



Compression Solutions

Data Manual

Job Number

16821/100627

Customer

Concept Compression

Description

Oil Separator

S/N: 16821-102

A#: 583951

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5120 – 6th Street NE Calgary Alberta T2K 4W5

Main: 403.274.6106 * Fax: 403.274.6149 * toll free: 800.256.1598

www.ngc-ltd.com

FORM U-1A MANUFACTURER'S DATA REPORT FOR PRESSURE VESSELS
(Alternative Form for Single Chamber, Completely Shop or Field Fabricated Vessels Only)
As Required by the Provisions of the ASME Boiler and Pressure Vessel Code Rules, Section VIII, Division 1

① 583951

1. Manufactured and certified by NGC Process Systems Ltd, # 2B, 624 Beaver Dam Rd. N.E Calgary, Alberta T2K 4W6 Calgary Alberta Canada
(Name and Address of Manufacturer)
2. Manufactured for Concept Compression Corp. 2325 - 20 Ave NE Calgary Alberta
(Name and address of purchaser)
3. Location of installation Stock
(Name and address)

4. Type Vertical 16821-102 K 6633.123 16821-102 Rev 2 N/A 2008
(Horizontal or vertical, tank) (Manufacturer's serial number) (CRN) (Drawing Number) (National Board number) (Year built)

5. The chemical and physical properties of all parts meet the requirements of material specifications of the ASME BOILER AND PRESSURE VESSEL CODE. The design, construction, and workmanship conform to ASME Rules, Section VIII, Division 1 2007
Year

to 2007 N/A N/A
[Addenda Date] [Code Case numbers] [Special service per UG-120(d)]

6. Shell: SA-106B 0.375" 0.125" 0 Ft 11.250 In 5 Ft 8.7 In S/FF
(Material Spec. number, grade) (Nominal thickness) (Corr. allow.) (Inner diameter) (Length (overall))

7. Seams: Seamless N/A 100 % N/A N/A Type 1 Spot 70 % 1
[Long (welded, dbl., sngl., lap, butt)] [R. T. (spot or full)] (Eff., %) (H.T. temp.) (Time, hr) [Girth (welded, dbl., sngl., lap, butt)] [R.T. (spot or full)] Eff.(%) (No. of courses)

8. Heads: (a) Material SA-234-WPB (b) Material SA-105N
(Spec. no., grade) (Spec. no., grade)

	Location (Top Bottom, Ends)	Minimum Thickness	Corrosion Allowance	Crown Radius	Knuckle Radius	Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure (Convex or Concave)
(a)	Bottom	0.3281"	0.125"			2:1				Concave
(b)	Top	1.94"	0.125"						20.47"	Flat

If removable, bolts used (describe other fastenings) _____
(Material spec., number, grade, size, number)

9. MAWP 450 psi at max. temp. 250 °F °F
(Internal) (External) (Internal) (External)

Min. design metal temp - 20 °F at 450 psi. Hydro., pneu., or comb. test pressure 585 psi.

10. Nozzles, inspection and safety valve openings:

Purpose (Inlet, Outlet, Drain)	Number	Diameter or Size	Type	Material	Nominal Thickness	Reinforcement Material	How Attached	Location
				SEE ATTACHED	U-4	FORM		

11. Supports: Skirt Yes Lugs Legs Other Attached: Welded to Bottom Head
(Yes or No) (Number) (Number) (Describe) (Where and how)

12. Remarks: Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report: _____
(Name of part, item number, Manufacturer's name and identifying stamp)

Volume (Cu. Ft.): 4.44 Built to Construction Drawing No: 16821-102 Rev 1

Description: Oil Separator Relief valves supplied by others as per UG 125

Impact Test Exempt per UG 20(f)(1-5) Equipment No: V - 102

CERTIFICATE OF SHOP/FIELD COMPLIANCE

We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship of this vessel conform to the ASME BOILER AND PRESSURE VESSEL CODE, Section VIII, Division 1. "U" Certificate of Authorization Number: 32,986

expires: Dec. 14, 2010

Date APR 30 2008 Co. name NGC Process Systems Ltd. Signed
(Manufacturer) (Representative)

CERTIFICATE OF SHOP/FIELD INSPECTION

Vessel constructed by NGC Process Systems Ltd. at #2B, 624 Beaverdam Road, N.E. Calgary, AB T2K 4W6
I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State or Province of Alberta and employed by ABSA

have inspected the component described in this Manufacturer's Data Report on MAY 13 2008, and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME BOILER AND PRESSURE VESSEL CODE, Section VIII, Division 1. By signing this certificate neither the Inspector nor his/her employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his/her employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date MAY 13 2008 Signed Commissions
(Authorized Inspector) (Nat'l Board (incl. endorsements), State, Prov. and No.)

FORM U-4 MANUFACTURER'S DATA REPORT SUPPLEMENTARY SHEET
As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

583951

1. Manufactured and certified by NGC Process Systems Ltd. #2B 624 Beaver Dam Road NE Calgary, AB T2K 4W6
 (Name and address of Manufacturer)
2. Manufactured for Concept Compression Corp. 2325 20 Ave NE Calgary Alberta Canada
 (Name and address of Purchaser)
3. Location of installation Stock
 (Name and address)
4. Type: Vertical Oil Separator 16821-102
 (Horiz., vert., or sphere) (Tank, separator, heat exch., etc.) (Mfg's. serial No.)
- K 6633.123 16821-102 Rev 0 N/A 2008
 (CRN) (Approved Drawing No.) (Nat'l Bd. No.) (Year Built)

Data Report
 Item Number 10
 Continued from Form U1a

Remarks

Purpose (Inlet, Outlet, Drain)	MK No.	No	Diam. or Size	Type	Mat'l	Nom. Thk.	Reinforce- ment Mat'l	How Attached	Location
Inlet	N1	1	2"	Pipe Elbow RFWN	SA-106B SA-234-WPB SA-105N	0.344" 0.344" CL300	N/A	Fig. UW 16.1(c)	Shell
Outlet	N2	1	2"	Pipe Elbow Pipe RFWN	SA-106B SA-234-WPB SA-106B SA-105N	0.344" 0.344" 0.344" CL300	N/A	Fig. UW 16.1(c)	Shell
Drain	N3	1	1.5"	Elbow Pipe	SA-234-WPB SA-106B	0.400" 0.400"	N/A	Fig. UW 16.1(a)	Bottom Head
Access	N4	1	12"	RFWN	SA-105N	CL300	N/A	Fig. UW 16.1(f)	
Level Switch	C1A/B	2	1 1/2"	CPLG	SA-105N	CL3000	N/A	Fig. UW 16.1(c)	Shell
Oil Drain	C2	1	1"	TOL	SA-105N	CL3000	N/A	Fig. UW 16.1(c)	Shell
PSV	C3	2	1"	TOL	SA-105N	CL3000	N/A	Fig. UW 16.1(c)	N2
Sight Glass	C4A/B	2	3/4"	TOL	SA-105N	CL3000	N/A	Fig. UW 16.1(c)	Shell Bottom Head

Certificate of Authorization: Type "U" No. 32986 Expires Dec 14, 2010

Date APR 30 2008 Name NGC Process Systems Ltd. Signed [Signature]
 (Manufacturer) (Representative)

Date MAY 13 2008 Name [Signature] Commission ACTO #11
 (Authorized Inspector) (Nat'l Board incl. Endorsement, State, Province and No.)

(12/91) This form (E00118) may be obtained from the ASME Order Dept., 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300

U
W
52

CERTIFIED BY



Process Systems Ltd.
Calgary, Alberta

ASME SECTION VIII DIV. 1

M.A.W.P.	450	PSI	AT	250	°F
M.D.M.T.	20	°F	AT	450	PSI
CAN REG NO	K 6633-123				
SHELL THK	0.375	IN	MAT'L	SA-106B	
HEAD THK	0.3281	IN	MAT'L	SAE234-WPB	
	1.9			SA-105N	
WT	666.65	LBS	YEAR BUILT	2008	
VOL	4.440	FT3	SERIAL NO.	16821-102	
CA	0.125	IN	TAG NO.	V-102	
OIL SEPARATOR					

12" O.D. X 68-9/16" S/S

④ 583951



Process Systems

HYDROSTATIC TEST REPORT

Date: MAR 3 1 2008

Customer: Concept Compression Corp.

