

Understanding the Hazard



Improperly Closed Valves

Understanding the Hazard

This series of publications is designed to help you understand the everyday hazards present at your company's facilities. For more information on how you can better understand the risks your business and operations face every day, contact FM Global.

UTH topic categories:

Construction

Equipment

Fire Protection

Human Element

Natural Hazards

Process Hazards

Hazard or Risk?

Improperly closed valves are a hazard, increasing loss potential if a fire starts at your facility.

FM Global can help you understand the risk your company may face as a result of this hazard.

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The Hazard

A fire involving improperly closed valves (ICVs) usually is devastating. Often, an entire building is lost as the result of a fire that would have been controlled within a small area if sprinklers had been able to function as designed. According to recent statistics, a fire in which valves are closed results in average damage of US\$3.5 million per loss, while a fire in a sprinklered building with open valves averages less than US\$300,000 in damage per loss.

An improperly closed valve is one that is:

- closed without authorization;
- closed with authorization, but for longer than necessary; or
- mechanically damaged.

Fire is not 100-percent preventable, but ICVs are. This brochure is designed to help you understand the hazard associated with improperly closed fire protection control valves, and the steps that can be taken to reduce your exposure.

Science of the Hazard

To be effective against fire, automatic sprinklers need to have sufficient water delivered to them through a piping arrangement, which includes the yard main, lead-in and sprinkler riser. A valve closed anywhere in this water supply system can prevent the flow of water to the sprinklers.

In a recent five-year period, FM Global engineers found nearly 4,000 ICVs during regularly scheduled visits, and this is probably just the "tip of the iceberg" for ICVs. When valves are closed, it is possible for a fire to quickly grow too large for sprinklers to control, even if the valve is reopened once the fire is discovered.

Handling a Valve Closure

Preplan

- Use the FM Global *Red Tag Permit System Wall Hanger* (P7427).
- Plan the impairment for an idle period.
- Notify facility management, FM Global's customer service desk, the public fire service, your alarm company, and your facility's emergency response team.
- Shut down hazardous operations.
- Arrange temporary protection.
- Prepare the work area (have excavation done, repair parts assembled and on site, etc.) prior to closing down fire protection so impairment time is minimized.

During an Impairment

- Eliminate ignition sources.
- Patrol affected area.
- Work without interruption.

After Work Is Completed

- Restore fire protection to service.
- Notify facility management, FM Global, the public fire service, your alarm company, and your facility's emergency response team.
- Complete actions detailed in FM Global's *Red Tag Permit System Wall Hanger*.

Why Are Valves Closed?

Valves sometimes are closed permanently because a building is idle or vacant. In this case, those portions of your facility are completely unprotected. Valves also may be closed for the following reasons:

- Sprinkler system repair
- Building alterations
- Maintenance
- Cold weather
- Error (not realizing valve is part of the sprinkler system)
- Maliciousness (including arson intent)

FM Global loss history records many instances when valves were supposed to be closed temporarily, but remained closed for weeks, months—even years, in some cases.

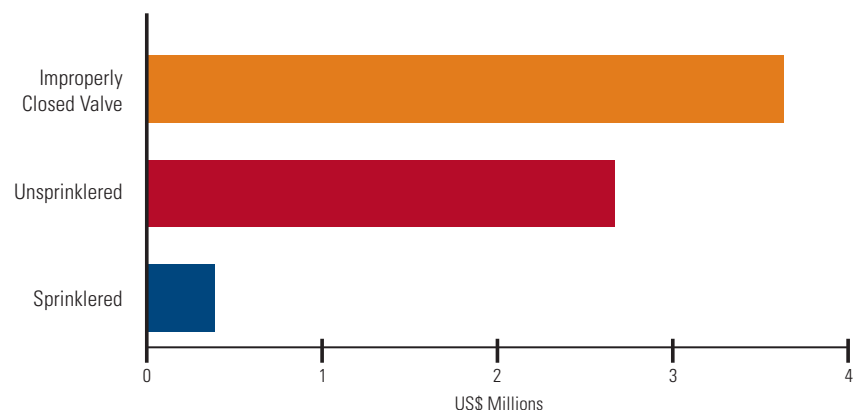
Loss Experience

Here are some examples of the consequences of ICVs:

- A valve was shut for leak repairs. After four days, repairs still had not been made when a fire broke out, causing a loss of more than US\$5 million.
- A valve was shut for approximately one month due to a cracked alarm check valve. The crack was not repaired, no inspections were made and no notification system was used. A fire broke out, causing more than US\$1 million in damage.
- A valve was closed for a year before a fire broke out, causing a loss of approximately US\$900,000. Plant personnel thought the area where the fire occurred was still protected.

