


**Quote Number:** No Prpd. Chk. Appr. Date Revision

Client: **OGDCL**  
 Location: End-User Ref. No.:  
 Project: **OG-4147** Project Ref. No.:

Valve ID					SIZING DATA					
1	Tag No.	20-PSV-01/02			41	Design Code	ASME Section VIII	Sizing Std.	API 520	
2	Service				42	Sizing Basis	Blocked Discharge			
3	PID No.				43	Fluid State at Inlet	Gas / Vapor			
4	Line No.				44	Relieving Case	Pressure Relief			
5			Quantity		45					
6						46	<b>Fluid Properties</b>			
7	<b>GENERAL</b>					47	Fluid Name	Natural Gas (SG=0.6)		
8	Valve Type	Conventional, Direct Spring-Op			48	Molecular Weight, M	20.8			
9	Safety / Relief	Safety	Balanced	No	49	Compressibility, Z	1.000			
10	Nozzle	Full	Bonnet	Closed	50	Ratio of Sp. Heats, k (Cp / Cv)	1.270			
11	<b>CONNECTIONS</b>					51	Gas Constant, C	344.1		
12	Inlet	2"	Fingd.	600#	RF	Standard	52			
13	Outlet	3"	Fingd.	150#	RF	ASME B16.5	53			
14	<b>MATERIALS OF CONSTRUCTION</b>					54				
15	Body / Base	CS SA216-WCB/WCC			55					
16	Bonnet / Cylinder	CS SA216-WCB/WCC			56					
17	Nozzle	316 SST			57					
18	Disc	316 SST			58					
19	Seat	Metal			59	<b>Sizing Coefficients</b>				
20	Spindle	316 SST			60	K, Gas	Kd, Gas	0.866	0.962	
21	Guide	SS A297 Gr. HE			61	Kb	Kc	1	1	
22	Spring	InconeI® X750			62					
23	Gaskets	316 SST			63					
24	Bellows	N/A			64	<b>Required Capacity</b>				
25	Cap Type	Packed Lift Lever w/ Test Rod			65	Total	68665			
26	NACE MR0175/ISO 15156:2015	Yes			66					
27	Accessories				67	<b>Pressures</b>				
28					68	MAWP	Operating			
29					69	Set	CDTP	1265	1265.00	
30					70	Over Pressure	126.5 10%			
31	<b>SIZING / SELECTION SUMMARY</b>					71	Back Pressure	Built-Up	0	
32	Valve Model No.	2H3JOS-E45E-N2			72	Constant Superimposed		0		
33	Brand	Crosby®			73	Variable Superimposed		0		
34	Area	Calculated	Selected	0.885	0.887	74		Total	0	
35	(in²)	Data Set	Orifice	ASME	H	75	Inlet Loss			
36	Flow	Unit	Required	lb/hr	68665	76	Atmospheric (Barometric)			
37		Rated	Actual	68811.554	76457.282	77	<b>Temperatures</b>			
38						78	Normal System			
39	Reaction Force, Open Discharge			640.66 daN		79	Operating	Relieving	147	
40	Noise Level (db), Open Discharge			123.4 at 100-ft		80	Design Min	Design Max		

<b>Tag Notes</b>					<b>Valve Dimensions</b>	A		
						in		6.06
								B
								6.38
								C
					27.25			
				lb	Weight			
					75			

Quote Number:				No	Prpd.	Chk.	Appr.	Date	Revision	
Client: OGDCL				End-User Ref. No.:						
Location:				Project Ref. No.:						
Project: OG-4147										
Valve ID				SIZING DATA						
1	Tag No. 20-PSV-03/04			41	Design Code		ASME Section VIII	Sizing Std.	API 520	
2	Service			42	Sizing Basis		Fire Case			
3	PID No.			43	Fluid State at Inlet		Gas / Vapor			
4	Line No.			44	Relieving Case		Pressure Relief			
5	Quantity			45						
6	<b>Fluid Properties</b>									
7	<b>GENERAL</b>				46	Fluid Name		Water & Hydrocarbon		
8	Valve Type		Conventional, Direct Spring-Op			47	Molecular Weight, M		22	
9	Safety / Relief		Safety		48	Compressibility, Z		1.000		
10	Nozzle		Full		49	Ratio of Sp. Heats, k (Cp / Cv)		1.270		
11			Balanced No		50	Gas Constant, C		344.1		
12			Bonnet Closed							
CONNECTIONS										
13	Inlet	1"	Fingd.	600#	RF	Standard				
14	Outlet	2"	Fingd.	150#	RF	ASME B16.5				
MATERIALS OF CONSTRUCTION										
15	Body / Base		CS SA216-WCB/WCC			51				
16	Bonnet / Cylinder		CS SA216-WCB/WCC			52				
17	Nozzle		316 SST			53				
18	Disc		316 SST			54				
19	Seat		Metal			55				
20	Spindle		316 SST			56				
21	Guide		SS A297 Gr. HE			57				
22	Spring		InconeI® X750			58				
23	Gaskets		316 SST			59				
24	Bellows		N/A			60				
25	Cap Type		Packed Lift Lever w/ Test Rod			61				
26	NACE MR0175/ISO 15156:2015		Yes			62				
27	Accessories				63					
28					64					
29					65					
30					66					
SIZING / SELECTION SUMMARY										
31	Valve Model No.		1D2JOS-E45E-N2			67				
32	Brand		Crosby®			68				
33	Area	Calculated	Selected	0.089	0.124	69				
34	(in²)	Data Set	Orifice	ASME	D	70				
35	Flow	Unit	Required	lb/hr	6445	71				
36		Rated	Actual	8991.838	9990.931	72				
37	Reaction Force, Open Discharge		84.26 daN			73				
38	Noise Level (db), Open Discharge		116.2 at 100-ft			74				
39						75				
40						76				
				<b>Required Capacity</b>						
				Total		Unit		lb/hr		
						6445				
				<b>Pressures</b>						
				Unit		psig				
				MAWP		Operating				
				Set		CDTP		1265 1277.65		
				Over Pressure				265.65 21%		
				Back Pressure		Built-Up		0		
						Constant Superimposed		0		
						Variable Superimposed		0		
						Total		0		
				Inlet Loss		0		0%		
				Atmospheric (Barometric)		14.696 psia				
				<b>Temperatures</b>						
				Unit		°F				
				Normal System						
				Operating		Relieving		433 433		
				Design Min		Design Max				
Tag Notes				Valve Dimensions						
				in		A				
						4.13				
						B				
						4.50				
						C				
						20.00				
				lb		Weight				
						36				

Quote Number:				No	Prpd.	Chk.	Appr.	Date	Revision	
Client: OGDCL				End-User Ref. No.:						
Location:				Project Ref. No.:						
Project: OG-4147										
1	<b>Valve ID</b>				41	<b>SIZING DATA</b>				
2	Tag No.	20-PSV-05/06			42	Design Code	ASME Section VIII	Sizing Std.	API 520	
3	Service				43	Sizing Basis	Fire Case			
4	PID No.				44	Fluid State at Inlet	Gas / Vapor			
5	Line No.			Quantity	45	Relieving Case	Pressure Relief			
6					46	<b>Fluid Properties</b>				
7	<b>GENERAL</b>				47	Fluid Name		Water & Hydrocarbon		
8	Valve Type	Conventional, Direct Spring-Op			48	Molecular Weight, M		78.4		
9	Safety / Relief	Safety	Balanced	No	49	Compressibility, Z		1.000		
10	Nozzle	Full	Bonnet	Closed	50	Ratio of Sp. Heats, k (Cp / Cv)		1.270		
11	<b>CONNECTIONS</b>				51	Gas Constant, C		344.1		
12	Inlet	1 1/2"	Flngd.	900# RTJ	Standard					
13	Outlet	2"	Flngd.	300# RF	ASME B16.5					
14	<b>MATERIALS OF CONSTRUCTION</b>				54					
15	Body / Base		CS SA216-WCB/WCC		55					
16	Bonnet / Cylinder		CS SA216-WCB/WCC		56					
17	Nozzle		316 SST		57					
18	Disc		316 SST		58					
19	Seat		Metal		59	<b>Sizing Coefficients</b>		Unit	-	
20	Spindle		316 SST		60	K, Gas	Kd, Gas	0.866	0.962	
21	Guide		SS A297 Gr. HE		61	Kb	Kc	1	1	
22	Spring		InconeI® X750		62					
23	Gaskets		316 SST		63					
24	Bellows		N/A		64	<b>Required Capacity</b>		Unit	lb/hr	
25	Cap Type		Packed Lift Lever w/ Test Rod		65	Total		5004		
26	NACE MR0175/ISO 15156:2015		Yes		66					
27	Accessories				67	<b>Pressures</b>		Unit	psig	
28					68	MAWP	Operating			
29					69	Set	CDTP	1265	1277.65	
30					70	Over Pressure		265.65	21%	
31	<b>SIZING / SELECTION SUMMARY</b>				71	Back Pressure		Built-Up	0	
32	Valve Model No.		1.5D2JOS-E56RE-N2		72	Constant Superimposed		0		
33	Brand		Crosby®		73	Variable Superimposed		0		
34	Area	Calculated	Selected	0.038	0.124	Total		0		
35	(in²)	Data Set	Orifice	ASME	D	Inlet Loss		0	0%	
36	Flow	Unit	Required	lb/hr	5004	Atmospheric (Barometric)		14.696	psia	
37		Rated	Actual	16509.372	18343.746					
38					77	<b>Temperatures</b>		Unit	°F	
39	Reaction Force, Open Discharge		84.26 daN		79	Operating	Normal System			
40	Noise Level (db), Open Discharge		113.6 at 100-ft		80	Design Min	Relieving	484	484	
						Design Max				
Tag Notes					Valve Dimensions	in	A			
							4.13			
							B			
							5.50			
							C			
				20.75	lb	Weight				
				65						

