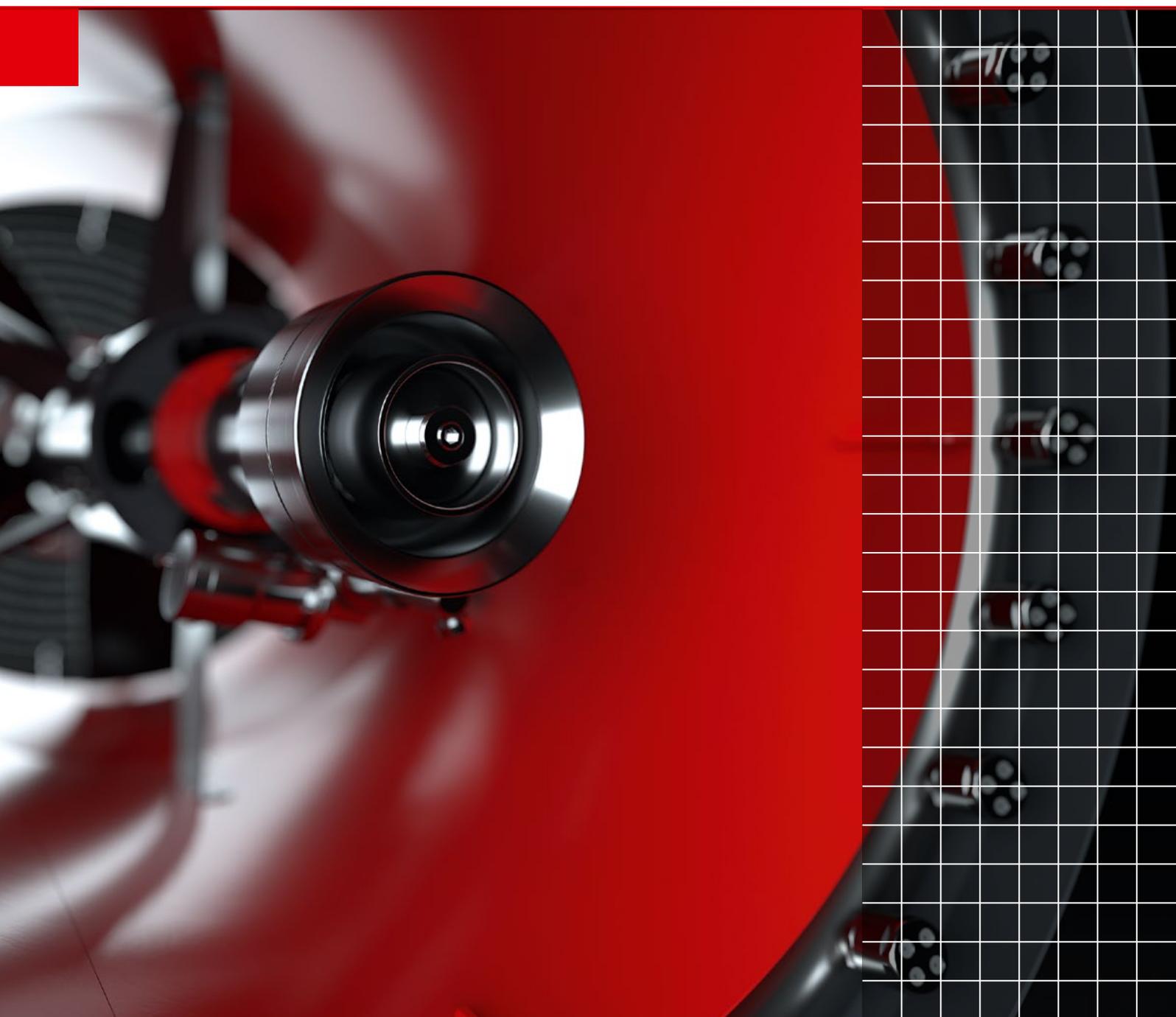


Experts in fire protection

MINIMAX

MXOne High-performance extinguishing turbine
Innovative fire fighting with highly efficient water
mist from a safe distance



TECHNOLOGIES

MXOne

Next-generation fire protection

The Minimax MXOne high-performance extinguishing turbine represents a new generation of fire fighting. Through an electrically adjustable jet pipe, the turbine achieves wide coverage, even with the addition of foam concentrate. The integrated position sensors provide the intelligent control system with continuous feedback on the setting mode and alignment of the extinguishing turbine.

