

# New technology for tackling corrosion in active fire protection systems

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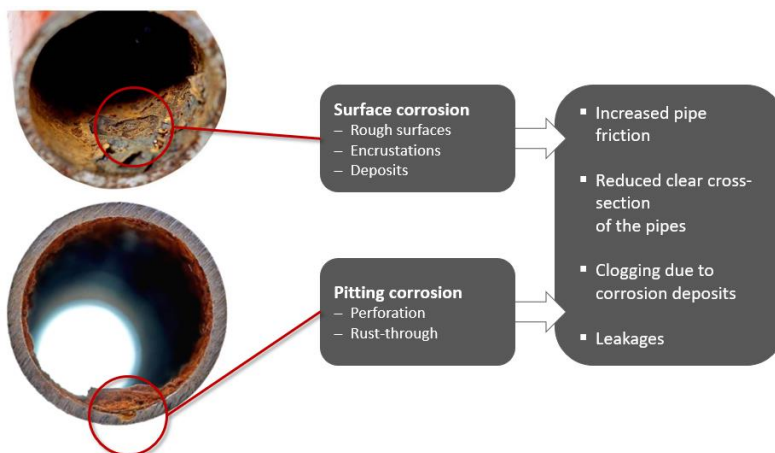
## BIO

Chris has been working in the water mist and sprinkler industry for over 20 years. He has worked in testing and certification of many active fire protection components and systems and has been a product manager with Viking for the past 16 years where he is responsible for managing the sprinkler and water mist product line for Viking across EMEA. Chris is active in many European and International committees and currently chairs the ISO TC21/SC5 working group on sprinkler system valves.

## Abstract

The increased corrosion resistance required in water mist system pipework can come with an increased cost, sometimes significantly, compared with the equivalent piping used on a sprinkler system in the same risk. This additional cost can become a hindrance to the specification and acceptance of water mist systems. There is also mounting evidence that the performance of galvanised pipes is not as expected. Viking will present a new piping technology with significantly improved corrosion protection and improved hydraulics compared to standard black steel (including galvanised) pipe networks.

Corrosion is a significant issue in sprinkler and water mist systems, particularly in dry or pre-action systems, with leaks causing damage and the potential to cause significant business interruption. In addition, the products of corrosion could prevent the proper and effective function of a system by restricting or even completely blocking the flow of water. The biggest challenge is that corrosion progress cannot easily be predicted. In fact, there is a considerable risk that the function of the system will be significantly impaired or disrupted before it operates.



Corrosion is no more present in water mist systems than in sprinkler systems but, due to the smaller orifices present in water mist nozzles, the products of corrosion could impair a water mist system

performance much sooner. In addition, the increased friction losses from corroded pipes can have a significant impact on the hydraulic performance of a water system.

For these reasons most, if not all, water mist systems rely on pipe networks with increase protection against corrosion to reduce the potential of corrosion products to impair the performance of the system. The most common types being galvanised or stainless steel pipes.

More recently independent research and testing as well as field experience has cast some doubt on the ability of galvanised pipes to withstand corrosion as much as we had previously thought and this had led to a reduction in scope of use for galvanised pipes. For example, the next edition of EN12845 will not recommend galvanised pipes for either wet or dry systems.

Stainless steel pipes do of course provide excellent corrosion resistance but this comes at a significant price premium and in addition, the contractor often has to use specialist fittings and tools.

Viking will present their new Fendium technology, which is a patented process adapting technology from the automotive industry which has a long and proven track record in providing excellent corrosion protection under harsh environmental conditions. This technology provides a polymer protection which is permanently bonded with the steel surface, both on the exterior AND on the interior of the pipes.

These polymer-enhanced pipes prevent the contact of water with the steel, significantly reducing the effects of corrosion. This has several positive impacts:

- Reduced possibility of rust-through and consequent leaks
- Reduced production of corrosion products and potential blockages
- Reduced surface corrosion which contributes to friction losses

Details of the testing conducted by both FM Approvals and VdS Schadenverhütung which has demonstrated the ability of Fendium to reduce the impacts of corrosion, will be presented. The key benefits recognized by FM and VdS are in reducing the possibility of leaks and an improvement in the hydraulic performance of the pipes, in other words a reduction in pressure loss through the pipes.

Evaluations carried out by the approval agencies included the following:

- Salt-spray ageing tests which compare the corrosion of samples of standard black steel, galvanized and stainless steel pipes compared to those treated with Fendium to evaluate the impact of rust through and corrosion products; and
- Comparing the hydraulic performance of different pipe materials vs Fendium to recalculate a C-factor for the Fendium pipes

Fendium pipes have demonstrated excellent corrosion resistance properties which has been recognized by FM and VdS. Further, VdS was also able to demonstrate the improved hydraulic performance to the extent that a C-factor of 140 is able to be used in hydraulic calculations. The combined benefits of improved hydraulics and corrosion resistance whilst avoiding the costs of stainless steel and the negative aspects of galvanized pipes allows Fendium pipes to help in the increased specification and use of water mist systems.

**Keywords:** Corrosion, water mist systems, hydraulics, savings