



Risk Engineering Services

Fire Protection Impairments



Fire can cause significant damage to buildings, production and the ability to continue business operations. Sprinklers or other fire protection systems are, therefore, critical components to protect business operations and help reduce the severity of fire. To be effective, fire protection systems need to be available at all times. A simple oversight, such as a closed valve or isolated pump could render these systems inoperable. The Swiss Re Corporate Solutions fire protection impairment process is designed to help you identify, assess and manage fire protection impairments, providing guidance and resources for use on site.

Background

Fire protection systems such as sprinklers are designed to automatically detect a fire and discharge an agent such as water to control or suppress the fire. Over the life of the system there will be times when the system will be taken out of service such as for maintenance, repair, modifications or following an activation. At this point, the system is considered impaired and is no longer providing protection.

Whilst well designed and installed sprinkler systems are considered very reliable, impairments are widely reported as the most common cause of failure. Information from the National Fire Protection Association (NFPA) reported 'system not in service' being the cause of nearly two thirds of events where sprinklers failed to operate.

Three different types of impairments can be encountered:

- **Preplanned impairments** for scheduled activities. This enables time for planning and preparation of the impairment.
- **Emergency impairments** following an incident or unexpected event. In this case, a well-practiced fire protection impairment system can help to manage the situation.
- **Hidden impairments** where a system is impaired without the knowledge of site personnel. In the worst case, the impairment is not identified until a demand is placed on the system and it fails to operate.

The average fire loss of an unsprinklered facility is around 4–6 times higher than a sprinklered facility. The fire loss in the event of a hidden (unmanaged) impairment could be higher still, particularly if sprinklers were an essential part of the buildings fire protection strategy, due to other features such as combustible construction or limited compartmentation. Therefore, to obtain the benefits of installed fire protection, it is important any impairment is as short as possible (duration), the area involved is as small as possible (extent), and measures are put in place to provide temporary protection, reduce the likelihood of fire by strictly controlling ignition sources and notifying key stakeholders. A robust impairment process is an essential tool to help manage fire protection impairments.

Loss Lesson

A contractor was conducting work on fire protection system at a sprinklered facility. During this work, the fire pump was switched to manual start. Unfortunately, it was not switched back to automatic. A fire occurred in the early hours of the morning, within the warehouse area. The sprinklers activated, but the fire pump did not start. When the fire brigade arrived, the fire had spread to the main production building, causing extensive damage and loss of production for over 12 months.

Understanding the risk

A permit is required for any fire protection system impairment, regardless of the reason or duration. Fire protection systems include but are not limited to:

- Sprinkler and water spray systems
- All fire system control valves
- Fire hydrant or standpipe systems
- Fire pumps
- Fire hose systems
- Fire service mains
- Fire water storage tanks
- Foam-water systems
- Wet-chemical systems
- Gas suppression systems
- Fire alarms and detection systems

A competent individual within the organisation should be selected to be the authorised manager for the fire protection systems. The authorised manager should ensure the fire protection impairment process and relevant precautions are in place.

Managing the risk

Before an impairment:

- If system work is planned, attempt to conduct this work when the fire hazard is at a minimum, such as non-operating periods.
- If the impairment is an emergency situation, ensure all precautions are taken and the fire protection impairment permit is issued immediately.
- If hazardous processes are left unprotected, it is recommended to shut these processes down.
- Permits should be issued regardless of reason or duration.

Issuing a permit:

- A permit should be prepared and issued by an authorized person.
- Physically confirm all precautions have been activated.
- Store the permit form and attach the rear part of the permit to the impaired system.

Impairments and hot work:

- Alternatives to hot work should always be considered, or a dedicated hot work area used for the task. However, if hot work is essential, an impairment to the fire protection system should be avoided. Isolation of the detection system directly above the hot work area is permitted if at risk of incorrect activation.

Further information

Additional resources are available in the form of the Swiss Re Corporate Solutions fire protection impairment kit. Digital copies are freely available. If you require paper copies, please contact your local Swiss Re Corporate Solutions risk engineer, underwriter or broker.



