



Hawkeye Series 5000 EPRV

1.0 Introduction

The Hawkeye Series 5000 Emergency Pressure Relief Vent is a weighted man way cover for liquid storage and process tanks. The device maintains a seal during normal operation and opens in the event of an emergency to relieve overpressures beyond the normal venting capacity.

2.0 Codes and Standards

This bulletin makes reference to the following documents:

API STANDARD 2000: FIFTH EDITION, APRIL 1998

Venting Atmospheric and Low-Pressure Storage Tanks:
Nonrefrigerated and Refrigerated

API STANDARD 650: TWELFTH EDITION, MARCH 2013

Welded Tanks for Oil Storage

API STANDARD 620: ELEVENTH EDITION, FEBRUARY 2008

Design and Construction of Large, Welded, Low-pressure
Storage Tanks

API SPECIFICATION 12B: FIFTEENTH EDITION, OCTOBER 2008

Specification for Bolted Tanks for Storage of Production
Liquids

API SPECIFICATION 12F: TWELFTH EDITION, OCTOBER 2008

Specification for Shop Welded Tanks for Storage of
Production Liquids

3.0 Terminology

Set Pressure: the internal tank pressure at which the vent will begin to open.

Overpressure: the amount by which the internal tank pressure exceeds the vent set pressure, measured as a percentage of the set pressure.

Normal Venting: venting of pressure or vacuum due to standard operation or atmospheric changes.

Emergency Venting: venting of abnormally high pressure due to an unplanned event, such as a fire or uncontrolled release within the tank.

4.0 Objective

The primary function of Hawkeye's Series 5000 Emergency Pressure Relief Vents (EPRV) is to permit the rapid outflow of gasses in an emergency situation to

prevent tank damage or failure due to overpressurization. Furthermore, during normal operation the vent must maintain a seal to reduce fugitive emissions. Many emergency situations can arise that require venting capacity beyond the means of standard tank vents, such as an external or internal fire or the accidental release of liquid or vapor into the tank.

The Hawkeye EPRV also allows tank manufacturers and purchasers to meet the emergency venting requirements set out in API 2000 as well as applicable tank construction standards such as API 650, API 620, API 12B and API 12F for most tank setups.

5.0 Design and Construction

The Series 5000 EPRV features a compound lever design which reduces the overpressure required to achieve full pallet lift as compared to a standard lever. This means that the device will vent the same flow rate of air at a lower tank pressure which reduces the risk of damaging the tank. The unique lever design also reduces the weight required to achieve a desired set pressure, thus keeping the device compact for all set pressures.

Hawkeye's soft seal design allows the sealing gasket to conform to the sealing surface. This provides a positive seal at pressures where traditional hard rubber or plastic seals will steadily leak. The vent exceeds API 2000 requirements by maintaining a bubble tight seal up to at least 90% of the set pressure as tested in a controlled laboratory setting.

The device will automatically close and reseal after activation to prevent further emissions release and for repeated use. The vent opening can also be used as a man way to access the tank internals and is completely field serviceable.

Components are powder coated, zinc plated, stainless steel or aluminum for excellent corrosion resistance. FKM (Viton) sealing gaskets make the vent suitable for sweet or sour gas applications. For situations demanding the highest corrosion resistance a severe service coating is available. This provides resistance to strong mineral acids, including hydrochloric, hydrofluoric and sulphuric

acids, high chloride ion solutions, aluminum chloride, potassium chloride and brine solutions, as well as many organic compounds common in the oilfield.

The Series 5000 EPRV has field-adjustable relief settings, in 2 ozsi increments from 4 ozsi to 32 ozsi by adding or removing the dead weight plates. The EPRV is available in 20" and 24" API 650 manway sizes, as well as 20" and 24" ANSI 150# sizes.

6.0 Size and Set Pressure Selection

The venting capacity of an EPRV varies with the size and set pressure of the device. Minimum venting requirements depend greatly on the size and construction of the tank it is to be installed on, but these are not the only considerations. Other factors that should be considered include, but are not limited to:

- Environmental conditions
- Location
- Liquid movement and risk of blowoff
- Process conditions
- Chemical reactions
- Tank insulation
- Wetted surface area of the tank
- Vent inlet and outlet piping
- Fluid properties such as volatility and toxicity
- Amount of the tank buried or covered by earth
- Surrounding structures/systems

Emergency venting situations can also arise from the abnormal operation or failure of:

- Heating systems
- Processing/pumping systems
- Other venting devices
- Overfill systems
- Refrigeration systems
- Utility or electrical power supply

API 2000 provides minimum emergency venting requirements and other criteria that influence the selection of venting devices. This and any other applicable standards or regulations should be used when selecting an EPRV for a particular system.

Note: It is the responsibility of the tank designer to consult the appropriate codes and standards for their jurisdiction to ensure that their tank is suitably vented for their particular context and application.

7.0 Appendix

20" EPRV

Set Pressure			Flow Rate (1000 SCFH air) at Overpressure**			Rated Capacity (1000 SCFH air)*
(ozsi)	(psi)	(Kpa)	20%	30%	40%	100% Overpressure
4	0.250	1.72	676	703	730	872
6	0.375	2.59	827	861	893	1067
8	0.500	3.45	955	993	1031	1231
10	0.625	4.31	1067	1110	1152	1376
12	0.750	5.17	1168	1216	1261	1506
14	0.875	6.03	1261	1313	1362	1626
16	1.000	6.90	1348	1403	1455	1737
18	1.125	7.76	1429	1487	1543	1841
20	1.250	8.62	1506	1567	1626	1940
22	1.375	9.48	1579	1643	1704	2033
24	1.500	10.34	1649	1715	1780	2122
26	1.625	11.21	1715	1785	1851	2208
28	1.750	12.07	1780	1851	1920	2290
30	1.875	12.93	1841	1916	1987	2369
32	2.000	13.79	1901	1978	2051	2445

24" EPRV

Set Pressure			Flow Rate (1000 SCFH air) at Overpressure**			Rated Capacity (1000 SCFH air)*
(ozsi)	(psi)	(Kpa)	20%	30%	40%	100% Overpressure
4	0.250	1.72	990	1030	1069	1277
6	0.375	2.59	1212	1261	1309	1563
8	0.500	3.45	1399	1456	1511	1804
10	0.625	4.31	1563	1627	1688	2016
12	0.750	5.17	1712	1782	1849	2207
14	0.875	6.03	1849	1924	1996	2382
16	1.000	6.90	1975	2056	2133	2545
18	1.125	7.76	2095	2179	2261	2698
20	1.250	8.62	2207	2296	2382	2842
22	1.375	9.48	2314	2408	2498	2979
24	1.500	10.34	2416	2514	2608	3110
26	1.625	11.21	2514	2615	2713	3235
28	1.750	12.07	2608	2713	2814	3355
30	1.875	12.93	2698	2807	2912	3471
32	2.000	13.79	2786	2898	3006	3583

*Rated capacity is determined as per API Standard 2000 and assumes that the vent has achieved full lift. This value is to be used for EPRV selection.

**Estimated flow rates at 20%, 30% and 40% overpressure are not be used in EPRV selection and are for informational purposes only.