FOGTEC®
FIRE PROTECTION

The Smarter Way of Fire Fighting

Fire Fighting with Water Mist

A Team of Specialists

FOGTEC offers optimal service at all levels

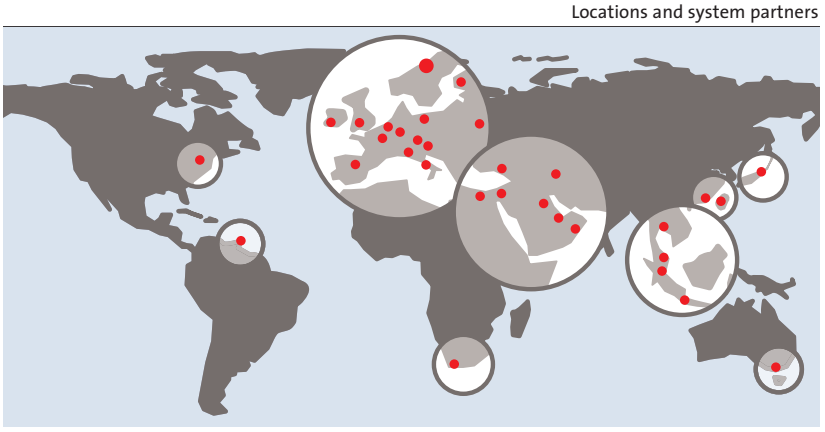
FOGTEC systems use pure water, converting it to fine mist at a pressure of 80 to 200 bar. Not only are these systems 100% environmentally friendly but they are often more effective than conventional gas or water fire fighting equipment. With 45
system partners worldwide, FOGTEC is the market leader for land-based water mist systems. At FOGTEC our primary aim is to continuously improve the protection of persons and property.

The basis of FOGTEC systems lies in the unique know-how of FOGTEC's partner companies LECHLER and KAMAT. LECHLER is the largest specialist nozzle manufacturer in Europe and has been developing water mist systems since the 1930s. KAMAT is one of the leading manufacturers of high-pressure pumping systems. As a result FOGTEC is backed by more than a century of nozzle technology and by three decades of high-pressure technology. In its locations in Cologne, Hamburg, Rostock, Paris, Shanghai and Mumbai, FOGTEC employs a team of specialist engineers from the areas of fire protection, mechanical engineering, chemistry, hydraulics, electronics, domestic technology and shipbuilding.

The cooperation between FOGTEC and a network of excellent system partner companies guarantees optimal service at all levels. Experienced specialists are available at all stages, from consulting, design, planning to installation and maintenance, investing the same level of efficiency and reliability into the development of small-sized projects as into the realisation of large-scale facilities. Customer care during coordination with public authorities and insurance companies is a matter of course for FOGTEC. Training courses for users and system partners are organized at regular intervals. FOGTEC components are manufactured to ISO 9001-2000. State of the art CNC manufacturing systems are employed for this purpose.

FOGTEC technology is relied on by such companies as Daimler, Honda, Lotus, Jaguar, ThyssenKrupp, BMW, Merrill Lynch, Royal Bank of Scotland, Bank of England, RTL, RAI, Esso, Shell, BP, Hewlett Packard, Daewoo, Samsung, Siemens, Bosch, Bayer, Infineon, Microsoft, IBM, Lavazza, RWE, Sanyo, Sony, BBC, Osram, Hertz, Hutchison 3G, Hüls ....

