EPA SNAP List

All Clean Agents are Approved & Accepted
The EPA report indicates that the USA’s impact on global warming from HFCs in fire protection represents 0.02% of the impact of all greenhouse gases on global warming.

Historical data reveals that the extremely small contribution of HFCs in fire protection to global warming has remained constant over a decade, as reported in the 2016 HFC Emissions Estimating Program (HEEP) Report.
US EPA FINAL RULE 21: December 2016

Recognizes the overall proven performance, safety in use and cost effectiveness offered by HFC clean agents

Recognizes the negligible impact of HFC’s in fire protection on global warming
Kigali Amendment

- Adopted in October 2016, is an amendment to the Montreal Protocol.
- Adds HFCs to the list of substances controlled under the Protocol to phase-down.
- Does not call for a complete phase-out of HFCs, but a phase-down:
  - Reduction to 15% to 20% of the base line by 2036-2047, depending on the country involved.
- Remaining allocation extends out indefinitely, with recognition of the importance of HFC use in many critical and/or non-emissive applications, such as in the fire protection industry.
- Does not inhibit or limit the sale of HFCs into the fire suppression market in any region.
- The HFC phase-down leaves 15%-20% as the HFC base line available indefinitely, which is more than adequate to encompass the needs to serve fire protection around the world.
Global Impact

Impact on global warming of HFCs in fire protection applications represents 0.019% of the total impact of all GHG emissions.
Global Agreement

- US EPA
- European Environment Agency (EEA)
- Halocarbon Emissions Estimating Program (HEEP)
- Halon Technical Options Committee (HTOC)

All in agreement that the impact of HFCs in fire protection on global warming (climate change) is negligible

Environmental regulators understand the science, and hence there are no proposals to ban or limit FM-200™ or FE-25™ in fire protection applications
Summary

• Emissions of HFC’s in fire protection industry are extremely low
• Restricting HFC use in fire protection will not provide any significant reduction in global warming
• US EPA Final Rule 21 does not impact use of HFC’s in fire protection
• Kigali Amendment to the Montreal Protocol allows for continued use of HFC’s in fire protection
• HFC’s can continue to provide society with important fire protection alternatives to protect human life and property indefinitely
Sustainability

Warranty
Sustainability

Warranty
What Happens During A Clean Agent Discharge?

- Wall Construction
- Discharge Pressure Spike
What Happens During A Clean Agent Discharge?

- A HFC-227ea Discharge creates enclosure pressure.

Wall Strength Specs:
250 Pa (5 PSF)  2x4 walls 16” OC
500 Pa (10 PSF) 2x6 walls 16” OC

-600 -400 -200 0 200 400 600 800
0 5 10 15 20 25 30
Time (seconds)

Enclosure Pressure (Pa) Versus Time

Peak Negative Pressure of -387 Pa
Peak Positive Pressure of +671 Pa

500 Pa = 10 PSF
HFC-125 Typical Pressure Profile

- A HFC-125 Discharge creates enclosure pressure.

Wall Strength Specs:
250 Pa (5 PSF) 2x4 walls 16” OC
500 Pa (10 PSF) 2x6 walls 16” OC
FK-5-1-12 Typical Pressure Profile

- A FK-5-1-12 Discharge creates enclosure pressure.

Wall Strength Specs:
- 250 Pa (5 PSF) 2x4 walls 16” OC
- 500 Pa (10 PSF) 2x6 walls 16” OC
- 900 Pa = 17 PSF
Natural Agents Discharge Room Pressure

900-950 Pa = 19-20 PSF

Wall Strength Specs:
- 250 Pa (5 PSF)  2x4 walls 16” OC
- 500 Pa (10 PSF) 2x6 walls 16” OC

<400 Pa = 8.35 PSF

Venting Requirements
Pressure Venting

- Inert Agents displace the oxygen in the room.

- Pressure venting is required to avoid over-pressurizing the room.

- If you forget to do it, the system has a built-in method of correcting the problem.
Room Pressure Problems

- Although rare, enclosure damage can and has occurred...
  - Enclosure design focus on agent retention, not room pressure.
  - Increased use of Inert gas systems which always require additional room venting due to high design concentrations.
- NFPA 2001 *Standard on Clean Agent Fire Extinguishing Systems*
Pressure Venting

• Why Vent?
  – Inert Agents require over 40% agent to room volume.
  – This means in 60 seconds, the air volume in the room is almost doubled.
  – The air needs to go somewhere or it will destroy doors, walls and ceilings.

• How to Vent?
  – Must be Engineered
  – Pressure Relief Dampers

250 Pa (10 PSF) 2x4 walls 16” OC
500 Pa (20 PSF) 2x6 walls 16” OC
# Pressure Venting

**PROINERT2 (IG-55) DESIGN DATA & VENTING CHART**

Area Volume x 44.9% (per manufacturer for Ethyl Alcohol) = Minimum Agent Required

**ADMC** = Adjusted Minimum Design Concentration

**FDC (Agent Supplied)** = Final Design Concentration

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<td>Barrel Room</td>
<td>1</td>
<td>A</td>
<td>16’ 10”</td>
<td>294</td>
<td>4949</td>
<td>70 F</td>
<td>44.9%</td>
<td>2949.21</td>
<td>N/A</td>
<td>3293.2</td>
<td>49%</td>
<td>313</td>
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<td>2</td>
<td>B</td>
<td>16’ 7”</td>
<td>112.75</td>
<td>1869.8</td>
<td>70 F</td>
<td>44.9%</td>
<td>90.4</td>
<td>N/A</td>
<td>112.4</td>
<td>46%</td>
<td>122</td>
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Relief Vents

• When Inert Gas and Carbon Dioxide fire suppression systems are discharged, the agent entering the enclosure results in a positive and/or negative pressure and displaces the air from the room. Suitable means of pressure relief/venting should always be used in order to avoid structural damage to the building and equipment.

• Pressure Vents have been developed to provide this pressure relief venting. The pressure vent blades start to open at above 55 to 60 Pa and are fully open at 100 Pa. The special design provides 90% free vent area from 100 Pa room pressure.
Sealing the Room

- **Protected Space**
  - 10-Minute required hold time
  - Clean agents are 5 – 6 times heavier than air

- **Potential Leaks**
  - Doors
  - Conduit penetrations/
    Holes in walls
  - Cable trays & ducts

- **1-Hour rating also required by NFPA 75**
Thank you!
Questions, or comments?