Job # 16821

Drawing #: S/N 16821-102

Description: 12" Oil Separator

Tests Conducted By: QC Dept

Test Pressure: 585 psi Holding Time at Test Pressure: 1 Hour

Charted : NO Recorder #: N/A

Results: Passed / OK

Authorized Inspector Witnessing Test: _____

Pressure Gauge ID #: SS-423 ; SS-424 Calibration Due : BOTH 12 FEB 09

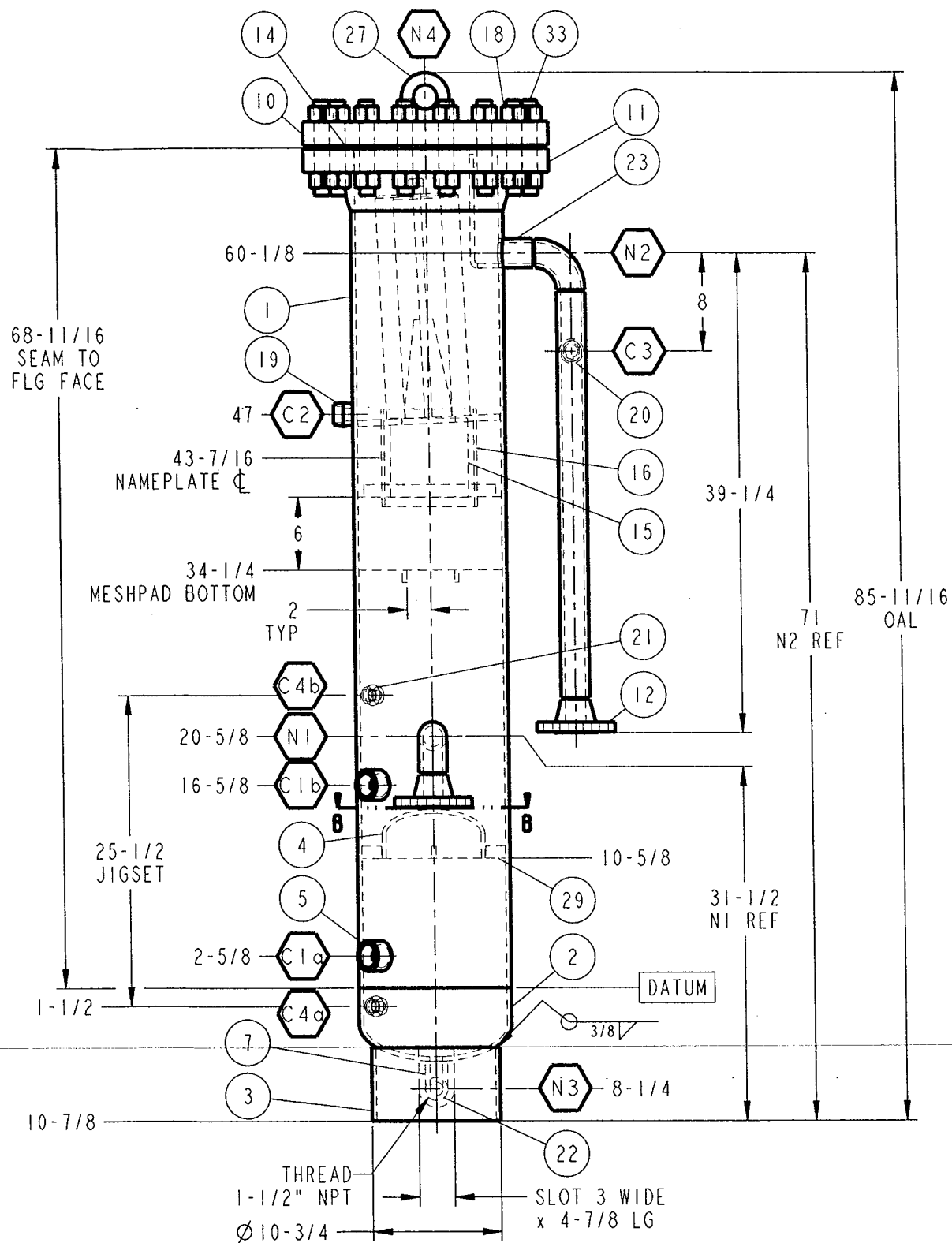
Comments : _____



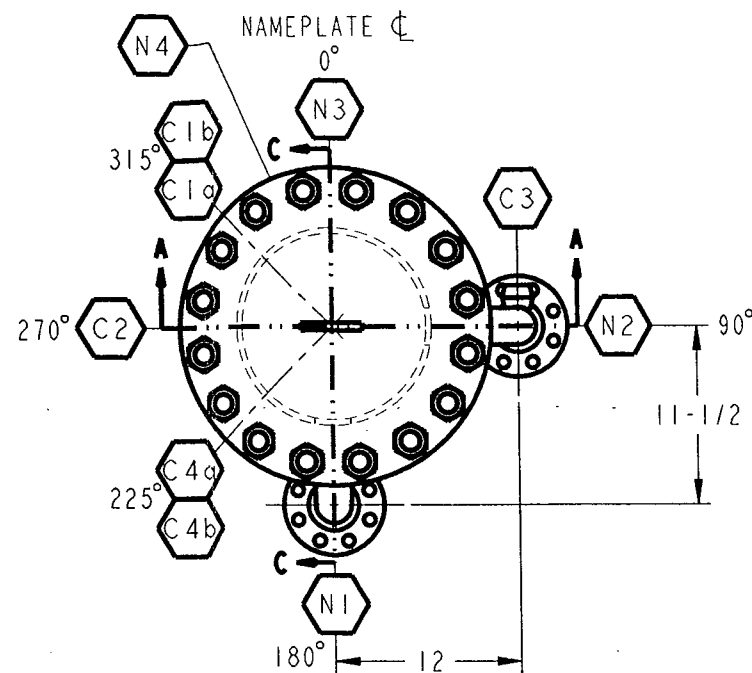
(Signature of QCM/QCI)

(Signature of Owners Inspector)

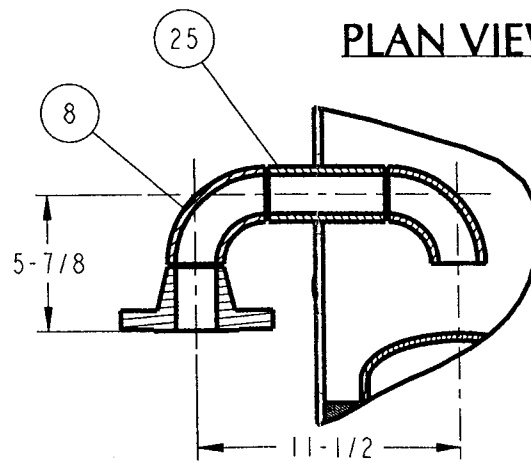
(Signature of Authorized Inspector, if applicable)



ELEVATION VIEW



PLAN VIEW



N1 DETAIL
SECTION C-C
SCALE 0.120

NAME PLATE DATA

CERTIFIED BY NGC Process Systems Ltd. Calgary, Alberta ASME SECTION VIII DIV.1	
W	RT-2
M.A.W.P.	450 PSI AT 250 °F
M.D.M.T.	-20 °F AT 450 PSI
CAN. REG. NO.	
SHELL THK.	0.375 IN MAT'L SA106-B
HEAD THK.	0.3281 IN MAT'L SA234-WPB
WT	666.65 LBS YEAR BUILT 2008
VOL.	4.440 FT ³ SERIAL NO. 16821-102
C.A.	0.125 IN TAG NO. V-102
OIL SEPARATOR	
12 OD x 63-9/16 S/S	

REVISED COPY - DESTROY
ALL PREVIOUS COPIES

BY: *[Signature]*

DATE: 04/07/03

ITEM	QTY.	DESCRIPTION	MATERIAL	COMMENTS
1	1	SHELL, PIPE SMLS, 12 STD x 63-9/16 LG.	SA106-B	
2	1	CAP, BW, 12", STD	SA234-WPB	
3	1	SKIRT, PIPE SMLS, 10 STD x 9 LG. (CUT TO DWG DIM.)	SA106-B	
4	1	CAP, BW, 8", STD	SA234-WPB	
5	2	COUPLING, HALF THD, 1-1/2"-3000CL	SA105N	
6	1	DEMISTER PAD, 12 OD x 6THK @ 9 LBS/CU.FT. (c/w CS GRID)	SS316L/SA-36	
7	1	ELBOW, 90 LR, 1-1/2", XXH	SA234-WPB	
8	3	ELBOW, 90 LR, 2", S160	SA234-WPB	
9	1	FILTER (7 OD x 18 LG)	-	
10	1	FLANGE, RF BLIND, 12-300CL	SA105N	
11	1	FLANGE, RF WN, 12-300CL STD	SA105N	
12	2	FLANGE, RF WN, 2-300CL S160	SA105N	
13	4	FLATBAR, 1 x 3/8 THK x 11 LG.	SA-36	
14	1	CASKET, FLEXITALLIC (GREY), 12"-300CL	316L/FLEXICARB	
15	1	NAMEPLATE	SS 316	
16	1	NAMEPLATE BRACKET 1/4 THK x 8 x 8	SA516-70N	
17	2	NUT, 0.62, SA194-2HM	-	
18	32	NUT, 1.25, SA194-2HM	-	
19	1	OLET, THD, 1"-3000CL (ON 12.75" RUN)	SA105N	
20	1	OLET, THD, 1"-3000CL (ON 2" RUN)	SA105N	
21	2	OLET, THD, 3/4"-3000CL (ON 12.75" RUN)	SA105N	
22	1	PIPE, SMLS, 1-1/2 XXH x 7 LG. TOE	SA106-B	
23	1	PIPE, SMLS, 2 S160 x 3 LG.	SA106-B	
24	1	PIPE, SMLS, 2 S160 x 33-1/4 LG.	SA106-B	
25	1	PIPE, SMLS, 2 S160 x 5-1/4 LG.	SA106-B	
26	1	PLATE, 1/2 THK x 11-7/8 DIA. (SEE DWG DETAIL)	SA516-70N	
27	1	PLATE, 1/2 THK, 4 x 4 (SEE DETAIL)	SA516-70N	
28	1	PLATE, 3/8 THK x 6-3/4 OD (SEE DWG DETAIL)	SA516-70N	
29	4	PLATE, 3/8 THK, 1 x 1-5/8 (SEE DWG DETAIL)	SA516-70N	
30	1	PLATE, 3/8 THK, 9-1/2 x 11-1/2 (BEND AS SHOWN)	SA516-70N	
31	2	PLATE, 3/8 THK, 8 x 1-5/8 (SEE DWG DETAIL)	SA516-70N	
32	1	ROUND BAR, 5/8 DIA. x 20 LG (FULLY THREADED)	SA516-70N	
33	16	STUD, 1-1/4 x 7-3/4 LG	SA194-2HM	

