

DRAFT

TENTATIVE INTERIM AMENDMENT PROPOSAL-NFPA 13 “GANGED” OPERATION OF ROOF VENTS

TIA Proposal:

Revise section 12.1.1 in NFPA 13 (2010 edition) as follows:

12.1.1 Roof Vents and Draft Curtains. See Section C.6.

12.1.1.1* Manually operated roof vents or automatic individually-activated roof vents with operating elements that have a higher temperature classification than the automatic sprinklers shall be permitted.

12.1.1.1.1 Roof venting designs where the simultaneous opening of two or more roof vents is initiated by the activation of the water flow indicating device, a smoke detection system or manually-activated controls shall not be permitted.

12.1.1.2 Early suppression fast-response (ESFR) sprinklers shall not be used in buildings with automatic heat or smoke vents unless the vents are individually-activated and use a high-temperature rated, standard response operating mechanism.

Background:

The roof vent provisions included in the 2010 edition of NFPA 13 do not specifically address the concept of the “ganged” operation of roof vents. (The “ganged” operation of roof vents is the automatic opening of two or more roof vents initiated by the activation of the water flow indicating device, a smoke detection system or by manually-activated controls, either with or without a delay.)

Research conducted at Underwriters Laboratories, Inc. (UL) in 1997/1998 demonstrated that the activation of sprinklers interferes with the opening of individually-activated roof vents where the temperature rating of the vent fusible link is the same as the temperature rating of the sprinklers. In all tests conducted as part of this research, no more than one roof vent activated. In one test, a roof vent located immediately above the ignition point failed to open at any time during the test. (The report on this research is referred to as NISTIR 6196-1, *Sprinkler, Smoke & Heat Vent, Draft Curtain Interaction – Large Scale Experiments and Model Development*, dated September 1998.)

In order to address the problem that an insufficient number of roof vents open due to the activation of sprinklers, consultants for the manufacturers of roof vents have proposed the concept of “ganged” roof vent operation be utilized. In particular, it has been proposed that multiple roof vents be opened 60 seconds after the sprinkler system water flow indicating device is activated. Alternate designs of “ganged” roof vent system include the initiation of the opening of multiple roof vents upon the activation of a smoke detection system or by manual-activated controls.

It should be noted that the use of the concept of the “ganged” operation of roof vents is recommended in Annex F.3 included in the 2007 edition of NFPA 204. This same recommendation will also be included in the 2012 edition of NFPA 204. Annex F.3 in the 2007 edition of NFPA 204 includes the following statements:

“The effect of control mode sprinkler cooling may limit the number of vents opening if control of the vent is only by fusible link or if drop-out panels are used. If the fusible link or if drop-out panel operating temperature is equal to or higher than the control mode sprinkler fusible element operating temperature, then vents outside the outer ring of operating control mode sprinklers are unlikely to open. This could significantly limit the effectiveness of the smoke vent system. Use of ganged vents operated from detectors or a sprinkler flow switch is a way to avoid this situation.”

“The studies of smoke and heat venting used in conjunction with control mode sprinklers do not provide evidence that venting has a negative effect on control mode sprinkler performance.”

“The experimental studies have shown that early vent activation has no detrimental effects on control mode sprinkler performance and have also shown that current design practices are likely to limit the number of vents operated to one and vents may in fact not operate at all in very successful control mode sprinkler operations. Design practices should move to methods that assure early operation of vents, and vent operation should be ganged so that the benefits of roof vents is fully realized. Control mode sprinkler design with vents and draft curtains needs to take full account of draft curtains as obstructions.”

Since it appears that there is a conflict between the intent of the roof vent provisions contained in NFPA 13 and the recommendations for the use of the concept of the “ganged” operation of roof vents contained in NFPA 204, this conflict should be resolved prior to the publication of the 2013 edition of NFPA 13.

Technical Substantiation:

The technical substantiation for the roof vent provisions included in the 2010 edition of NFPA 13 is as follows:

“The intent of the standard is that roof vents and draft curtains should not be used in conjunction with storage protection.”

Since other codes require that roof vents be provided in storage buildings protected by a sprinkler system, the roof vent provisions included in the 2010 edition of NFPA 13 were developed to accommodate compliance with these code provisions, while, at the same time, limiting any adverse effects of roof vent installations on the operation of sprinkler protection.

The intent of the provisions contained in section 12.1.1.1 in NFPA 13 is to substantially delay or prevent the opening of automatic (individually-activated) roof vents as a means to prevent roof vents from adversely affecting with the operation of the sprinkler system. The purpose of utilizing the “ganged” operation of roof vents is exactly the opposite- to limit the delay in the opening of roof vents.

The purpose of the proposed TIA above is two-fold: first, to clarify that the provisions contained in section 12.1.1.1 and 12.1.1.2 only apply to individually-activated roof vents; second, to specifically state that the simultaneous opening of two or more roof vents initiated by activation of the water flow indicating device, a smoke detection system or by manually-activated controls (referred to as “ganged” roof vent operation) is prohibited.

When considering this proposal, it should be noted that Annex F.3 in NFPA 204 specifically states that the opening of roof vents at anytime during sprinkler system operation will not adversely affect the system. If this were the case, there would be no reason to have included the provisions contained in section 12.1.1.1 and 12.1.1.2 in NFPA 13.

Emergency Substantiation:

A statement included in Annex F.3 in the 2007 edition of NFPA 204 regarding the effect of open roof vents on sprinkler protection is in conflict with the substantiation statement for the roof vent provisions contained in the 2010 edition of NFPA 13. The 2012 edition of NFPA 204 will contain this same statement.

The recommendation that roof venting systems be designed for the simultaneous opening of multiple roof vents initiated by the sprinkler water flow indicator, a smoke detection system or manually-activated controls in order to limit the delay in opening roof vents is in conflict with the substantiation statement for the roof vent provisions contained in the 2010 edition of NFPA 13. The 2012 edition of NFPA 204 will contain this same statement.

The purpose of this proposed TIA is clarify the intent of the roof vent provisions contained in the 2010 edition of NFPA 13 and to clearly address the use of the concept of the “ganged” operation of roof vents. The concept of the “ganged” operation of roof vent has been mandated in jurisdictions on the West Coast for several years already.

Since the concept of “ganged” operation of roof vents is presently being incorporated into roof venting designs (based upon the recommendations included in NFPA 204), the roof vent provisions contained in the 2010 edition of NFPA 13 should be clarified to clearly indicate that this practice does not comply with NFPA 13.

Given that the practice of utilizing the “ganged” operation of roof vents could have an adverse effect upon the sprinkler system performance and is presently being mandated in some jurisdictions, this proposed TIA should be considered to be of an emergency nature.

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