

GENERAL INFORMATION:

1	Position:	PSV-208/210	5	Type:	Spring	Balanced
2	Calculation standard:	API 520	6	Design:	ASME Section VIII	
3	Nozzle:	Whole	7	Tightness:	API 527	
4	Calculation scenario:		8	Replacement:	SB250F-40 50-04X000	

PROCESS DATA:

9	Wednesday:	Liquid ammonia	19	Working pressure:	Pr	141.22	Bar (abs.)
10	State:	Liquid	20	Setting pressure:	Rn	172.80	Bar (ex.)
11	Molecular weight:	M 17.03	g/mol	21	Opening pressure: Fully	Rno	192.00
12	Density:	ρ 696	kg/m³	22	opening pressure: Back pressure	Rpo	211.20
13	Adiabatic index:	TO		23	Permanent:		18:00
14	Compressibility:	Z 1		24	Variable:		8.00
15	Viscosity:	μ 0.164	sP	25	Dynamic:		
16	Operating temperature:	Tr 8	°C	26	General:		26.00
17	Reset temperature:	T 8	°C	27	CDTP:		166.00
18	Required flow rate:	W 39308.00	kg/hour				

CALCULATION FORMULA:

28	$A = \frac{Q * \sqrt{G}}{38 * K_d * K_w * K_c * K_v * \sqrt{\Delta P}}$			K Flow coefficient:	K	0.56	
				Re Nom. relief pressure: T	Re	4166389.1	
				Reset temperature:	T	283.2	°K
				Kv Viscosity coefficient:	Kv	1,005116	
				Kb Backpressure coefficient: Kc	Kb	1,000	
				Rupture membrane coefficient:	Kc	1,005116	

CALCULATION AND SELECTION:

29	Saddle area calculated:	A 0.202405	inch²	34	Design pressure:	Pd	19.2	MPa
30	Selected saddle area:	ASME 0.394	inch²	35	Calculated temperature (max)	Td	50	°C
31	Actual consumption:	Wa 76517	kg/hour	36	Calculated temperature (min)	Td	- 33	°C
32	Nozzle size	F		37	Detonation lever:	No		
33	Valve size:	1.5" x 2"	inch	38	Test bar:	No		

MATERIALS:

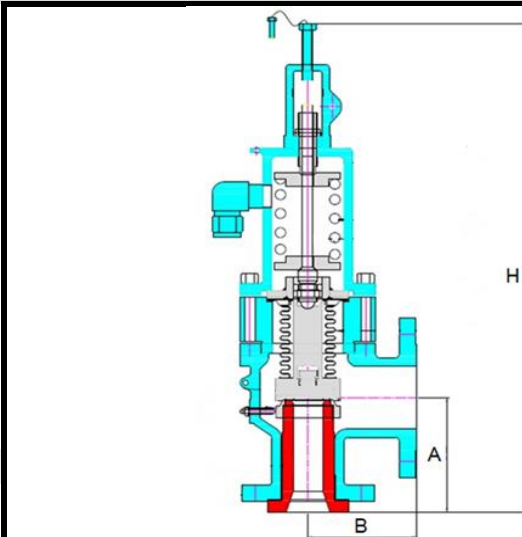
39	Frame	A351 Gr CF3M
40	Lid	A351 Gr CF3M
41	Nozzle	A479/276 Gr SS316L + STELLITING
42	Saddle	A479/276 Gr SS316L + STELLITING
43	Saddle holder	A479/276 Gr SS316L + STELLITING
44	Reset ring	CF3M
45	Spring	AISI 304
46	Cap	AISI 316L
47	bellows	AISI 316Ti
48	Stock	A479/276 Gr SS316L
49	Adjustment Bolt/Lock Nut	AISI 316L
50	Pad	PTFE
51	Fasteners	A193 B8M / A194 8M

ANNEXATIONS:

52	Standard:	ASME 16.5
53	Entrance:	1½" flange Pn250
54	Exit:	2" flange Pn40
55	A	150 mm
56	IN	140 mm
57	N	450 mm
58	Weight:	40 kg