NOZZLE SCHEDULE

MARK	SIZE	RATING	TYPE	SCH.	SERVICE	INT. PROJ.	EXT. PROJ.	WELD DETAIL	WELD SIZE
N1	2"	300CL	RF WN	S160	INLET	2.875	SEE DWG	1, 11	3/8
N2	2"	300CL	RF WN	S160	OUTLET	FLUSH	SEE DWG	11, 111	3/8
N3	1-1/2"	-	NPT	XXH	DRAIN	0	SEE DWG	X1	3/8
N4	12"	300CL	RF WN	STD	ACCESS	-	-	111	-
C1a/b	1-1/2"	3000CL	CPLG	-	LEVEL SWITCH	0	MAX	1X	3/8
C2	1"	3000CL	TOL	-	OIL DRAIN	0	MAX	X1	3/8
C3	1"	3000CL	TOL	-	PSV	0	MAX	X1	3/8
C4a/b	3/4"	3000CL	TOL	-	SIGHT GLASS	0	MAX	X1	3/8

DESIGN DATA

SERVICE SOUR	NO	LETHAL	NO
HYDROTEST PRESSURE (PSI)	585	WEIGHT FLOODED (LBS)	942.99
CODE	SECTION VIII, DIV. 1, 2007 EDITION		
X-RAY	RT-2		
STRESS RELIEVED	NONE		
ALLOW. STRESS (PSI)	SHELL	17100	HEAD 17100

GENERAL NOTES

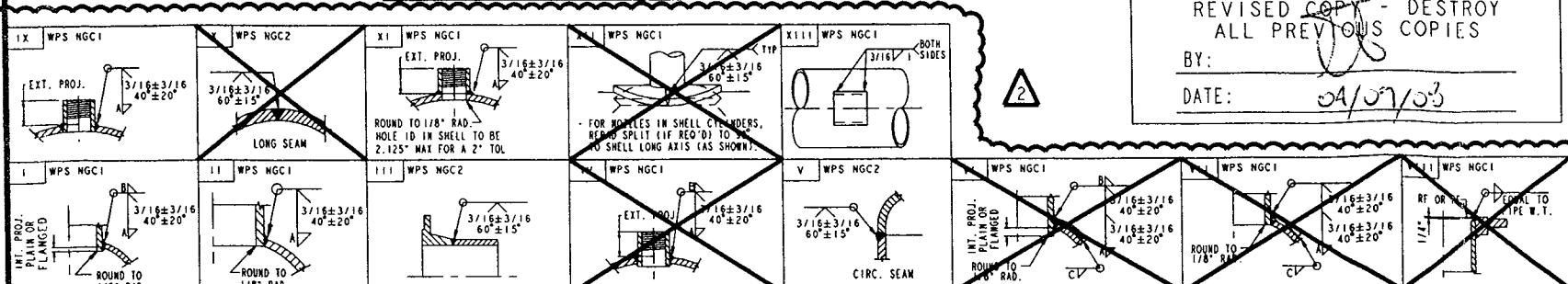
- FLANGE HOLES TO STRADDLE MAJOR CENTERLINES.
- ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED
- IMPACT TEST EXEMPT AS PER UG-201.13(c)-5.
- THE FOLLOWING MATERIALS MAY BE SUBSTITUTED:
SA-36 WITH W44 OR SA-516-70, SA-106 GR. B WITH SA-333 GR. 6, SA-516-70N WITH SA106-C (REPADS), SA-105 WITH SA-350 LF2 CL. 1, SA-234 WPB WITH SA-420 WPL6.
- ATTACHMENT WELDS WILL USE WPS NGC 1. FILLET WELDS WILL BE 3/16", UNLESS OTHERWISE NOTED.
- FINISH TO SSPC-SP2 AND ONE COAT OF ZINC CHROMATE PRIMER (GREY).
- TOLERANCES TO MEET D-STD-09-06 REV. 2, UNLESS OTHERWISE NOTED.
- IF SOUR SERVICE OPTION REQUESTED, THE FOLLOWING APPLIES:
DESIGN DATA-SERVICE -- SOUR -- YES;
STRESS RELIEVE VESSEL TO 1 HR @ 1150°F ± 25°F, NOTING THAT THE FOLLOWING WPS REQUIREMENTS APPLY: WPS NGC3 IN LIEU OF NGC1; WPS NGC4 IN LIEU OF NGC2;
X-RAY VESSEL TO RT-1;
NAMEPLATE DATA; ADD RT-1 AND HT REGISTER IN ALBERTA REG. A SASKATCHEWAN
- REGISTER IN ALBERTA REG. A SASKATCHEWAN
- CUT PLATE AND OTHER STOCK COMPLIES WITH UG-76

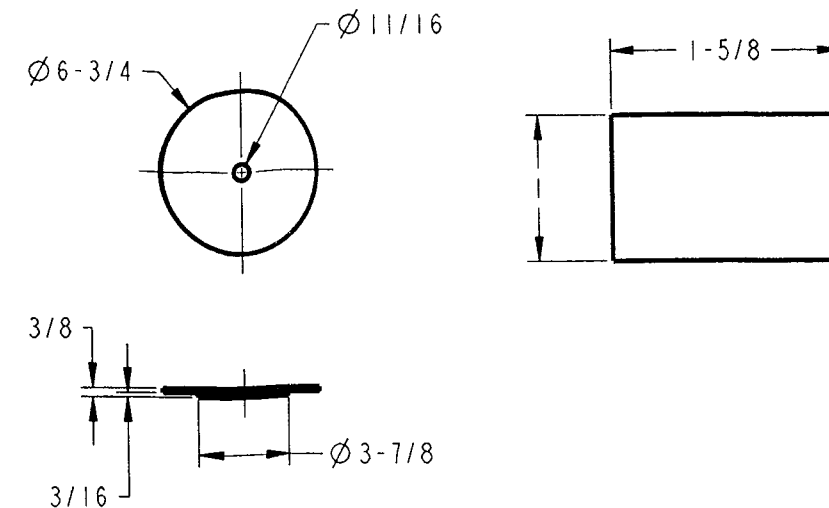
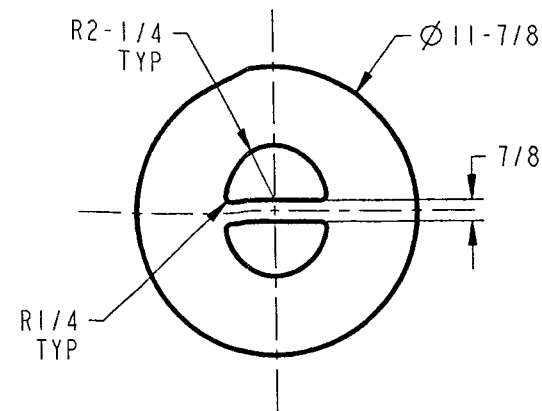
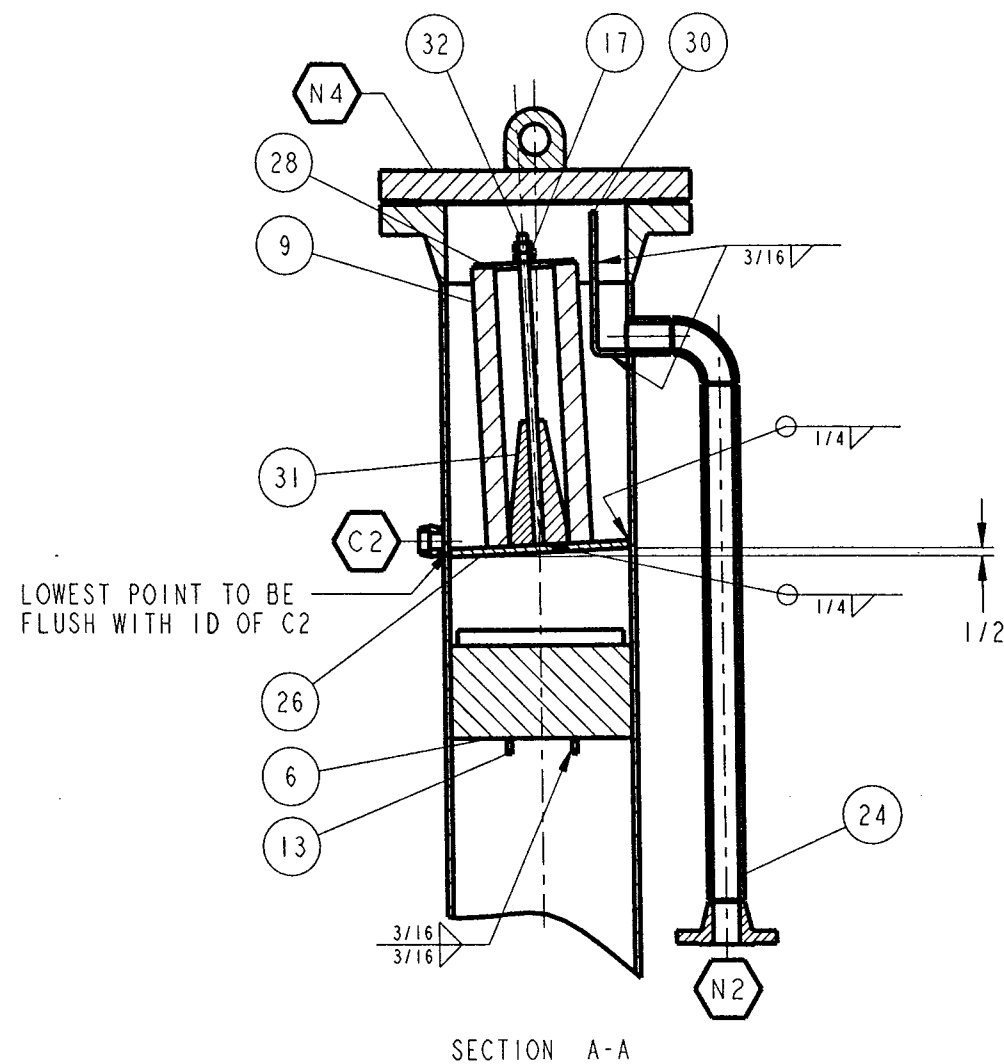
NO.	DATE	REVISION	BY
0	03/05/08	ISSUED FOR FABRICATION	ATE
1	03/20/08	REV NAMEPLATE DATA	ATE
2	04/09/08	REV INT PROJ. WAS 0", ADD NOTE 10, REV. WELD DETAILS, ADD TOE NOTE TO ITEM 22	ATE
3			
4			