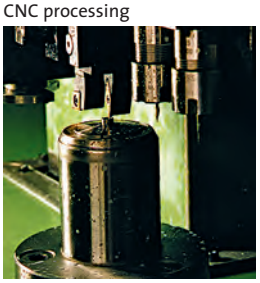
Locations and system partners



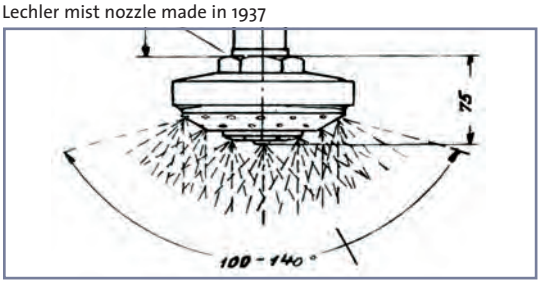
Ease of installation

Service Team

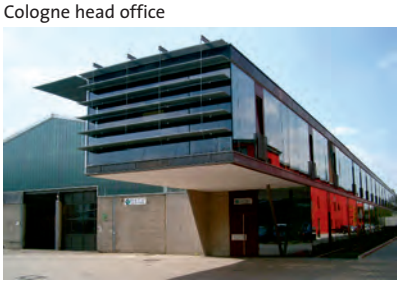
CNC processing

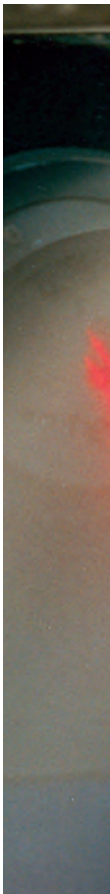


Lechler mist nozzle made in 1937



Cologne head office





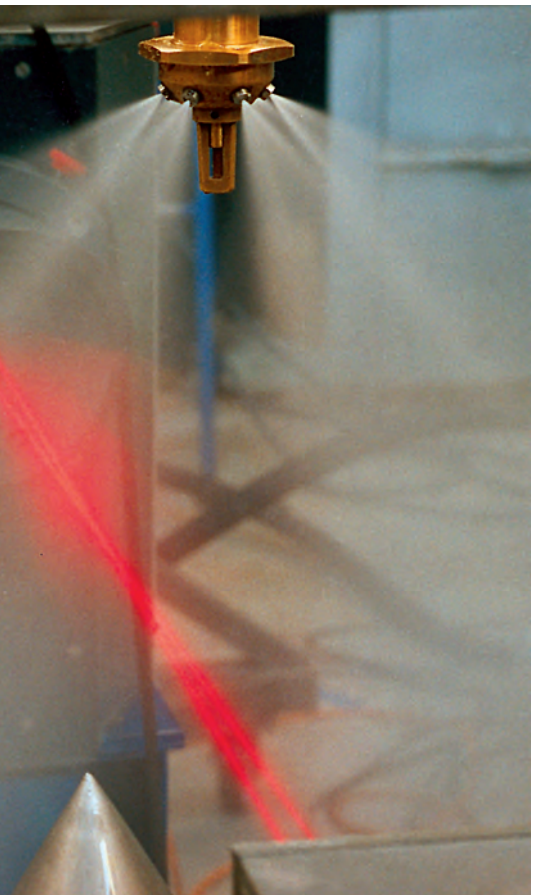
Research & Development, Approvals

FOGTEC Technology undergoes a continuous level of improvement through development and testing

In-house fire test facilities enable FOGTEC to carry out full-scale fire testing on a continuous basis. Such tests are performed as part of approval procedures, research projects or user-related test series. In addition, fire tests are carried out in cooperation with some of the most reputed scientific fire protection institutes in the world. Computer simulations and modelling are a standard element of such research activities.

FOGTEC uses state of the art nozzle development laboratories comprising measuring devices such as Laser Doppler equipment. Design work is carried out on 3D CAD work stations. As a result of the excellent reputation in the development sector, FOGTEC is involved in some of the largest European fire research projects.
All development activities are carried out on the basis of the ISO 9001-2000 certification.

