

Ensuring safe passage

HI-FOG® for underground stations



Why HI-FOG®?



The physics of fire and underground spaces work against fire fighters. The radiant heat and smoke given off by fire are amplified by the reduced ventilation and high traffic density of underground stations. Evacuation routes easily become congested. Emergency crews heading underground have to go against the flow of people and smoke. HI-FOG® makes an enormous difference in this scenario.

The answer is in the mist

HI-FOG® attacks fire with high-velocity plumes of water mist. The mist instantly penetrates to the seat of the fire, cools the surrounding air effectively, reduces the amount of smoke, and suppresses the fire before it can spread.


Traditional deluge systems fight fire by wetting surfaces and cannot be used to fight liquid fuel or spray fires. Gas systems are normally used to protect special technical or electrical spaces, but they are dependent upon enclosure integrity and represent a threat to humans.

With pure water mist, HI-FOG® combines the best characteristics of traditional systems while overcoming their limitations. Using very little water, HI-FOG® minimizes damage to infrastructure while keeping people and property safe.



The HI-FOG® Water Mist Fire Protection System proves its value in the first moments of a fire.

HI-FOG® water mist is composed of an enormous number of micro-droplets of water representing a massive surface area. When the mist comes in contact with fire, it evaporates very efficiently, cooling the fire itself and the space it is in very quickly. HI-FOG® water mist is unparalleled in its ability to attack two of the three things that fire needs to grow — heat and oxygen (the combustible material being the third) — while being entirely harmless to people and the environment.

	Typical drop size range (mm)	Number of droplets per litre of water	Surface area (m ²)
 Conventional sprinkler/ water spray	1...5	15 thousand to 2 million	1...6
 Low-pressure water mist	0.2...1	2 million to 250 million	6...30
 HI-FOG®	0.025...0.2	250 million to 150 billion <small>superior cooling and soot binding</small>	30...250 <small>superior cooling of water / heat</small>

One system, many applications



With one centralized pump unit, HI-FOG® can protect a diverse range of spaces in underground stations including passage-ways, platforms, shopping arcades, machinery rooms and electrical rooms. The system's modular design supports many configurations.

Public and maintenance spaces

With careful system dimensioning, HI-FOG® can easily protect both maintenance spaces and large public areas. Heat-activated HI-FOG® sprinkler heads produce fast-acting water mist that is completely harmless to people and highly effective against fire.



Electrical spaces

HI-FOG® has been tested extensively for the protection of spaces containing electrical equipment, with results indicating no significant increase in the risk of electrical shock. HI-FOG® ensures that fire damage to equipment is kept to an absolute minimum.

Technical spaces

The equipment in technical spaces such as machinery rooms and cable tunnels is critical to operations and access in case of fire is difficult. By filling the entire volume of the space with water mist, HI-FOG® swiftly suppresses and controls fire before major damage is done.



HI-FOG® sprinkler head

HI-FOG® suppresses and controls fire by:

- Cooling the seat of the fire
- Blocking the radiant heat
- Starving the fire of oxygen
- Binding with smoke particles

Fire protection for stations and trains

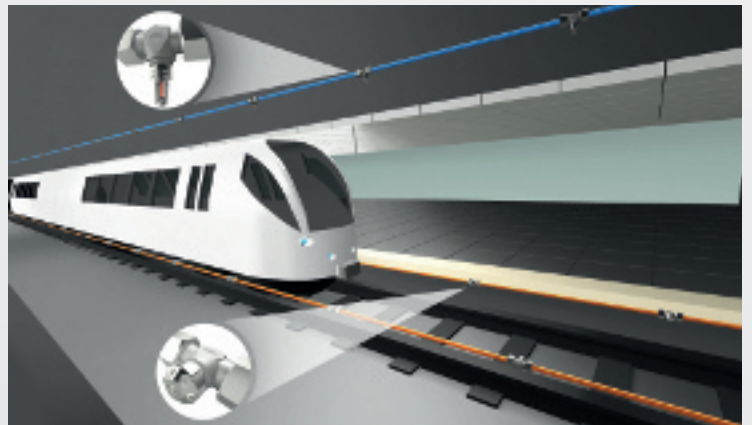
Marioff is introducing a new and innovative way to protect both trains and stations with a single solution.

If a fire starts on a subway train, standard procedure calls for the train to continue to the next station for passenger evacuation and emergency service.

When the train arrives, the on-board HI-FOG® tubing is connected to the station's HI-FOG® system for activation. By combining station and train fire protection in this way, overall system costs are reduced and a high level of fire safety is maintained.

A typical HI-FOG® system for underground stations consists of the following main components:

- HI-FOG® pump unit
- HI-FOG® spray heads or sprinkler heads
- Stainless steel tubing: 12 mm to 38 mm
- Section valves
- Water supply
- Fire detection system



HI-FOG® protection for trainway. If a fire is detected, the system activates. The HI-FOG® spray heads installed on the tracks and the HI-FOG® sprinklers above the train discharge, suppressing the fire.



The station's HI-FOG® system is connected automatically or manually to the HI-FOG® tubing on the train.