NGC 5120 6th STREET N.E. CALGARY, ALBERTA T2K 4W5
TEL: 403. 274.6106 FAX: 403. 730.1644 www.ngc-ltd.com

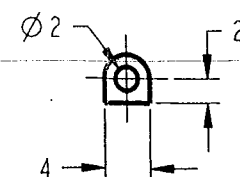
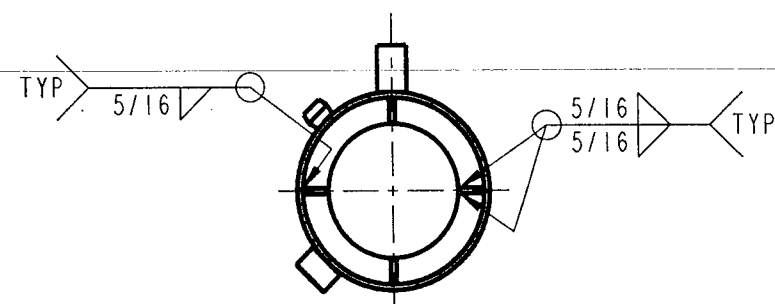
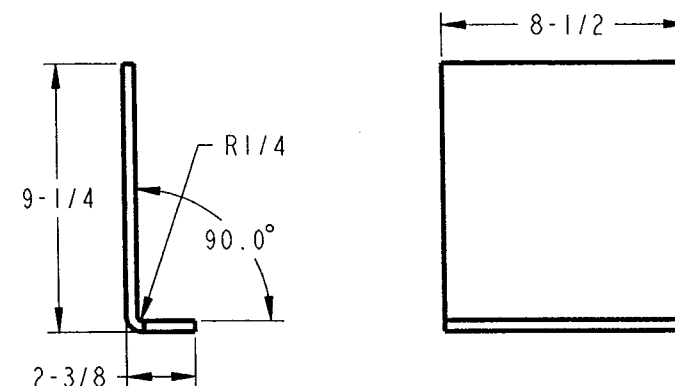
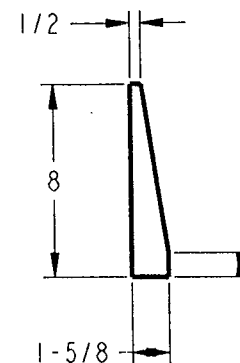
DRAWN BY: RR DATE: 02/13/08
CHECKED BY: AH DATE: 02/13/08
JOB NO.: 16821-CS EQUIP. NO.: V-102
TITLE: OIL SEPARATOR 12 OD x 68 11/16 S/F OF
END USER: CONCEPT COMPRESSION
SCALE: NTS DWG. NO.: 16821-102 REV: 2
PAGE 1 OF 2

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ITEM 29 DETAIL



GENERAL NOTES

- FLANGE HOLES TO STRADDLE MAJOR CENTERLINES.
- ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED.
- IMPACT TEST EXEMPT AS PER UG-20(f)(1-5).
- THE FOLLOWING MATERIALS MAY BE SUBSTITUTED:
SA-36 WITH W44 OR SA-516-70, SA-106 GR.B WITH SA-333 GR.6, SA-516-70N WITH SA106-C (REPADS), SA-105 WITH SA-350 LF2 CL.1, SA-234 WPB WITH SA-420 WPL6.
- ATTACHMENT WELDS WILL USE WPS NGC 1. FILLET WELDS WILL BE 3/16", UNLESS OTHERWISE NOTED.
- FINISH TO SSPC-SP2 AND ONE COAT OF ZINC CHROMATE PRIMER (GREY).
- TOLERANCES TO MEET D-STD-09-06 REV. 2, UNLESS OTHERWISE NOTED.
- IF SOUR SERVICE OPTION REQUESTED, THE FOLLOWING APPLIES:
DESIGN DATA SERVICE - SOUR - YES;
STRESS RELIEVE VESSEL TO 1 HR @ 1150°F ± 25°F, NOTING THAT THE FOLLOWING WPS REQUIREMENTS APPLY; WPS NGC3 IN LIEU OF NGC1; WPS NGC4 IN LIEU OF NGC2;
X-RAY VESSEL TO RT-1;
NAMEPLATE DATA; ADD RT-1 AND HT
- REGISTER IN ALBERTA, BC & SASKATCHEWAN

NO.	DATE	REVISION	BY
0	03/05/08	ISSUED FOR FABRICATION	ATE
1	03/20/08	REV. NAMEPLATE DATA.	ATE
2	04/09/08	REV NI INT PROJ. WAS 0", ADD NOTE 10, REV. WELD DETAILS, ADD TOE NOTE TO ITEM 22	ATE
3			
4			

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ALL PREVIOUS COPIES

BY:

DATE:

5120 6th STREET N.E. CALGARY, ALBERTA T2K 4W5 TEL: 403. 274.6106 FAX: 403. 730.1644 www.ngc-ltd.com	DRAWN BY: RR	DATE: 02/13/08
	CHECKED BY: AH	DATE: 02/13/08
	JOB NO.: 16821-CS	EQUIP. NO.: V-102
	TITLE: OIL SEPARATOR 12 OD x 63-9/16 S/S	
END USER: CONCEPT COMPRESSION		
SCALE: NTS	DWG. NO.: 16821-102	REV: 2

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VESSEL TRAVEL SHEET (FRONT)

DO NOT START CONSTRUCTION WITHOUT AI REVIEW									
AI REVIEW:			REVIEW DATE: MAR - 7 2008						
Serial No: 16821-102		Job No: 16821		Vessel Type: Oil Separator					
DRAWING NO.: 16821-102			REVISION NO.: 0						
Seq	Item	Comments	Q.C.	Date	A.I. Hold Points	A.I.	Date	Owner	Date
1.	Calculations in file		<i>[Signature]</i>	07-03-08	*	<i>[Signature]</i>	MAR - 7 2008		
2.	Release of Approved Drawing		<i>[Signature]</i>	07-03-08	*	<i>[Signature]</i>	"		
3.	Heat Numbers Recorded		<i>[Signature]</i>	MAR 28 2008	*	<i>[Signature]</i>	MAR 28 2008		
4.	M.T.R.'s Checked		<i>[Signature]</i>	APR 10 2008	*	<i>[Signature]</i>	MAY 13 2008		
5.	W.P.S. Checked		<i>[Signature]</i>	MAR 07 2008					
6.	Welders Qualified		<i>[Signature]</i>	MAR 07 2008					
7.	Thickness Recorded		<i>[Signature]</i>	MAR 28 2008					
8.	Shell & Head Fitted		<i>[Signature]</i>	MAR 24 2008					
9.	Nozzles & Fittings Fitted		<i>[Signature]</i>	MAR 10 2008					
10.	Nozzle Orientation		<i>[Signature]</i>	MAR 07 2008					
11.	Nozzle & Flange Rating Checked		<i>[Signature]</i>	MAR 07 2008					
12.	Impact Tests	Exempt per UG-20(f)(1-5)							
13.	Internals Checked		<i>[Signature]</i>	MAR 24 2008					
14.	Partial Internal - Head		<i>[Signature]</i>	MAR 24 2008					
15.	Partial Internal - Nozzle		<i>[Signature]</i>	MAR 24 2008					
16.	Final Internal Inspection	Shell Side	<i>[Signature]</i>	MAR 26 2008	**	<i>[Signature]</i>	MAR 26 2008	<i>Progen</i>	MAR 24 2008
17.	Weld Size Checked		<i>[Signature]</i>	MAR 28 2008					
18.	Welder I.D. Checked		<i>[Signature]</i>	MAR 28 2008					
19.	Radiography	RT-2/Spot			*	<i>[Signature]</i>	MAY 13 2008		
20.	Other N.D.E.								
21.	Final Ext. Prior to P.W.H.T.								
22.	PWHT Chart Checked								
23.	Final Ext. Inspection		<i>[Signature]</i>	MAR 28 2008	**	<i>[Signature]</i>	31/3/08		
24.	Hydrostatic Test 585 psig As per QCM Rev. 1	Gauge #12 Feb 09 55-423 Gauge #12 Feb 09 55-424	<i>[Signature]</i>	MAR 31 2008	**	<i>[Signature]</i>	MAR 31 2008		
25.	CRN #				*	<i>[Signature]</i>	MAY 13 2008		
26.	N.C.R. #								
27.	Nameplate Stamped				**	<i>[Signature]</i>	MAY 13 2008		
28.	Manuf. Data Report				**	<i>[Signature]</i>	"		
29.	Completed as built drawing due on:								
30.	Other								
31.	Nameplate Installed								

