

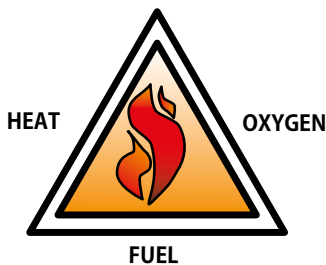
AUTOMATIC FIREFIGHTING
SYSTEMS IN
CABLE TUNNELS





Cable tunnels

SIEX has VdS approval for the protection of these hazards:



Generally speaking, a cable tunnel is a narrow tunnel through which medium or high voltage cables run.

In large industries and facilities, these underground gallery systems are used for electrical cables.

The risk of fires in electrical substations and cable tunnels is a growing concern for electric utilities. Accidents in these spaces can be numerous and serious. The aftermaths of a fire in these sys-

tems may cause serious damage to installations as a whole, cause disruptions to processes or business, leading to significant economic losses and, in the worst cases, even personal losses.

A vital goal from the fire protection standpoint in this type of infrastructure is to prevent fires and stop them from spreading, especially in older facilities, which implies active protection solutions supplemented with passive protection systems.

Risk Factors

Fires in cable tunnels have special characteristics that make them difficult for the fire-fighting services to combat.

DIFFICULTY OF ACCESS

Sometimes with narrow and unprepared entrances, or accesses far from where the outbreak occurs makes it difficult for firefighting personnel to access the area. Similarly, by their nature, these are places where visual inspection and/or maintenance is limited.

HEAT BUILDUP

The fire takes place in an enclosed area. Unlike building fires on the surface, heat does not dissipate, so very high temperatures are reached.

INSULATING PLASTIC COATINGS

Although much progress has been made in improving fire-resistance of materials used, there are still cables coated in combustible materials, chilled with oils or in large bundles accumulating combustible material. These properties, coupled with the linear arrangement of the enclosure, cause the fire to spread relatively quickly through the tunnel, releasing gases and fumes that make firefighters' work harder by further reducing their visibility.

COMMON CAUSES:

INTERNAL

- Short-circuits
- Sparks
- Overloading
- Static electricity
- Overheating

EXTERNAL

- Maintenance
- Accumulation of dirt
- Environmental Conditions
- Fuel concentration
- Fire spread from other fires

SPECIAL ATTENTION

An added risk in these constructions is the fact that the tunnels go under places like petrol stations, museums, hospitals, etc.

A cable fault may be sufficient to ignite the cable insulator, resulting in a major fire which generates large amounts of toxic smoke which will affect buildings and multiply the fire's effects. All this represents a great risk that needs to be successfully addressed to prevent the spread of fire.

The consequences of damage caused by traditional sprinkler systems contributed to leaving these resources unprotected. Currently, SIEX provides reliable, secure and safe alternatives to these expensive facilities and staff present.



SIEX recommendations

SAFETY OBJECTIVES

The main objectives of protection are:

- Minimize the smoke concentration.
- Prevent the premature collapse of the structure.
- Minimize exposure to smoke by controlling its movement.
- Limit exposure of the material to high temperatures.
- Limit the toxicity of combustion gases.

OBJECTIVES OF WATER MIST IN CABLE TUNNELS:

- BLOCK HEAT RADIATION.
- GUARANTEE STRUCTURAL INTEGRITY.
- COOLING THE MATERIAL OF THE TUNNEL.
- LOCAL INERTING BY OXYGEN REDUCTION.
- COOLING THE FIRE SOURCE.

The arrangement of fire detectors and automatic fire extinguishing systems should be complemented by measures such as: compartmentalization, smoke control systems equipped with extraction devices to hamper or prevent the spread of fire through the wires, and sealed cable outlets through compartmentalization elements.

The smoke control systems help to displace hot gases but do not extinguish the fire. Extinguishing by water mist systems is a key part of preventing the spread and growth of the fire.

CONSIDERATIONS

Effectiveness

The extinguishing agent must persist for as long as necessary. Water mist systems have great penetrating power due to the small droplet size.