The chart below shows that fire at a sprinklered facility where valves are closed can be even more damaging than fire at a facility with no sprinklers at all. This is because preplanned fire response at a sprinklered facility assumes sprinklers will detect the fire early and provide control until the public fire service can get there.

Average Fire Loss



But What About . . .

...our building? We don't own it.

Some building codes require the owner to conduct inspections unless that responsibility was transferred to the occupant in the lease agreement. In either case, FM Global can work with you and the building owner to ensure proper inspections are completed. Remember, it is your property and business at risk. That risk increases if there are other tenants in the building.

...valves inside the building?

Indoor valves may be at greater risk than valves located outside the building. Of the nearly 4,000 closed valves observed by FM Global engineers over five years, 60 percent were found indoors or in pits.

...valves with tamper switches and locks?

Even if your valves have tamper switches and locks, they still must be inspected regularly. Of the ICVs discovered, 13 percent were equipped with tamper switches alone, 19 percent were locked, 4 percent were locked and had tamper switches, while 64 percent were neither locked nor had tamper switches. FM Global recommends locking valves open first, then using tamper supervision, and using both techniques for higher risks. Routine valve inspections are necessary in all instances.

...the time and manpower to conduct inspections?

An inspection program is crucial to your business continuity. If you lack the time or manpower to establish such a program, consider contracting with a certified company for the service.

Minimum Valve Supervision Intervals

	Inspect visually	Try physically
Outside screw and yoke, indicating butterfly valves, and post-indicator valve assemblies	Once a week	Annually
Locked post-indicator, wall-mounted post-indicator, and curb-box valves	Once a week	Once a month

Controlling the ICV Hazard

To control this hazard, conduct regular valve inspections to locate improperly closed valves (ICVs) and correct them before a fire starts.

Establishing a Valve Inspection Program

- Appoint someone to manage the inspection process.
- Locate and identify all fire protection valves. (A building plan developed by FM Global for insurance purposes, including a scale drawing of building fire protection, may be useful.)
- Create an inspection form that lists all valves and includes spaces to record the information that should be obtained on a regular basis.
- Consult FM Global Property Loss Prevention Data Sheet 2-81, *Fire Safety Inspections and Sprinkler System Maintenance*, to learn how to inspect and test valves.
- Train personnel to conduct the inspections and tests.

Managing the Workload at Your Facility

The amount of time and effort involved in your program will depend on the size and number of buildings at your facility, and how many sprinkler systems you have. When you lock open your sprinkler valves:

- visually inspect all valves once a week to confirm they are locked open, undamaged and accessible.
- physically try post-indicator valves, wall-post-indicator valves, and curb-box valves monthly.

Need More Information?

Ask your FM Global engineer about the following:

- How to inspect a sprinkler valve
- FM Global's *Red Tag Permit System Wall Hanger* (P7427)
- A sample valve inspection form

Ordering Information

For Understanding the Hazard

For additional copies of *Understanding the Hazard* publications, contact your FM Global engineer or client service team.

For all other

FM Global publications

All other FM Global brochures and educational material can be found in the FM Global Resource Catalog and ordered online at

www.fmglobalcatalog.com.

Or, for personal assistance worldwide, contact our U.S.-based customer services team, Monday – Friday, 8 a.m. – 5 p.m. ET :

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Don't Let This Happen to You



Ensuring your fire protection control valves are open can prevent a catastrophe from happening at your facility.

Related Resources

The following resources can be ordered through FM Global's *Resource Catalog* (P6603), online at www.fmglobalcatalog.com, or by contacting a member of your client service team:

- *Controlling the Shut-Valve Hazard* (P7133)
- *Fire Protection Inspection Checklist* (P9116)
- FM Global Property Loss Prevention Data Sheet 2-81, *Fire Safety Inspections and Sprinkler System Maintenance*
- FM Global's online training course, *Managing Impairments Using FM Global's Red Tag Permit System* (available to clients only at <http://training.fmglobal.com>)
- *Red Tag Permit System Wall Hanger* (P7427)