Tentative Interim Amendment

NFPA 68

Standard on Explosion Protection by Deflagration Venting

2007 Edition

Reference: Various Sections
TIA 07-1
(SC 08-10-2/TIA Log #928)

Pursuant to Section 5 of the NFPA Regulations Governing Committee Projects, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 68, *Standard on Explosion Protection by Deflagration Venting,* 2007 edition. The TIA was processed by the Technical Committee on Explosion Protection Systems, and was issued by the Standards Council on October 28, 2008, with an effective date of November 17, 2008.

A Tentative Interim Amendment is tentative because it has not been processed through the entire standards-making procedures. It is interim because it is effective only between editions of the standard. A TIA automatically becomes a proposal of the proponent for the next edition of the standard; as such, it then is subject to all of the procedures of the standards-making process.

1. In equations 7.2.2.6, 7.3.3.7, and 8.2.8 the terms V and P_{red} are in the numerator and need to be moved to the denominator as shown in the revised equations below:

$$\Delta A_i = A_v \bullet \left[\frac{(0.0075) \bullet M^{0.6} \bullet K_G^{0.5}}{n^{0.3} \bullet V \bullet P_{red}^{0.2}} \right] \qquad 7.2.2.6$$

$$\Delta A_i = A_v \bullet \left[\frac{(0.0075) \bullet M^{0.6} \bullet K_G^{0.5}}{n^{0.3} \bullet V \bullet P_{red}^{0.2}} \right] \qquad 7.3.3.7$$

$$A_{v3} = A_{v2} \bullet \left[1 + \frac{(0.0075) \bullet M^{0.6} \bullet K_{st}^{0.5}}{n^{0.3} \bullet V \bullet P_{red}^{0.2}} \right] \qquad 8.2.8$$

2. In 8.2.8 revise the text to read as shown:

~~"If M > MT, the vent area shall be increased by adding the calculated area, Av3, from Equation 8.2.8:"~~

"For $M > M_T$, the required vent area, A_{v3}, shall be calculated as follows:"

3. In 8.2.7.1, revise the text to read as shown:

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8.2.7.1 When the mass of the vent panel is less than or equal to 40 kg/m^2 ~~and K_{St} is less than or equal to 250 bar-m/sec~~, Equation 8.2.7.2 shall be used to determine whether an incremental increase in vent area is needed and the requirements of 8.2.8 shall be used to determine the value of that increase.

4. In 8.2.7.2, revise the conditions for Equation 8.2.7.2 by deleting the condition for K_{St}:

where:
M_T = threshold mass (kg/m^2)
P_{red} = bar
n = number of panels
V = volume (m^3)
~~$K_{St} \leq 250$ bar-m/sec~~

5. In A.8.2.7 revise the text as follows:

A.8.2.7 Where M is greater than 40 kg/m^2 ~~or $K_{St} > 250$ bar-m/sec~~, see Annex G for guidance.

6. Add a new 8.2.7.3 as follows:

8.2.7.3 Where M is greater than 40 kg/m^2, it shall be permitted to use the procedure provided in Annex G.

7. In 7.3.3.6.1, revise the text to read as shown:

7.3.3.6.1 When the mass of the vent panel is less than or equal to 40 kg/m^2 ~~and K_G is less than or equal to 130 bar-m/sec~~, Equation 7.3.3.6.2 shall be used to determine whether an incremental increase in vent area is needed and the requirements of 7.3.3.7 shall be used to determine the value of that increase.

8. In 7.3.3.6.2, revise the conditions for Equation 7.3.3.6.2 by deleting the condition for K_G:

where:
M_T = threshold mass (kg/m2)
P_{red} = bar
n = number of panels
$V > 1$m^3
~~$K_G \leq 130$~~

9. In A.7.3.3.6.2 revise the text as shown:

A.7.3.3.6.2 Where M is greater than 40 kg/m^2 ~~or K_G is greater than 130 bar-m/sec~~, it is necessary to perform testing or apply alternative explosion protection methods per NFPA 69, *Standard on Explosion Prevention Systems*.

