

 NISOC	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض خرید پکیج های کمپرسور گاز (رفت و برگشتی) بینک (قرارداد ۰۳-۰۰۸-۰۰۰۰-BK-HD-GCS-CO)																				
شماره پیمان: ۰۵۳ - ۰۷۳ - ۹۱۸۴	CALCULATION NOTE FOR PSV SIZING <table border="1"> <tr> <td>نسخه</td> <td>سریال</td> <td>نوع</td> <td>رشته</td> <td>تمهيلات</td> <td>صادر کننده</td> <td>بسته کاری</td> <td>پروژه</td> </tr> <tr> <td>V00</td> <td>0001</td> <td>CN</td> <td>PR</td> <td>120</td> <td>HY</td> <td>GCS</td> <td>BK</td> </tr> </table>				نسخه	سریال	نوع	رشته	تمهيلات	صادر کننده	بسته کاری	پروژه	V00	0001	CN	PR	120	HY	GCS	BK	شماره صفحه: ۱ از ۱۶
نسخه	سریال	نوع	رشته	تمهيلات	صادر کننده	بسته کاری	پروژه														
V00	0001	CN	PR	120	HY	GCS	BK														
طرح نگهداشت و افزایش تولید ۲۷ مخزن CALCULATION NOTE FOR PSV SIZING نگهداشت و افزایش تولید میدان نفتی بینک																					
V00	OCT.2024	IFR	Havayar CO	M.Fakharian	M.SADEGHIAN																
Rev.	Date	Purpose of Issue/Status	Prepared By	Checked By	Approved By	Client Approval															
Class: CLIENT Doc. Number: status: IFA: Issued For Approval IFR: Issued For Review IFI: Issued For Information AFC: Approved For Construction																					



NISOC

شماره پیمان:

۰۵۳ - ۰۷۳ - ۹۱۸۴

نگهداشت و افزایش تولید میدان نفتی بینک
سطح الارض و ابنیه تحت الارض
خرید پکیج های کمپرسور گاز (رفت و برگشتی) بینک
(قرارداد ۰۳_۰۰۰۸-CO-GCS-BK-HD)



HAVAYAR
INDUSTRIAL GROUP

CALCULATION NOTE FOR PSV SIZING

نسخه	سریال	نوع	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه
V00	0001	CN	PR	120	HY	GCS	BK

شماره صفحه: ۲ از ۱۶

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		Savasoft V1.0 β - KIASA Safety Valve Sizing Software						
1	VALVE ID				11	CALCULATION NOTES		
2	TAG No.	PSV-2122A/PSV-2123A			12			
3	VALVE MODEL NO.	C3J42/1A21705			13			
4	SIZING DATA				14			
5	DESIGN CODE	ASME SECTION VIII	SIZING STD.	API 520	15			
6	FLUID STATE	GAS			16			
7	CALCULATION SUMMARY							
8	DISCHARGE CAPACITY	REQUIRED (kg/h)	8936		18	AREA	REQUIRED (mm²)	562.7
9		RATED (kg/h)	14419.51		19		SELECTED (mm²)	908
10	REACTION FORCE (N)		3536.51		20	NOISE LEVEL (db) @ 30m		109.23
VARIABLE TYPE		VARIABLE NAME		SYMBOL	INPUT VALUE	EQUATION VALUE		
21	FLUID DATA	MOLECULAR WEIGHT		M	24.52			
22		RATIO OF SPECIFIC HEATS		K	1.22			
23		COMPRESSIBILITY		Z	0.97			
24	SIZING DATA	REQUIRED DISCHARGE CAPACITY (kg/h)		Wreq.	8936			
25		SET PRESSURE (barg)		Pset	22			
26		OVER PRESSURE (barg)		Pover	2.45			
27		CONSTANT BACK PRESSURE (barg)			1			
28		VARIABLE BACK PRESSURE (barg)			0			
29		BUILT UP BACK PRESSURE (barg)			0			
30		TOTAL BACK PRESSURE (barg)		Pback	1			
31		RELIEVING TEMP. (°C)		T	129			
32		RUPTURE DISC COEFFICIENT		Kc	1			
33		DISCHARGE COEFFICIENT		Kd	0.88			
34		BACK PRESSURE CORRECTION FACTOR		Kb	1			
35		OUTLET DIAMETER (mm)		D0	101.6			
CALCULATION UPSTREAM RELIEVING PRESSURE, BACK PRESSURE								
36	P1=Pset +Pover +Patm (kPa)			P1		2795		
37	P2=Pback +Patm (kPa)			P2		200		
38	PR=P2/P1			PR		0.07		
CALCULATION GAS CONSTANT								
39	$C = 0.03948 \times \left\{ K \times \left[\frac{2}{K+1} \right]^{\frac{K+1}{K-1}} \right\}^{0.5}$			C		0.03		
CALCULATED RATED DISCHARGE CAPACITY								
40	$W_s = [A_s \times C \times K_d \times P_1 \times K_b \times K_c] / \sqrt{\frac{(T + 273.15) \times Z}{M}}$			W _s (kg/h)		14419.51		
CALCULATION REQUIRED ORIFICE AREA								
41	$A_{req} = \frac{W_{req.}}{C \times K_d \times P_1 \times K_b \times K_c} \times \sqrt{\frac{(T + 273.15) \times Z}{M}}$			A _{req.} (mm²)		562.7		
NOISE CALCULATION ACC. TO API RP 521								
42	$L_{30} = L + 10 \log \left[0.5 \times \frac{W_s}{3600} \times \left(91.2 \times \left(\frac{K \times (T + 273.15)}{M} \right)^{0.5} \right)^2 \right]$			db		109.23		
CALCULATION REACTION FORCE								
43	$A_0 = (\pi \times D_0^2) / 4$			F _{r.} (N)		3536.51		
44	$F = 129 \times \left(\frac{W_s}{3600} \right) \times \sqrt{\frac{K \times (T + 273.15)}{(K + 1) \times M}} + \frac{(A_0 \times P_0)}{1000}$							