MODEL:**COMMENTS:**

- 1 Replacement of the Sempell SB250F-40 50-04X000 valve with the same mounting dimensions.
- 2 Complete with mating flanges and fasteners.
- 3 Calibration frequency is once every 2 years.
- 4
- 5



- A. Hydrostatic pressure test of the hull
- B. Pressure Setting Test Certificate
- C. Leak Test
- D. Visual inspection
- E. Material Certificate 3.1

GENERAL INFORMATION:

1	Position:	PSV-232/233	5	Type:	Spring	Balanced
2	Calculation standard:	API 520	6	Design:	ASME Section VIII	
3	Nozzle:	Whole	7	Tightness:	API 527	
4	Calculation scenario:		8	Replacement:	SB325E-25 50-04X000	

PROCESS DATA:

9	Wednesday:	Two-phase mixture			19	Working pressure:	Pr	142.20	Bar (abs.)
10	State:	Liquid-Gas			20	Setting pressure:	Rn	166.32	Bar (ex.)
11	Molecular weight:	M	22.1/21.6	kg/mol	21	Opening pressure: Fully	Rno	184.80	Bar (ex.)
12	Density:	ρ	1215	kg/m³	22	opening pressure: Back pressure	Rpo	203.28	Bar (ex.)
13	Adiabatic index:	TO	1.4		23	Permanent:		3.96	Bar (ex.)
14	Compressibility:	Z	1		24	Variable:		0.00	Bar (ex.)
15	Viscosity:	μ	2.9	sP	25	Dynamic:			Bar (ex.)
16	Operating temperature:	Tr	73	°C	26	General:		3.96	Bar (ex.)
17	Reset temperature:	T	73	°C	27	CDTP:		180.84	Bar (ex.)
18	Required flow rate:	W	54585.00	kg/hour					

CALCULATION FORMULA:

28	$A = \frac{Q * \sqrt{G}}{38 * K_d * K_w * K_c * K_v * \sqrt{\Delta P}}$			K Flow coefficient:	K	0.56	
				Re Nom. relief pressure: T	Re	327188.51	
				Reset temperature:	T	348.2	°K
				Kv Viscosity coefficient:	Kv	1.0014689	
				Kb Backpressure coefficient: Kc	Kb	1,000	
				Rupture membrane coefficient:	Kc	1.0014689	

CALCULATION AND SELECTION:

29	Saddle area calculated:	A 0.190837	inch²	34	Design pressure:	Pd	18.48	MPa
30	Selected saddle area:	ASME 0.239	inch²	35	Calculated temperature (max)	Td	165	°C
31	Actual consumption:	Wa 68361	kg/hour	36	Calculated temperature (min)	Td		°C
32	Nozzle size	E		37	Detonation lever:		No	
33	Valve size:	1" x 2"	inch	38	Test bar:		No	

MATERIALS:

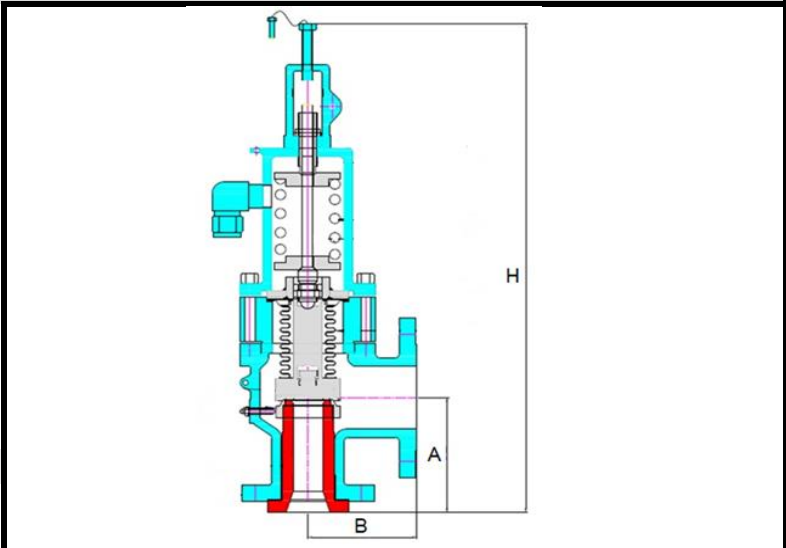
39	Frame	Duplex Stainless Steel
40	Lid	Duplex Stainless Steel
41	Nozzle	Duplex Stainless steel + STELLITING
42	Saddle	Duplex Stainless steel + STELLITING
43	Saddle holder	Duplex Stainless steel
44	Reset ring	Duplex Stainless Steel
45	Spring	INCONEL X750
46	Cap	Duplex Stainless Steel
47	bellows	INCONEL X750
48	Stock	Duplex Stainless Steel
49	Adjustment Bolt/Lock Nut	AISI 316
50	Pad	PTFE
51	Fasteners	Duplex Stainless Steel

