

FOGMAKER

Fire suppression for engine compartments

TRIPLE ACTION³
with high-pressure water mist



Protect yourself and your assets from an engine fire

Engine fires are difficult to deal with owing to their complexity, the danger they pose, and their physical aspects. Fire and explosions are risks associated with agriculture. The build-up of debris on machines and stored crops and grain dust explosions present a high risk of fire. Furthermore, high-temperatures are reached inside engines which can easily ignite debris.

The majority of all fires in agricultural machines occur in the summer months during sowing and harvesting. During this time, machines are sensitive to unplanned stoppage. An engine fire can be devastating to a farmer in terms of the financial consequences and impact on the surrounding environment. A rapidly spreading fire can lead to a disastrous series of events. Fire also puts the greatest resource of all in danger – people.

Difficult to detect fire in time

A fire in an unprotected engine compartment is difficult to detect in time and often intensifies rapidly. This type of fire is virtually impossible to control with a hand-held fire extinguisher.

As a result of this, many new safety regulations have been introduced over several years in a growing number of countries, insurance companies, and manufacturers/operators across the globe. These regulations stipulate the use of fully-automatic, permanently-installed fire suppression systems in agricultural machines.

Physical aspects of a fire

It is important to consider the physical aspects of a fire.

Heat, oxygen and fuel must all be anticipated and combated. These three elements of a fire are often symbolised by the fire triangle. Eliminating one side of the triangle may be sufficient to extinguish a fire, but, due to the complex nature of an engine compartment fire, there are no guarantees that the fire will not re-ignite. That's why a so-called triple action fire suppression system that combats all three sides of the triangle simultaneously is the safest and most logical method for minimising downtime and protecting human lives. At the same time, the fire suppression system must always be ready to operate independently of human interaction, vehicle position and vehicle operation.

These complex conditions are all covered by Fogmaker's technology: high-pressure water mist.

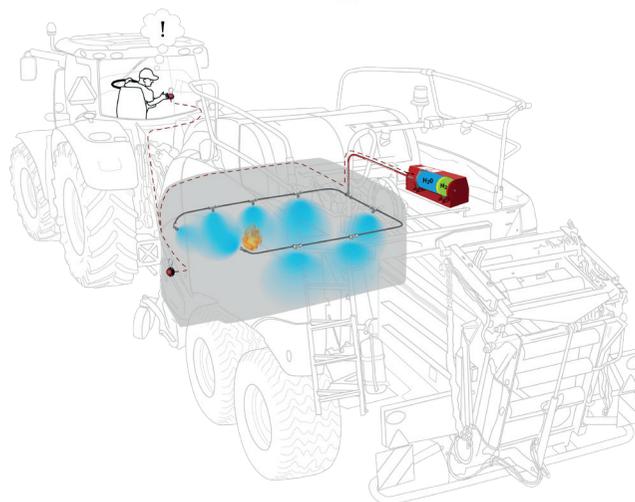
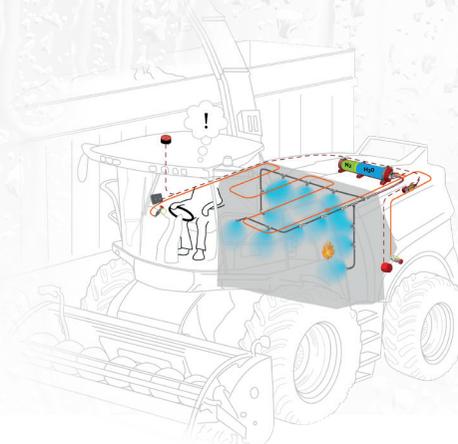


Illustration showing a Fogmaker system installed in a combine harvester and in a rear loader.



A Triple Action³ 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 m³ 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 Action³ suppresses a fire.