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2	TAG No.	PSV-2132A/PSV-2133A			12			
3	VALVE MODEL NO.	C1.5G33/1A21705			13			
4	SIZING DATA				14			
5	DESIGN CODE	ASME SECTION VIII	SIZING STD.	API 520	15			
6	FLUID STATE	GAS			16			
7	CALCULATION SUMMARY							
8	DISCHARGE CAPACITY	REQUIRED (kg/h)	8936		18	AREA	REQUIRED (mm²)	224.65
9		RATED (kg/h)	12927.65		19		SELECTED (mm²)	325
10	REACTION FORCE (N)		4261.99		20	NOISE LEVEL (db) @ 30m		109.13
VARIABLE TYPE		VARIABLE NAME		SYMBOL	INPUT VALUE	EQUATION VALUE		
21	FLUID DATA	MOLECULAR WEIGHT		M	24.52			
22		RATIO OF SPECIFIC HEATS		K	1.27			
23		COMPRESSIBILITY		Z	0.93			
24	SIZING DATA	REQUIRED DISCHARGE CAPACITY (kg/h)		Wreq.	8936			
25		SET PRESSURE (barg)		Pset	62			
26		OVER PRESSURE (barg)		Pover	6.2			
27		CONSTANT BACK PRESSURE (barg)			1			
28		VARIABLE BACK PRESSURE (barg)			0			
29		BUILT UP BACK PRESSURE (barg)			0			
30		TOTAL BACK PRESSURE (barg)		Pback	1			
31		RELIEVING TEMP. (°C)		T	148			
32		RUPTURE DISC COEFFICIENT		Kc	1			
33		DISCHARGE COEFFICIENT		Kd	0.88			
34		BACK PRESSURE CORRECTION FACTOR		Kb	1			
35		OUTLET DIAMETER (mm)		D0	76.2			
CALCULATION UPSTREAM RELIEVING PRESSURE, BACK PRESSURE								
36	P1=Pset +Pover +Patm (kPa)			P1		6920		
37	P2=Pback +Patm (kPa)			P2		200		
38	PR=P2/P1			PR		0.03		
CALCULATION GAS CONSTANT								
39	$C = 0.03948 \times \left\{ K \times \left[\frac{2}{K+1} \right]^{\frac{K+1}{K-1}} \right\}^{0.5}$			C		0.03		
CALCULATED RATED DISCHARGE CAPACITY								
40	$W_s = [A_s \times C \times K_d \times P_1 \times K_b \times K_c] / \sqrt{\frac{(T + 273.15) \times Z}{M}}$			W _s (kg/h)		12927.65		
CALCULATION REQUIRED ORIFICE AREA								
41	$A_{req} = \frac{W_{req.}}{C \times K_d \times P_1 \times K_b \times K_c} \times \sqrt{\frac{(T + 273.15) \times Z}{M}}$			A _{req.} (mm²)		224.65		
NOISE CALCULATION ACC. TO API RP 521								
42	$L_{30} = L + 10 \log \left[0.5 \times \frac{W_s}{3600} \times \left(91.2 \times \left(\frac{K \times (T + 273.15)}{M} \right)^{0.5} \right)^2 \right]$			db		109.13		
CALCULATION REACTION FORCE								
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2	TAG No.	PSV-2122B/PSV-2123B		12			
3	VALVE MODEL NO.	C3J42/1A21705		13			
4	SIZING DATA			14			
5	DESIGN CODE	ASME SECTION VIII	SIZING STD.	API 520			
6	FLUID STATE	GAS		16			
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29		BUILT UP BACK PRESSURE (barg)			0		
30		TOTAL BACK PRESSURE (barg)		Pback	1		
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30		TOTAL BACK PRESSURE (barg)		Pback	1			
31		RELIEVING TEMP. (°C)		T	148			
32		RUPTURE DISC COEFFICIENT		Kc	1			
33		DISCHARGE COEFFICIENT		Kd	0.88			
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CALCULATION UPSTREAM RELIEVING PRESSURE, BACK PRESSURE								
36	P1=Pset +Pover +Patm (kPa)			P1		6920		
37	P2=Pback +Patm (kPa)			P2		200		
38	PR=P2/P1			PR		0.03		
CALCULATION GAS CONSTANT								
39	$C = 0.03948 \times \left\{ K \times \left[\frac{2}{K+1} \right]^{\frac{K+1}{K-1}} \right\}^{0.5}$			C		0.03		
CALCULATED RATED DISCHARGE CAPACITY								
40	$W_s = [A_s \times C \times K_d \times P_1 \times K_b \times K_c] / \sqrt{\frac{(T + 273.15) \times Z}{M}}$			W _s (kg/h)		12927.65		
CALCULATION REQUIRED ORIFICE AREA								
41	$A_{req} = \frac{W_{req.}}{C \times K_d \times P_1 \times K_b \times K_c} \times \sqrt{\frac{(T + 273.15) \times Z}{M}}$			A _{req.} (mm²)		224.65		
NOISE CALCULATION ACC. TO API RP 521								
42	$L_{30} = L + 10 \log \left[0.5 \times \frac{W_s}{3600} \times \left(91.2 \times \left(\frac{K \times (T + 273.15)}{M} \right)^{0.5} \right)^2 \right]$			db		109.13		
CALCULATION REACTION FORCE								
43	$A_0 = (\pi \times D_0^2) / 4$			F _{r.} (N)		4261.99		
44	$F = 129 \times \left(\frac{W_s}{3600} \right) \times \sqrt{\frac{K \times (T + 273.15)}{(K + 1) \times M}} + \frac{(A_0 \times P_0)}{1000}$							