Quote Number:						No	Prpd.	Chk.	Appr.	Date	Revision
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Client: OGDCL  
 Location: End-User Ref. No.:  
 Project: OG-4147 Project Ref. No.:

Valve ID					SIZING DATA				
1					41				
2	Tag No.	30-PSV-01/02			42	Design Code	ASME Section VIII	Sizing Std.	API 520
3	Service				43	Sizing Basis	Fire Case		
4	PID No.				44	Fluid State at Inlet	Gas / Vapor		
5	Line No.			Quantity	45	Relieving Case	Pressure Relief		
6					46	<b>Fluid Properties</b>			
7	<b>GENERAL</b>				47	Fluid Name		HydroCarbon	
8	Valve Type	Balanced Bellows, Direct Spring-Op			48	Molecular Weight, M		84	
9	Safety / Relief	Safety	Balanced	Yes	49	Compressibility, Z		1.000	
10	Nozzle	Full	Bonnet	Vented	50	Ratio of Sp. Heats, k (Cp / Cv)		1.270	
11	<b>CONNECTIONS</b>				51	Gas Constant, C		344.1	
12	Inlet	1 1/2"	Fingd.	150# RF Standard	52				
13	Outlet	2"	Fingd.	150# RF ASME B16.5	53				
14	<b>MATERIALS OF CONSTRUCTION</b>				54				
15	Body / Base	CS SA216-WCB/WCC			55				
16	Bonnet / Cylinder	CS SA216-WCB/WCC			56				
17	Nozzle	316 SST			57				
18	Disc	316 SST			58				
19	Seat	Metal			59	<b>Sizing Coefficients</b>		Unit	-
20	Spindle	416 SST			60	K, Gas	Kd, Gas	0.866	0.962
21	Guide	SS A297 Gr. HE			61	Kb	Kc	1	1
22	Spring	Ctd. Alloy Steel			62				
23	Gaskets	316 SST			63				
24	Bellows	Inconel® 625			64	<b>Required Capacity</b>		Unit	lb/hr
25	Cap Type	Packed Lift Lever w/ Test Rod			65	Total		2953	
26	NACE MR0175/ISO 15156:2015	No			66				
27	Accessories				67	<b>Pressures</b>		Unit	psig
28					68	MAWP	Operating		
29					69	Set	CDTP	65	65.00
30					70	Over Pressure		13.65	21%
31	<b>SIZING / SELECTION SUMMARY</b>				71	Back Pressure	Built-Up		20
32	Valve Model No.	1.5F2JBS-E16E-SPL			72		Constant Superimposed		0
33	Brand	Crosby®			73		Variable Superimposed		0
34	Area	Calculated	Selected	0.284	0.347		Total		20
35	(in²)	Data Set	Orifice	ASME	F	Inlet Loss		0	0%
36	Flow	Unit	Required	lb/hr	2953	Atmospheric (Barometric)		14.696	psia
37		Rated	Actual	3611.978	4013.309				
38							<b>Temperatures</b>		Unit
39	Reaction Force, Open Discharge		9.75 daN		79	Normal System			
40	Noise Level (db), Open Discharge		92.1 at 100-ft		80	Operating	Relieving	140	140
					Design Min		Design Max		

Tag Notes			Valve Dimensions	A	
				4.88	
				B	
				4.75	
				C	
				23.75	
		lb	Weight		
				50	


Quote Number:					No	Prpd.	Chk.	Appr.	Date	Revision	
Client: OGDCL					End-User Ref. No.:						
Location:					Project Ref. No.:						
Project: OG-4147											

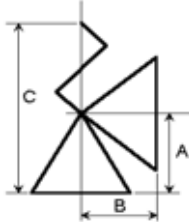
Valve ID					SIZING DATA					
1	Tag No.	40-PSV-01/02			41	Design Code	ASME Section VIII	Sizing Std.	API 520	
2	Service				42	Sizing Basis	Control Valve Failure			
3	PID No.				43	Fluid State at Inlet	Gas / Vapor			
4	Line No.		Quantity		44	Relieving Case	Pressure Relief			
5					45					
6					46					

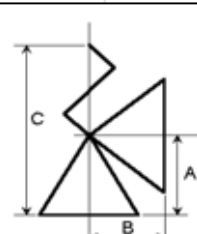
GENERAL					Fluid Properties					
7	Valve Type	<i>Balanced Bellows, Direct Spring-Op</i>			47	Fluid Name	Hydrocarbon			
8	Safety / Relief	Safety	Balanced	Yes	48	Molecular Weight, M	20			
9	Nozzle	Full	Bonnet	Vented	49	Compressibility, Z	1.000			
10					50	Ratio of Sp. Heats, k (Cp / Cv)	1.270			
11					51	Gas Constant, C	344.1			

CONNECTIONS					Sizing Coefficients					
12	Inlet	8"	Fingd.	300#	RF	Standard	K, Gas	Kd, Gas	0.866	0.962
13	Outlet	10"	Fingd.	150#	RF	ASME B16.5	Kb	Kc	0.894	1
14					59					

MATERIALS OF CONSTRUCTION					Required Capacity					
15	Body / Base	CS SA216-WCB/WCC			54		Unit	lb/hr		
16	Bonnet / Cylinder	CS SA216-WCB/WCC			55	Total	257707			
17	Nozzle	316 SST			56					
18	Disc	316 SST			57					
19	Seat	Metal			58					
20	Spindle	416 SST			59					
21	Guide	SS A297 Gr. HE			60					
22	Spring	InconeI® X750			61					
23	Gaskets	316 SST			62					
24	Bellows	InconeI® 625			63					
25	Cap Type	Packed Lift Lever w/ Test Rod			64					
26	NACE MR0175/ISO 15156:2015	No			65					
27	Accessories				66					
28					67					
29					68					
30					69					
31					70					

SIZING / SELECTION SUMMARY					Pressures					
32	Valve Model No.	8T10JBS-E45C6E			71		Unit	psig		
33	Brand	Crosby®			72	MAWP	Operating			
34	Area	Calculated	Selected	24.841	29.359	73	Set	CDTP	180	180.00
35	(in <sup>2</sup> )	Data Set	Orifice	ASME	T	74	Over Pressure		18	10%
36		Unit	Required	lb/hr	257707	75	Back Pressure	Built-Up		80
37	Flow	Rated	Actual	304581.438	338423.820	76		Constant Superimposed		0
38						77	Variable Superimposed		0	
39	Reaction Force, Open Discharge			2933.92 daN		78	Total		80	
40	Noise Level (db), Open Discharge			110.7 at 100-ft		79	Inlet Loss		0	0%
						80	Atmospheric (Barometric)		14.696	psia