The water mist it generates absorbs large amounts of energy in the event of a fire, providing effective cooling and, due to its three-dimensional operation, can also reach hidden sources of fire. It also binds smoke gases, pollutants, and odors and can quickly take effect over large areas. Unlike classic monitors that use a focused jet, the turbine's gentle application of water prevents burning material from being dispersed and potentially causing additional fire spread.

MXOne is unprecedented in its ability to protect a wide range of industries and risk areas from specific fire hazards inside or outside buildings – for example:

- Recycling companies
- Wood processing industry
- Chemical plants and refineries
- Airports and hangars
- Substations and transformers
- Disaster management
(e.g. fire protection in forest fire fighting)

With MXOne, a wide range of fire scenarios can be safely mastered. The flexible applicability of different extinguishing media plays a key role. MXOne can be operated with town water, salt water, with and without foam concentrate admixtures (also fluorine-free).

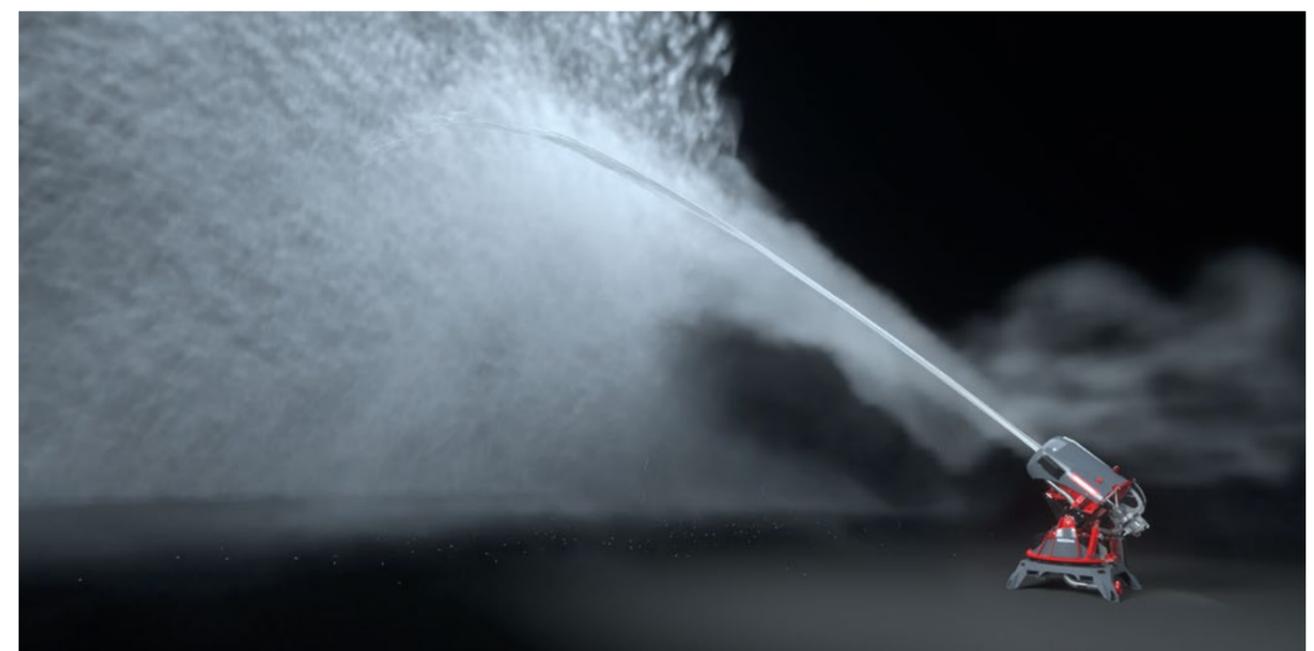
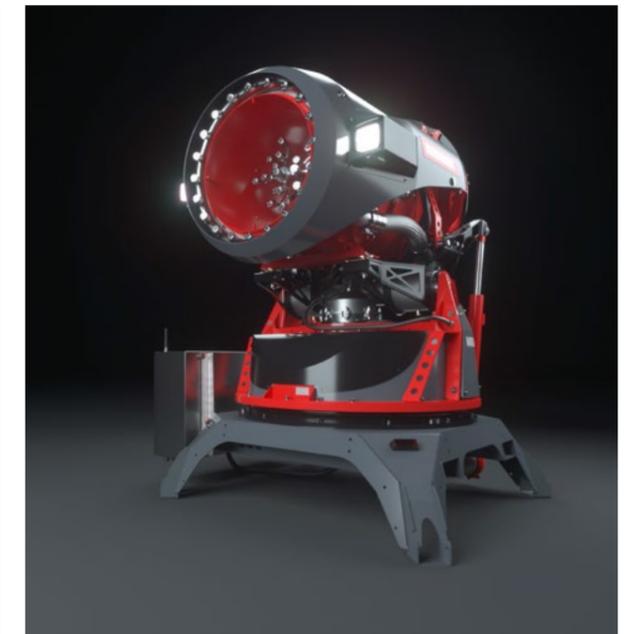
Due to its advantageous operating parameters, the extinguishing turbine is easy to integrate into existing systems and is suitable for use in areas with temperatures ranging from -15 to +55 °C.