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				Savasoft V1.0 β - KIASA Safety Valve Sizing Software			
1	VALVE ID				11	CALCULATION NOTES	
2	TAG No.	PSV-2203A			12		
3	VALVE MODEL NO.	C2638302 1705			13		
4	SIZING DATA				14		
5	DESIGN CODE	ASME SECTION VIII	SIZING STD.	API 520	15		
6	FLUID STATE	GAS			16		
7	CALCULATION SUMMARY						
8	DISCHARGE CAPACITY	REQUIRED (kg/h)	3.75		18	AREA	REQUIRED (mm²)
9		RATED (kg/h)	79		19		SELECTED (mm²)
10	REACTION FORCE (N)		11		20	NOISE LEVEL (db) @ 30m	
	VARIABLE TYPE	VARIABLE NAME		SYMBOL	INPUT VALUE	EQUATION VALUE	
21	FLUID DATA	MOLECULAR WEIGHT		M	28.01		
22		RATIO OF SPECIFIC HEATS		K	1.4		
23		COMPRESSIBILITY		Z	1		
24	SIZING DATA	REQUIRED DISCHARGE CAPACITY (kg/h)		Wreq.	3.75		
25		SET PRESSURE (barg)		Pset	2.8		
26		OVER PRESSURE (barg)		Pover	0.28		
27		CONSTANT BACK PRESSURE (barg)			0		
28		VARIABLE BACK PRESSURE (barg)			0		
29		BUILT UP BACK PRESSURE (barg)			0		
30		TOTAL BACK PRESSURE (barg)		Pback	0		
31		RELIEVING TEMP. (°C)		T	60		
32		RUPTURE DISC COEFFICIENT		Kc	1		
33		DISCHARGE COEFFICIENT		Kd	0.88		
34		BACK PRESSURE CORRECTION FACTOR		Kb	1		
35		OUTLET DIAMETER (mm)		D0	12.7		
CALCULATION UPSTREAM RELIEVING PRESSURE, BACK PRESSURE							
36	P1=Pset +Pover +Patm (kPa)			P1		408	
37	P2=Pback +Patm (kPa)			P2		100	
38	PR=P2/P1			PR		0.25	
CALCULATION GAS CONSTANT							
39	$C = 0.03948 \times \left\{ K \times \left[\frac{2}{K+1} \right]^{\frac{K+1}{K-1}} \right\}^{0.5}$			C		0.03	
CALCULATED RATED DISCHARGE CAPACITY							
40	$W_s = [A_s \times C \times K_d \times P_1 \times K_b \times K_c] / \sqrt{\frac{(T + 273.15) \times Z}{M}}$			W _s (kg/h)		79	
CALCULATION REQUIRED ORIFICE AREA							
41	$A_{req} = \frac{W_{req.}}{C \times K_d \times P_1 \times K_b \times K_c} \times \sqrt{\frac{(T + 273.15) \times Z}{M}}$			A _{req.} (mm²)		1.33	
NOISE CALCULATION ACC. TO API RP 521							
42	$L_{30} = L + 10 \log \left[0.5 \times \frac{W_s}{3600} \times \left(91.2 \times \left(\frac{K \times (T + 273.15)}{M} \right)^{0.5} \right)^2 \right]$			db		86	
CALCULATION REACTION FORCE							
43	$A_0 = (\pi \times D_0^2) / 4$			F _{r.} (N)		11	
44	$F = 129 \times \left(\frac{W_s}{3600} \right) \times \sqrt{\frac{K \times (T + 273.15)}{(K + 1) \times M}} + \frac{(A_0 \times P_0)}{1000}$						

