

Reliable *Report*

An informative publication for our friends

May 2013

Changes in the NFPA Standard 2001-12 Edition = Changes in Enclosure Testing Requirements.

Clean Agent Enclosure Integrity Testing Paradox: Pressure Venting vs Hold Time of Agent

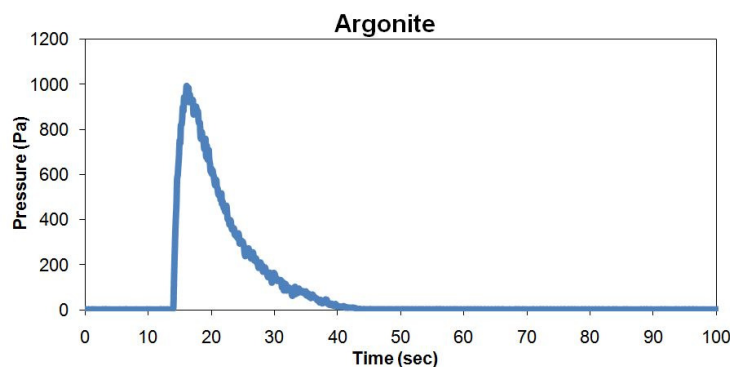
In the past, during the construction of a clean agent room (enclosure) there was an emphasis to make the rooms as air tight as possible. Contractors were instructed to patch, cover and plug every leakage point in the room to prevent agent loss. This was in an attempt to achieve the lowest leakage area possible, which would equate to the longest hold time possible for the agent. This would be proven beneficial during a room integrity pressurization test (door fan blower test). Unfortunately, this has now shown to have an adverse effect on the peak pressures created during a clean agent discharge, which can cause extensive damage to the enclosure structure itself.

Pressure Relief Venting of Peak Pressures

Damage caused by peak pressures is a huge potential liability that clean agent system owners must deal with. During a clean agent discharge, the enclosure must have sufficient leakage to prevent excessive pressures from building, but be tight enough to satisfy retention time requirements. To achieve this balance, Retrotec has designed pressure relief vents for use in buildings that incorporate clean agent fire suppression systems.

Why are Pressure Relief Vents a Good Idea for Buildings with Clean Agent Fire Suppression Systems?

The graph shown below is actual data recorded from a static pressure probe during a discharge test. The maximum pressure reached here is equivalent to about 20 pounds per square foot, which is double the "specified enclosure pressure limit" for most enclosures.



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12845 S. Cicero Ave., Alsip, IL 60803



708-597-4600
www.reliablefire.com
email: fire@reliablefire.com

Excessive peak pressure is normally resolved by the installation of a pressure relief vent but no comprehensive research had been done to determine the exact amount of venting required, until now. Retrotec completed a five-year study along with Fike, 3M, Ansul, Kidde-Fenwal, DuPont, Tyco, and Chemetron in which four inert agents and four halocarbons were discharged into the same test chamber at varying leakage and environmental conditions, to accurately determine the relationship between peak pressure and other variables.

Ignoring potential peak pressure in an enclosure can have expensive consequences, which can be seen in the pictures below. NFPA 2001-12 edition requires a peak pressure analysis but offers little help in determining peak pressure and relief vent area. Section 5.1.2.2(10) states that “an estimate of the maximum positive and the maximum negative pressure, relative to ambient pressure, expected to be developed upon discharge of agent” is required.



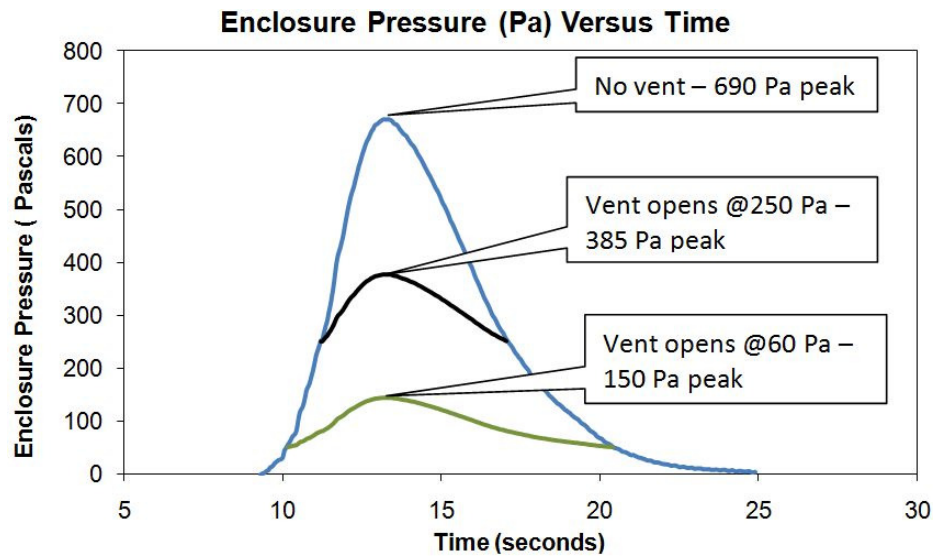
Pressure Relief Vents (PRV) reduce peak pressure

In many cases, PRVs fail to open at a low enough pressure to prevent damage. If a vent starts to open at 250 Pa, the peak pressure will rise to almost 400 Pa as shown below. Opening at 60 Pa reduces this peak to 150 Pa while not opening at all yields 690 Pa.