Examples of closed valves

Fire Protection Impairment Checklist

Providing temporary protection

- Provide additional fire extinguishers in the areas with the impairment.
- Ensure all fire hose stations are working with suitable water flow.
- Ensure all ignition sources are eliminated and all combustibles have been removed or covered with fire-rated blankets.
- Designate trained staff to conduct additional fire-watch services.

Notifications

- The fire department and/or fire monitoring company.
- Your emergency response, security and management team.
- Your Swiss Re Corporate Solutions contact (details in impairment folder).

During the impairment

- Ensure the permit is attached to the impaired equipment and present in the active permit pocket of the impairment pack at all times.
- Ensure all hazardous processes or those that can produce an ignition source remain ceased.
- Prohibit all smoking on site.
- Prohibit all hot work. If hot work is crucial, please call Swiss Re Corporate Solutions or your insurance broker to discuss the exposure.
- Continue additional fire-watch services. Ensure all affected areas are regularly inspected.
- Prioritize work to the impaired systems and restore the system as soon as possible.

After the impairment

- Confirm completion of work.
- Complete all testing to ensure the system is fully operational.
- If the system is online, but not operating as per the documented design, then keep the impairment active.

Closing out the permit

An impairment is complete when:

- The two parts of the permit are returned to the authorized manager.
- Ensure all fields, dates and times are completed. Sign the finished permit.
- Attach the front and back of the permit together and store for future auditing.
- Contact any notified persons that the impairment has been completed and the system is online.

References:

NFPA 25 Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems 2020

Contact:

Contact your Swiss Re Corporate Solutions risk engineer, broker or representative for additional information or assistance

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FIRE PROTECTION IMPAIRMENT PERMIT

Permit and location details

Permit number	Internal permit number (as required)
Company name	
Address	
Authorised manager	Phone number

Fire protection system details

<input type="checkbox"/> Automatic sprinkler system	<input type="checkbox"/> Hydrant or booster connection
<input type="checkbox"/> Fire pump	<input type="checkbox"/> Fire/smoke alarm system
<input type="checkbox"/> Fire water tank/town supply	<input type="checkbox"/> Gas suppression system
<input type="checkbox"/> Fire piping/ring main on-site	<input type="checkbox"/> Other (describe)

Describe the system and area impaired:

List valve and system numbers to be isolated:

All required precautions and temporary protection

<input type="checkbox"/> Additional fire extinguishers	<input type="checkbox"/> Hot work ceased* (see over for exemption)
<input type="checkbox"/> Fire hoses charged and ready	<input type="checkbox"/> All hazardous operations stopped
<input type="checkbox"/> Continuous fire-watch assigned	<input type="checkbox"/> No smoking reinforced
<input type="checkbox"/> Hydrant hoses connected (if possible)	<input type="checkbox"/> Notify departments/companies

Start date and time

Date/time	Authorised signature
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Conduct the required work on the system

With all precautions enforced above, work is authorised to start on the fire protection systems listed above. All precautions must stay active until the permit is completed. Attach the back of this permit to the impaired equipment. Place front of permit within the kit pocket provided.

Systems restored date and time

List valve and system numbers restored/reopened:

Testing has been completed and the system is active and works as designed. Sign below.

Date/time	Authorised signature
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FIRE PROTECTION IMPAIRMENT PERMIT

CAUTION

FIRE PROTECTION SYSTEM OUT OF SERVICE

HOT WORK PROHIBITED*.

EXTINGUISHERS/HOSES MUST BE PRESENT.

FIRE-WATCH SHOULD BE ACTIVE.

COMPLETE WORK AS SOON AS POSSIBLE.

*HOT WORK PERMITTED IF IMPAIRMENT IS ONLY FOR THE DETECTION SYSTEM ABOVE THE HOT WORK AREA TO PREVENT INCORRECT ACTIVATION. PLEASE REFER TO THE FIRE PROTECTION IMPAIRMENT KIT.

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