THIS P	ERMIT	
Date of Issue: Time Issued:			
Time Permit Expires: Equipment involved in Hot Work:		え	•
Description of Hot Work to be done:		2	5
Location: Department Doing Work:			
Personnel involved in Hot Work:			
1. Has the equipment/line been thoroughly cleaned and purged?	Yes	No	—— Initials
Cleaned by:			
2 Is equipment isolated and tagged 2			
2. Usua alestrical avitabas have lasked but and taged?			
3. Have electrical switches been locked out and tagged?			
4. Are blinds in place?			
5. Lock out / tag out in place?			
6. Combustible gas meter reading in work area:			
Is work area thoroughly ventilated?			
8. Fire Watch duty assignment:			
9. Are all sewers protected from falling sparks?			
10. Are all combustibles in the work area protected from falling sparks?			
11. Have combustible waste materials been removed from the area?			
12. What fire protection is on hand at work site? (Type of fire extinguishe	r)		
13. What departments have been advised of Hot Work?			
14. Has the equipment/line been inspected to ensure all parts are free			
of hazardous materials?			
15 List required DDF being used in work area			
13. Listrequirea FFE being used in work area.			
 16. Has a joint inspection of the work site been conducted with Maintenar Maintenance Personnel:	ıce?		

WARNING: THIS HOT WORK PERMIT IS FOR ILLUSTRATION PURPOSES ONLY AND SHOULD NOT BE USED

Hot Work Permit No.

ABC Biofuel Company

NO WORK IS ALLOWED EXCEPT THAT WHICH IS SHOWN ON THIS PERMIT

Dat	e of Issue:	Time Issued:	<u> </u>		
Tim	e Permit Expires:		c V		
Equ	ipment involved in Hot Work:				
Des	cription of Hot Work to be done:		02.		
Loca	ation:	Department Doing Work:			
Pers	sonnel involved in Hot Work:				
			es No Initials		
17.	Do unit and atmospheric conditions permi	t safe work?			
18. Is permit receiver aware of MSDS for materials previously contained					
in equipment/line?					
19. Are combustible gas tests required during the job progress?					
20[Insert site/process specific questions here]					
21[Insert site/process specific questions here]					
[Insert site/process specific questions here]					
AGREEMENT: THAVE CHECKED BOTH THE PERMIT AND THE WORK TO BE DONE. I					
UNDERSTAND THE NATURE AND EXTENT OF THE WORK I UNDERSTAND THE PRECAUTIONS					
TO BE FOLLOWED IN COMPLETING THE WORK. I UNDERSTAND THE WORK IS NOT					
COMPLETED LINTIL OPERATIONS HAS SIGNED OFF ON COMPLETION OF THE WORK					
	Permit Issued by:	Ioh Title:	Time		
	Permit received by:	Job Title:	Time:		
Γ	PERMIT WORK COMPLETED and Inspection	n of Work Completed:			
	Work Complete :	Job Title:	Time:		
	Permit Issuer:	Job Title:	Time:		

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To perform hot work as safely as possible, training materials compiled by the nonprofit New Jersey Work Environment Council recommend the following steps:

• A permit must be issued before work begins; it should record that safety requirements were met as well as the results of monitoring for combustible gases and vapors. Remember, a hot work

permit is an important tool, but it doesn't make unsafe work safe.

- The permit issuer should check the work site for:
 - Explosive atmospheres
 - Nearby combustible materials
 - Fire protection equipment
 - Safe condition of surrounding areas
 - Notification of all people involved
 - Establishment of a fire watch
- The worker performing hot work can't do his or her job and watch the area, too. At least one welltrained fire watch should be posted in each hot work area.
- Hot work areas should always be monitored for flammable gases before hot work is performed, but the highest level of protection comes from *monitoring the site continuously*.
- Hot work outside a designated area, such as a welding shop, is always a risk and should only be a last resort. Move the job to a safe site whenever possible.

What precautions does your business take when performing hot work? Tell us in the comments below.

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