NOTE: * DENOTES A.I. INSP. POINT AND ** DENOTES A.I. HOLD POINT

SN:16821-102

DESCRIPTION	GMAW	GTAW	SMAW	SAW	FCAW	WELDER ID	THK	Material	HEAT / SLAB # (item b)	
Shell 12"STD							.364	SA-106B	✓ 0730814	✓ X
C1 Bottom Head	✓		✓			C	.375	SA-234-WPB	✓ 2536	✓ X
N4 (c jnt) 12" CL300 RFWN	✓		✓			C		SA-105N	✓ 041725	✓ X
N1 (c jnt) 2" CL300 RFWN	✓		✓			P		SA-105N	✓ 10938	
N1 (c jnt) 2" S/160 ELBOW	✓		✓			P		SA-234-WPB	✓ 412B	
N1(d jnt) 2" S/160 PIPE			✓			VC	.325	SA-106B	✓ 063081632	✓ X
N1 (c jnt) 2" S/160 ELBOW	✓		✓			P		SA-234-WPB	✓ 412B	Internal
N2 (c jnt) 2" CL300 RFWN	✓		✓			C		SA-105N	✓ 10938	
N2 (c jnt) 2" S/160PIPE	✓		✓			C		SA-106B	✓ 063081632	
N2 (c jnt) 2" S/160 ELBOW	✓		✓			C		SA-234-WPB	✓ 412B	
N2 (d jnt) 2" S/160 PIPE			✓			C	.322	SA-106B	✓ 063081632	✓ X
N3 (c jnt) 1.5" XXH PIPE	✓		✓			C		SA-106B	✓ 531608	
N3 (d jnt) 1.5" XXH ELBOW			✓			C	.444	SA-234-WPB	✓ 660B	✓ X
C1A 1 1/2" 3M CPLG			✓			VC		SA-105N	✓ 7AK	
C1B 1 1/2" 3M CPLG			✓			VC		SA-105N	✓ 7AK	
C2 1" 3M TOL			✓			VC		SA-105N	✓ 57151	
C3 1" 3M TOL			✓			C		SA-105N	✓ 57151	
C4A 3/4" 3M TOL			✓			VC		SA-105N	✓ 8604	
C4B 3/4" 3M TOL			✓			VC		SA-105N	✓ 579	
Nameplate Bracket	✓					C		SA-516-70N	✓ 5	
Skirt			✓			C		SA-106B	✓ 1	
12" CL300 BLIND FLANGE							1.94		✓ 58087	✓ X

12" STD ASTM A53B HSA-106B 44 0 730814 TH-382 J-16821-03 450

Contract No: 07MIM08081
 L/C NO: J1013668V07010
 Name of Customer: R AND R TRADING CO., LTD.
 ORDER NO: 07MIM02081 P.O. NO: 400432
 DESCRIPTION: SEAMLESS STEEL PIPE
 TOTAL: 36PIECES, 148BUNDLES, 334.892MT, 10004FT
 HENGYANG VALIN STEEL TUBE CO., LTD
 MILL TEST CERTIFICATE
 Date: APR 13, 2007
 Page: 3/3
 Add: 10 Daluincun, Hengyang City, Hunan, China
 Tel and Fax: +86 734 8873739 8872942
 Cable: 6993
 P.C. 421001

SPEC: API 5LB /ASTM A53B-2002/A106B-2002a, ASME SA53B-2004/SA106B-2004, NACE MR-0175-1999

NO.	BATCH NO.	HEAT NO.	STEEL GRADE	SIZE	BUNDLES	PIECES	FEET	THEORETICAL WEIGHT (MT)	ACTUAL WEIGHT(MT)								
17	273400312	0731055	B	10"×0.719"×40'	17	34	1360	47.566									
18	273300110	0731059	B	10"×0.844"×40'	16	31	1240	50.297									
19	273300107	0731063	B	10"×1"×40'	7	13	520	24.59									
21	272302111	0730814	B	12"×0.375"×21'	16	48	1008	22.704									
	272302112	0730811	B	12"×0.375"×21'	38	114	2394	53.922									
22	272402315	0730812	B	12"×0.5"×21'	28	82	1722	51.168									
23	272202304	0730806	B	12"×0.688"×40'	8	16	640	25.768									
24	273302813	0730230	B	12"×0.844"×40'	8	15	600	29.243									
25	273302805	0731481	B	12"×1"×40'	7	13	520	29.634									
NO.	DELIVERY CONDITION	NONDESTRUCTIVE TEST					CHEMICAL COMPOSITION %										
		EDDY CURRENT TEST	ULTRASONIC TEST	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V				
17	HOT-ROLLED	OK	N/A	0.21	0.21	0.56	0.021	0.007	0.14	0.05	0.07	0.01	0.01				
18	HOT-ROLLED	OK	N/A	0.19	0.22	0.56	0.019	0.007	0.14	0.05	0.06	0.01	0.01				
19	HOT-ROLLED	OK	N/A	0.23	0.22	0.56	0.022	0.010	0.14	0.05	0.08	0.01	0.01				
21	HOT-ROLLED	OK	N/A	0.21	0.22	0.59	0.023	0.006	0.10	0.04	0.06	0.00	0.00				
	HOT-ROLLED	OK	N/A	0.19	0.18	0.55	0.020	0.009	0.13	0.04	0.07	0.01	0.01				
22	HOT-ROLLED	OK	N/A	0.20	0.17	0.56	0.019	0.009	0.11	0.04	0.06	0.01	0.01				
23	HOT-ROLLED	OK	N/A	0.20	0.20	0.55	0.018	0.009	0.12	0.04	0.07	0.01	0.01				
24	HOT-ROLLED	OK	N/A	0.19	0.22	0.58	0.010	0.005	0.10	0.03	0.05	0.00	0.00				
25	HOT-ROLLED	OK	N/A	0.20	0.22	0.54	0.009	0.005	0.09	0.04	0.04	0.02	0.01				
NO.	a b (PSI)		a s (PSI)		δ (%)		AK (J)		HARDNESS		HYDROSTATIC TEST		FLATTEN TEST		BEND TEST		
TENSILE STRENGTH			YIELD STRENGTH			ELONGATION		IMPACT									
17	74675		48575		42.5		N/A		HB 142		2800 PSI		OK		N/A		
18	69600		44950		39.0		N/A		HB 151		2800 PSI		OK		N/A		
19	70325		44950		38.5		N/A		HB 143		2800 PSI		OK		N/A		
21	66700		52200		37.5		N/A		HB 155		2800 PSI		OK		N/A		
	68150		52200		38.0		N/A		HB 154		2800 PSI		OK		N/A		
22	75400		47850		42.0		N/A		HB 138		2800 PSI		OK		N/A		
23	75400		47125		43.0		N/A		HB 133		2800 PSI		OK		N/A		
24	73950		47850		35.5		N/A		HB 139		2800 PSI		OK		N/A		
25	73950		49300		35.0		N/A		HB 131		2800 PSI		OK		N/A		
REMARKS: 1 No. of 10' bundles per 20' bundle.																	

REMARKS: 1. No mercury or mercury compounds or mercury bearing instruments and/or equipment have been used in any manner which might cause contamination in manufacture, assembly or test of material.

2. No weld repair was performed.

3. Class 1 ozone depleting chemicals are not to be used nor incorporated in any items to be delivered under this contract.

4. Properties compliance to DIN 50049 3.113

5. BRINELL /Rockwell hardness certified to NACE MR-0175-99.

6. SPECIMEN SIZE: (Pipe end, longitudinal, Gauge Length=2")

A. For pipes ≤ 1" full length specimen were used.

B. For pipes > 1" longitudinal strip specimen were used, the width of the gauge length portion is 3/4"

QUALITY MANAGER

[Signature]

NGC Process Systems Ltd.
 CHECKED TO ASME
 SECTION A
 2007 EBT
 MTR ACCEPTED
 PER REJECTED
 DATE APR 10 2008

SHELL
 .364"
 THK

BOTTOM HEAD .375" THK

HEAT NUMBER : 2536
TRANS AM PIPING PRODUCTS - REV'D BY: _____
Shipment/Seq #: S 5 - 6133 37

12" STD BW CAPS A234-WPB

NGC Process Systems Ltd.

CHECKED TO ASME

SECTION 2007 EBT

MTR ACCEPTED

REJECTED

PER

DATE APR 10 2008



INSPECTION CERTIFICATE

(MILL TEST)

CHUP HSIN ENTERPRISE CO., LTD.

17, TUNG U ROAD HSIAO KANG
KAOHSIUNG, TAIWAN R. O. C.