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		Savasoft V1.0 β - KIASA Safety Valve Sizing Software						
1	VALVE ID				11	CALCULATION NOTES		
2	TAG No.	PSV-2204A			12			
3	VALVE MODEL NO.	C2638302 1705			13			
4	SIZING DATA				14			
5	DESIGN CODE	ASME SECTION VIII	SIZING STD.	API 520	15			
6	FLUID STATE	GAS			16			
7	CALCULATION SUMMARY							
8	DISCHARGE CAPACITY	REQUIRED (kg/h)	3.75		18	AREA	REQUIRED (mm²)	1.33
9		RATED (kg/h)	79		19		SELECTED (mm²)	28.26
10	REACTION FORCE (N)		11		20	NOISE LEVEL (db) @ 30m		86
VARIABLE TYPE		VARIABLE NAME		SYMBOL	INPUT VALUE	EQUATION VALUE		
21	FLUID DATA	MOLECULAR WEIGHT		M	28.01			
22		RATIO OF SPECIFIC HEATS		K	1.4			
23		COMPRESSIBILITY		Z	1			
24	SIZING DATA	REQUIRED DISCHARGE CAPACITY (kg/h)		Wreq.	3.75			
25		SET PRESSURE (barg)		Pset	2.8			
26		OVER PRESSURE (barg)		Pover	0.28			
27		CONSTANT BACK PRESSURE (barg)			0			
28		VARIABLE BACK PRESSURE (barg)			0			
29		BUILT UP BACK PRESSURE (barg)			0			
30		TOTAL BACK PRESSURE (barg)		Pback	0			
31		RELIEVING TEMP. (°C)		T	60			
32		RUPTURE DISC COEFFICIENT		Kc	1			
33		DISCHARGE COEFFICIENT		Kd	0.88			
34		BACK PRESSURE CORRECTION FACTOR		Kb	1			
35		OUTLET DIAMETER (mm)		D0	12.7			
CALCULATION UPSTREAM RELIEVING PRESSURE, BACK PRESSURE								
36	P1=Pset +Pover +Patm (kPa)			P1		408		
37	P2=Pback +Patm (kPa)			P2		100		
38	PR=P2/P1			PR		0.25		
CALCULATION GAS CONSTANT								
39	$C = 0.03948 \times \left\{ K \times \left[\frac{2}{K+1} \right]^{\frac{K+1}{K-1}} \right\}^{0.5}$			C		0.03		
CALCULATED RATED DISCHARGE CAPACITY								
40	$W_s = [A_s \times C \times K_d \times P_1 \times K_b \times K_c] / \sqrt{\frac{(T + 273.15) \times Z}{M}}$			W _s (kg/h)		79		
CALCULATION REQUIRED ORIFICE AREA								
41	$A_{req} = \frac{W_{req.}}{C \times K_d \times P_1 \times K_b \times K_c} \times \sqrt{\frac{(T + 273.15) \times Z}{M}}$			A _{req.} (mm²)		1.33		
NOISE CALCULATION ACC. TO API RP 521								
42	$L_{30} = L + 10 \log \left[0.5 \times \frac{W_s}{3600} \times \left(91.2 \times \left(\frac{K \times (T + 273.15)}{M} \right)^{0.5} \right)^2 \right]$			db		86		
CALCULATION REACTION FORCE								
43	$A_0 = (\pi \times D_0^2) / 4$			F _{r.} (N)		11		
44	$F = 129 \times \left(\frac{W_s}{3600} \right) \times \sqrt{\frac{K \times (T + 273.15)}{(K + 1) \times M}} + \frac{(A_0 \times P_0)}{1000}$							