Temperatures					Tag Notes					
77		Unit	°F			Tag Notes	Valve Dimensions	in	A	
78	Normal System				lb			Weight	930	
79	Operating	Relieving	137							
80	Design Min	Design Max								

Quote Number:						No	Prpd.	Chk.	Appr.	Date	Revision	
Client: OGDCL						End-User Ref. No.:						
Location:						Project Ref. No.:						
Project: OG-4147												
Valve ID						SIZING DATA						
1	Tag No. 40-PSV-06/07					41	Design Code		ASME Section VIII		Sizing Std. API 520	
2	Service					42	Sizing Basis		Valve Capacity			
3	PID No.					43	Fluid State at Inlet		Steam			
4	Line No.					44	Relieving Case		Pressure Relief			
5	Quantity					45						
6						46	<b>Fluid Properties</b>					
7	<b>GENERAL</b>					47	Fluid Name		Steam			
8	Valve Type <i>Balanced Bellows, Direct Spring-Op</i>					48	Molecular Weight, M		18.020			
9	Safety / Relief <i>Safety</i>					49	Compressibility, Z		1.000			
10	Nozzle <i>Full</i>					50	Ratio of Sp. Heats, k (Cp / Cv)		1.310			
11	<b>CONNECTIONS</b>					51	Saturation Temperature		302.622 °F			
12	Inlet	4"	Fingd.	150#	RF	Standard						
13	Outlet	6"	Fingd.	150#	RF	ASME B16.5						
14	<b>MATERIALS OF CONSTRUCTION</b>					54						
15	Body / Base		CS SA216-WCB/WCC			55						
16	Bonnet / Cylinder		CS SA216-WCB/WCC			56						
17	Nozzle		316 SST			57						
18	Disc		316 SST			58						
19	Seat		Metal			59	<b>Sizing Coefficients</b>		Unit		-	
20	Spindle		416 SST			60	K, Steam	Kd, Steam	0.866	0.962		
21	Guide		SS A297 Gr. HE			61	Kb	Kc	0.845	1		
22	Spring		Chr. Steel - Alum. Metallized			62	Kn	Ksh	1	1		
23	Gaskets		316 SST			63	Ksc					
24	Bellows		Inconel® 625			64	<b>Required Capacity</b>		Unit		lb/hr	
25	Cap Type		Screwed (Ht. Rest.)			65	Total		12000			
26	NACE MR0175/ISO 15156:2015		Yes			66						
27	Accessories	ASME Code Case 2203				67	<b>Pressures</b>		Unit		psig	
28						68	MAWP	Operating				
29						69	Set	CDTP	50	50		
30						70	Over Pressure		5	10%		
31	<b>SIZING / SELECTION SUMMARY</b>					71	Back Pressure		Built-Up		25	
32	Valve Model No.		4N6JBS-E15A-N2			72			Constant Superimposed		0	
33	Brand		Crosby®			73			Variable Superimposed		0	
34	Area (in²)	Calculated	Selected	4.569	4.9	74			Total		25	
35		Data Set	Orifice	ASME	N	75	Inlet Loss		0	0%		
36	Flow	Unit	Required	lb/hr	12000	76	Atmospheric (Barometric)		14.696	psia		
37		Saturated	Superheated	12874.094	12870.512	77	<b>Temperatures</b>		Unit		°F	
38						78	Normal System					
39	Reaction Force, Open Discharge			99.39 daN		79	Operating	Relieving	303			
40	Noise Level (db), Open Discharge			89.2 at 100-ft		80	Design Min	Design Max				
Tag Notes						Valve Dimensions	in	A				
								7.75				
								B				
								8.25				
								C				
								37.75				
lb	Weight	260										


Quote Number:

No Prpd. Chk. Appr. Date Revision

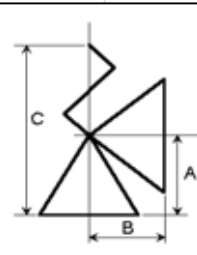
Client: OGDCL  
 Location:  
 Project: OG-4147

End-User Ref. No.:  
 Project Ref. No.:

1	<b>Valve ID</b>				41	<b>SIZING DATA</b>			
2	Tag No.	40-PSV-08/09			42	Design Code	ASME Section VIII	Sizing Std.	API 520
3	Service				43	Sizing Basis	Fire Case		
4	PID No.				44	Fluid State at Inlet	Steam		
5	Line No.			Quantity	45	Relieving Case	Pressure Relief		
6					46	<b>Fluid Properties</b>			
7	<b>GENERAL</b>				47	Fluid Name		Steam	
8	Valve Type	Balanced Bellows, Direct Spring-Op			48	Molecular Weight, M		18.020	
9	Safety / Relief	Safety	Balanced	Yes	49	Compressibility, Z		1.000	
10	Nozzle	Full	Bonnet	Vented	50	Ratio of Sp. Heats, k (Cp / Cv)		1.310	
11	<b>CONNECTIONS</b>				51	Saturation Temperature		307.772 °F	
12	Inlet	1 1/2"	Flngd.	150# RF Standard	52				
13	Outlet	3"	Flngd.	150# RF ASME B16.5	53				
14	<b>MATERIALS OF CONSTRUCTION</b>				54				
15	Body / Base		CS SA216-WCB/WCC		55				
16	Bonnet / Cylinder		CS SA216-WCB/WCC		56				
17	Nozzle		316 SST		57				
18	Disc		316 SST		58				
19	Seat		Metal		59	<b>Sizing Coefficients</b>		Unit	-
20	Spindle		316 SST		60	K, Steam	Kd, Steam	0.866	0.962
21	Guide		SS A297 Gr. HE		61	Kb	Kc	1	1
22	Spring		Inconel® X750		62	Kn	Ksh	1	0.999
23	Gaskets		316 SST		63	Ksc			
24	Bellows		Inconel® 625		64	<b>Required Capacity</b>		Unit	lb/hr
25	Cap Type		Packed Lift Lever w/ Test Rod		65	Total		2144	
26	NACE MR0175/ISO 15156:2015		Yes		66				
27	Accessories				67	<b>Pressures</b>		Unit	psig
28					68	MAWP	Operating		
29					69	Set	CDTP	50	50
30					70	Over Pressure		10.5	21%
31	<b>SIZING / SELECTION SUMMARY</b>				71	Back Pressure	Built-Up		15
32	Valve Model No.		1.5H3JBS-E15E-N2		72		Constant Superimposed		0
33	Brand		Crosby®		73		Variable Superimposed		0
34	Area	Calculated	Selected	0.640	0.887		Total		15
35	(in²)	Data Set	Orifice	ASME	H				
36	Flow	Unit	Required	lb/hr	2144				
37		Saturated	Superheated	2974.015	2972.177				
38					77	<b>Temperatures</b>		Unit	°F
39	Reaction Force, Open Discharge		19.44 daN		79	Normal System			
40	Noise Level (db), Open Discharge		96.8 at 100-ft		80	Operating	Relieving	307	307.772
						Design Min	Design Max		

<b>Tag Notes</b>			<b>Valve Dimensions</b>	A	
				5.13	
				B	
				4.88	
				C	
				23.75	
		lb	Weight	55	