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



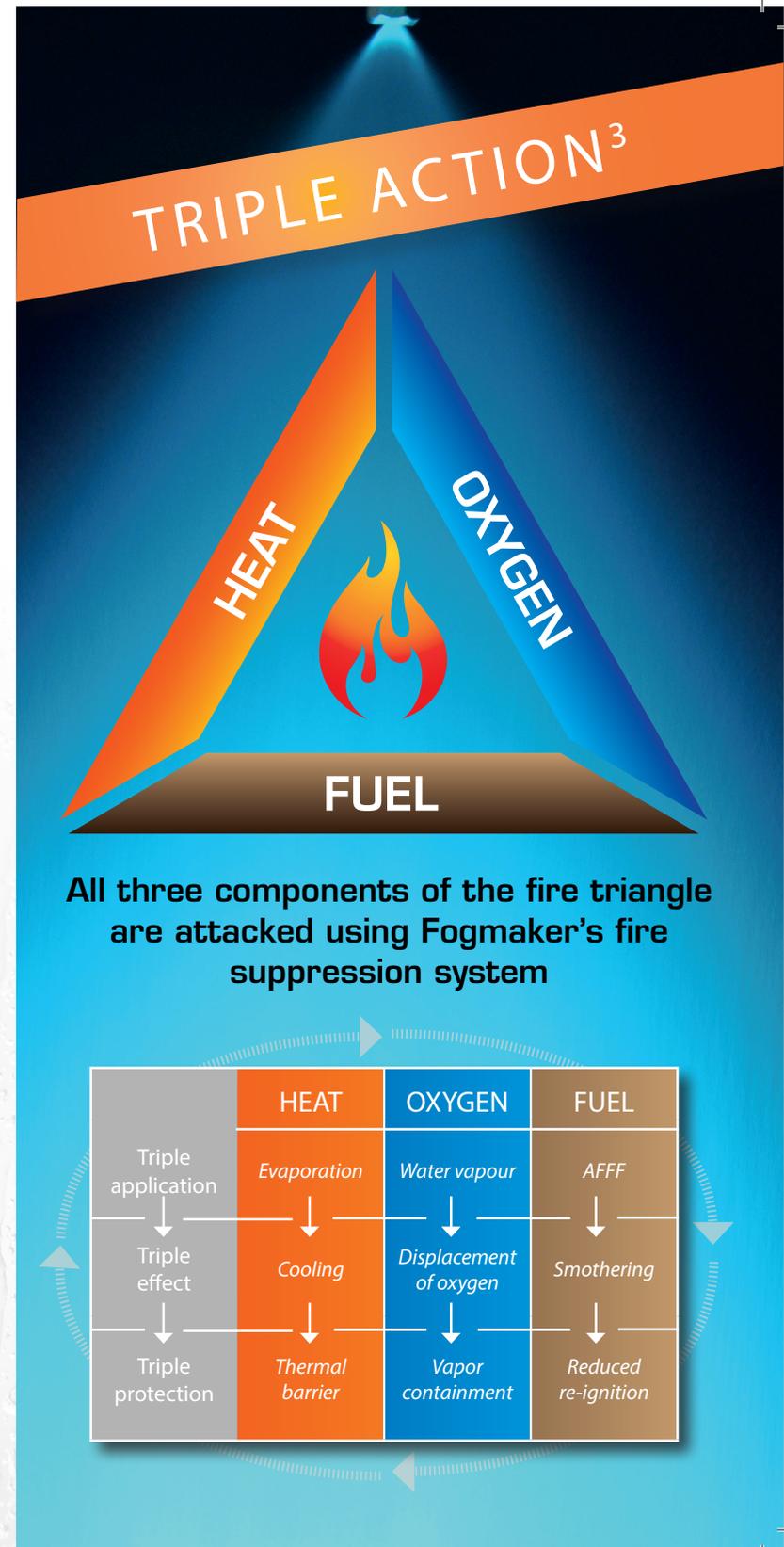
+870 °C
0 sec

5 sec

+136 °C
10 sec

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 m³. 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.



A proven fire suppression solution

Fogmaker holds numerous certificates and approvals. Our fire suppression system is the first ever to be homologated for UNECE Reg. 107 [the standard for permanently-installed fire suppression systems in buses in Europe].

Fogmaker also holds AS-5062 (Australia) and SBF-127/128 (Scandinavia), and it is UL listed (UL 1384) and FM pending (FM 5970). Through our work processes, we ensure that we maintain the highest possible standards and further develop our products. Furthermore, following the recent re-certification of ISO 9001:2015 and 14001:2015 as well as IATF 16949, our organisational structure has successfully expanded.

This establishes a solid foundation for our expanded organisation through our global network of distributors and partners, who offer a full range of services wherever our customers are located. We currently cover more than 55 countries in Europe, North and South

America, the Middle East, Asia and Oceania. But what we are most proud of is the trust our customers around the world have in us. The first Fogmaker fire extinguishing system was put into operation in 1995. Today, more than 185,000 vehicles are equipped with Fogmaker high-pressure water mist.



**FOGMAKER
INTERNATIONAL AB**

Sandvägen 4
PO Box 8005
SE-350 08 Växjö, Sweden

+46 470-77 22 00
info@fogmaker.com

fogmaker.com



WHY FOGMAKER?

- Triple Action³ – attackers all three sides of the fire triangle
- Installations made of Certified Fogmaker Partners
- Simplicity – no power supply, position-independent
- Low servicing costs – annual inspection, 5-year service, minimal clean-up after system activation
- System monitoring – activity, low pressure and fire warning
- We perform retrofit installations
- In-house product development
- Global network of Certified installation Partners



SBF-127
Swedish Fire Protection Association



UL-1384 (UL listed)
Underwriter's Laboratories

...och FM-5970 pending!
Factory Mutual

Agriculture EN Ed-19
Art.nr: 8050-08-002

EN