Fire tests carried out by FOGTEC's specialist engineers



Laser Doppler droplet measurement

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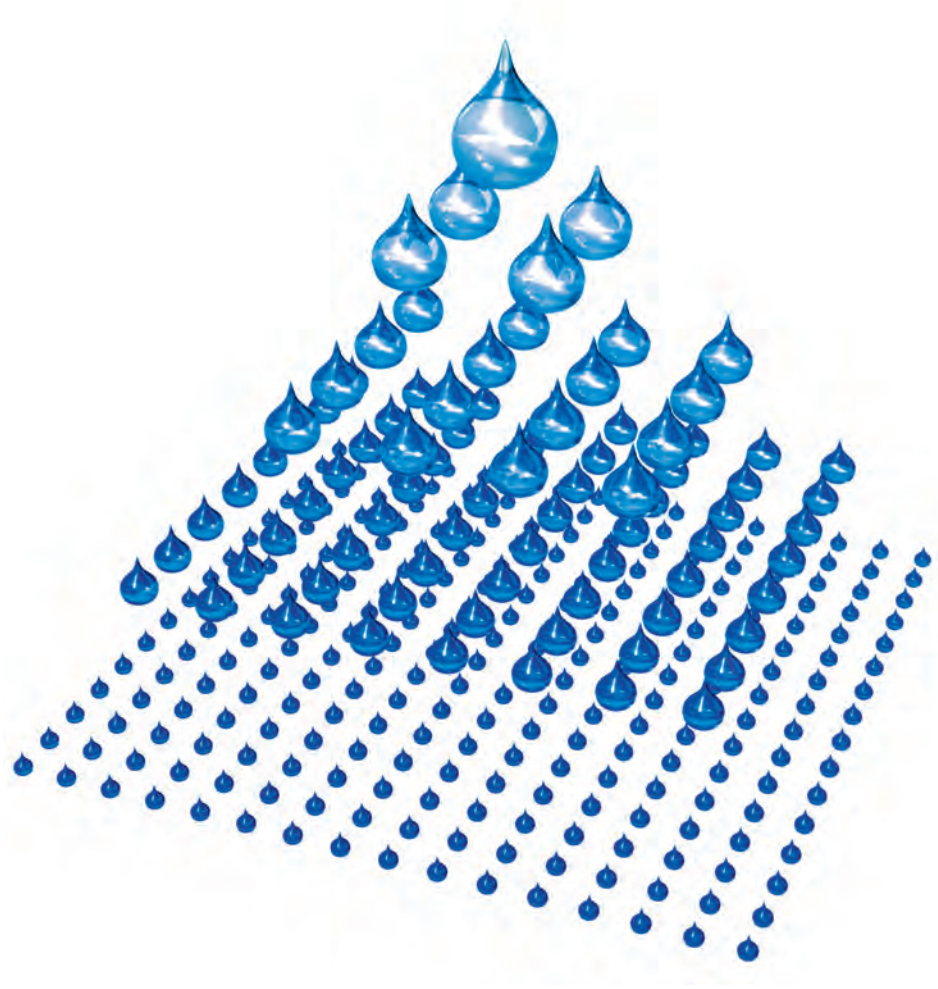
E 1805002

Full scale fire test

The Smarter Way of Fire Fighting

FOGTEC water mist systems offer substantial advantages in comparison with conventional fire fighting systems

The key to FOGTEC's fire fighting effectiveness is the generation of very fine water droplets. The size of the droplets is classified as NFPA 750 Class 1. This extremely small droplet size makes the FOGTEC system highly effective and uses only small amounts of water. The key factors are the
systems ability to cool and the localised oxygen displacement effect.



Cooling effect

As a result of the water being atomised at high pressure, the surface area available for cooling is considerably greater than that of conventional low pressure systems. This means FOGTEC systems extract the energy (heat) far more rapidly and effectively from the fire. The strong cooling effect serves not only to fight the fire but also to protect persons and property against the effects of radiated heat. Water mist shields also effectively protect construction elements such as walls, doorways, facades etc.

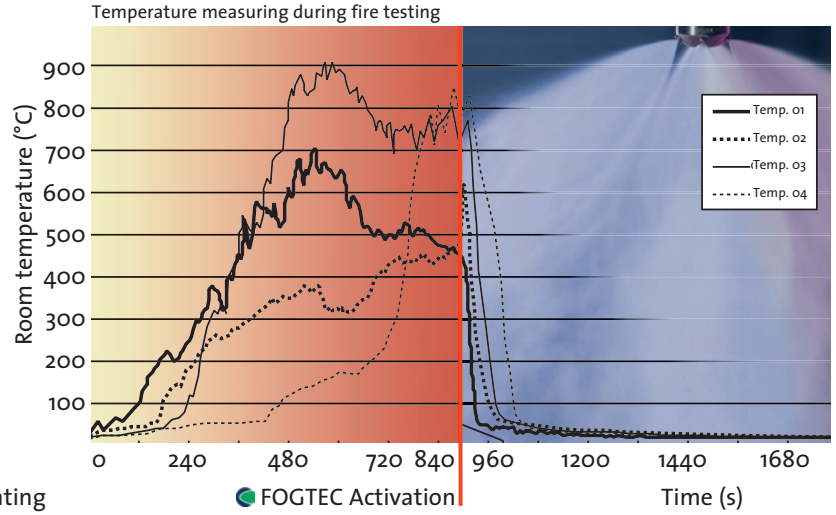
Oxygen displacement

The small water droplets rapidly evaporate at the fire source. Evaporation occurs only where there is a high temperature. Where there is a low temperature there is no steam generated so these areas may be used to escape. The vaporization of the water increases the water volume by 1640 times and the oxygen is displaced locally at the fire source. As a result, a localised inerting effect is generated

