ANDERSON GREENWOOD RESERVE CAPACITY RELIEF VALVE

Designed to provide overpressure relief for large cryogenic storage volumes; enables emergency capacities protecting against adverse conditions.

FEATURES

- Large orifice area reduces dramatically the number of valves needed to provide safety.
- O-ring seat provides bubble-tight performance to 90% of set pressure.
- A combination of tension link and spring force holds the valve closed to provide positive opening at set pressure and bubble tight shut-off at reseat.
- Full open at set pressure with no overpressure required for rated capacity.
- Flange mounting with a flat face, smooth finish.
- Reseat pressure is 50% of set.

GENERAL APPLICATIONS

The RCRV is used typically for LNG or LPG storage tank applications to relieve excessive pressures generated by overfill, mechanical failure, rollover or loading errors.

TECHNICAL DATA

Sizes: 24" and 36" (DN 600 and DN 900)

Flange mounting:
    24" = 150# Class/ANSI 16.5
    36" = 125# Class/ANSI 16.1

Set pressure range:
    24": 1.5 to 5.0 psig (103 to 345 mbarg)
    36": 1.5 to 3.0 psig (103 to 207 mbarg)

Consult factory for higher pressures.

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Product overview

Certain special emergency venting situations could require relief capacities far greater than that provided by the primary pressure relief valves. The large orifice area of the RCRV makes it possible to use one or two valves instead of perhaps ten or twenty valves to assure this additional safety.

APPLICATIONS

Overfill

The RCRV is capable of relieving the excessive vapor that may be generated under some level control failure conditions, where cold liquid could be pumped over the top of the inner wall and into the warm insulation space.

Mechanical failure

Should the inner wall on a double wall tank fail and permit liquid to pass through into the insulation space, excessive vapor will be generated rapidly and this can be relieved by the RCRV.

Rollover

The RCRV provides the very large orifice area needed to prevent excessive overpressure caused by boil-off of lower density product rolling up and over higher density product.

Loading error

The RCRV can provide the large capacity necessary to relieve the dangerous quantities of vapor produced when loading propane into a partially filled butane tank.
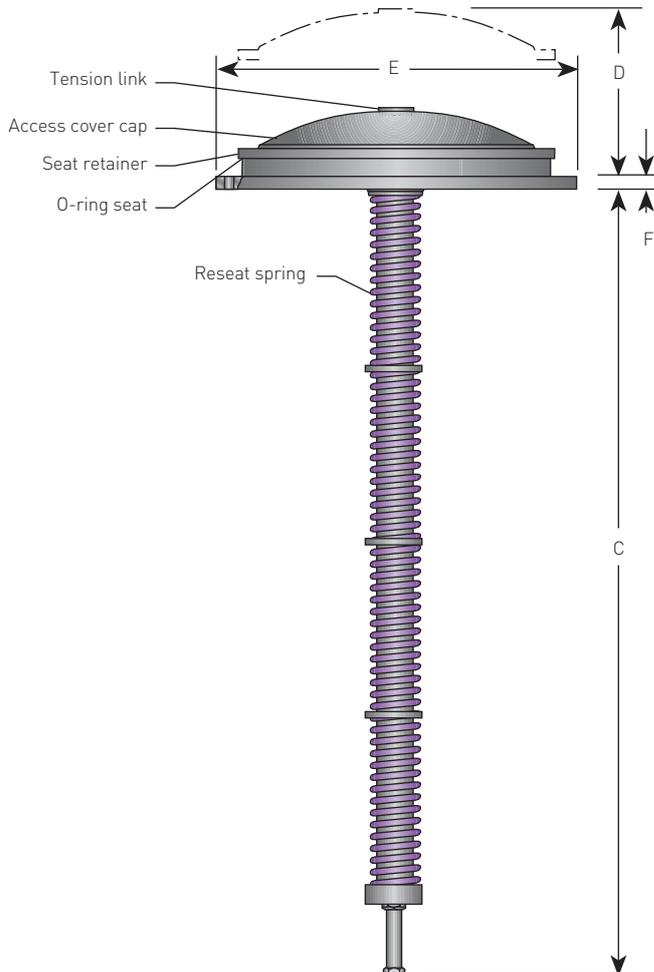
MATERIALS