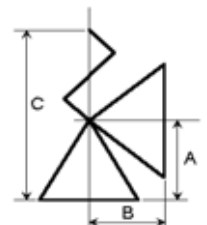


Quote Number:				No	Prpd.	Chk.	Appr.	Date	Revision	
Client: OGDCL				End-User Ref. No.:						
Location:				Project Ref. No.:						
Project: OG-4147										
1	Valve ID				41	SIZING DATA				
2	Tag No.	50-PSV-01/02		42	Design Code	ASME Section VIII	Sizing Std.	API 520		
3	Service			43	Sizing Basis	Fire Case				
4	PID No.			44	Fluid State at Inlet	Gas / Vapor				
5	Line No.			45	Relieving Case	Pressure Relief				
6	Quantity			46	Fluid Properties					
7	GENERAL				47	Fluid Name		Natural Gas (SG=0.6)		
8	Valve Type	Conventional, Direct Spring-Op		48	Molecular Weight, M		17.400			
9	Safety / Relief	Safety	Balanced No	49	Compressibility, Z		1.000			
10	Nozzle	Full	Bonnet Closed	50	Ratio of Sp. Heats, k (Cp / Cv)		1.270			
11	CONNECTIONS				51	Gas Constant, C		344.1		
12	Inlet	1 1/2"	Fingd. 900# RF	Standard	52					
13	Outlet	2"	Fingd. 300# RF	ASME B16.5	53					
14	MATERIALS OF CONSTRUCTION				54					
15	Body / Base		SS SA351-CF8M		55					
16	Bonnet / Cylinder		SS SA351-CF8M		56					
17	Nozzle		Monel®		57					
18	Disc		Monel®		58					
19	Seat		Metal		59	Sizing Coefficients			Unit	-
20	Spindle		316 SST		60	K, Gas	Kd, Gas	0.866	0.962	
21	Guide		SS A297 Gr. HE		61	Kb	Kc	1	1	
22	Spring		316 SST		62					
23	Gaskets		316 SST		63					
24	Bellows		N/A		64	Required Capacity			Unit	
25	Cap Type		Packed Lift Lever w/ Test Rod		65	Total				
26	NACE MR0175/ISO 15156:2015		No		66					
27	Accessories			67	Pressures			Unit	psig	
28				68	MAWP	Operating				
29				69	Set	CDTP		1265	1265.00	
30				70	Over Pressure		265.65	21%		
31	SIZING / SELECTION SUMMARY				71	Back Pressure		Built-Up		126
32	Valve Model No.		1.5D2JOS-E52M7E		72			Constant Superimposed		0
33	Brand		Crosby®		73			Variable Superimposed		0
34	Area (in²)	Calculated	Selected	0.124	74			Total		126
35		Data Set	Orifice	ASME D	75	Inlet Loss				0
36	Flow	Unit	Required	lb/hr	76	Atmospheric (Barometric)				14.696 psia
37		Rated	Actual	12511.437	13901.597	77	Temperatures			Unit
38					78	Normal System				
39	Reaction Force, Open Discharge				79	Operating	Relieving	20	-95	
40	Noise Level (db), Open Discharge				80	Design Min	Design Max			
Tag Notes					Valve Dimensions					
						A				
						B				
						C				
				Weight						



Quote Number:				No	Prpd.	Chk.	Appr.	Date	Revision
Client: OGDCL				End-User Ref. No.:					
Location:				Project Ref. No.:					
Project: OG-4147									
1	<b>Valve ID</b>				41	<b>SIZING DATA</b>			
2	Tag No.	50-PSV-03/04			42	Design Code	ASME Section VIII	Sizing Std.	API 520
3	Service				43	Sizing Basis	Fire Case		
4	PID No.				44	Fluid State at Inlet	Gas / Vapor		
5	Line No.			Quantity	45	Relieving Case	Pressure Relief		
6					46	<b>Fluid Properties</b>			
7	<b>GENERAL</b>				47	Fluid Name		Natural Gas (SG=0.6)	
8	Valve Type	Conventional, Direct Spring-Op			48	Molecular Weight, M		17.400	
9	Safety / Relief	Safety	Balanced	No	49	Compressibility, Z		1.000	
10	Nozzle	Full	Bonnet	Closed	50	Ratio of Sp. Heats, k (Cp / Cv)		1.270	
11	<b>CONNECTIONS</b>				51	Gas Constant, C		344.1	
12	Inlet	1"	Fingd.	300# RF	Standard				
13	Outlet	2"	Fingd.	150# RF	ASME B16.5				
14	<b>MATERIALS OF CONSTRUCTION</b>				54				
15	Body / Base		SS SA351-CF8M		55				
16	Bonnet / Cylinder		SS SA351-CF8M		56				
17	Nozzle		Monel®		57				
18	Disc		Monel®		58				
19	Seat		Metal		59	<b>Sizing Coefficients</b>		Unit	-
20	Spindle		316 SST		60	K, Gas	Kd, Gas	0.866	0.962
21	Guide		SS A297 Gr. HE		61	Kb	Kc	1	1
22	Spring		316 SST		62				
23	Gaskets		316 SST		63				
24	Bellows		N/A		64	<b>Required Capacity</b>		Unit	
25	Cap Type		Packed Lift Lever w/ Test Rod		65	Total			
26	NACE MR0175/ISO 15156:2015		No		66				
27	Accessories				67	<b>Pressures</b>		Unit	psig
28					68	MAWP	Operating		
29					69	Set	CDTP	545	545.00
30					70	Over Pressure		114.45	21%
31	<b>SIZING / SELECTION SUMMARY</b>				71	Back Pressure		Built-Up	54.5
32	Valve Model No.		1D2JOS-E32M7E		72	Constant Superimposed		0	
33	Brand		Crosby®		73	Variable Superimposed		0	
34	Area	Calculated	Selected	0.124	74	Total		54.5	
35	(in <sup>2</sup> )	Data Set	Orifice	ASME D	75	Inlet Loss			
36		Unit	Required	lb/hr	76	Atmospheric (Barometric)		14.696	psia
37	Flow	Rated	Actual	6468.068 7186.742	77	<b>Temperatures</b>		Unit	°F
38					78	Normal System			
39	Reaction Force, Open Discharge		25.24 daN		79	Operating	Relieving	-25	-200
40	Noise Level (db), Open Discharge		103.7 at 100-ft		80	Design Min	Design Max		
Tag Notes					Valve Dimensions	in		A	
								4.13	
								B	
								4.50	
								C	
				lb		Weight		20.00	
								36	

Quote Number:					No	Prpd.	Chk.	Appr.	Date	Revision	
Client: OGDCL					End-User Ref. No.:						
Location:					Project Ref. No.:						
Project: OG-4147											
Valve ID					SIZING DATA						
1	Tag No. 50-PSV-05/06				41	Design Code	ASME Section VIII		Sizing Std.	API 520	
2	Service				42	Sizing Basis	Fire Case				
3	PID No.				43	Fluid State at Inlet	Gas / Vapor				
4	Line No.				44	Relieving Case	Pressure Relief				
5	Quantity				45	<b>Fluid Properties</b>					
6					46	Fluid Name		Natural Gas (SG=0.6)			
7	GENERAL				47	Molecular Weight, M		17.400			
8	Valve Type	Conventional, Direct Spring-Op			48	Compressibility, Z		1.000			
9	Safety / Relief	Safety	Balanced	No	49	Ratio of Sp. Heats, k (Cp / Cv)		1.270			
10	Nozzle	Full	Bonnet	Closed	50	Gas Constant, C		344.1			
11	CONNECTIONS				51	<b>Sizing Coefficients</b>					
12	Inlet	1"	Fingd.	600# RF Standard	52	K, Gas		Kd, Gas	0.866 0.962		
13	Outlet	2"	Fingd.	150# RF ASME B16.5	53	Kb		Kc	1 1		
14	MATERIALS OF CONSTRUCTION				54	<b>Required Capacity</b>					
15	Body / Base		CS SA216-WCB/WCC		55	Total		Unit			
16	Bonnet / Cylinder		CS SA216-WCB/WCC		56	<b>Pressures</b>					
17	Nozzle		316 SST		57	MAWP		Operating		Unit psig	
18	Disc		316 SST		58	Set		CDTP		1265 1265.00	
19	Seat		Metal		59	Over Pressure				265.65 21%	
20	Spindle		416 SST		60	Back Pressure		Built-Up		0	
21	Guide		SS A297 Gr. HE		61			Constant Superimposed		0	
22	Spring		InconeI® X750		62			Variable Superimposed		0	
23	Gaskets		316 SST		63			Total		0	
24	Bellows		N/A		64	Inlet Loss				0 0%	
25	Cap Type		Screwed (Ht. Rest.)		65	Atmospheric (Barometric)				14.696 psia	
26	NACE MR0175/ISO 15156:2015		No		66	<b>Temperatures</b>					
27	Accessories				67	Normal System					
28					68	Operating		Relieving		150 150	
29					69	Design Min		Design Max			
30					70						
31	SIZING / SELECTION SUMMARY				71						
32	Valve Model No.		1D2JOS-E45C6A		72						
33	Brand		Crosby®		73						
34	Area	Calculated	Selected	0.124	74						
35	(in²)	Data Set	Orifice	ASME D	75						
36	Flow	Unit	Required	lb/hr	76						
37		Rated	Actual	9676.311 10751.456	77						
38					78						
39	Reaction Force, Open Discharge		84.26 daN		79						
40	Noise Level (db), Open Discharge		115.9 at 100-ft		80						
Tag Notes					Valve Dimensions						
					in		A				
							4.13				
							B				
							4.50				
							C				
				lb		16.75					
						Weight					
						36					