MXOne is – depending on the configuration – either fully automatically or remotely and manually aligned to a hot spot. Thanks to intelligent control, even two or more neighboring areas can be alternately supplied with extinguishing water using a single turbine in automatic mode. This allows several fires to be fought in parallel or nearby facilities threatened by fire to be cooled in a targeted manner.

Due to a highly hydraulically balanced and optimized design, the MXOne impresses with relatively large coverage at already low water pressure, thereby requiring less extinguishing water compared to conventional monitors or similar machines.

Variants:

- Stationary on the ground
- Stationary on tower (high pile)
- Mobile on trailer (trailer)
- Mobile on flat rack container
with own power and water supply





Operating pressure 4 to 16 bar (58 to 232 psi)

Nozzle ring

Max. flow rate 4,000 l/min (1,057 US gpm)

Power connection 400 V/50 Hz (480 V/60 Hz)
Nominal max. current 32 A (27A)

Controlling: fully automatic or manually via remote control

Weight 945 kg (2,083 lbs)

LED lighting (2 x 3,000 lumen)

Propeller power 12.5 kW at 2,910 rpm

Summer and winter operation
-15° to +55°C (5° to 131°F)

Max. air flow 31,000 m³/h (1,094,754 ft³/h)

Tilting angle -19° to +43°

Rotation angle 360°

Water connection
5 in (DN 125)

(H) 1,942 mm
(6.371 ft)

(W) 1,390 mm (4.560 ft)

(L) 1,590 mm (5.217 ft)

Spray patterns and extinguishing media

Fighting fire with water mist from a long distance is one of the MXOne's unique strengths. The turbine compensates for the susceptibility of small drops to external influencing factors, like crosswinds or headwinds, by intelligently controlling and switching on the propeller. In addition, the system can be flexibly adapted to almost any challenge from different fire scenarios. MXOne achieves unprecedented versatility of use, as it can be used with town water as well as with salt water or foam concentrate (also fluorine-free), and the extinguishing agent can then be applied in a variety of spray patterns – from fine water mist to full jet.



Water mist

Extinguishing with water mist:

Minimum water use, maximum effectiveness

When extinguishing with water mist, water is atomized under high pressure to create tiny water droplets, and thus a larger reaction surface for absorbing heat. When the water droplets evaporate completely near the flame, their volume is increased by a factor of 1600, so that the oxygen at the source of the fire is temporarily displaced and the resulting smothering effect abruptly suppresses the fire. The downstream water mist creates a highly effective cooling effect, ensuring that the backfire temperature is undercut as quickly as possible and the fire is extinguished. In addition, the water mist protects people and property from the effects of heat. The amount of water used in an extinguishing attack with water mist is considerably less than with full-jet extinguishing, so significantly less water damage can be expected.

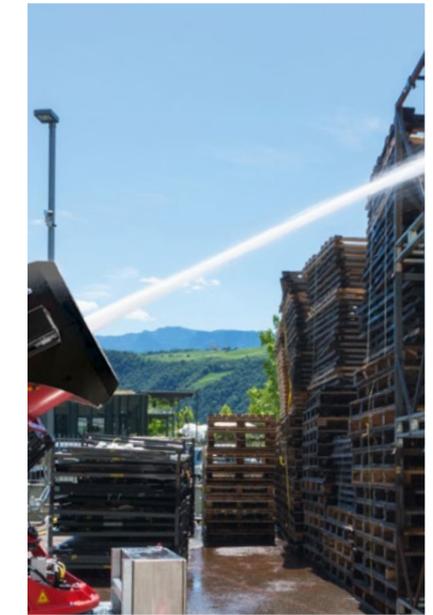
- Water has a very high specific heat capacity (~ 4.2 kJ/(kg-K)), meaning it can absorb large amounts of energy compared to other liquids and solids.
- The smaller the water droplets are when dispersed, the larger their surface area and the faster their heating and evaporation occur (energy extraction from the fire). With evaporation, additional inertization takes place through oxygen displacement.
- The total surface area of a water droplet is inversely proportional to its diameter.