Cap	Aluminum	B26-356-T6
Tension link cover	316 SS	A479-316
Flange	Aluminum	B26-356-T6
Seat	NBR	Nitrile
Seat retainer	Aluminum	B36-356-T6
Spring	Inconel®	AMS 5699 X-750
Internals	SS	B36-356-T6

NOTE

1. Inconel® is a registered trademark of International Nickel Company.

DIMENSIONS, INCHES (mm)

Valve size	C	D	E	F	Weight lb (kg)
24	29	17	32	1.88	350
(600)	(737)	(432)	(813)	(48)	(159)
36	100	29	46	1.63	600
(900)	(2540)	(737)	(1168)	(41)	(273)

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VALVE SIZING – NOMENCLATURE

English units

$$W = \frac{735\, KAP_1\, F\sqrt{M}}{\sqrt{TZ}}$$

$$V = \frac{4645\, KAP_1\, F}{\sqrt{MTZ}}$$

Metric units

$$W = \frac{558\, KAP_1\, F\sqrt{M}}{\sqrt{TZ}}$$

$$V = \frac{12510\, KAP_1\, F}{\sqrt{MTZ}}$$

where:

$$F = \sqrt{\frac{k}{k-1}\left[\left(\frac{P_2}{P_1}\right)^{\frac{2}{k}} - \left(\frac{P_2}{P_1}\right)^{\frac{k+1}{k}}\right]}$$

GAS FLOW

Symbol	Description	Inch pounds	Metric units
P_1	Absolute pressure at valve inlet connection under relieving conditions and equal to set pressure, p + overpressure + atmospheric pressure	lb/in² absolute (psia)	Bar absolute (bara)
P_2	Absolute atmospheric pressure at valve outlet	lb/in² absolute (psia)	Bar absolute (bara)
T	Absolute relieving temperature, equal to relieving temperature plus base temperature where: T (°Rankin = t (°F) + 460 and T (°Kelvin) = t (°C) + 273	Degrees Rankin (°R)	Degrees Kelvin (°K)
V	Gas flow capacity expressed in volumetric units per time unit. The formula for SCFM is based on an atmospheric pressure of 14.7 psia and a temperature of 60°F. The formula for Nm³/hr is based on an atmospheric pressure of 1.013 bara and 0°C	Standard cubic feet per minute (SCFM)	Normal cubic meter per hour (Nm³/hr)
W	Gas flow capacity expressed in weight units per time unit	Pounds per hour (lb/hr)	Kilograms per hour (kg/hr)
F	Subsonic flow factor, based on the ratio of specific heats and pressure drop across the valve		
k	The ratio of specific heats of gas, where k = C_p/C_v		
KA	The valve flow factor (refer to chart below)	In²	Cm²
M	Molecular weight of the flowing gas		

SCFM AIR 0% OVERPRESSURE, 60°F

Pressure (psig)	24"	36"
1.5	51,000	126,000
2.0	58,800	145,000
2.5	65,700	162,000
3.0	71,900	177,000
5.0	92,300	-

NM³/HR AIR 0% OVERPRESSURE, 0°C

Pressure (barg)	600 mm	900 mm
0.100	82,900	204,000
0.150	101,000	250,000
0.200	117,000	288,000
0.345	148,400	-

Gas or vapor	K	M
Air	1.40	29
N-Butane	1.09	58
Ethane	1.19	30
Ethylene	1.24	28
Methane	1.31	16
Natural gas	1.27	17.4
Nitrogen	1.40	28
Oxygen	1.40	32
Propane	1.13	44
Propylene	1.15	42

Size (mm)	KA English	KA metric
24" (600)	288	1858
36" (900)	710	4580

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