

PROJECT :			DATE :	03-May-13
PROJ. NO.:			BY :	S.Rahimi
CLIENT :			REV :	A
UNIT :			DOC NO.:	


Control Valve Failure Relief Rate (Compressible Flow)

Process Data	Unit		
Valve Full Open (Rated) CV	---	80.000	
Density @ CV inlet	kg/m ³	7.55	
Viscosity @ CV inlet	Cp	0.01	
Pressure @ CV inlet	bara	9.97	
Pressure @ CV outlet	bara	5.05	
Valve Differential Pressure	bar	4.93	
Valve Calculated CV	---	80.00	
Flow Rate	Kg/h	13351	
Flow Rate at Source condition	m3/h	1768	

Valve Suction Data			
* Source Pressure	bara	10.000	
* Static Head	m	0.000	0
* Exchanger Pressure Drop	bar	0.000	
* Other Losses	bar	0.000	
* Metering Loss	bar	0.000	

Valve Discharge Data			
* Destination Pressure	bara	4.500	
* Static Head	m	0.000	
* Exchanger Pressure Drop	bar	0.000	
* Other Losses	bar	0.000	
* Metering Loss	bar	0.000	

General Notes

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Control Valve Inlet Line Pressure Drop Calculation

General Data	Tag No. :	Source	line 2-1	line 2-2	line 2-3	CV inlet
Segment Inlet Pressure	bara	10.00	9.99	9.99	9.98	9.98
Normal Flow Rate	m ³ /hr	1768.0	1768.9	1769.8	1770.8	1771.7
Temperature	°C	50.00	50.00	50.00	50.00	50.00
Gas MW	----	20.00	20.00	20.00	20.00	20.00
Gas Density	kg/m ³	7.55	7.55	7.54	7.54	7.54
Gas Viscosity	cp	0.0100	0.0100	0.0100	0.0100	0.0120

Suction Condition						
Pipe Length	m	2	2	2	2	2
Nominal Pipe Size	inch	6	6	6	6	6
Pipe Schedule No.	----	std	std	std	std	std
Pipe Roughness (DEF.)	inch	0.00180	0.00180	0.00180	0.00180	0.00180

Fittings Quantity						
* tee flow thru	no.	0	0	0	0	0
* tee branch	no.	0	0	0	0	0
* elbow 90 deg LR	no.	0	0	0	0	0
* elbow 90 deg screwed	no.	0	0	0	0	0
* elbow 45 deg LR	no.	0	0	0	0	0
* elbow 45 deg screwed	no.	0	0	0	0	0
* close pattern return bend	no.	0	0	0	0	0
* gate valve	no.	0	0	0	0	0
* ball valve	no.	0	0	0	0	0
* globe valve	no.	0	0	0	0	0
* angle valve	no.	0	0	0	0	0
* butterfly valve (2" - 8")	no.	0	0	0	0	0
* butterfly valve (10" - 14")	no.	0	0	0	0	0
* butterfly valve (16" - 24")	no.	0	0	0	0	0
* check valve swing	no.	0	0	0	0	0
* check valve lift	no.	0	0	0	0	0
* check valve stop lift	no.	0	0	0	0	0
* check valve tilting disk	no.	0	0	0	0	0
* foot valve hinged disc	no.	0	0	0	0	0
* foot valve poppet disc	no.	0	0	0	0	0
* reducer / expander	no.	0	0	0	0	0
* entrance (projecting)	no.	0	0	0	0	0
* entrance (sharp-edged)	no.	0	0	0	0	0
* entrance (flush)	no.	0	0	0	0	0
* exit (projecting)	no.	0	0	0	0	0
* exit (sharp-edged)	no.	0	0	0	0	0
* exit (rounded)	no.	0	0	0	0	0

Suction Side Calculation Results						
Pipe Internal Diameter	mm	154.05	154.05	154.05	154.05	154.05
Velocity	m/s	26.35	26.36	26.38	26.39	26.40
Reynolds No.	----	3.06E+06	3.06E+06	3.06E+06	3.06E+06	2.55E+06
Friction Factor		0.0152	0.0152	0.0152	0.0152	0.0153
Pipe Loss	m	6.994	7.001	7.009	7.016	7.048
Fitting Loss	m	0.000	0.000	0.000	0.000	0.000
Segment Pressure Drop	bar	0.005	0.005	0.005	0.005	0.005

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Control Valve Outlet Line Pressure Drop Calculation

General Data	Tag No. :	Destination	line 2-1	line 2-2	line 2-3	CV Outlet
Segment Inlet Pressure	bara	4.50	4.62	4.73	4.84	4.94
Normal Flow Rate	m ³ /hr	3928.9	3830.9	3739.9	3655.2	3576.0
Temperature	°C	50.00	50.00	50.00	50.00	50.00
Gas MW	----	20.00	20.00	20.00	20.00	20.00
Gas Density	kg/m ³	3.40	3.48	3.57	3.65	3.73
Gas Viscosity	cp	0.0100	0.0100	0.0100	0.0100	0.0100

Suction Condition						
Pipe Length	m	20	20	20	20	20
Nominal Pipe Size	inch	6	6	6	6	6
Pipe Schedule No.	----	std	std	std	std	std
Pipe Roughness (DEF.)	inch	0.00180	0.00180	0.00180	0.00180	0.00180

Fittings Quantity						
* tee flow thru	no.	0	0	0	0	0
* tee branch	no.	0	0	0	0	0
* elbow 90 deg LR	no.	0	0	0	0	0
* elbow 90 deg screwed	no.	0	0	0	0	0
* elbow 45 deg LR	no.	0	0	0	0	0
* elbow 45 deg screwed	no.	0	0	0	0	0
* close pattern return bend	no.	0	0	0	0	0
* gate valve	no.	0	0	0	0	0
* ball valve	no.	0	0	0	0	0
* globe valve	no.	0	0	0	0	0
* angle valve	no.	0	0	0	0	0
* butterfly valve (2" - 8")	no.	0	0	0	0	0
* butterfly valve (10" - 14")	no.	0	0	0	0	0
* butterfly valve (16" - 24")	no.	0	0	0	0	0
* check valve swing	no.	0	0	0	0	0
* check valve lift	no.	0	0	0	0	0
* check valve stop lift	no.	0	0	0	0	0
* check valve tilting disk	no.	0	0	0	0	0
* foot valve hinged disc	no.	0	0	0	0	0
* foot valve poppet disc	no.	0	0	0	0	0
* reducer / expander	no.	0	0	0	0	0
* entrance (projecting)	no.	0	0	0	0	0
* entrance (sharp-edged)	no.	0	0	0	0	0
* entrance (flush)	no.	0	0	0	0	0
* exit (projecting)	no.	0	0	0	0	0
* exit (sharp-edged)	no.	0	0	0	0	0
* exit (rounded)	no.	0	0	0	0	0

Suction Side Calculation Results						
Pipe Internal Diameter	mm	154.05	154.05	154.05	154.05	154.05
Velocity	m/s	58.55	57.09	55.74	54.47	53.29
Reynolds No.	----	3.06E+06	3.06E+06	3.06E+06	3.06E+06	3.06E+06
Friction Factor		0.0152	0.0152	0.0152	0.0152	0.0152
Pipe Loss	m	345.392	328.374	312.963	298.941	286.129
Fitting Loss	m	0.000	0.000	0.000	0.000	0.000
Segment Pressure Drop	bar	0.115	0.112	0.110	0.107	0.105