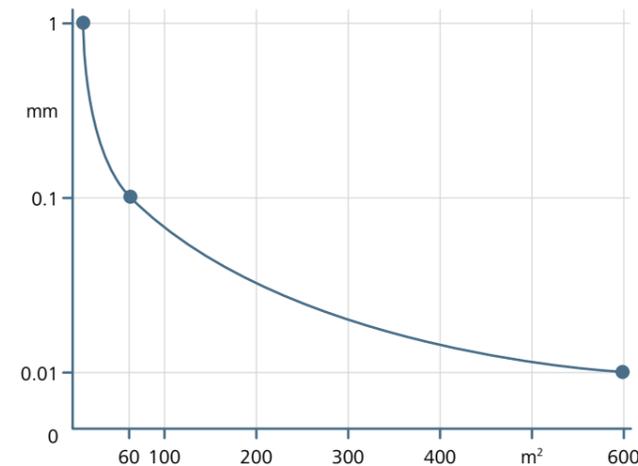
Open spray jet



Closed spray jet



Full spray



Ratio of drop diameter to drop surface area

- 1l of water sprayed in a drop size of
 - 1mm diameter = 6m²
 - 0.1mm diameter = 60m²
 - 0.01mm diameter = 600m²
- Due to the properties of water mist, effective fire fighting can be realized even with minimal water use.
- The droplet spectrum must be optimally selected so that the fire source can also be reached against the fire thermals.

Operating concept – Stationary or mobile control

The control and alignment of the extinguishing turbine can be fully automatic. For this purpose, the information from at least two fire detectors (e.g. UniVario industrial fire detectors or infrared cameras) is evaluated in the fire alarm control panel and, from this, the coordinates of the source of the fire are precisely determined before MXOne is activated. Alternatively, manual control of the turbine is always possible. Both stationary and mobile control variants can be realized entirely according to customer requirements.



Detection

Fire detection can be done with both industrial fire detectors and infrared cameras. With information from at least two fire detectors from different perspectives, the position of a fire can be precisely determined.

VdS- and FM-approved fire detection and suppression control panel

- Control of single-zone or complex multi-zone suppression systems
- Touch display

Control panel

- MXOne control
- Touch display
- On/Off function (emergency stop): Turbine, monitor, nozzle ring, LED spotlight
- Monitor: Full/Spray jet (open to closed)
- Scenario selector switch (e.g. oscillation, step chain)
- Joystick control rotation / tilt

Wall panel

- Controls for manual control

Radio remote control

- Controls for manual control incl. predefined scenarios
- Industrial radio link
- Radio frequencies depending on world region

Mobile devices: Smartphone or tablet*

- Facilitation of commissioning, service, and maintenance
- Measurement of project-specific room data and direct transfer to the system

* No control of the turbine during extinguishing operation

Variants

Meeting special requirements: The MXOne can be adapted to a wide range of environmental requirements and customer preferences. Different variants – for example, with extended reach on a tower or mobile on a trailer – emphasize the versatility of the MXOne. The system can also be integrated into existing fire suppression systems and retrofitted. By using container and modular solutions, it is possible to react flexibly to changing requirements.



Stationary installation: Floor or tower
MXOne is usually mounted on a mounting frame on the floor. However, optional elevated installation on a solid tower is possible. The elevated position increases the coverage and effective radius of the system.

Holistic "Plug and Play" modular solution

We offer complete system solutions from a single source, from the modular water storage tank, to a ready-to-install fire pump container, also including power generator and optional foam proportioning equipment, package of buried piping, to the MXOne extinguishing turbine and, on request, a fully automatic fire detection and extinguishing system control with visualization. These fire protection modules are manufactured according to standardized processes, delivered, and commissioned on site. Due to the high degree of prefabrication, the commissioning outlay remains within manageable limits. This saves time, and thus money.