Small droplets, big effect

Droplet diameter	Reaction surface per litre of water
1 mm	2 m² (conventional technologies)
0,1 mm	20 m²
0,01 mm	200 m² (FOGTEC-water mist)

Temperature measuring during fire testing

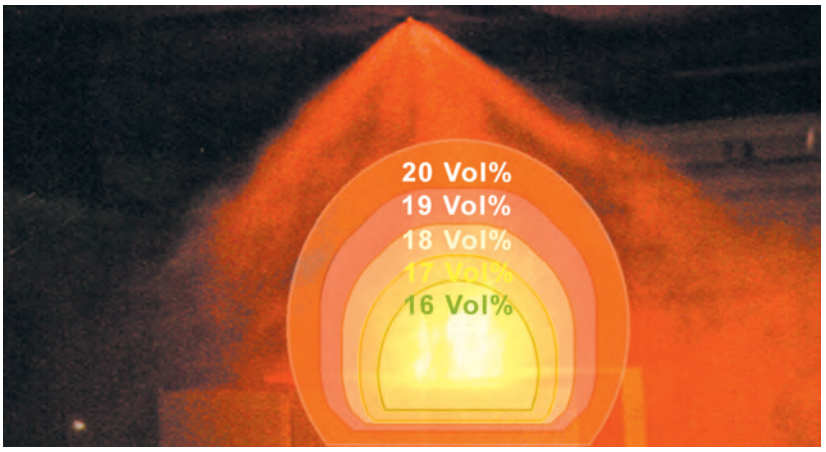


at the fire source. This is comparable to the effect of an inert extinguishing gas, although when using such a gas, the air oxygen content has to be reduced in the whole area to be effective. The larger water droplets generated by low pressure water mist systems or other conventional water fire fighting systems, convert to vapour at a much slower rate, and here there is a substantial part of the droplet that does not convert at all.

In order to achieve optimum results in fire fighting, FOGTEC adapts the amount of water used, the droplet size distribution and the number and positioning of nozzles to each specific application.

FOGTEC systems are 100% environmentally friendly and harmless to personnel. Unlike many chemical-extinguishing gases, FOGTEC water mist systems neither destroy the ozone layer nor do they contribute to the greenhouse effect. A pre-warning time prior to activation to protect persons normally is not necessary.

Local oxygen displacement in the flame zone



Therefore the localised oxygen displacement effect of the FOGTEC systems, operating with high pressure, is a considerable advantage.

Applied water amount

	FOGTEC water mist	Sprinkler	Low pressure water mist	Inert gases (e.g. CO_2)	Chemical gases
Cooling effect	extensive / radiant heat attenuation	small	limited	none	none
Inerting effect (oxygen displacement)	locally at fire source	none	limited	in entire volume	in entire volume
Effect on people and environment	safe / none	large water consumption	safe / none	danger of suffocation / green house effect (CO_2)	effect on ozon layer / green house effect
Damage by extinguishing agent	negligible (pure water)	extensive water damage	small	negligible	corrosive by-products
Pre-warning times	none	none	none	essential	essential
Effect on electrical components	small (pure water)	extensive	extensive	small	corrosive by-products
Requirement for enclosures	none	none	none	yes	yes

Reliability as Top Priority

FOGTEC Systems

FOGTEC systems operate at a pressure of 80 to 200 bar. The high pressure is utilized in two ways, to split the water into fine droplets and to create momentum for the droplets created. If a lower pressure were used, either the droplets generated would be bigger or the momentum of the droplets would not be sufficient.

Special water mist nozzles are the heart of every FOGTEC system. They are optimised for specific applications and have undergone extensive testing with independent testing houses such as Factory Mutual, to ensure their reliability. FOGTEC water mist nozzles are subjected to a 100 % quality test. Each individual micro-nozzle, within the main nozzle body, is furnished with an individual filter.