Quote Number:							No	Prpd.	Chk.	Appr.	Date	Revision
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Client: *OGDCL*  
 Location:  
 Project: *OG-4147*

End-User Ref. No.:  
 Project Ref. No.:

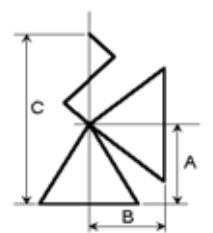
Valve ID					SIZING DATA					
1	Tag No.	<i>60-PSV-03/04</i>			41	Design Code	<i>ASME Section VIII</i>	Sizing Std.	<i>API 520</i>	
2	Service				42	Sizing Basis	<i>Fire Case</i>			
3	PID No.				43	Fluid State at Inlet	<i>Gas / Vapor</i>			
4	Line No.	Quantity			44	Relieving Case	<i>Pressure Relief</i>			
5					45	<b>Fluid Properties</b>				
6					46	Fluid Name	<i>Natural Gas (SG=0.6)</i>			
7	<b>GENERAL</b>				47	Molecular Weight, M	<i>51</i>			
8	Valve Type	<i>Balanced Bellows, Direct Spring-Op</i>			48	Compressibility, Z	<i>1.000</i>			
9	Safety / Relief	<i>Safety</i>	Balanced	Yes	49	Ratio of Sp. Heats, k (Cp / Cv)	<i>1.270</i>			
10	Nozzle	<i>Full</i>	Bonnet	<i>Vented</i>	50	Gas Constant, C	<i>344.1</i>			
11	<b>CONNECTIONS</b>				51					
12	Inlet	<i>3"</i>	<i>Fingd.</i>	<i>300#</i>	<i>RF</i>	Standard	52			
13	Outlet	<i>4"</i>	<i>Fingd.</i>	<i>150#</i>	<i>RF</i>	<i>ASME B16.5</i>	53			
14	<b>MATERIALS OF CONSTRUCTION</b>				54					
15	Body / Base	<i>CS SA216-WCB/WCC</i>			55					
16	Bonnet / Cylinder	<i>CS SA216-WCB/WCC</i>			56					
17	Nozzle	<i>316 SST</i>			57					
18	Disc	<i>316 SST</i>			58					
19	Seat	<i>Metal</i>			59	<b>Sizing Coefficients</b>				
20	Spindle	<i>416 SST</i>			60	K, Gas	Kd, Gas	Unit	-	
21	Guide	<i>SS A297 Gr. HE</i>			61	Kb	Kc	0.866	0.962	
22	Spring	<i>Chr. Steel - Alum. Metallized</i>			62					
23	Gaskets	<i>316 SST</i>			63					
24	Bellows	<i>Inconel® 625</i>			64	<b>Required Capacity</b>				
25	Cap Type	<i>Screwed (Ht. Rest.)</i>			65	Total	Unit		lb/hr	
26	NACE MR0175/ISO 15156:2015	Yes			66	42680				
27	Accessories				67	<b>Pressures</b>			Unit	psig
28					68	MAWP	Operating	295		
29					69	Set	CDTP	335	338.35	
30					70	Over Pressure	70.35		21%	
31	<b>SIZING / SELECTION SUMMARY</b>				71	Back Pressure	Built-Up	33.5		
32	Valve Model No.	<i>3J4JBS-E35A-N2</i>			72		Constant Superimposed	0		
33	Brand	<i>Crosby®</i>			73		Variable Superimposed	0		
34	Area	Calculated	Selected	<i>1.357</i>	<i>1.453</i>		Total	33.5		
35	(in²)	Data Set	Orifice	<i>ASME</i>	<i>J</i>					
36	Flow	Unit	Required	<i>lb/hr</i>	<i>42680</i>					
37		Rated	Actual	<i>45694.829</i>	<i>50772.032</i>					
38					77	<b>Temperatures</b>			Unit	°F
39	Reaction Force, Open Discharge				<i>253.92 daN</i>	78	Normal System			
40	Noise Level (db), Open Discharge				<i>112.2 at 100-ft</i>	79	Operating	Relieving	348	348
					80	Design Min	Design Max			

Tag Notes	Valve Dimensions	in	A	
			7.25	
			B	
			7.13	
		C		
lb	Weight	24.63		
			100	


**Quote Number:** No Prpd. Chk. Appr. Date Revision

Client: *OGDCL*  
 Location: End-User Ref. No.:  
 Project: *OG-4147* Project Ref. No.:

Valve ID						SIZING DATA					
1						41					
2	Tag No.	<i>60-PSV-05/06</i>				42	Design Code	<i>ASME Section VIII</i>		Sizing Std.	<i>API 520</i>
3	Service					43	Sizing Basis	<i>Fire Case</i>			
4	PID No.					44	Fluid State at Inlet	<i>Gas / Vapor</i>			
5	Line No.				Quantity	45	Relieving Case	<i>Pressure Relief</i>			
6						46	<b>Fluid Properties</b>				
7	<b>GENERAL</b>					47	Fluid Name	<i>Natural Gas (SG=0.6)</i>			
8	Valve Type	<i>Balanced Bellows, Direct Spring-Op</i>				48	Molecular Weight, M	43			
9	Safety / Relief	<i>Safety</i>	Balanced	Yes		49	Compressibility, Z	1.000			
10	Nozzle	<i>Full</i>	Bonnet	<i>Vented</i>		50	Ratio of Sp. Heats, k (Cp / Cv)	1.270			
11	<b>CONNECTIONS</b>					51	Gas Constant, C	344.1			
12	Inlet	<i>1 1/2"</i>	<i>Fingd.</i>	<i>300#</i>	<i>RF</i>	Standard					
13	Outlet	<i>2"</i>	<i>Fingd.</i>	<i>150#</i>	<i>RF</i>	<i>ASME B16.5</i>					
14	<b>MATERIALS OF CONSTRUCTION</b>					54					
15	Body / Base	<i>CS SA216-WCB/WCC</i>				55					
16	Bonnet / Cylinder	<i>CS SA216-WCB/WCC</i>				56					
17	Nozzle	<i>316 SST</i>				57					
18	Disc	<i>316 SST</i>				58					
19	Seat	<i>Metal</i>				59	<b>Sizing Coefficients</b>				
20	Spindle	<i>416 SST</i>				60	K, Gas	Kd, Gas	<i>0.866</i>	<i>0.962</i>	
21	Guide	<i>SS A297 Gr. HE</i>				61	Kb	Kc	<i>1</i>	<i>1</i>	
22	Spring	<i>Chr. Steel - Alum. Metallized</i>				62					
23	Gaskets	<i>316 SST</i>				63					
24	Bellows	<i>Inconel® 625</i>				64	<b>Required Capacity</b>				
25	Cap Type	<i>Screwed (Ht. Rest.)</i>				65	Total	<i>10827</i>			
26	NACE MR0175/ISO 15156:2015	Yes				66					
27	Accessories					67	<b>Pressures</b>				
28						68	MAWP	Operating			
29						69	Set	CDTP	<i>510</i>	<i>515.10</i>	
30						70	Over Pressure	<i>107.1</i>		<i>21%</i>	
31	<b>SIZING / SELECTION SUMMARY</b>					71	Back Pressure	Built-Up	<i>51</i>		
32	Valve Model No.	<i>1.5F2JBS-E35A-N2</i>				72	Constant Superimposed	<i>0</i>			
33	Brand	<i>Crosby®</i>				73	Variable Superimposed	<i>0</i>			
34	Area	Calculated	Selected	<i>0.238</i>	<i>0.347</i>	74	Total	<i>51</i>			
35	(in²)	Data Set	Orifice	<i>ASME</i>	<i>F</i>	75	Inlet Loss	<i>0</i>		<i>0%</i>	
36	Flow	Unit	Required	<i>lb/hr</i>	<i>10827</i>	76	Atmospheric (Barometric)	<i>14.696 psia</i>			
37		Rated	Actual	<i>15759.841</i>	<i>17510.934</i>	77	<b>Temperatures</b>				
38						78	Normal System				
39	Reaction Force, Open Discharge	<i>99.17 daN</i>				79	Operating	Relieving	<i>279</i>	<i>279</i>	
40	Noise Level (db), Open Discharge	<i>108.2 at 100-ft</i>				80	Design Min	Design Max			

