



## Wind Turbine Fire Protection

### Protection of wind turbines

It is very difficult to protect wind turbines against fire, since they are difficult to reach due to their height and remote location, and often the fire brigade has to stay on the ground to secure the area.

Gas protection is not normally suited for wind turbines because gas protection requires closed rooms in order to be efficient.

Therefore, Tyco Fire & Integrated Solutions has developed a high pressure water mist system to cover the entire wind turbine. Normally, the whole nacelle of the turbine will be protected by water mist. Depending on the type of turbine, the tower can also be protected in cases where combustible material has been placed in the tower. In both cases, the wind turbine will be safely protected.

### The Tyco Fire & Integrated Solutions HPWM system

The water consumption of the Tyco HPWM water mist system is very low requiring only small pipe diameters. This leads to a reduction of weight and also allows installation in smaller spaces. The pump unit is compact, which means that the Tyco HPWM system can be fully integrated in the nacelle.

The Tyco HPWM water mist system is frost proof; hence the system will work under all weather conditions. The system is not a "one-shot" system, - as long as water and electricity are available, the system remains in operation. The protection system can also be delivered with battery back-up in case of power failure.

The system is dimensioned in accordance with the FM standard for turbine enclosure. The system has been adapted for wind turbines, improved to address freezing environments as well.

## SPECIFICATIONS

### The function of the Tyco Fire & Integrated Solutions HPWM system:

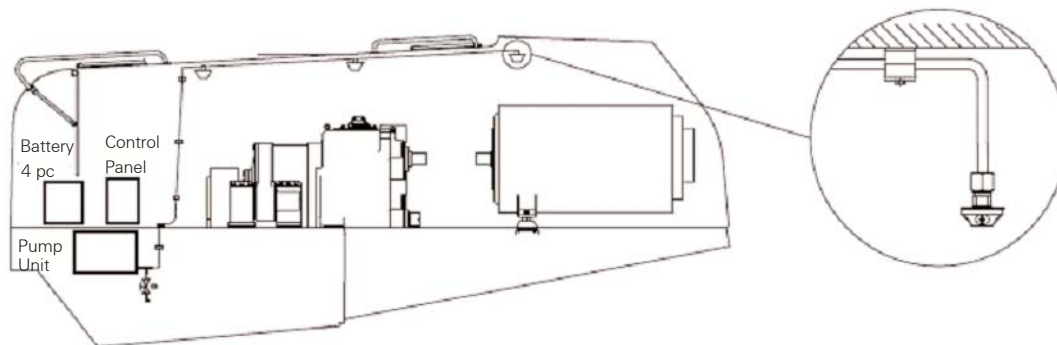
A typical high-pressure water mist system for protection of the nacelle is shown in the drawing above. Normally, the high pressure will be created by a pump-driven system placed in the nacelle. The water tank on the pump unit holds a heating element at the bottom, which makes the unit frost proof. In this case, battery back-up is also provided with the system.

Open nozzles specifically designed to cover the conditions in a wind turbine are placed in the nacelle. Once the system is activated, all nozzles will open at the same time and thus suppress the fire. The system can be released manually by a pushbutton or automatically by detectors connected to the fire detection system.

### How water mist functions:

Water mist is a fine mist or fog created at a 100 bar nozzle pressure. The fine water mist evaporates very quickly and hereby the fire is suppressed both by oxygen reduction and cooling, providing the advantages of both water and gas based fire suppression systems.

High pressure water mist is finding its way into more and more applications, offering customers an efficient system which is environmentally friendly as well as safe for occupants.



### Typical water mist fire protection of the nacelle

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