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Internally Galvanized Steel Pipe Blamed for Explosions

Two decades ago the NFPA Committee on Automatic Sprinklers was considering a requirement that all steel pipe used in dry pipe sprinkler systems be internally galvanized, but recently the rules have actually become much less favorable to galvanized pipe. The 2013 edition of the sprinkler standard removed the long-standing allowance to increase the hydraulic C-factor from 100 to 120 for galvanized dry pipe and preaction systems. The 2016 edition of NFPA 13 removed the requirement that steel pipe used with control mode specific application (CMSA) sprinklers be internally galvanized, a requirement that had been in place since large drop sprinklers were first permitted to be used in dry pipe systems in the 1991 edition of the standard. Now galvanized pipe has been blamed for several explosions in Europe, and researchers have developed an explanation of the chemical reactions that can result in such incidents.

The most recent explosion destroyed a pump house in France in late October, after a sprinkler contractor drained a sprinkler system to allow some work to be performed on the system. The control valves for the system were located within the pump house, and the explosion reportedly took place about 15 minutes after the drain valve was opened, the system left unattended and draining. Although the pump house was destroyed, no one was injured. The diesel engine and fuel tank were originally suspected to somehow be the source of the explosion. Later, however, parallels were found to two explosions that had taken place in 2014 in Denmark, both of which took place in sprinkler piping following drainage of water from the systems, and both of which resulted in injuries to maintenance personnel.

The Confederation of Fire Protection Associations-Europe reports that a technical investigation funded by Finance Norway led to the conclusion that water within the systems had reacted with the internal zinc linings of the piping to



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produce hydrogen gas. Random sparks ignited the gases as they were released during draining of the systems.

With the wide use of galvanized steel sprinkler pipe in Europe, some authorities are beginning to develop safety guidelines for use when draining the systems, such as the following:

- Be on the lookout for abnormal pressure increases within the systems
- Ensure good ventilation as the systems are being drained
- Avoid doing work in the areas while systems are being drained
- If work must be performed in areas where systems are being drained, use only non-sparking tools
- Consider the use of gas detectors or explosimeters to monitor for hydrogen gas levels



The pump house destroyed in the October 2016 explosion.

A presentation of research on the subject of hydrogen produced in galvanized steel pipe systems conducted at the Sintef laboratory in Norway can be accessed at:

<http://www.fgsikring.no/Global/FG,%20Forsikrings-selskapenes%20Godkjennelsesnevnd/FG-sprinklerkonferansen%202015/03%20Blucher.pdf>



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