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API -2000

Standard Information
Tank Blanketing Regulator Selection

The tank blanketing valve is not a substitute for the vacuum relief device.

API Standard 2000 states, "The design of a gas repressuring system to eliminate the requirement for vacuum relief valves is beyond the scope of this standard and should be considered only when the induction of air represents a hazard equal to or greater than failure of the tank".

The tank blanketing valve failure must be taken into account when considering possible causes of overpressure in a tank.

API Standard 2000 states, "When the possible causes of overpressure or vacuum in a tank are being determined, other circumstances resulting from equipment failures and operating errors must be considered and evaluated by the designer." Failure of the tank blanketing valve can result in unrestricted gas flow into the tank, reduced gas flow or complete loss of the gas flow.

Tank blanketing valve set point definition is determined by manufacturers. Steriflow Valve defines set point as the point where the tank blanketing valve is just beginning to open, and the valve requires a pressure above the set point in order to close completely. Others define set point somewhere in between opening and closing but still the pressure must go above the defined set point in order to close completely.

CAPACITY REQUIREMENTS

The capacity requirement of the tank blanketing valve is composed of two components. The first being inbreathing due to liquid or product movement out of the tank, and the second being inbreathing due to contraction of the vapors/product because of ambient or process temperature changes.

Inbreathing due to maximum liquid or product movement out of the tank equals 8.0 SCFH of air for each US gallon per minute of maximum emptying rate or 0.94 Nm^3/h of air for each m^3/h of maximum emptying rate.

Q displacement (SCFH)=Max. Pumpout Rate (gpm) x8.0

or

Q displacement (Nm^3/h)=Max. Pumpout Rate (m^3/h) x.94

The second component, inbreathing due to temperature changes, is selected from Table 1 (Table 2 for metric). The tank capacity is found in column 1 and the corresponding inbreathing requirement is selected from column 2.

The two components are added together to give the total inbreathing requirement and the capacity requirement of the tank blanketing valve.

Q total = Q displacement + Q thermal

VALVE SELECTION GUIDELINES

As with all regulators, to select the correct valve size and orifice or Cv, you will need the valves flow rate requirement (ideally min, normal and max), valve supply-inlet pressure (ideally min and max), and the valves outlet pressure (set point pressure). Use the MK968 series or the JSRLP, or JSRLFLP data sheet flow capacity tables for these applications.

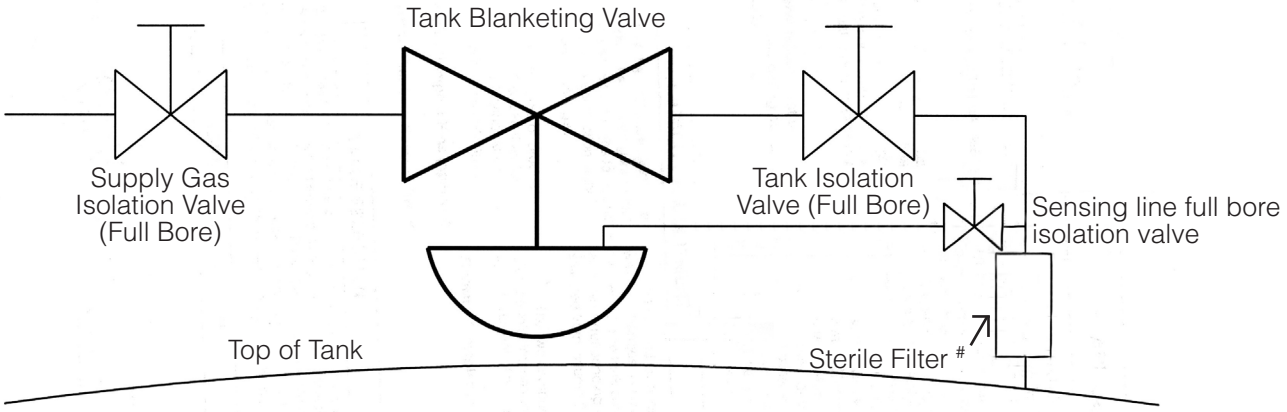
1. Determine the valve flow rate requirement: The valve flow rate requirement is Q total. To obtain Q total, add the vessels Thermal Inbreathing (Q thermal) requirement from Table 1 or 2 below to the Displacement Inbreathing (Q displacement) requirement as the vessel is emptied.