Turnkey advantages

Marioff can provide a turnkey HI-FOG® system that will help you keep traffic flowing safely through your underground stations by minimizing the threat posed by fire. This is a long-term proposition, and Marioff supports HI-FOG® over the complete lifecycle of the system.

Design & project management services

Marioff will design the right HI-FOG® system for your underground station based on the fire risk assessment, water supply and any special protection requirements. A Marioff project manager ensures smooth and correct system delivery.

Installation

Marioff's service and maintenance team offers a full palette of services to ensure that your HI-FOG® system stays in peak condition throughout its life. Team members are available the world over to provide the best local support possible.

Training

As part of your overall safety regimen, Marioff will train your staff to operate and maintain the HI-FOG® system to make sure it performs at its best when it really matters – all the time.

Maintenance service

Marioff is expert at installation in various environments. The full range of our experience will be placed at your disposal in the project planning stages. Through its subsidiaries, Marioff will always be at your side.



HI-FOG® is a proven solution for traffic stations, installed and protecting many different types of spaces in the following places:

- Barcelona Metro
- Bilbao Metro
- London Underground
- Madrid Metro
- Palma de Mallorca Metro
- Washington Dulles Airport ATS



Madrid Metro: over 2,000 HI-FOG®-protected areas including escalators, electrical and maintenance spaces.

The world's pre-eminent water mist company

Founded in 1985, Marioff is the world's leading provider of water mist systems on land and at sea. About 1,000 passenger cruise ships, ferries and naval vessels are protected by HI-FOG® at sea.

About 1,500 installations are protected by HI-FOG® on land: historic buildings and museums, hospitals, libraries and archives, IT and telecoms facilities, energy facilities, road tunnels, metro trains and stations, factories – the list is long and growing fast.

Relentless fire testing

With over 6,000 full-scale fire tests behind it, the HI-FOG® Water Mist Protection System is the world's most tested water mist system. HI-FOG® has been tested across a larger variety of different applications than any other water mist fire protection system.

World's most approved water mist system

HI-FOG® has received more type approvals, across more application areas, than any other water mist system. HI-FOG® has been issued over 100 type approvals to date.



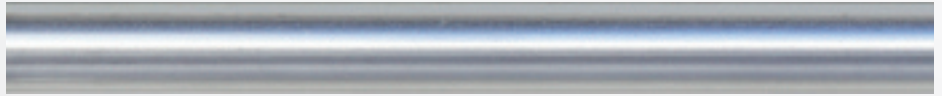
Full-scale tunnel fire test carried out for the M30 Madrid tunnel project.



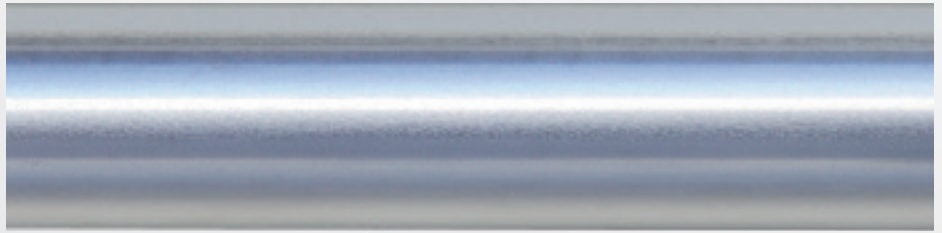
HI-FOG® sprinkler head for public areas



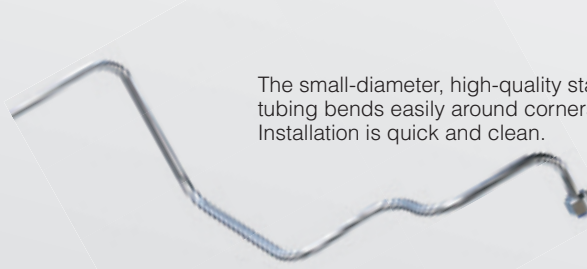
HI-FOG® spray head for machinery rooms



12 mm stainless-steel HI-FOG® tube. Final tube to the sprinklers. Actual size.



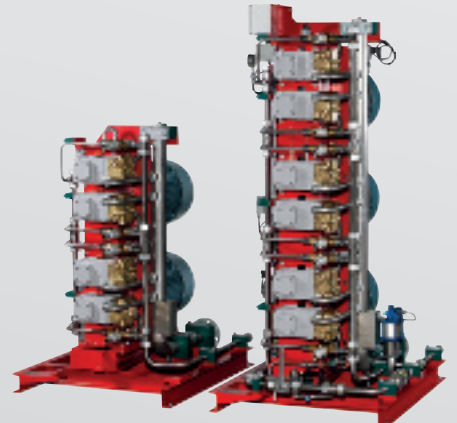
30 mm stainless-steel HI-FOG® tube. Main tube from the pump. Actual size.



The small-diameter, high-quality stainless steel HI-FOG® tubing bends easily around corners and obstructions. Installation is quick and clean.



The HI-FOG® high-pressure, gas-driven pump unit. An option when the HI-FOG® system is required to be entirely independent of mains electricity.



The HI-FOG® high-pressure, modular electric pump unit. Provides a constant flow of 140 bar pressure during activation. Can be reset quickly and automatically after a discharge.



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