TEL: (07) 831-9157-9

FAX: (07) 831-2942, 821-7500

Certificate No: 09300173-0104

Order No: P1-04-35499

Date: 2005/6/8

Customer: TRANS AM PIPING PRODUCTS LTD.
Product: SEAMLESS STEEL PIPE FITTING
Spec: ASTM/A53/A234 WPB-00
EN10044/DIN 50049-1/B1

Specification for Raw Material		Specification for Inspection		Visual Examination		Dimensional Inspection	
JIS G3103 SB410		ASME B16.9-2001		GOOD		GOOD	
Item	Description	Quantity	Heat ID.	Heat No.	Raw Material Mfg	Raw Certificate NO.	
30	CAP STD	3	M451	4M451	C.S.C.	921028H0049	
31	CAP STD	6	Z536	4Z536	C.S.C.	910718H0087	
32	CAP STD	6	Z536	4Z536	C.S.C.	910718H0087	

Specification	Chemical Composition %												Tension Test				HARDNESS TEST	Heat Treatment	Magnetic Particle Exm.	Remark
	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V	Nb	C.E.	Y.S.	T.S.	E	H.B.				
	×100	×100	×100	×1000	×1000	×100	×100	×100	×100	×1000	×1000	×100	P.S.I	P.S.I	%					
	MIN	MAX	MIN	MAX	MAX	MAX	MAX	MAX	MAX	MAX	MAX	MAX	MAX	MAX	MAX	MAX				
	30	10	29	106	50	58	40	40	15	80	20	50	35000	60000	30	197	S.R. 650°C.x0.5 HR	CAP ELONGATION MIN. 17%		
30	15	15	75	24	9	1	3	3	1	<1	<2	29	48173	64715	24	131				
31	16	11	79	19	8	<1	3	3	<1	<1	<2	30	53252	69358	26	130				
32	16	11	79	19	8	<1	3	3	<1	<1	<2	30	53252	69358	26	130				

E=C+MN/6+(CR+MO+V)/5+CN/6+V/5

C.E.=C+Mn/6+(CR+Mo+V)/5+(Ni+Cu)/15
We hereby certify that the product described herein has manufactured in accordance with the specifications concerned and also with the purchaser's requirements and that the test results shown herein are correct.

Chief of Quality Assurance Section

L.S. Tsai

N 4

HEAT NUMBER : 641725
TRANS AM PIPING PRODUCTS - REV'D BY: *AD*
Shipment/Seq #: 8 7 - 1069 3

12" CL 300 W/N FLANGE RF STD
BORE A105N



METALFAR
PRODOTTI INDUSTRIALI S.P.A.
23861 CESANA BRIANZA (LC) ITALY
Tel. 031 655441 - Fax 031 655149
MATERIAL TEST DEPARTMENT
SALA PROVE ED ANALISI MATERIALI

COMPANY
TRANS AM PIPING PRODUCTS LTD
WITH QUALITY MANAGEMENT
SYSTEM CERTIFIED BY DNV
= ISO 9001 : 2000 =
CALGARY-ALBERTA

INSPECTION CERTIFICATE EN 10204/3.1

CERTIFICATO DI COLLAUDO

N. 354/ 30/01/2007
INVOICE / FATTELLA: 289/ 29/01/2007
S. 48684
DEL NOTE / BOLLE: 587/ 29/01/2007

HEAT CODE COD. COLATA	HEAT COLATA	ITEM POS.	YOUR P.O. VS. ORDINE	OUR REFERENCE VS. ORDINE	QUANTITY QUANTITA'	DESCRIPTION DESCRIZIONE	DIM. ACCORDANCE TO DIM. IN ACCORDO A	SATISFACTORY SODDISFACENTE	VISUAL & DIMENSIONAL VISTO E DIMENSIONALE												
36575.		0012	C106-444	06002074 0019	W/N 300 RP 4" STD	LP2CL1	ASME/ANSI B16.5	SATISFACTORY													
36575.		0021	C106-721	06003732 0028	W/N 300 RP 4" STD	LP2CL1	ASME/ANSI B16.5	SATISFACTORY													
36575.		0021	C106-721	06003732 0028	W/N 300 RP 4" STD	LP2CL1	ASME/ANSI B16.5	SATISFACTORY													
36575.		0021	C106-721	06003732 0028	W/N 300 RP 4" STD	LP2CL1	ASME/ANSI B16.5	SATISFACTORY													
36575.		0021	C106-721	06003732 0028	W/N 300 RP 4" STD	LP2CL1	ASME/ANSI B16.5	SATISFACTORY													
641725		0031	C106-767	06003814 0038	W/N 300 RP 12" STD	A105	ASME/ANSI B16.5	SATISFACTORY													
HEAT CODE COD. COLATA	HEAT COLATA	ITEM POS.	MATERIAL	C %	SI %	Mn %	S %	P %	CR %	NI %	Mo %	TI %	Cu %	V %	Nb %	N %	Al %	C.E. %	ORIGIN ORIGINE		
36575.		0012	ASTM A350 LP2 CL1/2	0.180	0.210	1.130	0.013	0.013	0.100	0.050	0.010	0.015	0.110	0.023	0.002	0.000	0.025	0.409	EUROPE		
36575.		0021	ASTM A350 LP2 CL1/2	0.180	0.210	1.130	0.013	0.013	0.100	0.050	0.010	0.015	0.110	0.023	0.002	0.000	0.025	0.409	EUROPE		
36575.		0021	ASTM A350 LP2 CL1/2	0.180	0.210	1.130	0.013	0.013	0.100	0.050	0.010	0.015	0.110	0.023	0.002	0.000	0.025	0.409	EUROPE		
36575.		0021	ASTM A350 LP2 CL1/2	0.180	0.210	1.130	0.013	0.013	0.100	0.050	0.010	0.015	0.110	0.023	0.002	0.000	0.025	0.409	EUROPE		
36575.		0021	ASTM A350 LP2 CL1/2	0.180	0.210	1.130	0.013	0.013	0.100	0.050	0.010	0.015	0.110	0.023	0.002	0.000	0.025	0.409	EUROPE		
641725		0031	ASTM A 105	0.188	0.240	1.136	0.018	0.012	0.074	0.042	0.009	0.000	0.043	0.003	0.002	0.000	0.031	0.400	EUROPE		
HEAT CODE COD. COLATA	HEAT COLATA	ITEM POS.	TEST SPECIMEN Samp. Prov. Spec. 2014	YIELD POINT Sovrammento 2014	TENSILE STRENGTH Rm 2014	ELONGATION Allungamento 2014	REDUCTION OF AREA Riduzione Area 2014	IMPACT TEST Prova 2014	IMPACT TEST Resistenza Area 2014	IMPACT TEST Resistenza Area 2014	IMPACT TEST Resistenza Area 2014	IMPACT TEST Resistenza Area 2014	IMPACT TEST Resistenza Area 2014	IMPACT TEST Resistenza Area 2014	IMPACT TEST Resistenza Area 2014	IMPACT TEST Resistenza Area 2014	IMPACT TEST Resistenza Area 2014	IMPACT TEST Resistenza Area 2014	IMPACT TEST Resistenza Area 2014		
36575.		0012	126.60	50.80	367.0	529	28.0	57.0	159-163	0.0	0.0	0.0	-50	60	58	62	1		0.0		
36575.		0021	126.60	50.80	367.0	529	28.0	57.0	159-163	0.0	0.0	0.0	-50	60	58	62	1		0.0		
36575.		0021	126.60	50.80	367.0	529	28.0	57.0	159-163	0.0	0.0	0.0	-50	60	58	62	1		0.0		
36575.		0021	126.60	50.80	367.0	529	28.0	57.0	159-163	0.0	0.0	0.0	-50	60	58	62	1		0.0		
36575.		0021	126.60	50.80	367.0	529	28.0	57.0	159-163	0.0	0.0	0.0	-50	60	58	62	1		0.0		
641725		0031	126.60	50.80	335.0	533	31.0	60.0	163-165	0.0	0.0	0.0	20	82	84	80	1		0.0		
HEAT CODE COD. COLATA	HEAT COLATA	ITEM POS.	MATERIAL IN ACCORDO A MATERIALE IN ACCORDO A																		
36575.		0012	ASTM/ASME A 350/SA 350 M - 04a	NORMALIZED AT 930 C - COOLED IN STILL AIR																	ELECTRIC FURNACE
36575.		0021	ASTM/ASME A 350/SA 350 M - 04a	NORMALIZED AT 930 C - COOLED IN STILL AIR																	ELECTRIC FURNACE
36575.		0021	ASTM/ASME A 350/SA 350 M - 04a	NORMALIZED AT 930 C - COOLED IN STILL AIR																	ELECTRIC FURNACE
36575.		0021	ASTM/ASME A 350/SA 350 M - 04a	NORMALIZED AT 930 C - COOLED IN STILL AIR																	ELECTRIC FURNACE
36575.		0021	ASTM/ASME A 350/SA 350 M - 04a	NORMALIZED AT 930 C - COOLED IN STILL AIR																	ELECTRIC FURNACE
641725		0031	ASTM/ASME A 105/SA 105 K - 05	NORMALIZED AT 920 C - COOLED IN STILL AIR																	ELECTRIC FURNACE

HEAT TREATMENT
TRATTAMENTO TERMICO

MATERIAL IN ACCORDANCE WITH NACE MR-0175/2003

NGC Process Systems Ltd.

CHECKED TO ASME

2007 Edr

MIN. ACCEPTED

REJECTED

PER

DATE

APR 10 2008

BRACCHI FAVO

QUALITY CONTROL DEPARTMENT

INSPECTION AUTHORITY

MANUFACTURER'S SYMBOL



HEAT: 660B SKU: 7515219 DESC: 1-1/2 XXH LR 90 WELD ELLWPB

N 3
494"
THK

NGC Process Systems Ltd.

CHECKED TO ASME

SECTION A 2007 Edt

MTR ACCEPTED

REJECTED

PER

DATE APR 10 2008

INSPECTION CERTIFICATE

(MILL TEST)

CHUP HSIN ENTERPRISE CO., LTD.

17, TUNG LI ROAD HSIAO KANG

KAHSIUNG, TAIWAN R.O.C.