Open type nozzles are installed in dry pipe systems, as well as closed type nozzles which are activated in a similar way to conventional sprinklers by a fast acting glass bulb.
The modular nozzle design concept allows the use of both standard application nozzles and special application nozzles for false floors, ceiling voids, zones with particularly high temperatures, areas exposed to the wind, etc.

To supply the system with high-pressure water, FOGTEC pump and pressure cylinder units are used. The pump units are comprised of individual pump modules. Since FOGTEC uses pump modules with flow rates between 25 and 800 l/min, the total performance of a system can be optimally adapted to site requirements. The use of large numbers of small pumps is avoided to minimize possible sources of failure. To reduce the number of moving parts to a minimum, there is one drive motor directly connected to each pump. No gearboxes are used. Both electric and diesel motors are offered.

In a FOGTEC system, filters of different mesh sizes are used at different points so that a particularly high degree of reliability can be assured. Section valves are available for dry and wet pipe networks, for dry pressurised, and for pre-action areas. All valves can be supplied with testing devices.

Nozzles for all applications

Cylinder system

Diesel-driven pump unit

For systems not activated via glass bulb, almost all fire detection systems can be used. FOGTEC control panels have state of the art PLC control equipment and can easily be connected to fire alarm systems. If required, operator guidance can be provided via touch screen. Remote-controlled maintenance via modem is optionally available.

PLC control equipment

Our entire piping systems are made of stainless steel as required by international standards for water mist fire fighting equipment. Pipe diameters range from 10 to 40 mm. Layout and installations are carried out to conform to international standards.

Section valves

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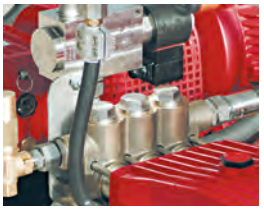
Electric pump unit

Perfection in detail



Offices, Hotels, Hospitals, Archives and Museums ...

In public buildings high priority is given to the protection of human life. FOGTEC water mist has highly efficient cooling qualities and is therefore ideal for dramatically reducing the spread of heat and creating better conditions for people escaping. FOGTEC systems thus provide optimal fire protection for these types of buildings.

When using conventional sprinkler systems or low-pressure mist systems, the resulting water damage often even exceeds the damage directly caused by the fire. FOGTEC systems, in contrast, use the water so efficiently that the risk of water damage is reduced to a minimum. Sensitive areas such as archives or museums, which have in the past been left unprotected, can be protected effectively with a FOGTEC system. Operators of hotels, hospitals and offices appreciate the additional benefit of shorter interruptions. Very small pipe diameters mean the system can be unobtrusively fitted in existing buildings, or historical buildings and are ideal where modern architectural techniques have been employed.

The central pumping unit requires considerably less space than in the case of sprinkler systems. Large water storage tanks are not required.

Protection of heritage buildings

Protection of offices, glass facades and archives

Easy and space-saving nozzle installation

Data Centres, Telecommunication Systems and other EDP Areas

IT areas and telecommunication rooms constitute a major fire hazard because of possible short-circuits and system overloads. Inadequate heat removal as a result of insufficient or defective cooling systems further increases the risks. A breakdown of such EDP facilities results in major damage. A fire in an IT or telecommunication area produces large amounts of acidic and hazardous smoke particles as a result of the burning of insulation materials and plastics. This soot is deposited on all surfaces including sensitive electronic circuitry. When this occurs it damages sensitive circuits and data media as it is extremely corrosive. Major system breakdowns may result. The resulting loss of data or transmission is the worst scenario for the operator of an IT centre.

Unlike conventional gas extinguishing technology, high-pressure water mist rapidly suppresses the fire while limiting the spread of smoke. This is achieved by the fine water droplet absorbing parts of the smoke particles and dropping to the floor. Owing to the extremely small amounts of water used, the effect on EDP components is negligible.

FOGTEC systems can be used for both the protection of rooms and of false floor voids and control panels. The same pump unit can be used for protecting all areas. When different areas such as offices, cable ducts, etc. are to be protected within the same building, this can be done using a single central pump unit.