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				Savasoft V1.0 β - KIASA Safety Valve Sizing Software				
1	VALVE ID				11	CALCULATION NOTES		
2	TAG No.	PSV-2203B		12				
3	VALVE MODEL NO.	C2638302 1705		13				
4	SIZING DATA			14				
5	DESIGN CODE	ASME SECTION VIII	SIZING STD.	API 520				15
6	FLUID STATE	GAS						16
7	CALCULATION SUMMARY							
8	DISCHARGE CAPACITY	REQUIRED (kg/h)	3.75	18	AREA	REQUIRED (mm²)	1.33	
9		RATED (kg/h)	79	19		SELECTED (mm²)	28.26	
10	REACTION FORCE (N)	11		20	NOISE LEVEL (db) @ 30m		86	
VARIABLE TYPE		VARIABLE NAME		SYMBOL	INPUT VALUE	EQUATION VALUE		
21	FLUID DATA	MOLECULAR WEIGHT		M	28.01			
22		RATIO OF SPECIFIC HEATS		K	1.4			
23		COMPRESSIBILITY		Z	1			
24	SIZING DATA	REQUIRED DISCHARGE CAPACITY (kg/h)		Wreq.	3.75			
25		SET PRESSURE (barg)		Pset	2.8			
26		OVER PRESSURE (barg)		Pover	0.28			
27		CONSTANT BACK PRESSURE (barg)			0			
28		VARIABLE BACK PRESSURE (barg)			0			
29		BUILT UP BACK PRESSURE (barg)			0			
30		TOTAL BACK PRESSURE (barg)		Pback	0			
31		RELIEVING TEMP. (°C)		T	60			
32		RUPTURE DISC COEFFICIENT		Kc	1			
33		DISCHARGE COEFFICIENT		Kd	0.88			
34		BACK PRESSURE CORRECTION FACTOR		Kb	1			
35		OUTLET DIAMETER (mm)		D0	12.7			
CALCULATION UPSTREAM RELIEVING PRESSURE, BACK PRESSURE								
36	P1=Pset +Pover +Patm (kPa)			P1		408		
37	P2=Pback +Patm (kPa)			P2		100		
38	PR=P2/P1			PR		0.25		
CALCULATION GAS CONSTANT								
39	$C = 0.03948 \times \left\{ K \times \left[\frac{2}{K+1} \right]^{\frac{K+1}{K-1}} \right\}^{0.5}$			C		0.03		
CALCULATED RATED DISCHARGE CAPACITY								
40	$W_s = [A_s \times C \times K_d \times P_1 \times K_b \times K_c] / \sqrt{\frac{(T + 273.15) \times Z}{M}}$			W _s (kg/h)		79		
CALCULATION REQUIRED ORIFICE AREA								
41	$A_{req} = \frac{W_{req.}}{C \times K_d \times P_1 \times K_b \times K_c} \times \sqrt{\frac{(T + 273.15) \times Z}{M}}$			A _{req.} (mm²)		1.33		
NOISE CALCULATION ACC. TO API RP 521								
42	$L_{30} = L + 10 \log \left[0.5 \times \frac{W_s}{3600} \times \left(91.2 \times \left(\frac{K \times (T + 273.15)}{M} \right)^{0.5} \right)^2 \right]$			db		86		
CALCULATION REACTION FORCE								
43	$A_0 = (\pi \times D_0^2) / 4$			F _{r.} (N)		11		
44	$F = 129 \times \left(\frac{W_s}{3600} \right) \times \sqrt{\frac{K \times (T + 273.15)}{(K + 1) \times M}} + \frac{(A_0 \times P_0)}{1000}$							

