

RELIEF VENT SIZING FOR DUST APPLICATIONS
NFPA-68, 1998 Edition



Your Added Value Supplier

Proprietary and Confidential

Client Information

Company Name:
 Contact Name :
 Telephone # :
 Fax # :
 Vent Application:
 Notes:

We have prepared this sizing profile based on data provided by you or published by NFPA, unless otherwise noted. Further, it must be recognized that it is not rational to consider an active process system to be adequately protected by isolating a portion of it only for explosion protection assessment. Henderson accepts no liability for the information contained herein and we reserve the right to revise the sizing and our applicable quotation, if required, upon receipt of any additional information that may be relevant to the application.

					Is the enclosure cylindrical (Y/N) ?	Y				
					Enter the Diameter of Enclosure?	1.07	m			
					Enter the Height of Enclosure?	3.25	m			
							If there is a discharge duct, is it >0m or <3m (Y/N)?	Y	If there is a discharge duct, is it >=3m or <=6m (Y/N)?	N
P_{max} (bar)	P_{red} (bar)	Volume (m ³)	K_{st} (bar*m/s)	P_{stat} (bar)						
10.30	0.99	2.41	202.00	0.10						

Note: Discharge ducts over 6m are beyond the scope of NFPA 68 sizing

$$A_v = (3.264 \times 10^{-5} \times P_{max} \times K_{st} \times P_{red}^{-0.569} + 0.27 \times (P_{stat} - 0.1) \times P_{red}^{-0.5}) \times V^{0.753}$$

$$A_v = 0.13372 \text{ m}^2 = 1.44 \text{ ft}^2$$

Test for elongated vessel influence
 L/D = 3.04649

If 2 < L/D < 6 then the vessel is elongated and an additional relief area, ΔA, is required.
 If greater than 6, Chapter 8 sizing applies

$$\Delta A = A_v \times (-4.305 \times \text{Log} P_{red} + 0.758) \times \text{Log}(L/D)$$

$$\Delta A = 0.04989 \text{ m}^2 = 0.54 \text{ ft}^2$$

Total vent area required given an elongated vessel and WITHOUT a discharge duct

$$A_v + \Delta A = 0.18361 \text{ m}^2 = \boxed{1.98} \text{ ft}^2$$

The following applies only if there is a discharge duct.

Discharge duct impact on P_{red} ---> P'_{red} as a substitution in the formula for A_v to get A_v'

Since discharge duct length is <3m, then $P'_{red} = 0.394(P_{red}^{1.529})$

$$P'_{red} = 0.38979 \text{ m}^2 = 4.20 \text{ ft}^2$$

$$A_v' = 0.22749 \text{ m}^2 = 2.45 \text{ ft}^2$$

Additional vent area given discharge duct consideration with respect to A_v'

If 2 < L/D < 6 then the vessel is elongated and an additional relief area, ΔA', is required.

$$\Delta A' = 0.27730 \text{ m}^2 = 2.98 \text{ ft}^2$$

Total vent area required given an elongated vessel, WITH a discharge duct

$$A_v' + \Delta A' = 0.50479 \text{ m}^2 = \boxed{5.43} \text{ ft}^2$$

