

” *We save life  
and property.*



# FOGMAKER

Fire suppression for engine compartments

**TRIPLE ACTION<sup>3</sup>**

with high-pressure water mist



# THE CHALLENGE

Engine fires in airports involve risks to human life, property and machinery. Fires can also create major service disruptions, effect downtime and cause delay.

Ground support machines (GSE) can serve as a potential high-risk element at an airport causing major damage to airplanes, delays and in worst case scenarios injuring people. A fire suppression system is an investment for the safety of people and property. High pressure water mist is a superior suppression technique in engine compartments to strongly limit the consequences of a fire in GSE machines such as luggage trucks, carriers and freight loaders, passenger buses, supply trucks etc.

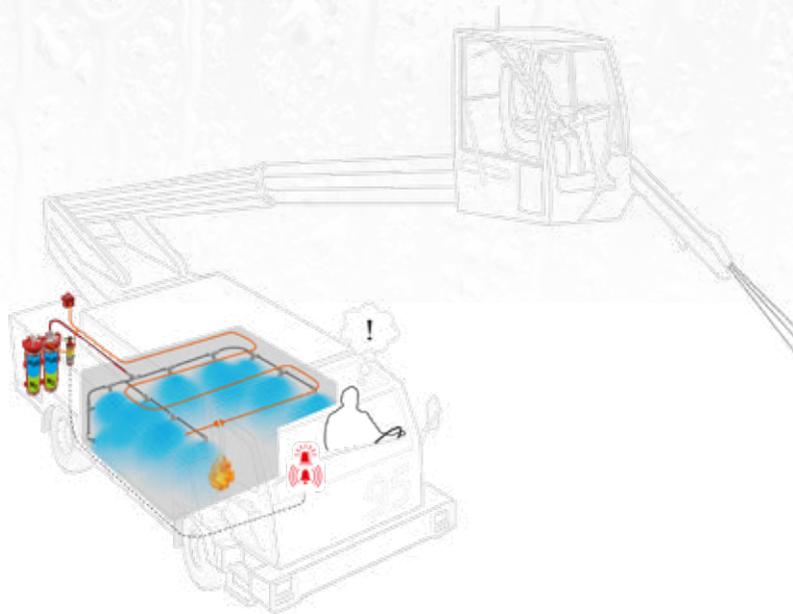
A fire in an unprotected engine compartment is hard to detect in time and often develops in intensity extremely quickly. This type of fire is almost impossible to fight with a portable fire extinguisher. Because of this, the need for safety regulations has increased in past years leading to the installation of completely automatic and permanent fire suppression systems in many machine types.

This has spread to more and more countries, insurance agencies and manufacturers/operators throughout the world.

An important point to bear in mind is what the physical aspects of a fire are. The impact of the heat, oxygen and fuel, all need to be anticipated and dealt with accordingly. These three elements of a fire are often symbolised by the fire triangle. Removing one side of the triangle may be sufficient to extinguish a fire, but because of the complicated nature of a fire in an engine compartment there are no guarantees and reignition may still occur. That is why a fire suppression system with so-called triple effect that attacks all sides of the fire triangle at the same time is the safest and most logical method that can be used to minimise downtime, improve service continuity and protect human life.

At the same time, the fire suppression system must always be ready to operate independently of human interaction, the vehicle's location and how the vehicle is being used.

Fogmaker's high-pressure water mist provides the right conditions to combat the complex conditions that may arise in an engine compartment.



*Simplified illustration of our fire suppression system installed in a De-icer machine.*

## WHY FOGMAKER?

- Triple Action<sup>3</sup> – attacks all three sides of the fire triangle
- Simplicity – no power supply, position independent, low weight, minimal obstruction
- Low service cost – annual inspection, 5 year service, minimal clean up after the system has been triggered
- System monitoring – activity, low pressure and fire alarm
- Automatic engine shutdown optional
- Single cylinder approved for up to 6.2m<sup>3</sup> (R-107)
- Product development in-house



# A Triple Action<sup>3</sup> Fire Suppression System

Fogmaker's fire suppression system uses the purest form of extinguishing agent – water. The combination of high-pressure water mist and a small amount of foam additive simultaneously attack all three components of the chain reaction that cause a fire – heat, oxygen and fuel.

## HEAT - Cooling

Cooling is by far the most important factor when breaking the fire's chain reaction and water is a superior medium for this purpose. During the evaporation process, the water mist cools the fuel gases and the hot parts in the engine compartment.

When the liquid runs through the spray nozzles, a normal size droplet which is 1 mm in diameter is split into as many as 8,000 micro-droplets. The droplets evaporate easily, taking up the energy from the fire and cooling the fumes in the engine compartment

## OXYGEN - Oxygen displacement

During evaporation, up to 1,700 litres of water vapour is generated from one litre of water. This means that from a single 7.5 litre Fogmaker cylinder, up to 12 m<sup>3</sup> of water vapour are generated, providing an effective displacement of oxygen atoms in the air, supporting a "knockdown effect" on the fire.

## FUEL - Smothering

The small amount of AFFF surfactant creates a smothering effect on the fire thus preventing oxygen from coming into contact with hot surfaces or fuel. The fire is also prevented from reigniting.

That is how Fogmaker's Triple Action<sup>3</sup> suppresses a fire.

"From 870 °C to 136 °C in 10 seconds!"