<b>Tag Notes</b>						<b>Valve Dimensions</b>	A		
							in		4.88
									B
									6.00
									C
							lb		20.25
						Weight			
						50			


**Quote Number:** \_\_\_\_\_ **No** **Prpd.** **Chk.** **Appr.** **Date** **Revision**

Client: *OGDCL*  
 Location: \_\_\_\_\_ End-User Ref. No.: \_\_\_\_\_  
 Project: *OG-4147* Project Ref. No.: \_\_\_\_\_

Valve ID				SIZING DATA			
1	Tag No. <i>60-PSV-07/08</i>			41	Design Code	<i>ASME Section VIII</i>	Sizing Std. <i>API 520</i>
2	Service			42	Sizing Basis	<i>Valve Capacity</i>	
3	PID No.			43	Fluid State at Inlet	<i>Gas / Vapor</i>	
4	Line No.		Quantity	44	Relieving Case	<i>Pressure Relief</i>	
5	<b>Fluid Properties</b>						
6	Fluid Name			47	<i>Natural Gas (SG=0.6)</i>		
7	Molecular Weight, M			48	<i>53.3</i>		
8	Compressibility, Z			49	<i>1.000</i>		
9	Ratio of Sp. Heats, k (Cp / Cv)			50	<i>1.270</i>		
10	Gas Constant, C			51	<i>344.1</i>		
GENERAL				Sizing Coefficients			
11	Valve Type	<i>Conventional, Direct Spring-Op</i>		47	K, Gas	Kd, Gas	Unit
12	Safety / Relief	<i>Safety</i>	Balanced <i>No</i>	48	Kb	Kc	-
13	Nozzle	<i>Full</i>	Bonnet <i>Closed</i>	49	Required Capacity		Unit
14	CONNECTIONS			50	Total		lb/hr
15	Inlet	<i>1 1/2"</i>	<i>Flngd. 300# RF Standard</i>	51	Pressures		
16	Outlet	<i>2"</i>	<i>Flngd. 150# RF ASME B16.5</i>	52	MAWP	Operating	Unit
17	MATERIALS OF CONSTRUCTION			53	Set	CDTP	psig
18	Body / Base		<i>CS SA216-WCB/WCC</i>	54	Over Pressure		
19	Bonnet / Cylinder		<i>CS SA216-WCB/WCC</i>	55	Back Pressure		Built-Up
20	Nozzle		<i>316 SST</i>	56	Constant Superimposed		0
21	Disc		<i>316 SST</i>	57	Variable Superimposed		0
22	Seat		<i>Metal</i>	58	Total		0
23	Spindle		<i>316 SST</i>	59	Inlet Loss		0
24	Guide		<i>SS A297 Gr. HE</i>	60	Atmospheric (Barometric)		<i>14.696 psia</i>
25	Spring		<i>InconeI® X750</i>	61	Temperatures		
26	Gaskets		<i>316 SST</i>	62	Normal System		
27	Bellows		<i>N/A</i>	63	Operating	Relieving	Unit
28	Cap Type		<i>Screwed (Ht. Rest.)</i>	64	Design Min	Design Max	°F
29	NACE MR0175/ISO 15156:2015		<i>Yes</i>	65	Reaction Force, Open Discharge		
30	Accessories			66	<i>28.32 daN</i>		
31	SIZING / SELECTION SUMMARY			67	Noise Level (db), Open Discharge		
32	Valve Model No.		<i>1.5F2JOS-E35A-N2</i>	68	<i>105.4 at 100-ft</i>		
33	Brand		<i>Crosby®</i>	69			
34	Area	Calculated	Selected	70			
35	(in²)	Data Set	Orifice	71			
36	Flow	Unit	Required	72			
37		Rated	Actual	73			
38	Reaction Force, Open Discharge		<i>28.32 daN</i>	74			
39	Noise Level (db), Open Discharge		<i>105.4 at 100-ft</i>	75			
40				76			

<b>Tag Notes</b>													
										<b>Valve Dimensions</b>	in	A	
												4.88	
										<b>Valve Dimensions</b>	in	B	
												6.00	
										<b>Valve Dimensions</b>	lb	C	
20.25													
		Weight											
		50											


Quote Number:

No Prpd. Chk. Appr. Date Revision

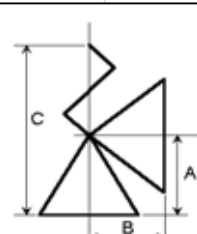
Client: OGDCL  
 Location:  
 Project: OG-4147

End-User Ref. No.:  
 Project Ref. No.:

Valve ID		41		SIZING DATA				
2	Tag No.	120-PSV-03		42	Design Code	ASME Section VIII	Sizing Std.	API 520
3	Service			43	Sizing Basis	Blocked Discharge		
4	PID No.			44	Fluid State at Inlet	Gas / Vapor		
5	Line No.	Quantity		45	Relieving Case	Pressure Relief		
6				46	<b>Fluid Properties</b>			
7	<b>GENERAL</b>			47	Fluid Name		Natural Gas (SG=0.6)	
8	Valve Type	Conventional, Direct Spring-Op		48	Molecular Weight, M		17.400	
9	Safety / Relief	Safety	Balanced No	49	Compressibility, Z		1.000	
10	Nozzle	Full	Bonnet Closed	50	Ratio of Sp. Heats, k (Cp / Cv)		1.270	
11	<b>CONNECTIONS</b>			51	Gas Constant, C		344.1	
12	Inlet	2" Flngd.	1500# RF Standard	52				
13	Outlet	3" Flngd.	300# RF ASME B16.5	53				
14	<b>MATERIALS OF CONSTRUCTION</b>			54				
15	Body / Base	CS SA216-WCB/WCC		55				
16	Bonnet / Cylinder	CS SA216-WCB/WCC		56				
17	Nozzle	316 SST		57				
18	Disc	316 SST		58				
19	Seat	Metal		59	<b>Sizing Coefficients</b>		Unit	-
20	Spindle	316 SST		60	K, Gas	Kd, Gas	0.866	0.962
21	Guide	SS A297 Gr. HE		61	Kb	Kc	1	1
22	Spring	InconeI® X750		62				
23	Gaskets	316 SST		63				
24	Bellows	N/A		64	<b>Required Capacity</b>		Unit	
25	Cap Type	Screwed (Ht. Rest.)		65	Total			
26	NACE MR0175/ISO 15156:2015	Yes		66				
27	Accessories			67	<b>Pressures</b>		Unit	psig
28				68	MAWP	Operating		
29				69	Set	CDTP	1480	1480.00
30				70	Over Pressure		148	10%
31	<b>SIZING / SELECTION SUMMARY</b>			71	Back Pressure		Built-Up	0
32	Valve Model No.	2G3JOS-E65A-N2		72			Constant Superimposed	0
33	Brand	Crosby®		73			Variable Superimposed	0
34	Area	Calculated	Selected	74			Total	0
35	(in²)	Data Set	Orifice	75			Inlet Loss	0
36		Unit	Required	76			Atmospheric (Barometric)	14.696 psia
37	Flow	Rated	Actual	77	<b>Temperatures</b>		Unit	°F
38				78			Normal System	
39	Reaction Force, Open Discharge		466.53 daN	79	Operating	Relieving		150
40	Noise Level (db), Open Discharge		122.9 at 100-ft	80	Design Min	Design Max		

Tag Notes	Valve Dimensions		in	A	
				6.13	
				B	
				6.75	
				C	
				23.25	
		lb	Weight		
			90		