10. Revise the entries in Table 8.5.10 as shown in the text and table below:

For the "Vent ducts" model, the application statement on panel density shall read "Panel Density $\leq$ 40 kg/m^2".

For the "Panel inertia" model, the application statement "No vent duct" shall be deleted.

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Table 8.5.10 Combination Rules and Limitations for NFPA 68 Dust Models

Model	Application
Vent ducts	$0.8 \le P_0 \le 1.2$ bar-abs Panel density ~~$\le M_T$~~ and ≤ 40 kg/m^2 Allow partial volume $1 \le L/D \le 6$ (calculate vent duct effect last)
Partial volume	Allow vent duct Panel density ≤ 40 kg/m^2 $0.8 \le P_0 \le 1.2$ bar-abs $1 \le L/D \le 6$ (calculate vent duct effect last)
Elevated initial pressure	No vent duct Panel density $\le M_T$ and ≤ 40 kg/m^2 $0.2 \le P_0 \le 4$ bar-g Full volume deflagration $1 \le L/D \le 6$ (calculate elevated initial pressure effect last)
Panel inertia	$0.8 \le P_0 \le 1.2$ bar-a ~~No vent duct~~ Panel density ≤ 40 kg/m^2 Allow partial volume $1 \le L/D \le 6$

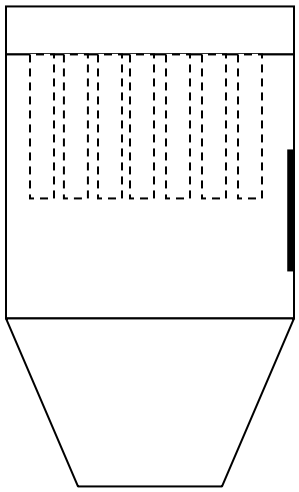
11. Revise 6.8.2 as shown and add the reference to the paper by Hey, "Pressure relief of dust explosions through large diameter ducts and effect of changing the position of the ignition source", J. Loss Prev. Process Ind., 1991, Vol 4, July, pg 217. :

6.8.2A vent duct shall have a cross sectional area at least as great as that of the vent itself but shall be limited to no more than 150% of the vent itself at any point in the vent duct. [Hey]

12. Revise 8.7.1(3) as follows:

(3) Locate the vents such that the bottom of the vent(s) is ~~at or above~~ below the bottom of the bags, as shown in Figure 8.7.1 (e)~~, and the row of bags closest to the vent are restrained from passing through the vent~~. For this case, the volume used to calculate the vent area shall be the entire volume (clean and dirty) below the tube sheet.

13. Keep the current Figure 8.7.1 (e) and add this second drawing as part of the same figure with the current drawing on the left side and this drawing adjacent on the right:



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14. In equation 7.3.3.2, the constant to be subtracted from P_{stat} should be 0.1 bar.

$$A_v = [(0.127 \log_{10} K_G - 0.0567) P_{red}^{-0.582} + 0.175 P_{red}^{-0.572} (P_{stat} - 0.1)] V^{2/3}$$

15. Revise 8.7.1(2) as follows:

(2) Locate the vents as shown in Figure 8.7.1(c) and Figure 8.7.1(d), and bags are either completely removed or shortened so that they do not extend below the top of the vent for a distance of one vent diameter from the vent. In addition, ~~the bags immediately adjacent to the vent shall be removed and the remaining bags~~ the bags which extend below the top of the vent shall be verified by test to be rigid enough to remain in place during venting, or shall be restrained from passing through the vent. For this case, the vent area shall be permitted to be calculated on the basis of the dirty side only; that is, calculate the volume below the tube sheet, and subtract out the volume occupied by the bags.

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(Note: For further information on NFPA Codes and Standards, please see www.nfpa.org/codelist)

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