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		Savasoft V1.0 β - KIASA Safety Valve Sizing Software						
1	VALVE ID				11	CALCULATION NOTES		
2	TAG No.	PSV-2204B			12			
3	VALVE MODEL NO.	C2638302 1705			13			
4	SIZING DATA				14			
5	DESIGN CODE	ASME SECTION VIII	SIZING STD.	API 520	15			
6	FLUID STATE	GAS			16			
7	CALCULATION SUMMARY							
8	DISCHARGE CAPACITY	REQUIRED (kg/h)	3.75		18	AREA	REQUIRED (mm²)	1.33
9		RATED (kg/h)	79		19		SELECTED (mm²)	28.26
10	REACTION FORCE (N)	11			20	NOISE LEVEL (db) @ 30m		86
VARIABLE TYPE		VARIABLE NAME		SYMBOL	INPUT VALUE	EQUATION VALUE		
21	FLUID DATA	MOLECULAR WEIGHT		M	28.01			
22		RATIO OF SPECIFIC HEATS		K	1.4			
23		COMPRESSIBILITY		Z	1			
24	SIZING DATA	REQUIRED DISCHARGE CAPACITY (kg/h)		Wreq.	3.75			
25		SET PRESSURE (barg)		Pset	2.8			
26		OVER PRESSURE (barg)		Pover	0.28			
27		CONSTANT BACK PRESSURE (barg)			0			
28		VARIABLE BACK PRESSURE (barg)			0			
29		BUILT UP BACK PRESSURE (barg)			0			
30		TOTAL BACK PRESSURE (barg)		Pback	0			
31		RELIEVING TEMP. (°C)		T	60			
32		RUPTURE DISC COEFFICIENT		Kc	1			
33		DISCHARGE COEFFICIENT		Kd	0.88			
34		BACK PRESSURE CORRECTION FACTOR		Kb	1			
35		OUTLET DIAMETER (mm)		D0	12.7			
CALCULATION UPSTREAM RELIEVING PRESSURE, BACK PRESSURE								
36	P1=Pset +Pover +Patm (kPa)			P1		408		
37	P2=Pback +Patm (kPa)			P2		100		
38	PR=P2/P1			PR		0.25		
CALCULATION GAS CONSTANT								
39	$C = 0.03948 \times \left\{ K \times \left[\frac{2}{K+1} \right]^{\frac{K+1}{K-1}} \right\}^{0.5}$			C		0.03		
CALCULATED RATED DISCHARGE CAPACITY								
40	$W_s = [A_s \times C \times K_d \times P_1 \times K_b \times K_c] / \sqrt{\frac{(T + 273.15) \times Z}{M}}$			W _s (kg/h)		79		
CALCULATION REQUIRED ORIFICE AREA								
41	$A_{req} = \frac{W_{req.}}{C \times K_d \times P_1 \times K_b \times K_c} \times \sqrt{\frac{(T + 273.15) \times Z}{M}}$			A _{req.} (mm²)		1.33		
NOISE CALCULATION ACC. TO API RP 521								
42	$L_{30} = L + 10 \log \left[0.5 \times \frac{W_s}{3600} \times \left(91.2 \times \left(\frac{K \times (T + 273.15)}{M} \right)^{0.5} \right)^2 \right]$			db		86		
CALCULATION REACTION FORCE								
43	$A_0 = (\pi \times D_0^2) / 4$			F _{r.} (N)		11		
44	$F = 129 \times \left(\frac{W_s}{3600} \right) \times \sqrt{\frac{K \times (T + 273.15)}{(K + 1) \times M}} + \frac{(A_0 \times P_0)}{1000}$							

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		Savasoft V1.0 β - KIASA Safety Valve Sizing Software						
1	VALVE ID				11	CALCULATION NOTES		
2	TAG No.	PSV-2203C			12			
3	VALVE MODEL NO.	C2638302 1705			13			
4	SIZING DATA				14			
5	DESIGN CODE	ASME SECTION VIII	SIZING STD.	API 520	15			
6	FLUID STATE	GAS			16			
7	CALCULATION SUMMARY							
8	DISCHARGE CAPACITY	REQUIRED (kg/h)	3.75		18	AREA	REQUIRED (mm²)	1.33
9		RATED (kg/h)	79		19		SELECTED (mm²)	28.26
10	REACTION FORCE (N)		11		20	NOISE LEVEL (db) @ 30m		86
VARIABLE TYPE		VARIABLE NAME		SYMBOL	INPUT VALUE	EQUATION VALUE		
21	FLUID DATA	MOLECULAR WEIGHT		M	28.01			
22		RATIO OF SPECIFIC HEATS		K	1.4			
23		COMPRESSIBILITY		Z	1			
24	SIZING DATA	REQUIRED DISCHARGE CAPACITY (kg/h)		Wreq.	3.79			
25		SET PRESSURE (barg)		Pset	2.8			
26		OVER PRESSURE (barg)		Pover	0.28			
27		CONSTANT BACK PRESSURE (barg)			0			
28		VARIABLE BACK PRESSURE (barg)			0			
29		BUILT UP BACK PRESSURE (barg)			0			
30		TOTAL BACK PRESSURE (barg)		Pback	0			
31		RELIEVING TEMP. (°C)		T	60			
32		RUPTURE DISC COEFFICIENT		Kc	1			
33		DISCHARGE COEFFICIENT		Kd	0.88			
34		BACK PRESSURE CORRECTION FACTOR		Kb	1			
35		OUTLET DIAMETER (mm)		D0	12.7			
CALCULATION UPSTREAM RELIEVING PRESSURE, BACK PRESSURE								
36	P1=Pset +Pover +Patm (kPa)			P1		408		
37	P2=Pback +Patm (kPa)			P2		100		
38	PR=P2/P1			PR		0.25		
CALCULATION GAS CONSTANT								
39	$C = 0.03948 \times \left\{ K \times \left[\frac{2}{K+1} \right]^{\frac{K+1}{K-1}} \right\}^{0.5}$			C		0.03		
CALCULATED RATED DISCHARGE CAPACITY								
40	$W_s = [A_s \times C \times K_d \times P_1 \times K_b \times K_c] / \sqrt{\frac{(T + 273.15) \times Z}{M}}$			W _s (kg/h)		79		
CALCULATION REQUIRED ORIFICE AREA								
41	$A_{req} = \frac{W_{req.}}{C \times K_d \times P_1 \times K_b \times K_c} \times \sqrt{\frac{(T + 273.15) \times Z}{M}}$			A _{req.} (mm²)		1.33		
NOISE CALCULATION ACC. TO API RP 521								
42	$L_{30} = L + 10 \log \left[0.5 \times \frac{W_s}{3600} \times \left(91.2 \times \left(\frac{K \times (T + 273.15)}{M} \right)^{0.5} \right)^2 \right]$			db		86		
CALCULATION REACTION FORCE								
43	$A_0 = (\pi \times D_0^2) / 4$			F _{r.} (N)		11		
44	$F = 129 \times \left(\frac{W_s}{3600} \right) \times \sqrt{\frac{K \times (T + 273.15)}{(K + 1) \times M}} + \frac{(A_0 \times P_0)}{1000}$							

