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FirePro®

Manufacturer &
Worldwide Supplier of
Fire Extinguishing
Aerosol Systems

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Subject: Integrity room good engineering practice.

The board of experts at the ISO TC21 SC8 (Gaseous Media and Fire Fighting Systems Using Gas) and the working group in charge to develop the ISO 15779 Standard for condensed aerosol extinguishing systems, after a long debate recognized the impossibility to measure accurately the resulting aerosol agent density generated by the solid compound reaction, due to the aerosol extinguishing agent specific characteristics (micro solid particles, the active agent, carried by a gas), thus the impossibility to derive a formula of leakage compensation.

Thus the door fan test applied for gas agents, which is linked to a formula correlating the pressure upon discharge and the quantity of gas escaped as per leakage area, it is applicable for measurable gaseous agents.

Aerosol agents' density is not measurable.

Therefore the only way to address this issue is to run experimental tests (for the specific aerosol technology) and derive the leakage compensation ratio versus different leakage areas.

The latest ISO 15779 Standard defines the test protocol at Section D7: Test of the determination of the maximum leakage area/volume ratio.

We have applied a leakage area during a number of the various tests with different fire scenarios, especially the ones run for the UL listing test program, witnessed by UL. The standard sealed test room of 100 m³ volume had a venting opening of 0.3m x 0.2m (one way flap) and the measured pressure was 0.7 in/H₂O (inches over water), equivalent to 174 Pa, or 0.025 psi or 0.0017 bar.

All fires were extinguished with such opening, which is equivalent to:

Room dimensions: 5.23 x 5.23 x 3.66 (h) = 100.11 m³

Leakage area applied: 0.3 x 0.2 = 0.06 m²

Ratio (%) of leakage area versus total volume: 0.06 m²/ 100 m³

Therefore as a general guideline for rooms with a leakage area of up to 0.06 m² per 100 m³ ratio to volume, there is no need to add additional aerosol to the applied standard aerosol design density.

This leakage area is equivalent to normal leakages due to small openings in doors and windows, which are not perfectly sealed.

In case of larger openings such as fixed venting louvers or open ducts, these should be closed.

Furthermore, since the tests run with the opening were using the extinguishing application density but in the real projects the design application density is applied (which is 30 % higher than the extinguishing density), the additional safety factor ensures that the leakage area indicated will not affect the extinguishing performance.

In the event that an already protected enclosure do not undergo any modification (checks shall be done comparing the original design with the reality), it is not necessary any special provision; if the protected enclosure has been modified we have to provide a new design.

FirePro will run soon additional tests with various leakage areas in order to define experimentally the leakage compensation.

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