Quote Number:					No	Prpd.	Chk.	Appr.	Date	Revision	
Client: OGDCL					End-User Ref. No.:						
Location:					Project Ref. No.:						
Project: OG-4147											
1	<b>Valve ID</b>				41	<b>SIZING DATA</b>					
2	Tag No.	120-PSV-04			42	Design Code	ASME Section VIII	Sizing Std.	API 520		
3	Service				43	Sizing Basis	Blocked Discharge				
4	PID No.				44	Fluid State at Inlet	Gas / Vapor				
5	Line No.			Quantity	45	Relieving Case	Pressure Relief				
6					46	<b>Fluid Properties</b>					
7	<b>GENERAL</b>				47	Fluid Name		Natural Gas (SG=0.6)			
8	Valve Type	Conventional, Direct Spring-Op			48	Molecular Weight, M		17.400			
9	Safety / Relief	Safety	Balanced	No	49	Compressibility, Z		1.000			
10	Nozzle	Full	Bonnet	Closed	50	Ratio of Sp. Heats, k (Cp / Cv)		1.270			
11	<b>CONNECTIONS</b>				51	Gas Constant, C		344.1			
12	Inlet	2"	Fingd.	1500# RF	Standard						
13	Outlet	3"	Fingd.	300# RF	ASME B16.5						
14	<b>MATERIALS OF CONSTRUCTION</b>				54						
15	Body / Base		CS SA216-WCB/WCC		55						
16	Bonnet / Cylinder		CS SA216-WCB/WCC		56						
17	Nozzle		316 SST		57						
18	Disc		316 SST		58						
19	Seat		Metal		59	<b>Sizing Coefficients</b>			Unit	-	
20	Spindle		316 SST		60	K, Gas	Kd, Gas	0.866	0.962		
21	Guide		SS A297 Gr. HE		61	Kb	Kc	1	1		
22	Spring		InconeI® X750		62						
23	Gaskets		316 SST		63						
24	Bellows		N/A		64	<b>Required Capacity</b>			Unit		
25	Cap Type		Screwed (Ht. Rest.)		65	Total					
26	NACE MR0175/ISO 15156:2015		Yes		66						
27	Accessories				67	<b>Pressures</b>			Unit	psig	
28					68	MAWP	Operating				
29					69	Set	CDTP	1480	1480.00		
30					70	Over Pressure		148	10%		
31	<b>SIZING / SELECTION SUMMARY</b>				71	Back Pressure		Built-Up		0	
32	Valve Model No.		2G3JOS-E65A-N2		72	Constant Superimposed				0	
33	Brand		Crosby®		73	Variable Superimposed				0	
34	Area	Calculated	Selected		74	Total				0	
35	(in²)	Data Set	Orifice	ASME	75	Inlet Loss		0	0%		
36	Flow	Unit	Required	SCFM	76	Atmospheric (Barometric)		14.696		psia	
37		Rated	Actual	17040.332	18933.702	77	<b>Temperatures</b>			Unit	°F
38						78	Normal System				
39	Reaction Force, Open Discharge		466.53 daN		79	Operating	Relieving	150			
40	Noise Level (db), Open Discharge		122.9 at 100-ft		80	Design Min	Design Max				
Tag Notes					Valve Dimensions	in	A				
							6.13				
							B				
							6.75				
							C				
							23.25				
				lb	Weight						
					90						


Quote Number: No Prpd. Chk. Appr. Date Revision

Client: OGDCL  
 Location: End-User Ref. No.:  
 Project: OG-4147 Project Ref. No.:

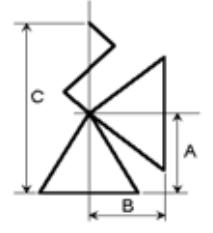
Valve ID					SIZING DATA				
1					41				
2	Tag No.	806-PSV-01			42	Design Code	ASME Section VIII	Sizing Std.	API 520
3	Service				43	Sizing Basis	Control Valve Failure		
4	PID No.				44	Fluid State at Inlet	Gas / Vapor		
5	Line No.			Quantity	45	Relieving Case	Pressure Relief		
6					46	<b>Fluid Properties</b>			
7	<b>GENERAL</b>				47	Fluid Name		Hydrocarbon Vapor	
8	Valve Type	Balanced Bellows, Direct Spring-Op			48	Molecular Weight, M		21.6	
9	Safety / Relief	Safety	Balanced	Yes	49	Compressibility, Z		1.000	
10	Nozzle	Full	Bonnet	Vented	50	Ratio of Sp. Heats, k (Cp / Cv)		1.270	
11	<b>CONNECTIONS</b>				51	Gas Constant, C		344.1	
12	Inlet	1 1/2"	Fingd.	150# RF Standard	52				
13	Outlet	3"	Fingd.	150# RF ASME B16.5	53				
14	<b>MATERIALS OF CONSTRUCTION</b>				54				
15	Body / Base	CS SA216-WCB/WCC			55				
16	Bonnet / Cylinder	CS SA216-WCB/WCC			56				
17	Nozzle	316 SST			57				
18	Disc	316 SST			58				
19	Seat	Metal			59	<b>Sizing Coefficients</b>		Unit	-
20	Spindle	416 SST			60	K, Gas	Kd, Gas	0.866	0.962
21	Guide	SS A297 Gr. HE			61	Kb	Kc	1	1
22	Spring	Inconel® X750			62				
23	Gaskets	316 SST			63				
24	Bellows	Inconel® 625			64	<b>Required Capacity</b>		Unit	lb/hr
25	Cap Type	Packed Lift Lever w/ Test Rod			65	Total		10000	
26	NACE MR0175/ISO 15156:2015	No			66				
27	Accessories				67	<b>Pressures</b>		Unit	psig
28					68	MAWP	Operating		
29					69	Set	CDTP	225	225.00
30					70	Over Pressure		22.5	10%
31	<b>SIZING / SELECTION SUMMARY</b>				71	Back Pressure	Built-Up		60
32	Valve Model No.	1.5H3JBS-E15C6E			72		Constant Superimposed		0
33	Brand	Crosby®			73		Variable Superimposed		0
34	Area	Calculated	Selected	0.652	0.887		Total		60
35	(in²)	Data Set	Orifice	ASME	H	Inlet Loss		0	0%
36	Flow	Unit	Required	lb/hr	10000	Atmospheric (Barometric)		14.696	psia
37		Rated	Actual	13612.786	15125.318				
38					77	<b>Temperatures</b>		Unit	°F
39	Reaction Force, Open Discharge		80.14 daN		78	Normal System			
40	Noise Level (db), Open Discharge		106.5 at 100-ft		79	Operating	Relieving		100
					80	Design Min	Design Max		

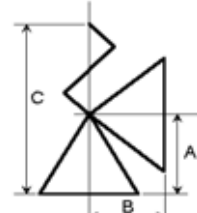
<b>Tag Notes</b>					<b>Valve Dimensions</b>	in		A	
								5.13	
						B		4.88	
						C		23.75	
						lb		Weight	
								55	

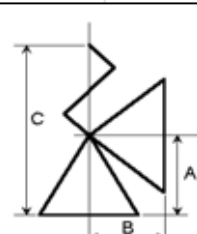

Quote Number: **No Prpd. Chk. Appr. Date Revision**

Client: **OGDCL**  
 Location:  
 Project: **OG-4147**  
 End-User Ref. No.:  
 Project Ref. No.:

Valve ID				SIZING DATA			
1	Tag No. <b>806-PSV-02</b>			41	Design Code <b>ASME Section VIII</b>   Sizing Std. <b>API 520</b>		
2	Service			42	Sizing Basis <b>Control Valve Failure</b>		
3	PID No.			43	Fluid State at Inlet <b>Gas / Vapor</b>		
4	Line No.		Quantity	44	Relieving Case <b>Pressure Relief</b>		
5				45			
6				46			
GENERAL				Fluid Properties			
7	Valve Type <b>Balanced Bellows, Direct Spring-Op</b>			47	Fluid Name <b>Hydrocarbon Vapor</b>		
8	Safety / Relief	<b>Safety</b>	Balanced <b>Yes</b>	48	Molecular Weight, M <b>21.6</b>		
9	Nozzle	<b>Full</b>	Bonnet <b>Vented</b>	49	Compressibility, Z <b>1.000</b>		
10				50	Ratio of Sp. Heats, k (Cp / Cv) <b>1.270</b>		
CONNECTIONS				Sizing Coefficients			
11	Inlet	<b>3" Flngd.</b>	<b>150# RF</b>	51	Gas Constant, C <b>344.1</b>		
12	Outlet	<b>4" Flngd.</b>	<b>150# RF</b>	52	K, Gas		Kd, Gas <b>0.866</b>
13				53	Kb		Kc <b>0.933</b>
14				54			
MATERIALS OF CONSTRUCTION				Required Capacity			
15	Body / Base		<b>CS SA216-WCB/WCC</b>	55	Total		<b>7838</b>
16	Bonnet / Cylinder		<b>CS SA216-WCB/WCC</b>	56			
17	Nozzle		<b>316 SST</b>	57			
18	Disc		<b>316 SST</b>	58			
19	Seat		<b>Metal</b>	59			
20	Spindle		<b>416 SST</b>	60			
21	Guide		<b>SS A297 Gr. HE</b>	61			
22	Spring		<b>Inconel® X750</b>	62			
23	Gaskets		<b>316 SST</b>	63			
24	Bellows		<b>Inconel® 625</b>	64			
25	Cap Type		<b>Packed Lift Lever w/ Test Rod</b>	65			
26	NACE MR0175/ISO 15156:2015		<b>No</b>	66			
27	Accessories			67	Pressures		Unit
28				68	MAWP	Operating	psig
29				69	Set	CDTP	<b>75 75.00</b>
30				70	Over Pressure		<b>7.5 10%</b>
SIZING / SELECTION SUMMARY				Temperatures			
31	Valve Model No. <b>3K4JBS-E15C6E</b>			71	Built-Up		<b>30</b>
32	Brand <b>Crosby®</b>			72	Back Pressure	Constant Superimposed	<b>0</b>
33	Area	Calculated	Selected	73		Variable Superimposed	<b>0</b>
34	(in <sup>2</sup> )	Data Set	Orifice	74		Total	<b>30</b>
35		Unit	Required	75	Inlet Loss		<b>0 0%</b>
36	Flow	Rated	Actual	76	Atmospheric (Barometric)		<b>14.696 psia</b>
37				77			
38				78			
39	Reaction Force, Open Discharge		<b>60.72 daN</b>	79	Normal System		
40	Noise Level (db), Open Discharge		<b>94.4 at 100-ft</b>	80	Operating	Relieving	<b>100</b>
					Design Min	Design Max	