Huge volumes

Sprinklers pose challenges in terms of water supply, pressure and pipe sections. The SIEX™ WATER MIST system ostensibly reduces pipe diameters and water supply needs.

Efficiency -retention of the agent

Actual tests are conducted to test its effectiveness in a variety of situations. This is due to the diverse types of hazards and different volumes, with sections and lengths to be determined.

STRATEGY APPLIED TODAY

Quickly identify the fire location.

DETECTION SYSTEMS.

Fast, safe evacuation.

SUB-DIVISION AND COMPARTMENTALIZATION OF SYSTEMS.

Maintain conditions for survival



SMOKE CONTROL SYSTEMS
WATER MIST

SOLUTION



The water mist system is superior to any fire control and extinguishing alternative for such hazards. Compared with sprinkler systems, it stands out because it does not damage the existing elements and controls the smoke.

Requires much less water

	SPRINKLERS	WATER MIST
Number of drop	1	8000
Drop size (µm)	1000-3000 	>200(50-80) 
Surface	1	800
Vaporization time (seg.)	1	0.003
Flow (l/min)	400 (l/min)	400 (l/min)

As well as many other advantages:

- Small diameter pipework.
- Less space requirement, important in existing installations.
- Full-scale tests.
- Technology used for many applications.
- Minimal water damage, unlike sprinkler systems.
- Compatibility with combustible electrical equipment.
- Cost-effectiveness, thanks to the minimal cost of extinguishing agent for refills.
- Environmentally friendly extinguishing agent.
- Safe for protected equipment and for people.
- Drastic reduction of the temperature in the compartment upon system release.
- Scrubbing water-soluble smoke and toxic gases from atmosphere.
- Prevention of reignition.
- Faster evaporation.



convenTional nozzles



Water Mist Nozzle

OBJECTIVES

FIRE CONTROL

Growth and spread of fire is limited by cooling objects, adjacent gases and pre-wetting of fuels. The duration of the discharge is long enough to allow manual intervention teams to take charge of fighting the fire.

FIRE SUPPRESSION

Sharp reduction in the rate of heat emitted and prevention of resurgence of fire during discharge.

FIRE EXTINGUISHMENT

After discharge, the system is able to prevent the reactivation of the fire until its total disappearance. Systems are able to extinguish outbreaks according to the relevant application. Meeting this goal requires quick response from the fire detection and extinguishing system and greater extinguishing intensity.

FIRE BARRIER

Complementing and reinforcing fire protection structures, preventing the spread of the fire to other areas and knocking down smoke and other combustion gases.

HEAT RETENTION

Absorption of heat produced in the vicinity of the protected object, washing out smoke and gases generated and ultimately safeguarding the safety of structures and installations.

OTHER SPECIAL HAZARDS PROTECTING BY SIEX:

SERVICE STATIONS

ARCHIVES AND LIBRARIES

DPCs

PAINT SPRAY BOOTHS

ELECTRICAL PANELS

INDUSTRIAL KITCHEN

TURBINES AND GENERATORS

ROAD TUNNELS

NATURAL GAS PLANTS

CLEAN ROOMS

CABLE TUNNELS

TELECOMMUNICATION CENTRES

HOTELS

HOSPITALS

EDUCATIONAL ESTABLISHMENTS

TRAIN AND UNDERGROUND STATIONS

TRAINS

TRANSFORMERS

OFFSHORE PLATFORMS

SOLAR THERMAL PLANTS

MACHINE TOOLS

PRINTING INDUSTRY

HISTORIC BUILDINGS

ROBOTIC PARKINGS

WIND TURBINES

STEEL INDUSTRY

BANKS

OFFICES

LARGE VEHICLES

CONVEYOR BELTS

GAS PUMPS

OIL & GAS

TIMBER INDUSTRY



C/ Merindad de Montija, 6
P.I. Villalonquéjar
09001 Burgos (SPAIN)

tlfno: +34 947 28 11 08
fax: +34 947 28 11 12

siex@siex2001.com
www.siex2001.com



SIEX®