TEL: (07) 831-9157-9

FAX: (07) 831-2942, 821-7500

Certificate No: 09500028-0401

Order No

2006/125

Date

Customer: CCTFA DIVISION OF EMCO LTD)
Product : SEAMLESS STEEL PIPE FITTING
Spec : ASTM A234 WPB-03
IDN 500493, IBINACE MR 0175-95

Specification for Raw Material		Specification for Inspection		Visual Examination		Dimensional Inspection														
ASTM A106 GR.B		ASME B16.9-2001		GOOD		GOOD														
Item	Description	Quantity	Heat ID.	Heat No.	Raw Material Mfg	Raw Certificate NO.														
88	90 E S/R STD 7510008 90 E L/R XXS 7515219	3 50	2108 660B	J6K2108 J6K3660	SUMITOMO SUMITOMO	WY7Y0662 BY7L4314														
Chemical Composition %				Tension Test																
Specifi cation	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V	Nb	C.E.	Y.S	T.S	E	H B	HARD NESS TEST	Heat Treatment	Magnetic Particle Exam.	Remark
MIN	100	10	25	1000	1000	100	100	100	100	1000	1000	100	35000	60000	30	197		620°C TO 980°C HOT FORMED		
MAX	30	106	50	58	40	40	40	40	15	80	20	50	47200	72500	40	139				
9	20	72	66	16	9	10	6	5	2	0	0	33	49300	70200	40	139				
88	20	24	46	12	9	3	2	2	1	0	0	29								
202																				

C.E.=C+Mn/6+(CR+MO+V)/5+(NI+CU)/15
We hereby certify that the product described herein has manufactured in accordance with the specifications concerned and also with the purchaser's requirements and that the test results shown herein are correct.

Chief of Quality Assurance Section

L.S. Jai

HEAT NUMBER : 58087
 TRANS AM PIPING PRODUCTS - REV'D BY:
 Shipment/Seq #: S 6 - 1566 8

12" CL 300 BLIND FLANGE RF
 A105N

三英鋼鐵股份有限公司
 SAN ENG STEEL FORGING CO., LTD.

NO. 22 LANE 50, WAN SING STREET
 SAN MIN DISTRICT, KAOHSIUNG,
 TAIWAN, R. O. C.
 Tel: 07-372 4249 07-371 2934
 Fax: 07-371 2923 07-371 2846
 URL: http://www.saneng.com.tw
 e-mail: saneng@ksts.seed.net.tw

MILL TEST CERTIFICATE
 EN10204-3.1.B(DIN50049/3.1.B)
 CUSTOMER : SEYBOLD INTERNATIONAL CORP.

20 HOLLY STREET, SUITE 205
 TORONTO, M4S 3B1, CANADA
 TEL: 416-4810191 FAX: 416-4811790

ORDER NO.: 5798(2) TRANS AM
 L/C NO. :

PAGE :

CHECKED TO ASME
 SECTION A 2007 Edt
 MTR ACCEPTED
 REJECTED
 PER DATE APR 10 2008
 CERT NO.: SE-5798BN
 DATE : 09/18/2006

P R O D U C T		SPECIFICATION FOR MATERIAL		SPECIFICATION FOR FITTINGS											
FORGED CARBON STEEL FLANGES		ASTM A-105-03/ASME SA-105 (Z245.12 CAT 1 GR.248 SOUR SERVICE-01)		ASME B16.5-98a											
ITEM NO.	D E S C R I P T I O N	QUANTITY	C H E M I C A L C O M P O S I T I O N (%)												
			C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V	Nb	N	C.E.
1.	900/1500 WRF XS 1 1/2" A105N	1	0.200	0.220	0.980	0.009	0.007	0.060	0.060	0.030	0.005	0.003	0.005	0.007	0.383
2.	300 BLRF 12" A105N	1	0.200	0.260	0.900	0.021	0.017	0.170	0.180	0.190	0.020	0.000	0.001	0.008	0.414
3.	300 BLRF 24" A105N	1	0.200	0.200	1.190	0.013	0.014	0.080	0.060	0.050	0.005	0.003	0.005	0.008	0.421
4.	600 BLRF 10" A105N	1	0.200	0.240	1.090	0.015	0.015	0.120	0.070	0.060	0.005	0.003	0.005	0.008	0.410
5.	900 BLRF 10" A105N	1	0.190	0.260	0.870	0.018	0.019	0.180	0.140	0.150	0.030	0.000	0.009	0.009	0.393
6.	900/1500 HUB BLRF 1" A105N	1	0.210	0.180	1.030	0.010	0.007	0.090	0.080	0.060	0.005	0.003	0.005	0.010	0.410
7.	300 THRF 1" A105N	1	0.230	0.120	1.020	0.008	0.009	0.070	0.040	0.040	0.005	0.003	0.005	0.010	0.417
8.	300 THRF 1 1/4" A105N	1	0.200	0.250	0.920	0.017	0.018	0.170	0.110	0.100	0.020	0.000	0.001	0.009	0.398
9.	600 THRF 2" A105N	1	0.190	0.200	1.140	0.008	0.011	0.110	0.080	0.070	0.005	0.003	0.005	0.009	0.410
10.	300 SWRF XS 3/4" A105N	1	0.200	0.170	1.110	0.010	0.015	0.070	0.040	0.030	0.005	0.003	0.005	0.010	0.402
ITEM	HEAT	TENSILE STRENGTH (MPA)	YIELD STRENGTH (MPA)	ELONGATION (%)	HARDNESS (HB)	REDUCTION OF AREA (%)	HEAT TREATMENT	MATERIAL SUPPLIER	R E M A R K S						
	485 MIN	250 MIN	22.0 MIN	187 MAX	30.0 MIN				NORMALIZATION: 880°CX3HRS CONFORMS TO MEET WITH NACE MR01-75/03 AND MR01-03/03						
1.	10669	487.10	335.20	36.2	149	69.5	NORMALIZED	OEK	RED OCTOBER RED OCTOBER RED OCTOBER RED OCTOBER RED OCTOBER RED OCTOBER RED OCTOBER RED OCTOBER RED OCTOBER RED OCTOBER						
2.	58087	508.00	315.80	35.2	155	64.0	NORMALIZED	OEK							
3.	38665	503.10	323.60	33.2	150	66.8	NORMALIZED	OEK							
4.	19278	508.00	311.90	33.6	153	66.8	NORMALIZED	OEK							
5.	58095	509.90	325.60	32.6	153	66.8	NORMALIZED	RED OCTOBER							
6.	34949	509.90	306.00	39.0	148	65.9	NORMALIZED	OEK							
7.	49187	513.90	296.20	33.4	162	67.7	NORMALIZED	OEK							
8.	58048	503.10	317.70	34.4	162	66.8	NORMALIZED	RED OCTOBER							
9.	29570	491.30	298.10	35.4	150	65.9	NORMALIZED	OEK							
10.	13182	517.80	333.40	35.6	150	67.7	NORMALIZED	OEK							

WE HEREBY CERTIFY THAT THE MATERIAL DESCRIBED HEREIN HAS BEEN MADE IN ACCORDANCE WITH THE ABOVE SPECIFICATION AND ALSO WITH THE REQUIREMENTS CALLED FOR BY THE ABOVE ORDER AND IS THAT WHICH HAS BEEN TESTED TO THE SATISFACTION OF THE CERTIFICATE

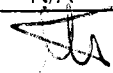
MANAGER

TEST CHIEF

DRAWING AND CALCULATION REVISION SHEET

Date 4/9/2008
Job 16821-CS

	Document	Revision
Drawing	16821-101;102	2
Vessel Calculation	16821-VC-101;102	1
Skirt/Baseplate Calculation	N/A	N/A
Saddle Calculation	N/A	N/A
Lifting Lug Calculation	N/A	N/A

Signature 

***Misc.**

DRAWING AND CALCULATION REVISION SHEET

Date 3/20/2008
Job 16821-CS

	Document	Revision
Drawing	16821-102	1
Vessel Calculation	16821-VC-102	1
Skirt/Baseplate Calculation	N/A	N/A
Saddle Calculation	N/A	N/A
Lifting Lug Calculation	N/A	N/A

Signature _____

- *Revised Nameplate Data to Match Design Data / Calc. for RT-2
- *Revised CS Calc. to 85% Joint Efficiency

NGC Process Systems Ltd.
5120 - 6th St. NE Calgary, AB T2K 4W5

Date Printed: 20/03/2008

CUSTOMER

CONCEPT STOCK

CALGARY, ALBERTA

VESSEL LOCATION

CONCEPT STOCK

CALGARY, ALBERTA

VESSEL DESCRIPTION

12" OD x 68.7" S/FOF, OIL SEPARATOR

Vessel designed per the ASME Boiler & Pressure Vessel Code,
Section VIII, Division 1, 2007 Edition
with Advanced Pressure Vessel, Version: 10.0.0
Vessel is ASME Code Stamped

Job No: 16821-CS

Vessel Number: V-102 REV.1

NAMEPLATE INFORMATION

Vessel MAWP: 450.00 PSI at 250 °F
MDMT: -20 °F at 450.00 PSI
Serial Number(s): 16821-102
Canadian Registration Number(s): -
Year Built: 2008
Radiography: RT 2
Postweld Heat Treated: NONE
Construction Type: W

Notes

All loadings per UG-22 (a) to (d) & (f) have been considered.
Loadings per UG-22 (e) & (g) to (i) do not apply.
This vessel is NOT in lethal service.
Over pressure protection devices by others.