Mobile variant on trailer

Mounting on a trailer with prepared connections for electricity and water allows maximum mobility and flexibility. Quickly positioned and connected to the local power and water supply, the MXOne can help implement reliable fire protection in almost any operation. Positioned on site, the turbine is operated via an industrial radio remote control. There's no faster and more flexible way to be on the job site.

1	Turbine	4	Base frame
2	Strainer	5	Control and control cabinet
3	Tap and feed fitting	6	Storage box

Version on trailer consisting of:

- Turbine, base frame, control cabinet
- Remote keypad (wired)
- Radio remote control
- Feed fitting
- Tap fitting
- Strainer
- Storage boxes for hoses and electrical accessories
- Spare tire

Technical specifications

Trailer:

Internal dimensions:	
LxWxH:	3,000x2,000x2,000mm
Empty weight:	740kg
Payload:	Approx. 2,760kg
Total weight:	Approx. 2,300kg



Ready-to-use version on flat rack roll-off container

The variant on a flat rack – suitable for vehicles with roll-off function or for container transport – is equipped with its own power and water supply and allows for immediate extinguishing attack with the MXOne at the scene. Maximum flexibility, as almost any vehicle with a corresponding roll-off function can be used. Standardized attachment points for transport on conventional container vehicles are also available, with their own diesel power generator and a 9,000 l break tank, as well as a receptacle for one or two portable pumps.

1	Turbine	5	Flat rack container/ Roll-off container
2	Receptacle for 1 - 2 portable pumps	6	Feed fitting
3	Break tank	7	Tap fitting
4	Diesel power generator	8	Strainer

Technical specifications

Flat rack container:
 Dimensions: LxWxH: 6,058x2,438x370mm
 Empty weight: 2,520kg
 Total weight: Approx. 15t

Diesel power generator:
 Dimensions LxWxH: 2,350x1,100x1,450mm
 Empty weight: Approx. 1,255kg
 Ver. Continuous power (PRP): 44kVA/35kW
 Emergency power (LTP): 48kVA/38kW
 Voltage: 400/231V/50Hz

Sprinkler pump(s):
 Dimensions WxH: 365 x 1609mm
 Weight: 304kg
 Delivery rate: 1,083.3l/min.

Version on flat rack roll-off container consisting of:

- Turbine, base frame, control cabinet
- Remote keypad (wired)
- Radio remote control
- Tap fitting
- 2 swing check valves
- Strainer
- 9,000 l break tank
- Diesel power generator
- Sprinkler pump MMP

Comprehensive efficacy tests passed

The MXOne has proven its reliability in numerous efficacy tests under the supervision of the independent test and inspection institutes, DMT and FlameCert, respectively. Minimax engineers have tested the system in full-scale fire tests (with combustible liquids, kerosene, plastic waste, and wood) and optimized it for use in the various application areas. Minimax expertise in engineering, installation, and service ensures that with MXOne, customers receive a system that sets new standards in supporting fire protection.



Field tests and sales release

The development of an extinguishing system includes, among other things, successfully passing fire tests with a variety of representative combustible materials, which have been confirmed by independent bodies. Minimax engineers have also repeatedly tested the MXOne under a variety of weather conditions, and are continuously incorporating practical experience into the further development of the system. In this way, it has already been possible to make improvements like significantly increasing coverage distances and optimizing the spray patterns for use in various fire scenarios.





Solid fires

Depending on the distance, weather factors, and fire thermals, solid fires can be reliably extinguished with water mist or adapted spray. The selection of the spray pattern has a crucial effect on the coverage and penetration ability of the extinguishing agent. Spray obstructions must also be taken into account when determining the spray pattern, for optimal control of a fire on an object that can form embers.

Example of an experimental setup

Burning material: Stack of wooden pallets
 Distance: 60m
 Extinguishing agent: Water

Plastic waste fires

Plastic waste poses a high fire risk, especially in recycling facilities and waste processing plants. Because the exact composition of the waste is not known to the storage company, it can repeatedly catch fire through spontaneous combustion. Thermoplastic, thermosetting, or foam plastics, together with their additives, emit toxic gases in the event of a fire. For this reason, foam-based extinguishing agents are often the better choice. The foam settles on the burning material, extinguishes the fire, and prevents against re-ignition and fire spread.