ANNEXATIONS:

52	Standard:	ASME 16.5
53	Entrance:	1" flange Pn250
54	Exit:	2" flange Pn40
55	A	170 mm
56	IN	140 mm
57	N	525 mm
58	Weight:	60 kg

MODEL:**COMMENTS:**

- 1 Replacement of the Sempell SB325E-25 50-04X000 valve with the same mounting dimensions.
- 2 Complete with mating flanges and fasteners.
- 3 Calibration frequency is once every 2 years.
- 4 A steam jacket is included. Steam parameters: P working = 0.4 MPa, Tr = 165 °C. A
- 5 nozzle for flushing the housing is included.



- A. Hydrostatic pressure test of the hull
- B. Pressure Setting Test Certificate
- C. Leak Test
- D. Visual inspection
- E. Material Certificate 3.1

GENERAL INFORMATION:

1	Position:	PSV-1290	5	Type:	Spring	Traditional
2	Calculation standard:	API 520	6	Design:	ASME Section VIII	
3	Nozzle:	Whole	7	Tightness:	API 527	
4	Calculation scenario:		8	Replacement:	1914-00H-1-S4-*MS-31-RJ-GS-HP	

PROCESS DATA:

9	Wednesday:	Carbon dioxide			19	Working pressure:	Pr	76.20	Bar (abs.)
10	State:	Gas			20	Setting pressure:	Rn	81.00	Bar (ex.)
11	Molecular weight:	M	44.01	g/mol	21	Opening pressure: Fully	Rno	90.00	Bar (ex.)
12	Density:	ρ	1,977	kg/m³	22	opening pressure: Back pressure	Rpo	99.00	Bar (ex.)
13	Adiabatic index:	TO	1.29		23	Permanent:		0.058	Bar (ex.)
14	Compressibility:	Z	0.99438		24	Variable:		0.00	Bar (ex.)
15	Viscosity:	μ	1,495	sP	25	Dynamic:			Bar (ex.)
16	Operating temperature:	Tr	25 - 100	°C	26	General:		0.058	Bar (ex.)
17	Reset temperature:	T	25	°C	27	CDTP:		89,942	Bar (ex.)
18	Required flow rate:	W	60800	kg/hour					

CALCULATION FORMULA:

28	$A = \frac{W * \sqrt{T * Z}}{C * K * P1 * Kb * \sqrt{M}}$	K Flow coefficient:	K	0.975	
		P1 Nom. relief pressure: T	P1	1450.5762	Psig
		Reset temperature:	T	77.0	°F
		WIFlow constant:	C	346	
		Kb Backpressure coefficient: Kc	Kb	1.00	
		Rupture membrane coefficient:	Kc	1	

CALCULATION AND SELECTION:

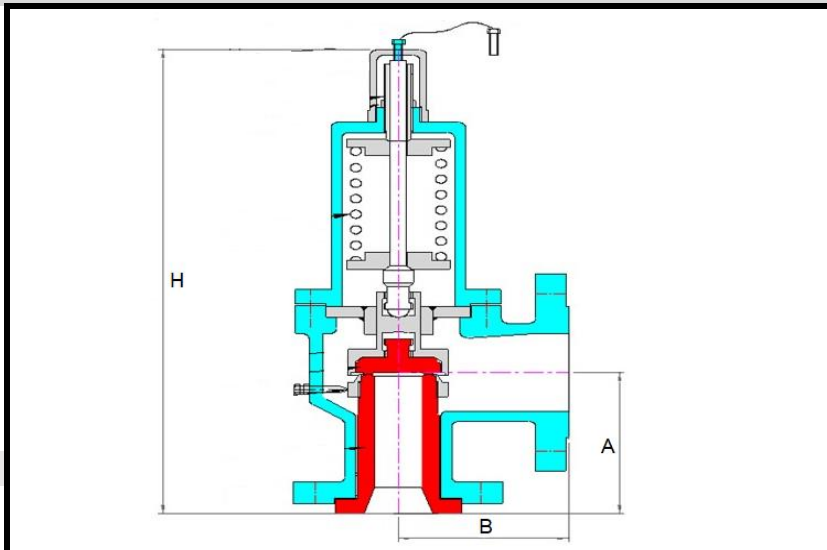
29	Saddle area calculated:	A 0.954113	inch²	34	Design pressure:	Pd	16.0	MPa
30	Selected saddle area:	ASME 0.975	inch²	35	Calculated temperature (max)	Td	100	°C
31	Actual consumption:	Wa 62131	kg/hour	36	Calculated temperature (min)	Td	- 40	°C
32	Nozzle size	H		37	Detonation lever:		No	
33	Valve size:	2" X 3"	inch	38	Test bar:		No	

MATERIALS:

39	Frame	A351 Gr. CF8M
40	Lid	A351 Gr. CF8M
41	Nozzle	A479 Gr 316
42	Saddle	A479 Gr 316
43	Saddle holder	A479 Gr 316
44	Reset ring	AISI 316L
45	Spring	AISI 316
46	Cap	AISI 316
47	Pad	PTFE
48	Stock	A479 Gr 316
49	Adjustment bolt	AISI 304
50	Lock-nut	AISI 304
51	Fasteners	A193 B8M / A194 8M

ANNEXATIONS:

52	Standard:	ASME 16.5
53	Entrance:	2" flange RTJ 900#
54	Exit:	3" flange RF 150#
55	A	154 mm
56	IN	162 mm
57	N	650 mm
58	Weight (approx.):	56 kg



- A. Hydrostatic pressure test of the hull
- B. Pressure Setting Test Certificate
- C. Leak Test
- D. Visual inspection
- E. Material Certificate 3.1

MODEL:**COMMENTS:**

- 1 Replacement of Consolidated 1914-00H-1-S4-*MS-31-RJ-GS-HP valve with the same mounting dimensions.
- 2 Complete with mating flanges and fasteners.
- 3 Calibration frequency is once every 2 years.
- 4
- 5

GENERAL INFORMATION:

1	Position:	PSV-1291	5	Type:	
2	Calculation standard:		6	Design:	
3	Nozzle:	Whole	7	Tightness:	
4	Calculation scenario:		8	Replacement:	RVK161-S 24*24

PROCESS DATA:

9	Wednesday:			Water vapor	19	Working pressure:		Pr	- 0.0913	Bar (abs.)	
10	State:			Steam	20	Setting pressure:		Rn	0.36	Bar (ex.)	
11	Molecular weight:		M	g/mol	21	Opening pressure: Fully		Rno	0.40	Bar (ex.)	
12	Density:		ρ	1	kg/m³	22	opening pressure: Back pressure		Rpo	0.44	Bar (ex.)
13	Adiabatic index:		TO		23	Permanent:			0.00	Bar (ex.)	
14	Compressibility:		Z		24	Variable:			0.00	Bar (ex.)	
15	Viscosity:		μ		25	Dynamic:			0.00	Bar (ex.)	
16	Operating temperature:		Tr	45.84	°C	26	General:			0.00	Bar (ex.)
17	Reset temperature:		T	45.84	°C	27	CDTP:			0.40	Bar (ex.)
18	Required flow rate:		W	81200,00	kg/hour						