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				Savasoft V1.0 β - KIASA Safety Valve Sizing Software				
1	VALVE ID				11	CALCULATION NOTES		
2	TAG No.	PSV-2204C			12			
3	VALVE MODEL NO.	C2638302 1705			13			
4	SIZING DATA				14			
5	DESIGN CODE	ASME SECTION VIII	SIZING STD.	API 520	15			
6	FLUID STATE	GAS			16			
7	CALCULATION SUMMARY							
8	DISCHARGE CAPACITY	REQUIRED (kg/h)	3.75		18	AREA	REQUIRED (mm²)	1.33
9		RATED (kg/h)	79		19		SELECTED (mm²)	28/26
10	REACTION FORCE (N)		11		20	NOISE LEVEL (db) @ 30m		86
VARIABLE TYPE		VARIABLE NAME		SYMBOL	INPUT VALUE	EQUATION VALUE		
21	FLUID DATA	MOLECULAR WEIGHT		M	28.01			
22		RATIO OF SPECIFIC HEATS		K	1.4			
23		COMPRESSIBILITY		Z	1			
24	SIZING DATA	REQUIRED DISCHARGE CAPACITY (kg/h)		Wreq.	3.75			
25		SET PRESSURE (barg)		Pset	2.8			
26		OVER PRESSURE (barg)		Pover	0.28			
27		CONSTANT BACK PRESSURE (barg)			0			
28		VARIABLE BACK PRESSURE (barg)			0			
29		BUILT UP BACK PRESSURE (barg)			0			
30		TOTAL BACK PRESSURE (barg)		Pback	0			
31		RELIEVING TEMP. (°C)		T	60			
32		RUPTURE DISC COEFFICIENT		Kc	1			
33		DISCHARGE COEFFICIENT		Kd	0.88			
34		BACK PRESSURE CORRECTION FACTOR		Kb	1			
35		OUTLET DIAMETER (mm)		D0	12.7			
CALCULATION UPSTREAM RELIEVING PRESSURE, BACK PRESSURE								
36	P1=Pset +Pover +Patm (kPa)			P1		408		
37	P2=Pback +Patm (kPa)			P2		100		
38	PR=P2/P1			PR		0.25		
CALCULATION GAS CONSTANT								
39	$C = 0.03948 \times \left\{ K \times \left[\frac{2}{K+1} \right]^{\frac{K+1}{K-1}} \right\}^{0.5}$			C		0.03		
CALCULATED RATED DISCHARGE CAPACITY								
40	$W_s = [A_s \times C \times K_d \times P_1 \times K_b \times K_c] / \sqrt{\frac{(T + 273.15) \times Z}{M}}$			W _s (kg/h)		79		
CALCULATION REQUIRED ORIFICE AREA								
41	$A_{req} = \frac{W_{req.}}{C \times K_d \times P_1 \times K_b \times K_c} \times \sqrt{\frac{(T + 273.15) \times Z}{M}}$			A _{req.} (mm²)		1.33		
NOISE CALCULATION ACC. TO API RP 521								
42	$L_{30} = L + 10 \log \left[0.5 \times \frac{W_s}{3600} \times \left(91.2 \times \left(\frac{K \times (T + 273.15)}{M} \right)^{0.5} \right)^2 \right]$			db		86		
CALCULATION REACTION FORCE								
43	$A_0 = (\pi \times D_0^2) / 4$			F _{r.} (N)		11		
44	$F = 129 \times \left(\frac{W_s}{3600} \right) \times \sqrt{\frac{K \times (T + 273.15)}{(K + 1) \times M}} + \frac{(A_0 \times P_0)}{1000}$							