Safe for electronic components

EDP areas and server rooms

Protection of false floors

Cable Tunnels, the Nervous System of Business Enterprises

Fires in cable tunnels can cause immense economic damage

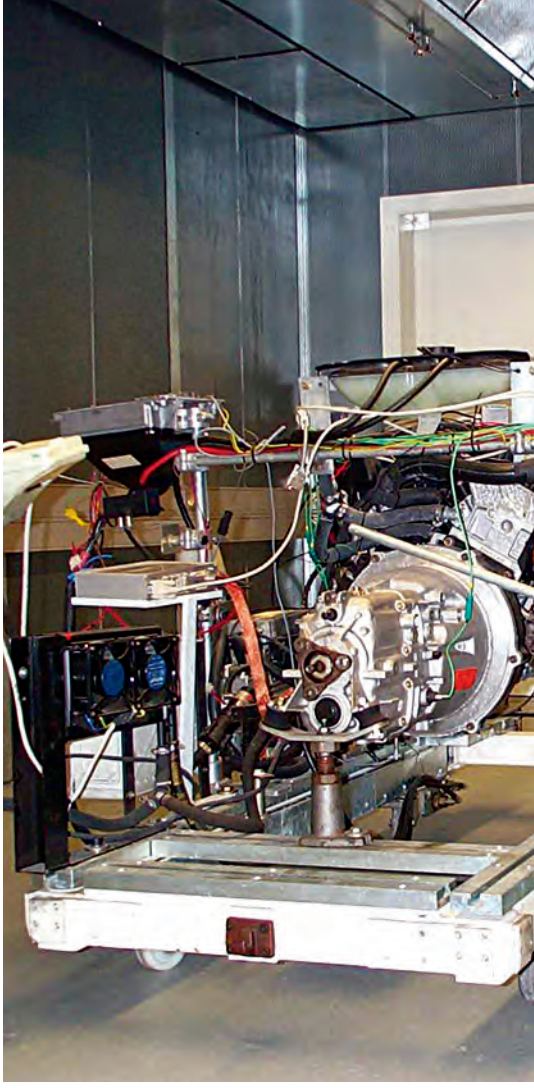
In the past, cable tunnels often remained unprotected despite the fact that they carry the important cable infrastructures of manufacturers, IT companies or telecommunications providers. This was mainly due to the lack of a suitable fire suppression system. The risk of water damage lead companies to leave these valuable resources unprotected. This no longer needs to be a concern.

Easy installation of nozzles on the ceiling

FOGTEC nozzle

Our customers choose FOGTEC systems as a recognised and accepted way of protecting cable tunnels. The minimum amounts of water used and the maximum effect make FOGTEC the number one choice. A fire within a cable tunnel can rapidly reach very high temperatures. FOGTEC system's impressive cooling capability enables fire damage to be kept to the minimum. A single row of nozzles positioned on the ceiling is often all that is required to protect a tunnel. Cable trays can be positioned on either side. With low pressure systems it is often necessary to install multiple levels of pipe and nozzles. This is not the case with FOGTEC. The system is flexible and the user can easily install additional cables. Unlike gas systems the FOGTEC system can be fitted in tunnels with forced air ventilation and openings.

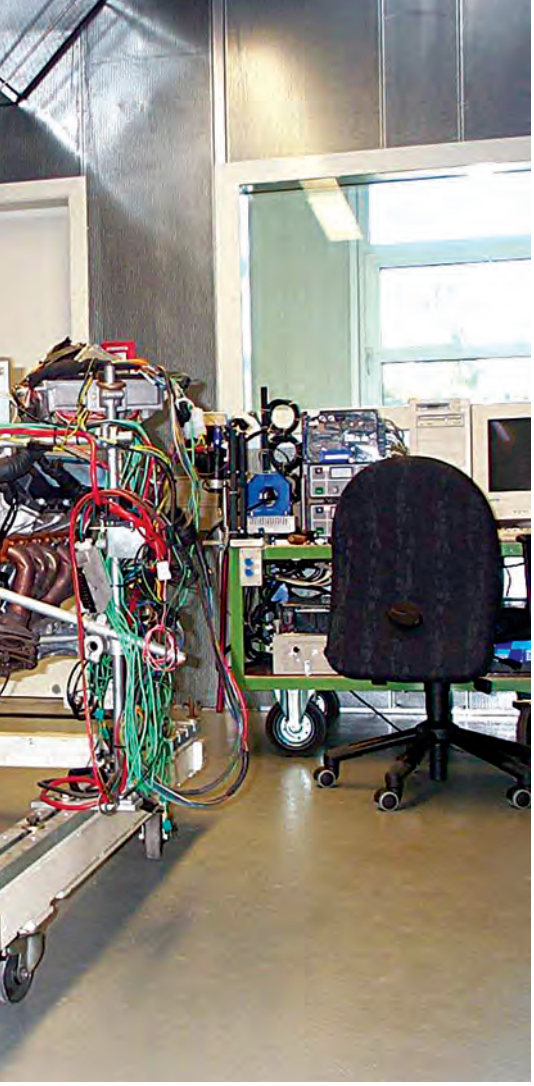
Effective protection for complex cable layouts