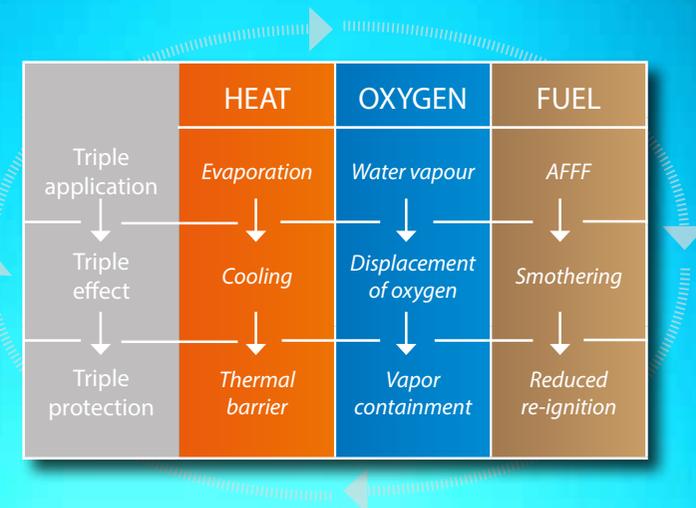
Unique cooling effect, temperature reduction of 734 °C in 10 seconds!

*Fire suppression test in a simulated engine compartment with a volume of 2,5 m<sup>3</sup>. The fire source consists of four 20x40 cm trays filled with diesel. Diesel spray is also applied at a rate of 2 litres per minute at a pressure of 5 bar, which showers the engine. The heat effect reaches approximately 1,600kW. The pictures are taken with 2 second intervals. During the whole interval, 10 seconds, approximately 5 dl of extinguishant is used.*

# TRIPLE ACTION<sup>3</sup>



All three components of the fire triangle are attacked using Fogmaker's fire suppression system





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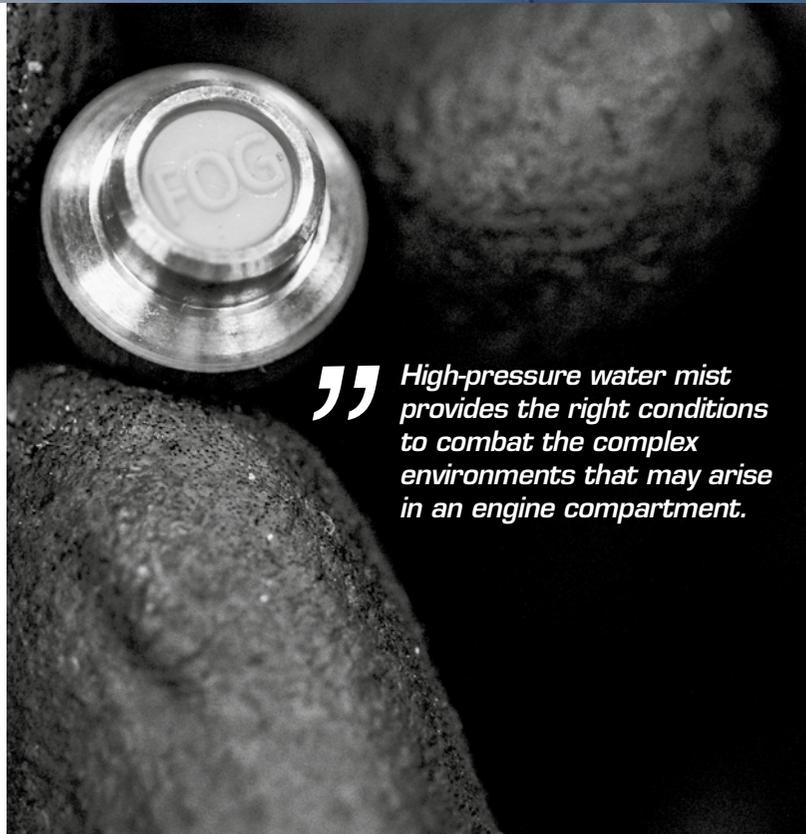
## A proven fire suppression solution

Fogmaker is the holder of several qualification certificates and approvals. We provided the first fire suppression system ever approved for UNECE Reg. 107 (Europe). Fogmaker also holds the following certifications: AS-5062 (Australia), SBF-128 (Scandinavia), UL listed (UL 1384) and FM pending (FM 5970).

Through our work processes, we ensure that we maintain the highest possible standards during the development of our products. Furthermore, following the latest re-certification of ISO 9001:2015 and 14001:2015 with a pending IATF 16949 certification, our organisational structure will be able to grow successfully.

Our global network of distributors and partners provide a stable foundation for our organisations' growth so that we can offer a complete service wherever our customers are. Today we are represented in more than 55 countries in Europe, North and South America, Africa, the Middle East, Asia and Oceania.

But first of all we are proud of the trust our customers around the world have shown us. Fogmaker's fire suppression system first saw the light of day in 1995. Today, more than 160,000 vehicles are equipped with Fogmaker's high-pressure water mist system.



” *High-pressure water mist provides the right conditions to combat the complex environments that may arise in an engine compartment.*



 **UNECE 107 R - 06001**  
United Nation Economic  
Commission for Europe

 **AS-5062**  
Australian Standard

 **UL-1384 (UL listed)**  
Underwriter's Laboratories

 **SBF-127/128**  
Swedish Fire Protection Association

**...and FM-5970 pending!**  
Factory Mutual

Airport EN Ed-1-19  
Art. no.: 8050-06-002

EN