

Fire Fighting for Tunnels
Save Lives
Reduce Damage



High-pressure
water mist fire protection



www.ultrafog.com



DELIVERING FIRE PROTECTION SERVICES FOR TUNNELS



Ultra Fog is an international brand founded in Gothenburg, Sweden.

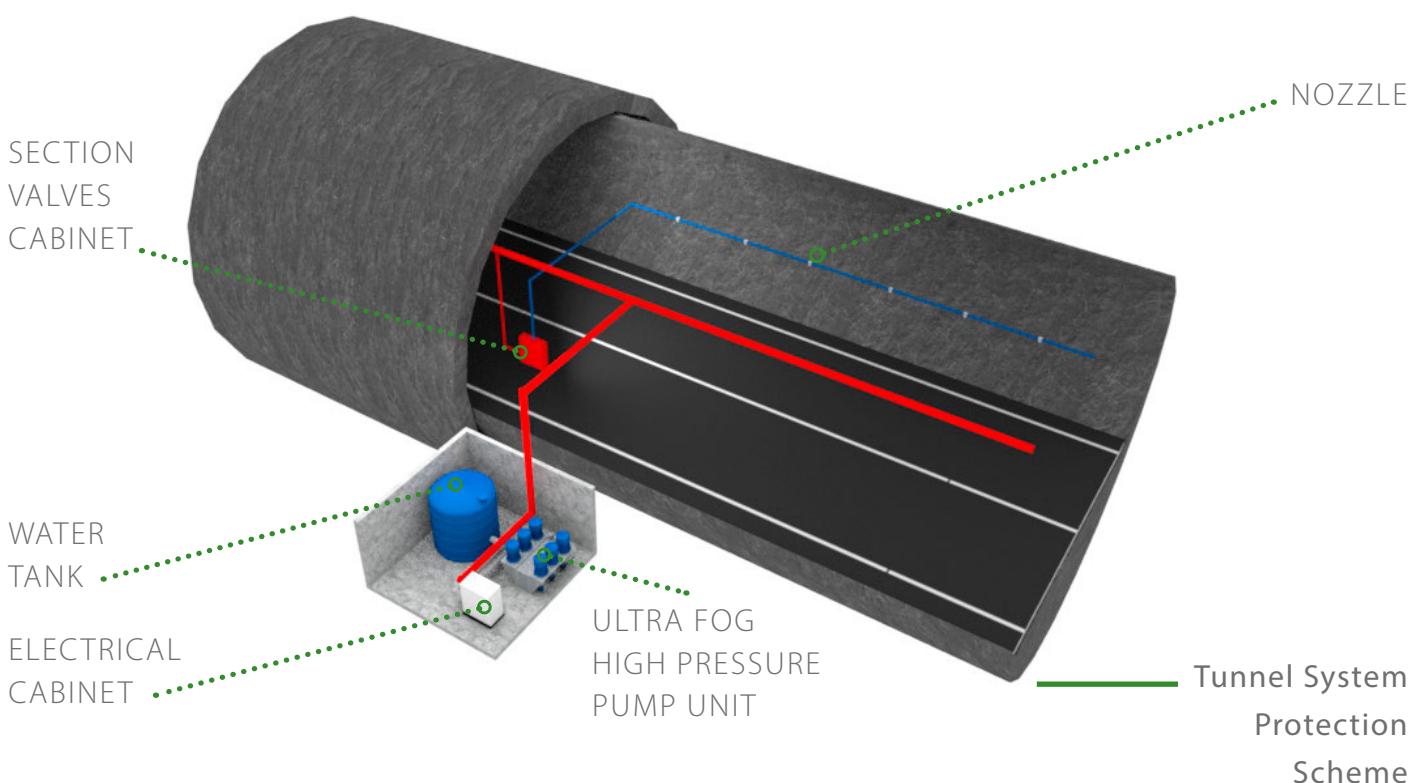
The company specializes in the development, design and application of high-pressure water mist sprinkler systems.

This high-performance product line results from a continuous program of research and development, extensive certification and type approvals, and quality controlled manufacturing. Ultra Fog's global reach, aftersales service and maintenance provision ensures that customers benefit from lifelong product assurance and protection.

Tunnels are an essential part of travel infrastructure but possessing a dangerous feature: the incidence of fires is increasing. Within road tunnels, such unhappy events

can occur as a result of vehicle collisions; overheating braking systems; overheating engines; and other accidental, deliberate, or negligent actions. Due to the enclosed nature of a tunnel's structure, the control of heat and smoke is a priority. Assuring the safety of life, and the integrity of the tunnel's construction is our duty.

Life safety may be at further risk if the design of the tunnel has not made provision for adequate means of escape or refuge – which can be the case within older tunnels, constructed under old standards that may have put less emphasis on life safety than modern tunnel standards. Further to this, the emission and concentration of thick smoke and intense heat within the tunnel can present severe technical challenges to firefighters, during their rescue activities.