Example of an experimental setup

Burning material: Recyclable material bags with contents
 Distance: 55m
 Extinguishing agent: Fluorine-free foaming concentrate

Liquid fires

Liquid fires are also fought with foam concentrate. Key for a fast, successful extinguishing attack is the gentle application and even distribution of the extinguishing agent. The foam needs to spread completely over the surface without any burning liquid escaping from the test pan. The foam cover prevents re-ignition.

Example of an experimental setup

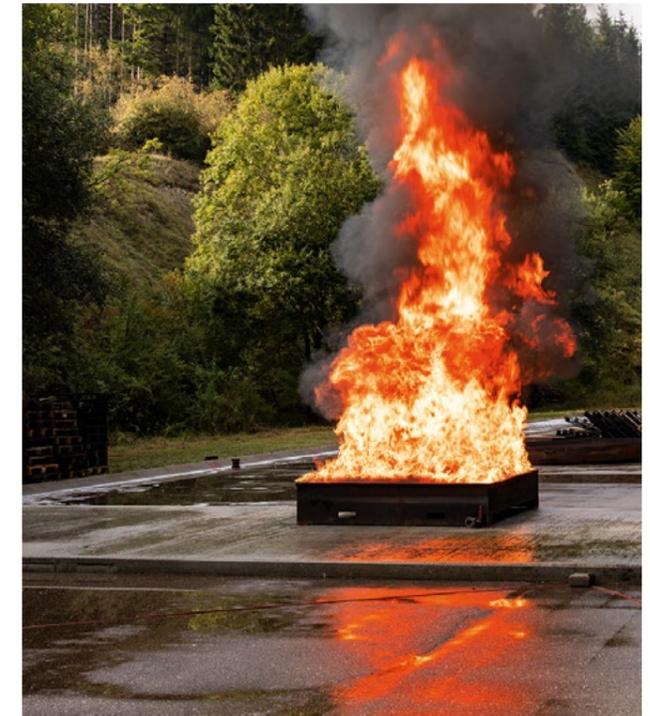
Burning material: Non-polar fabric in FM fire pan
 Distance: 50m
 Extinguishing agent: Fluorine-free foaming concentrate

Kerosene liquid fires

Due to its low flash point, spilled and ignited kerosene poses one of the most dangerous situations when fighting fires at airports and in hangars. Because it spreads in three dimensions, it runs the risk of explosion due to the rising gases. Here, too, the film-forming property of foam extinguishing agents and their sticking effect are necessary.

Example of an experimental setup

Burning material: Kerosene in FM fire pan
 Distance: 75m
 Extinguishing agent: Fluorine-free foaming concentrate MX ad One 3/3 f-0



Fire tests for kerosene liquid fires were conducted and documented under the direction and supervision of FlameCert.

Application areas

The MXOne is particularly suitable for open areas and open halls where the burning material is too far away from possible stationary fire protection systems. Thanks to turbine technology, MXOne reaches coverage distances of up to 80 meters and can be lifted and tilted swiftly and seamlessly. This gives it an extraordinary range of effectiveness in which the throw can be adjusted at any time. The option of using foam concentrates extends the range of applications to areas with fire loads such as liquids or plastics. MXOne also meets the requirements for systems used in harsh, industrial environments. The fire extinguishing system can be used in areas with an ambient temperature of -15 to 55 °C and, despite its robust design, is easy to operate and requires minimal maintenance.



Wood processing industry

Until now, the proper fire protection solution has not been available for outdoor storage facilities in the wood processing industry. It is here that the raw material for the entire value chain of this industry is stored. Microbial and chemical processes, environmental influences, technical failure, human carelessness, or arson can quickly cause a fire out here.

In addition, there are some areas on the site that are difficult to reach and control in the event of fire, with increased fire risk, such as in drying, mechanical conveying, storage in silos, or transformers located outdoors (see p. 18).

MXOne is used in these areas, with and without foam additives, to effectively fight fires, even those with high energy and strong flame formation.

Recycling companies

The potential for ignition must be adequately countered as early as the delivery of the recyclable material and its storage. The quantities of organic and inorganic substance mixtures pose a considerable fire risk due to fermentation processes. Combined with batteries, unemptied containers with combustible liquids, or aerosol cans, the ignition potential of the recyclable material increases several times over.

In delivery and storage areas, whether indoors or outdoors, MXOne protects human lives, recyclables, processes, and the environment.