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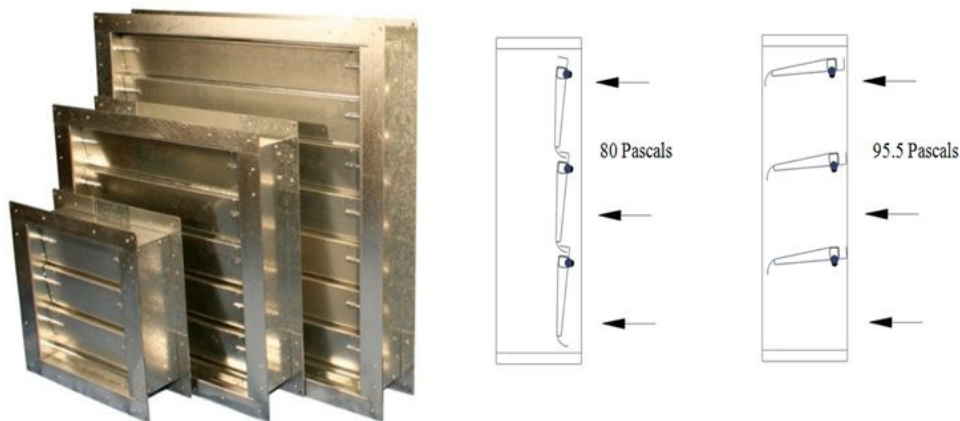


Additionally, many pressure relief vents are electronically or pneumatically actuated. This can cause reliability issues, especially during a fire when controlling circuits may be damaged. Gravity actuation is the most failsafe method.

Reliable Fire is pleased to offer pressure relief vents for both inert agents and halocarbons along with our state of the art software that will accurately predict peak pressures and required free vent area based on live test data.

RSH PRV'S for Inert Agents

The RSH Series of PRV's are gravity actuated; they are fully closed at 80 Pa and fully open at 95 Pa, ensuring safe dissipation of peak pressure while remaining unaffected by HVAC pressures.



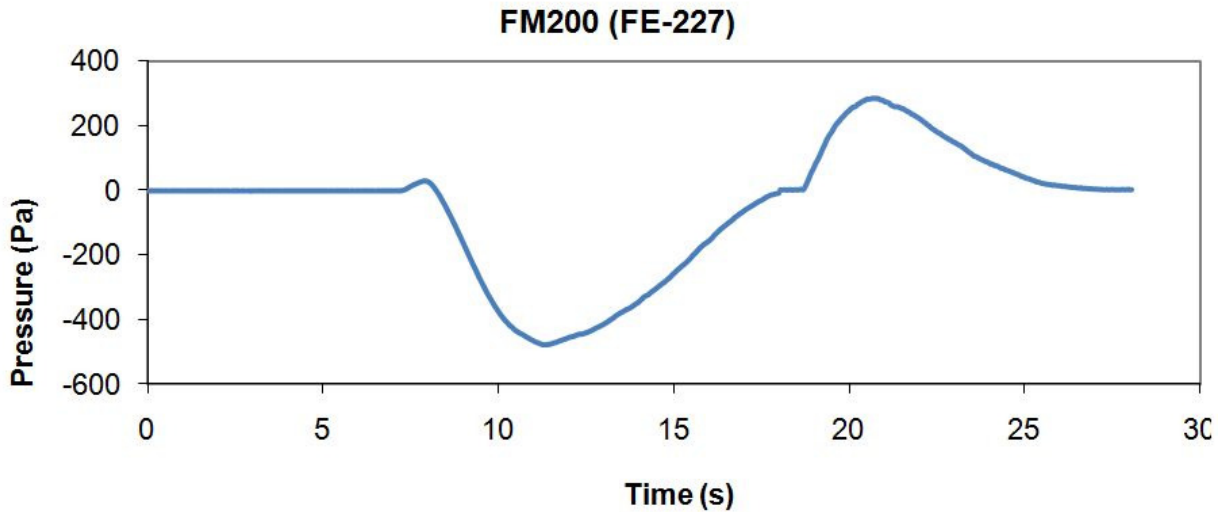
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RSH Dual Flow PRV's for halocarbons

The graph below shows live test data from an FM200 discharge. As observed, the temperature change in the enclosure caused by the agent discharge creates a negative pressure spike followed by a positive pressure spike caused by the nitrogen blowdown.



The RSH Dual Flow PRV's have been engineered to open in both directions, eliminating the need to install 2 single flow vents in opposite directions, saving both time and money.

RSH PRV's have a 2 hour fire rating as certified by EN1363, and are the only pressure relief vents to have gone through live tests, witnessed and verified by the BRE (Building Research Establishment) Fire and Security.



For more information and to schedule testing
Contact: Reliable Fire Equipment Company

12845 SOUTH CICERO AVENUE • ALSIP, ILLINOIS 60803-3083

PHONE: (708) 597-4600 • FAX: (708) 597-0174

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Reliable Fire Equipment Company
12845 S. Cicero Ave., Alsip, IL 60803



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email: fire@reliablefire.com