2. Determine the valve inlet pressure: If the tank blanketing supply (inlet) pressure varies, use the minimum supply pressure in selecting the vessel blanketing valve. Note that the maximum supply pressure should be used to determine the blanketing valves failure capacity.

3. Determine the valve outlet pressure or set point: This figure will be given to you by the vessel owner or design engineer.

4. Select the valve:
Using the minimum supply (inlet) pressure, consult the valve flow capacity charts to determine what size valve will meet the Total Inbreathing Requirement (Q total) at your minimum supply (valve inlet) pressure, and at the set point required. Note: Each valve series also have their own sizing guidelines.

NORMAL INSTALLATION



* Sensing line required on 1 1/2" - 2" MK968 only.

Most sanitary process vessels will require that a sterile filter be used for any air inlet or outlet points. Note that the filter will cause a pressure difference between it's inlet and outlet. Consult filter guide to determine pressure drop. Adjust regulator accordingly and consult Steriflow with questions. Make sure sensing line connection to regulator outlet line is well downstream of any elbows or piping restrictions.

TABLE 1					
REQUIREMENTS FOR THERMAL INBREATHING - ENGLISH UNITS (AIR)					
(Column 1)		(Column 2)	(Column 1)		(Column 2)
TANK CAPACITY		INBREATHING	TANK CAPACITY		INBREATHING
Barrels	Gallons	SCFH	Barrels	Gallons	SCFH
60	2,500	60	35,000	1,470,000	31,000
100	4,200	100	40,000	1,680,000	34,000
500	21,000	500	45,000	1,890,000	37,000
1000	42,000	1000	50,000	2,100,000	40,000
2,000	84,000	2,000	60,000	2,520,000	44,000
3,000	126,000	3,000	70,000	2,940,000	48,000
4,000	168,000	4,000	80,000	3,360,000	52,000
5,000	210,000	5,000	90,000	3,780,000	56,000
10,000	420,000	10,000	100,000	4,200,000	60,000
15,000	630,000	15,000	120,000	5,040,000	68,000
20,000	840,000	20,000	140,000	5,880,000	75,000
25,000	1,050,000	24,000	160,000	6,720,000	82,000
30,000	1,260,000	28,000	180,000	7,560,000	90,000

NOTE: Table and sizing from API 2000 fifth edition, April 1998

TABLE 2					
REQUIREMENTS FOR THERMAL INBREATHING - METRIC UNITS (AIR)					
(Column 1)		(Column 2)	(Column 1)		(Column 2)
TANK CAPACITY		INBREATHING	TANK CAPACITY		INBREATHING
CUBIC METERS	LITERS	Nm3/H	CUBIC METERS	LITERS	Mn3/H
0.100	100	0.017	2,000	2,000,000	337
0.200	200	0.034	3,000	3,000,000	506
0.500	500	0.084	3,180	3,180,000	536
0.700	700	0.118	4,000	4,000,000	647
1	1,000	0.169	5,000	5,000,000	787
2	2,000	0.337	6,000	6,000,000	896
5	5,000	0.843	7,000	7,000,000	1,003
7	7,000	1.18	8,000	8,000,000	1,077
10	10,000	1.69	9,000	9,000,000	1,136
20	20,000	3.37	10,000	10,000,000	1,210
100	100,000	16.90	12,000	12,000,000	1,345
200	200,000	33.70	14,000	14,000,000	1,480
300	300,000	50.60	16,000	16,000,000	1,615
500	500,000	84.30	18,000	18,000,000	1,745
700	700,000	118	20,000	20,000,000	1,877
1,000	1,000,000	169	25,000	25,000,000	2,179
1,500	1,500,000	253	30,000	30,000,000	2,495

NOTE: Table and sizing from API 2000 fifth edition, April 1998

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