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1	VALVE ID				11	CALCULATION NOTES		
2	TAG No.	RV-2200 A-B-C			12			
3	VALVE MODEL NO.	C1E22/1C21705			13			
4	SIZING DATA				14			
5	DESIGN CODE	ASME SECTION VIII	SIZING STD.	API 520	15			
6	FLUID STATE	LIQUID			16			
7	CALCULATION SUMMARY							
8	DISCHARGE CAPACITY	REQUIRED (kg/h)#(L/min)	6775.32#131		18	AREA	REQUIRED (mm²)	81.26
9		RATED (kg/h)	12840.75		19		SELECTED (mm²)	154
10					20			
VARIABLE TYPE		VARIABLE NAME		SYMBOL	INPUT VALUE		EQUATION VALUE	
21	FLUID DATA	VISCOSITY (cP)		μ	19.38			
22		SPECIFIC GRAVITY		SG	0.86			
23	SIZING DATA	REQUIRED DISCHARGE CAPACITY(kg/h)		Wreq.	6775.32			
24		SET PRESSURE (barg)		Pset	7			
25		OVER PRESSURE (barg)		Pover	0.7			
26		CONSTANT BACK PRESSURE (barg)			0			
27		VARIABLE BACK PRESSURE(barg)			0			
28		BUILT UP BACK PRESSURE(barg)			0			
29		TOTAL BACK PRESSURE(barg)		Pback	0			
30		RELIEVING TEMP. (°C)		T	70			
31		RUPTURE DISC COEFFICIENT		Kc	1			
32		DISCHARGE COEFFICIENT		Kd	0.65			
33		ORIFICE AREA (mm²)		A	154			
34		VISCOSITY CORRECTION FACTOR INITIAL		Kv,i	1			
35		VISCOSITY CORRECTION FACTOR FINAL		Kv,f	0.98			
36		BACK PRESSURE CORRECTION FACTOR		Kw	1			
CALCULATION UPSTREAM RELIEVING PRESSURE, BACK PRESSURE								
37	P1=Pset +Pover +Patm (kPa)			P1			870	
38	P2=Pback +Patm (kPa)			P2			100	
CALCULATION REQUIRED ORIFICE AREA								
39	$Q_i = (W_{req} \times 1000)/(60 \times 998 \times G)$			lit/min			131.57	
40	$A_{req} = \frac{11.78 \times Q_i}{K_d K_w K_c K_{v,f}} \sqrt{\frac{G}{(P_1 - P_2)}}$			mm²			81.26	
CALCULATION REYNOLDS NUMBER								
40	$Re_i = (Q_i \times 18800 \times G)/(\mu \times \sqrt{A})$			R _i			12295.98	
41	$Re_f = (Q_s \times 18800 \times G)/(\mu \times \sqrt{A})$			R _f			16763.02	
CALCULATED RATED DISCHARGE CAPACITY								
42	$Q_s = \frac{K_d K_w K_c K_{v,f} A_s}{11.78} \sqrt{\frac{(P_1 - P_2)}{G}}$			lit/min			249.35	
43	$W_s = (Q_s \times 60 \times 998 \times G)/(1000)$			kg/h			12840.75	

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Savasoft V1.0 β - KIASA Safety Valve Sizing Software

1	VALVE ID				11	CALCULATION NOTES		
2	TAG No.	RV-2201 A/B/C			12			
3	VALVE MODEL NO.	C1E22/1C21705			13			
4	SIZING DATA				14			
5	DESIGN CODE	ASME SECTION VIII	SIZING STD.	API 520	15			
6	FLUID STATE	LIQUID			16			
7	CALCULATION SUMMARY							
8	DISCHARGE CAPACITY	REQUIRED (kg/h)#(L/min)	6775.32#131		18	AREA	REQUIRED (mm²)	81.26
9		RATED (kg/h)	12840.75		19		SELECTED (mm²)	154
10					20			
VARIABLE TYPE		VARIABLE NAME		SYMBOL	INPUT VALUE		EQUATION VALUE	
21	FLUID DATA	VISCOSITY (cP)		μ	19.38			
22		SPECIFIC GRAVITY		SG	0.86			
23	SIZING DATA	REQUIRED DISCHARGE CAPACITY(kg/h)		Wreq.	6775.32			
24		SET PRESSURE (barg)		Pset	7			
25		OVER PRESSURE (barg)		Pover	0.7			
26		CONSTANT BACK PRESSURE (barg)			0			
27		VARIABLE BACK PRESSURE(barg)			0			
28		BUILT UP BACK PRESSURE(barg)			0			
29		TOTAL BACK PRESSURE(barg)		Pback	0			
30		RELIEVING TEMP. (°C)		T	70			
31		RUPTURE DISC COEFFICIENT		Kc	1			
32		DISCHARGE COEFFICIENT		Kd	0.65			
33		ORIFICE AREA (mm²)		A	154			
34		VISCOSITY CORRECTION FACTOR INITIAL		Kv,i	1			
35		VISCOSITY CORRECTION FACTOR FINAL		Kv,f	0.98			
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CALCULATED RATED DISCHARGE CAPACITY								
42	$Q_s = \frac{K_d K_w K_c K_{v,f} A_s}{11.78} \sqrt{\frac{(P_1 - P_2)}{G}}$			lit/min			249.35	
43	$W_s = (Q_s \times 60 \times 998 \times G)/(1000)$			kg/h			12840.75	

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