Protection of infrastructure

Industrial Applications

There are many fire hazards in industry. FOGTEC systems offer a solution for almost all of them



Nozzle installation in an engine test stand

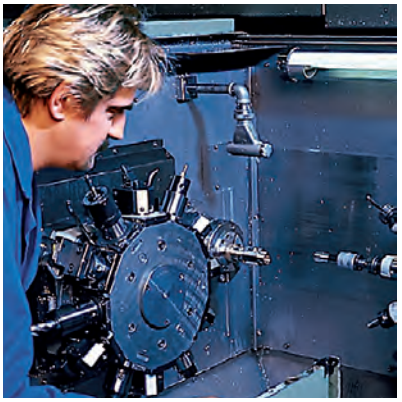
Production materials and lubricants are fire hazards that are present in most areas of industry. Their worst feature is their ability to become major fires quickly. In many full-scale fire tests as well as in real fires, FOGTEC systems have proven to be extremely effective when fighting hydrocarbon fires. This applies to fires in gas turbines, hydraulics cellars, generators, engine test stands, CNC machines, etc. Depending on individual requirements, FOGTEC systems may be designed as object protection or total flooding systems.

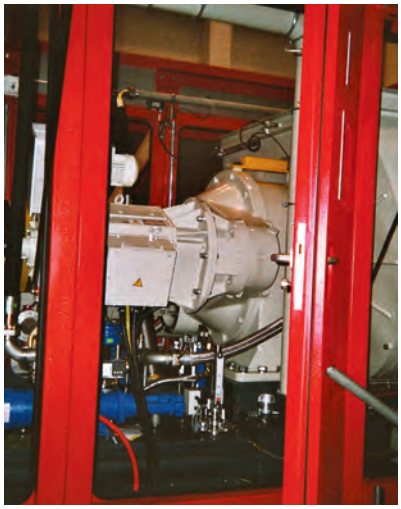
From the operator's point of view, the normally short shutdown times after activation as well as the fast and inexpensive re-commissioning of the FOGTEC system are major considerations. The minimal amounts of water used in most cases result in short interruptions.

Because water is used in the form of a fine spray, normally no thermal stresses occur that could shorten the life of the machine. This is due to the small droplets creating uniform surface cooling.

Special protection measures against the effect of the water mist for staff are not required since the FOGTEC mist is absolutely safe.

Protection of CNC machines





Protection of diesel generators and gas turbines

Industrial and Kitchen Deep Fat Fryers

Fighting oil fires with pure water

FOGTEC technology is ideal for fighting cooking oil fires. The reason for this success becomes obvious when considering the way the system works. The water mist droplets are so fine that they are light enough not to penetrate the oil surface. The droplets rapidly absorb the heat of the fire and so extinguish fires rapidly while continuing to cool the oil and effectively prevent reignition.

In the past, deep fat fryers in restaurant kitchens, canteens etc. were mostly protected with chemical-based extinguishing agents. The time consuming cleaning work required after discharge, and the resulting business interruptions are considerably reduced when using FOGTEC systems.

Industrial large-scale deep fat fryers are often protected by CO_2 systems. Here there is a risk of reignition because the gas rapidly becomes diluted after being discharged. This is not a problem for FOGTEC systems even in cases where the hood of the fryer is in the 'up' position. FOGTEC systems can be easily integrated into the design of deep fat fryer lines without affecting their operation.

The systems are activated automatically via a fast acting detection system. Service and maintenance costs are substantially lower than most for other extinguishing systems.