Chemical plants and refineries

Many chemical plants and refineries are continuously investing in the modernization and expansion of their production facilities. The requirements for fire protection are particularly high, due to the processing and storage of liquids that are usually highly flammable.

Here, MXOne is mainly used with foam additive to smother the flames as quickly as possible in the event of a fire, covering the surface with a foam film and preventing re-ignition. In parallel, adjacent areas can be cooled as a preventive measure and protected against the flames spreading.

The use of water mist can additionally bind escaping gases and immediately suppress smoke development.

About Minimax

For 120 years, Minimax has been one of the leading brands in fire protection. Today's Minimax Viking Group generates annual sales of 1.9 billion euros and employs around 9,500 people worldwide. The Group, headquartered in Bad Oldesloe, Germany, maintains several of its own research, development, and manufacturing facilities. Whether in automotive plants, power stations, logistics centers, office and administration buildings, data centers, or on ships – wherever fire hazards arise, Minimax supplies custom solutions and a comprehensive range of services after the fire protection system has been installed. For more information, visit www.minimax.com



Airports and hangars

Airports are usually public places with heavy public traffic and high security standards. At the same time, the immediate vicinity sees large quantities of combustible liquids (kerosene, gasoline, oil) stored and transported. In addition, there are high value concentrations – for example, in fully occupied hangars. If an aircraft catches fire, the response must be immediate and the extinguishing process must be initiated with foam.

In the event of a fire, MXOne makes it possible to extinguish the fire quickly and, above all, selectively from a safe distance. The turbine's fast alignment on all sides and flexible coverage make it the optimal fire protection system at airports and in hangars. The lowered use of extinguishing agents compared to other foam-based suppression systems significantly reduces the environmental impact.

Substations and transformers

Substations are the hubs of our power supply: There are well over 1,000 of them in Germany alone. They link power lines together, transform electricity into different voltage levels, and conduct it onward. Transformers are the heart of a substation. In addition, transformers are used in large industrial sites. They convert the AC voltage into the voltage level required for industrial operation.

Large amounts of heat are generated during operation, which is why power transformers are usually designed with oil cooling. If oil escapes, it can easily ignite when exposed to hot surfaces or sparks. In these areas, MXOne is primarily used with foam additives. Even fires with high energy and strong flame formation can be reliably fought.

Minimax is your expert in fire protection.

Fully provided for: Minimax offers you a unique range of proven and innovative fire protection systems and components from our own development and manufacturing facilities. With our holistic solutions, you can be sure of everything from planning and project management to installation and subsequent service.

For 120 years, Minimax has been one of the leading brands in fire protection. Let us make safety a given for you – worldwide.

Everything from a single source

MXOne can be easily integrated into existing systems. As a provider of complete solutions, Minimax can make any necessary adjustments for you, including installation of an additional water supply as a modular or container variant, integration into an existing hydrant system, or a complete solution tailored to your specific needs. With Minimax's comprehensive product range, all options are open to you, from optimizing an existing system to the complete development and implementation of a new project.

Photos
Title: Kracher Grafik-Service, Rimpar
Page 03:
Page 04/05: Kracher Grafik-Service, Rimpar
Page 06/07: EmiControls, Bozen
Page 08/09: Kracher Grafik-Service, Rimpar; Dias, Dresden
Page 10: Kracher Grafik-Service, Rimpar
Page 16: Oliver Güth, Cologne
Page 18: Freiwillige Feuerwehr Bröckingen
Page 19: Oliver Güth, Cologne

MXOne high-performance extinguishing turbine

- Targeted adaptation of spray pattern and extinguishing medium to the material to be protected
- Fast fire fighting and ambient cooling through sophisticated water mist technology
- Pinpoint automatic or manual alignment
- Flexible use of town/salt water and foam (also fluorine-free)
- Adjustable spray patterns from water mist to full jet
- Simple, safe operation via remote control
- Large effective range: 360° swiveling and up to 80m coverage distance at only 9.2bar
- Seamless navigation thanks to quickly adjustable inclination angle (-19 to +43°)
- Low operating pressures starting at 4bar facilitate use of existing water supply
- Easy to integrate into operating infrastructure and existing fire suppression systems
- Smoke extraction by powerful blower (31,000m³ per hour)
- Variety of mobile and stationary mounting variants



Tests and certifications

The effectiveness of MXOne has been extensively tested and approved by independent authorities. This includes accredited fire protection certification bodies such as DMT, MPA Dresden, and FlameCert.

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