CALCULATION FORMULA:

28	$A = \frac{W}{51.5 \cdot P1 \cdot K \cdot Kn \cdot Ksh}$			K Flow coefficient:	K	0.875	
				P1 Nom. relief pressure: T	P1	21,081672	Psig
				Reset temperature:	T	113.0	°F
				WIFlow constant:	C		
				Kn Coefficient according to Napier equation:	Kn	0.943	
				Ksh Coefficient for superheated steam:	Ksh	0.99	

CALCULATION AND SELECTION:

29	Saddle area calculated:	A	inch²	34	Design pressure:	Pd	0.2	MPa
30	Selected saddle area:	As	inch²	35	Calculated temperature (max)	Td	150	°C
31	Actual consumption:	Wa	135355	kg/hour	36	Calculated temperature (min)	Td	°C
32	Nozzle size			37	Detonation lever:		Yes	
33	Valve size:	24" x 24"	inch	38	Test bar:		No	

MATERIALS:

39	Frame	A216 Gr. WCB
40	Saddle	SS304
41	Disk	SS304
42	Guide	SS304
43	Flange	SS304
44	Stock	SS304/SS410
45	Rod lever	SS304/SS410
46	Detonation lever	SS304
47	Lock-nut	SS304
48	Adjustment bolt	SS304
49	Steering wheel	CI/CS
50	Gaskets	GRAPHITE / PTFE
51	Fasteners	CS- A193 B7 / A194 2H

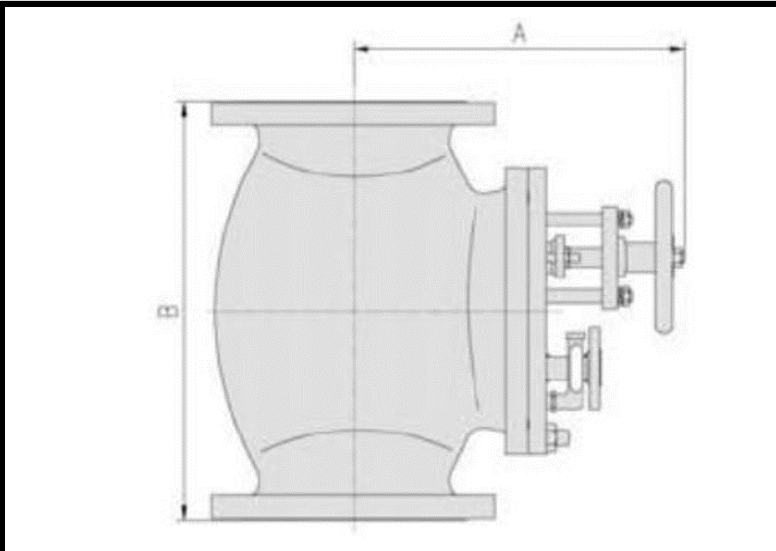
ANNEXATIONS:

52	Standard:	ASME 16.5	
53	Entrance:	24" flange	RF 150#
54	Exit:	24" flange	RF 150#
55	A	980	mm
56	IN	1330	mm
57	N		mm
58	Weight:	1300	kg

MODEL:

COMMENTS:

- 1 Replacement of the Fukui REC161-S 24*24 valve with the same installation
- 2 dimensions. Complete with counter flanges and fasteners.
- 3 Calibration frequency is once every 2 years.
- 4 To reduce weight, it is recommended to reduce the flange thickness to 25 mm.
- 5 3/8" NPT inlet/outlet for water channel.



- A. Hydrostatic pressure test of the hull
- B. Pressure Setting Test Certificate
- C. Leak Test
- D. Visual inspection
- E. Material Certificate 3.1