Protection of kitchen areas
and industrial deep fat fryers

Wall Cabinets

Manual fire fighting with water mist

FOGTEC wall cabinet for offices

FOGTEC wall cabinets operate on the same principle as fixed FOGTEC systems, except that the high pressure water mist is produced by a manually operated FOGGUN. The spray patterns of the mist being discharged can easily be adjusted to the risk. A particularly fine mist can be used to effectively fight liquid and dust fires without splashing or disturbing the fire load. A high-energy spray can be used to fight larger fires.

FOGTEC wall cabinets are suited for a wide range of applications in industry, but also in archives, museums and EDP rooms. Low water consumption, ease of use and the resulting reduction of damage, distinguish the FOGTEC wall cabinets from conventional systems. In industrial sites, FOGTEC wall cabinets are used to complement fixed fire fighting systems or to protect risks for which a protection by fixed systems is not practicable for technical or economic reasons.

A small diameter hose, as well as the easily manageable FOGGUN ensure great flexibility, with almost no reaction force on discharge. FOGTEC wall cabinets can be integrated into a pipe network of a fixed FOGTEC pump system or installed as a separate system.

Industrial application

FOGTEC wall cabinet

Mobile application of water mist

Further Applications

FOGTEC systems have been employed to protect a large and varied range of other risks

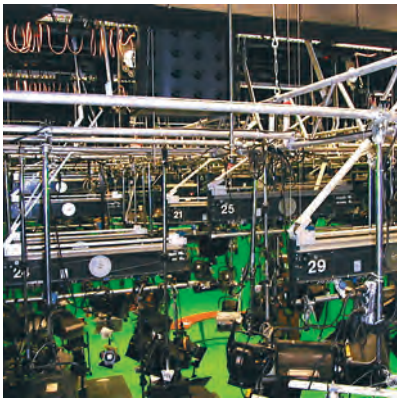
Clean rooms, TV studios and similar spaces with a high concentration of different risks are ideal locations to benefit from the unique protection features of the FOGTEC system. These rooms accommodate large fire hazards such as plastics and cable material, which generate high temperatures and acidic smoke in the event of a fire. An example would be a TV studio or broadcasting station where a fire must be suppressed rapidly to avoid major damage.

Due to the excellent cooling effect, FOGTEC systems are particularly suitable for use in tunnels and underground traffic systems. The problems of tunnel length, air velocity and height can all be overcome with a FOGTEC system.

FOGTEC water mist curtains can be used to prevent fire spreading and to shield off radiated heat and smoke. Buildings made of steel and glass can be protected against the effects of heat. Wall openings for conveyor belts and passageways can be protected without recourse to expensive construction measures. This gives the operator more freedom for logistic and architectural requirements.

Flammable liquid storage

Clean rooms and laboratories



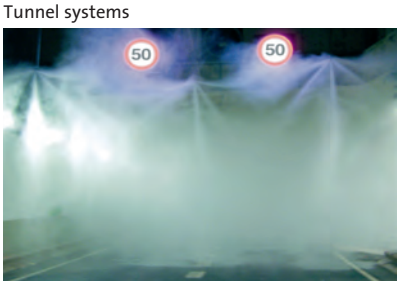
TV studios

Metro Budapest

FOGTEC water mist curtain

M30 Madrid

Tunnel systems



Virgelo Tunnel, Italy

FOGTEC systems on ships and oil platforms

On ships and oil platforms, FOGTEC systems protect accommodation areas, engine rooms and gas turbines. High-pressure water mist is perfectly suited for marine risks because safety standards imposed on ships and the offshore industry, are very high.

Fire brigades and industrial operators can use mobile FOGTEC systems. The extremely compact systems are specifically suited for installation within small fire fighting vehicles such as off-road vehicles and pick-ups.

For companies that do not have their own in-house fire service or in large companies with access difficulties, mobile FOGTEC units have proved very successful as first intervention systems.

Mobile fire fighting with the FOGGUN

Mobile systems for rapid intervention

Advantages of FOGTEC Systems

- Environmentally friendly
- Safe for people
- High cooling effect
- Reduction of radiated heat
- Water consumption approx. 10 % of conventional sprinklers
- Minimal water damage
- No pre-warning time required
- Easy and space-saving installation
- Small storage space requirement for system technology
- Activation via glass bulb or separate detection system
- Alternative to gas systems and sprinklers

All photographs of references shown are actual risks that are protected by FOGTEC systems.
Subject to technical changes.

FOGTEC® FIRE PROTECTION

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