<b>Tag Notes</b>	<b>Valve Dimensions</b>	in	A	
			6.13	
			B	
			6.38	
			C	
			30.25	
		lb	Weight	
		116		

Quote Number:					No	Prpd.	Chk.	Appr.	Date	Revision					
Client: OGDCL					End-User Ref. No.:										
Location:					Project Ref. No.:										
Project: OG-4147															
<b>Valve ID</b>					41	<b>SIZING DATA</b>									
2	Tag No. 911-PSV-01/02/03/04				42	Design Code	ASME Section VIII	Sizing Std.	API 520						
3	Service				43	Sizing Basis	Fire Case								
4	PID No.				44	Fluid State at Inlet	Liquid								
5	Line No.			Quantity	45	Relieving Case	Pressure Relief								
6				4	46	<b>Fluid Properties</b>									
<b>GENERAL</b>					47	Fluid Name		LPG							
8	Valve Type Conventional, Direct Spring-Op				48	Sp. Gravity, G		0.48							
9	Safety / Relief Safety Relief		Balanced	No	49	Viscosity		0.09000 cP							
10	Nozzle Full		Bonnet	Closed	50	Reynolds No.		528187.43							
11	<b>CONNECTIONS</b>				51	Reynolds No. (max)		4527872.67							
12	Inlet	1"	Fingd.	300# RF Standard	52										
13	Outlet	2"	Fingd.	150# RF ASME B16.5	53										
<b>MATERIALS OF CONSTRUCTION</b>					54										
15	Body / Base		CS SA216-WCB/WCC		55										
16	Bonnet / Cylinder		CS SA216-WCB/WCC		56										
17	Nozzle		316 SST		57										
18	Disc		316 SST		58										
19	Seat		Metal		59										
20	Spindle		416 SST		60	<b>Sizing Coefficients</b>		Unit	-						
21	Guide		SS A297 Gr. HE		61	K, Liquid	Kd, Liquid	0.656	0.729						
22	Spring		InconeI® X750		62	Kw	Kc	1.0	1						
23	Gaskets		316 SST		63	Kv	Kv (max)	1	1.0						
24	Bellows		N/A		64	<b>Required Capacity</b>		Unit	lb/hr						
25	Cap Type		Packed Lift Lever w/ Test Rod		65	Total		4000							
26	NACE MR0175/ISO 15156:2015		No		66										
27	Accessories				67						<b>Pressures</b>		Unit	psig	
28					MAWP						Operating				
29					Set						CDTP	265	265.00		
30					Over Pressure		55.65	21%							
<b>SIZING / SELECTION SUMMARY</b>					71	Back Pressure		Built-Up		0					
32	Valve Model No.		1E2JLTJOS-E35C6E		72			Constant Superimposed		0					
33	Brand		Crosby®		73			Variable Superimposed		0					
34	Area	Calculated	Selected	0.026	0.221			Total		0					
35	(in²)	Data Set	Orifice	ASME	E	Inlet Loss		0	0%						
36		Unit	Required	lb/hr	4000	Atmospheric (Barometric)		14.696 psia							
37	Flow	Rated	Actual	34289.893	38099.881	<b>Temperatures</b>		Unit	°F						
38						Normal System									
39	Reaction Force, Open Discharge		2.22 daN		79	Operating	Relieving	140	140						
40	Noise Level (db), Open Discharge		N/A		80	Design Min	Design Max								
Tag Notes						Valve Dimensions		A							
								4.13							
								B							
								4.50							
								C							
								20.00							
Weight															
						lb	36								

Quote Number:					No	Prpd.	Chk.	Appr.	Date	Revision	
Client: OGDCL					End-User Ref. No.:						
Location:					Project Ref. No.:						
Project: OG-4147											
1	<b>Valve ID</b>				41	<b>SIZING DATA</b>					
2	Tag No.	911-PSV-06/07/08			42	Design Code	ASME Section VIII	Sizing Std.	API 520		
3	Service				43	Sizing Basis	Thermal Relief				
4	PID No.				44	Fluid State at Inlet	Liquid				
5	Line No.			Quantity	45	Relieving Case	Pressure Relief				
6				3	46	<b>Fluid Properties</b>					
7	<b>GENERAL</b>				47	Fluid Name		LPG			
8	Valve Type	Conventional, Direct Spring-Op			48	Sp. Gravity, G		0.48			
9	Safety / Relief	Safety Relief	Balanced	No	49	Viscosity		0.09000 cP			
10	Nozzle	Full	Bonnet	Closed	50	Reynolds No.					
11	<b>CONNECTIONS</b>				51	Reynolds No. (max)		3125473.32			
12	Inlet	3/4"	Fngd.	300# RF Standard	52						
13	Outlet	1"	Fngd.	150# RF ASME B16.5	53						
14	<b>MATERIALS OF CONSTRUCTION</b>				54						
15	Body Cylinder		CS SA216-WCB		55						
16	Body Base		316 SST		56						
17	Connections		Carbon Steel		57						
18	Disc		316 SST		58						
19	Seat		Metal		59	<b>Sizing Coefficients</b>		Unit	-		
20	Seals		N/A		60	K, Liquid	Kd, Liquid	0.662	0.735		
21	Spindle		416 SST		61	Kw	Kc	1.0	1		
22	Guide		316 SST		62	Kv	Kv (max)		1.0		
23	Spring		17-7 PH SST		63						
24					64	<b>Required Capacity</b>		Unit			
25	Cap Type		Screwed		65	Total					
26	NACE MR0175/ISO 15156:2015		No		66						
27	Accessories				67	<b>Pressures</b>		Unit	psig		
28					68	MAWP	Operating				
29					69	Set	CDTP	358	358.00		
30					70	Over Pressure		35.8	10%		
31	<b>SIZING / SELECTION SUMMARY</b>				71	Back Pressure		Built-Up		0	
32	Valve Model No.		95110121A		72	Constant Superimposed				0	
33	Brand		Crosby®		73	Variable Superimposed				0	
34	Area	Calculated	Selected	0.084	74	Total				0	
35	(in²)	Data Set	Orifice	ASME	75	Inlet Loss		0	0%		
36	Flow	Unit	Required	lb/hr	76	Atmospheric (Barometric)		14.696	psia		
37		Rated	Actual	14622.690	16247.433	77	<b>Temperatures</b>		Unit	°F	
38					78	Normal System					
39	Reaction Force, Open Discharge		1.57 daN		79	Operating	Relieving	140			
40	Noise Level (db), Open Discharge		N/A		80	Design Min	Design Max				
Tag Notes					Valve Dimensions	in	A				
							4.25				
							B				
							4				
							C				
							12.81				
				lb	Weight						
						11					