Product overview & services



WATER TANK

- Plastic or other material tank custom made
- Automatic refill
- With heater for cold environment

MASTER PUMP A6



- Outlet pressure: 100 – 140 bar
- Flow range: 50 – 115 litres/min/high pressure pump
- Power consumption: 22 – 30kw/high pressure pump
- Control system with PLC, fire alarm system, power supply for feeder pumps etc
- External connections for alarm and control cabinets and operating panels through serial or TCP/IP communication
- Flexible designed pump station with internal buffer tanks to hold the high pressure pumps
- Pump unit can be equipped with high pressure pumps
- Electric driven pilot pump
- Each unit fitted with two 25µm liters
- Temperature safety drain valve and pressure regulator
- Test valve on manifold

SECTION VALVES



- Stainless steel section valves for the electrical activation of a dry pipe system
- Modular design for flexible configuration of groups of electrical section valves
- Reduce peak pressures in the piping system
- Allows isolation of an individual section of sprinklers for maintenance work
- Allows operational testing of the system

PIPINGS & FITTINGS



- PIPINGS made either of stainless steel 316, Duplex or custom special material
- Low cost pipes
- Less weight than in traditional sprinkler systems
- Pipe networks that are easy to conceal
- PIPINGS with fast connection fittings or welded pipe





NOZZLE HEADS

- Patented nozzle design - inline construction
- Droplet size 30 – 200 μm
- Suitable for very small installation space
- Specially designed nozzle arrangement for tunnel applications
- High quality design, made of stainless steel
- High resistance nozzles



WALL HYDRANT

- Maximum pressure: 140 bar
- Hose reel with up to 60 m high pressure hose
- Multifunctional water mist gun 20l/min
- Optional: piercing tool for water mist gun
- Activation via pressure drop or electric signal (e.g. limit switch)



SIMULATIONS

- CFD - supported calculation models
- Pool fires of up to 100 m^2 and solid fires
- Application - specific fire scenarios



DELIVERY, INSTALLATION & COMMISSIONING

- On-time delivery
- Onsite support with the installation all over the world



SERVICE & MAINTENANCE

- Direct service and aftersales, through a few carefully selected and trained authorized service providers
- 24/7 on call service

Fire tests

Ultra Fog's tunnel systems are ultra reliable. Having built upon 30 years' of experience of the design and manufacture of water mist systems for the marine, land and offshore markets, Ultra Fog has developed a water mist system specifically to address the technical challenges posed by fires within tunnels. [This has been validated with full-scale fire tests at the + TST tunnel test facility, during which 30MW, 50MW and 100MW fires were tested.] Furthermore, all the future testing will be performed at our brand new fire laboratory whose features are unique in the world. Ultra

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The most recent 30 MW fire test has been performed in August 2020.



Ultra Fog tunnel systems are designed to be as simple as possible – to ensure reliability, ease of maintenance, and to minimise the costs associated with the installation and through-life maintenance. Investment in an Ultra Fog tunnel system is primarily an investment in life safety, but secondary benefits include the protection of physical assets, lower insurance premiums, faster clean-up and repair after a fire; and less downtime, closure, and disruption.

Throughout the tests, the tunnel's ventilation system ran continuously to create an airspeed. In real-world tunnel fires, ventilation is a double-edged sword. It is an essential tool for the control of smoke, to improve tenability and visibility within the tunnel, and to increase the window of opportunity for people to evacuate safely. On the other hand, ventilation provides the fire with supply oxygen which can intensify the fire, and the flow of air can dilute the water mist reducing its effectiveness. Accordingly, it was necessary to test the Ultra Fog system in conjunction with the tunnel's ventilation system.

Despite the ventilation, the Ultra Fog system excelled. Each of the 30 MW fire tests followed the same ignition sequence. The main fuel load (having a heat release rate of 30MW) was ignited, and the fire was allowed to develop for several minutes before the Ultra Fog system was manually activated. During this time, the average temperature 5m downstream of the fire peaked in excess of 600°C [$\sim 1110^{\circ}\text{F}$]. Within few seconds of activation of the Ultra Fog system is reduced to 200°C [$\sim 390^{\circ}\text{F}$]. After few minutes, the temperature had returned to $\sim 20^{\circ}\text{C}$ [$\sim 68^{\circ}\text{F}$].

Fire Testing, Type Approvals and compliance:

Ultra Fog's Water Mist System has been fire tested by the Swedish Test Laboratory (SP), SINTEF - Norway and Danish Fire Laboratory (DFL), and the Southwest Research Institute (SwRI) and Baltic Fire Laboratory (BFL).

- FM5560 Data Processing Equipment Rooms/Halls (Appendix M and N)
- FM5560 Non-Storage Occupancies, HC-1, Part 4 EN14972
- FM5560 Turbine and Machinery in Enclosures, Part 14 and 15 EN14972
- Part 3 EN14972 OH1
- Part 10 EN14972 Annex A OH4
- Part 2 EN14972 Annex A OH3
- Part 5 EN14972 Annex A OH2
- Part 7 & 17 EN14972 Annex A, Residential Water Mist Systems
 - BS 8458 – Domestic and Residential Water Mist Systems
 - BS 8489 – Commercial and Industrial Water Mist Systems
 - NFPA 750
- Archive / Library CEN TS 14972 annex B, ref fire report BFL2020/TP02/001 and BFL2020/TP02/009
- Part 12 EN14972, Fat Fryer & Galley Hood
- Component testing by the laboratory of UL and FM
- Tunnel: Uptun, Applus+ guideline full scale fire test.
- Vehicle / Diesel Train: Regulation No. 107, Revision 7, Annex 13; Train test specification ALn663

Since 1990, Ultra Fog has been committed to a continuous programme of product development and fire testing in response to the latest rules, regulations, and standards around the world. Ultra Fog products are 3rd party tested and approved, in accordance with internationally recognised test protocols.

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