Signatures

APPROVED BY::

ALAN HALBERT

Date: 03 / 20 / 08

NGC Process Systems Ltd.
5120 - 6th St. NE Calgary, AB T2K 4W5

Date Printed: 20/03/2008

Project Description

Rev. A: Issued for Approval
Rev. 0: Issued for Fabrication
Rev. 1: Rev. circ. seam joint efficiency to 85%

NGC Process Systems Ltd.

SHELL, PIPE, 12"OD, Sch. STD,

Customer: **CONCEPT STOCK**

Job No: 16821-CS

Number: 1

Vessel Number: V-102 REV.1

Mark Number: S1

Date Printed: 20/03/2008

Cylindrical Shell Design Information

Design Pressure:	450.00 PSI	Design Temperature:	250 °F
Static Head:	2.00 PSI	Long. Joint Efficiency:	100 %
Shell Material:	SA-106 Gr B	Factor B Chart:	CS-2
Shell Length:	63.5625 in.	Material Stress (hot):	17100 PSI
Corrosion Allowance:	0.1250 in.	Material Stress (cold):	17100 PSI
External Corrosion Allowance:	0.0000 in.	Compressive Stress:	17170 PSI
Outside Diameter (new):	12.7500 in.	Actual Circumferential Stress:	14007 PSI
Outside Diameter (corroded):	12.7500 in.	Actual Longitudinal Stress:	7912 PSI
Shell Surface Area:	17.68 Sq. Ft.	Specific Gravity:	1.00
Shell Estimated Volume:	31.12 Gal.	Weight of Fluid:	260.01 lb.
Circ. Joint Efficiency:	85 %	Total Flooded Shell Weight:	522.26 lb.
		Shell Weight:	262.25 lb.

Minimum Design Metal Temperature Data

Minimum Design Metal Temperature: -20 °F

Material is exempt from impact testing per UG-20(f), 1 through 5

Design Thickness Calculations

Longitudinal Stress Calculations per Paragraph UG-27(c)(2)

$$t = \frac{PR}{2SE + 0.4P} = \frac{452.00 * 6.1250}{2 * 17100 * 0.85 + 0.4 * 452.00} = 0.0946 + 0.1250 \text{ (corrosion)} + 0.0000 \text{ (ext. corrosion)} + 0.0469 \text{ (12 1/2\% for pipe)}$$

= minimum of **0.2665 in.**

Circumferential Stress Calculations per Appendix 1-1(a)(1)

$$t = \frac{PR_o}{SE + 0.4P} = \frac{452.00 * 6.3750}{17100 * 1.00 + 0.4 * 452.00} = 0.1668 + 0.1250 \text{ (corrosion)} + 0.0000 \text{ (ext. corrosion)} + 0.0469 \text{ (12 1/2\% for pipe)}$$

= minimum of **0.3387 in.**

MAWP for this Shell Section Only

$$P = \frac{SEt}{R_o - 0.4t} = \frac{17100 * 1.00 * 0.2031}{6.3750 - 0.4 * 0.2031}$$

= maximum design pressure of **551.82 PSI**

External loads do not control design.

Pipe Selected: Size = **12 in.**, Schedule = **STD**, Diameter = **12.7500 in.**, Wall = **0.3750 in.**

NGC Process Systems Ltd.

12" OD, 2:1 SE, SEAMLESS WELD CAP (BOTTOM)

Customer: **CONCEPT STOCK**

Job No: 16821-CS

Number: 2

Vessel Number: V-102 REV.1

Mark Number: H1

Date Printed: 20/03/2008

Ellipsoidal Head Design Information

Design Pressure:	450.00 PSI	Design Temperature:	250 °F
Static Head:	2.00 PSI	Joint Efficiency:	85 %
Head Material:	SA-234 Gr WPB	Factor B Chart:	CS-2
Corrosion Allowance:	0.1250 in.	Material Stress (hot):	17100 PSI
External Corrosion Allowance:	0.0000 in.	Material Stress (cold):	17100 PSI
Head Location:	Bottom	Actual Head Stress:	15728 PSI
Outside Diameter :	12.7500 in.	Straight Flange :	2.0000 in.
12.5 % pipe undertolerance:	0.0469 in.	Head Depth (ho) :	3.3750 in.
$K = \frac{1}{6}[2 + (D/2h)^2]$:	0.97		
Head Surface Area:	1.70 Sq. Ft.	Specific Gravity:	1.00
Head Estimated Volume:	1.96 Gal.	Weight of Fluid:	16.33 lb.
Head Weight:	25.97 lb.	Total Flooded Head Weight:	42.30 lb.

Minimum Design Metal Temperature Data

Min. Temperature Curve:	B	Pressure at MDMT:	450.00 PSI
UCS-66(b) reduction:	No	Minimum Design Metal Temperature:	-20 °F
UCS-68(c) reduction:	No	Computed Minimum Temperature:	-20 °F

Design Thickness Calculations

Design Thickness Calculations per Appendix 1-4(c)

$$t = \frac{PD_0K}{2SE + 2P(K - 0.1)} = \frac{452.00 * 12.7500 * 0.97}{2 * 17100 * 0.85 + 2 * 452.00 * (0.97 - 0.1)}$$

$$= 0.1873 + 0.1250 \text{ (corrosion)} + 0.0000 \text{ (ext. corrosion)} + 0.0469(12.5 \%) = \text{minimum of } \mathbf{0.3592 \text{ in.}}$$

MAWP per UG-32 for this Head Only

$$P = \frac{2SEt}{KD_0 - 2t(K - 0.1)} = \frac{2 * 17100 * 0.85 * 0.2031}{0.97 * 12.7500 - 2 * 0.2031 * (0.97 - 0.1)} = \mathbf{491.43 \text{ PSI}}$$

External loads do not control design.

Nominal Head Thickness Selected = **0.3750 in.**

Minimum Thickness after forming, t_s (uncorroded) = **0.3281 in.**

Pipe Cap

Size: 12 Schedule: STD

NGC Process Systems Ltd.
2"-300CL NOZZLE IN SHELL (OUTLET)

Customer: **CONCEPT STOCK**
 Job No: 16821-CS
 Number: 1
 ID Number: 2

Vessel Number: V-102 REV.1
 Mark Number: N2

Date Printed: 20/03/2008

Nozzle Design Information

Design Pressure:	450.00 PSI	Design Temperature:	250 °F
Static Head:	0.00 PSI	Nozzle Efficiency (E):	100 %
Nozzle Material:	SA-106 Gr B	Joint Efficiency (E ₁):	1.00
		Factor B Chart:	CS-2
External Projection:	2.0000 in.	Allowable Stress at Design Temperature (S):	17100 PSI
Internal Projection:	0.0000 in.	Allowable Stress at Ambient Temperature:	17100 PSI
Inside Corrosion Allowance:	0.1250 in.	Correction Factor (F):	1.00
External Corrosion Allowance:	0.0000 in.	Nozzle Path:	None
Nozzle Pipe Size:	2	Nozzle Pipe Schedule:	160
Nozzle ID (new):	1.6890 in.	Nozzle Wall Thickness(new):	0.3430 in.
Nozzle ID (corroded):	1.9390 in.	Nozzle Wall Thickness(corroded):	0.2180 in.
Outer "h" Limit:	0.5078 in.	Upper Weld Leg Size(Weld 41):	0.3750 in.
Internal "h" Limit:	0.2325 in.	Internal Weld Leg Size(Weld 43):	0.0000 in.
OD, Limit of Reinforcement:	3.8780 in.	Outside Groove Weld Depth:	0.3750 in.

Minimum Design Metal Temperature

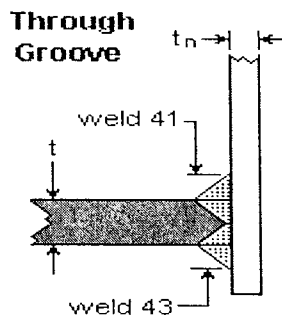
Minimum Design Metal Temperature: -20 °F

Material is exempt from impact testing per UG-20(f), 1 through 5

Host Component: Shell 1 - SHELL, PIPE, 12"OD, Sch. STD,

Material:	SA-106 Gr B	Shell wall thickness(new):	0.3750 in.
Material Stress(S _y):	17100 PSI	Shell wall thickness - 12% for pipe (corroded):	0.2031 in.

Nozzle Detail Information



Upper Weld Leg Size(Weld 41):	0.3750 in.
Internal Weld Leg Size(Weld 43):	0.0000 in.
Nozzle Wall Thickness(t _n):	0.3430 in.
Outside Groove Weld Depth:	0.3750 in.

Nozzle passes through the vessel, attached by a groove weld.

Pipe Size: 2 Schedule: 160

Nozzle is adequate for UG-45 requirements.

Opening is adequately reinforced for Internal Pressure.

Reinforcement calculations are not required per UG-36(c)(3)(a) See Uw-14 for exceptions.

Weld Strength Paths are adequate.

NGC Process Systems Ltd.
2"-300CL NOZZLE IN SHELL (OUTLET)

Job No: 16821-CS
 Number: 1
 ID Number: 2

Vessel Number: V-102 REV.1
 Mark Number: N2

Date Printed: 20/03/2008

Required Shell Thickness per Paragraph UG-37(a)

$$t_r = \frac{P R_o}{S E + 0.4 P} = \frac{450.00 * 6.3750}{17100 * 1 + 0.4 * 450.00} = 0.1660 \text{ in.}$$

Nozzle Required Thickness Calculations

Required Nozzle Thickness for Internal Pressure per Paragraph UG-37(a)

$$t_{rn} = \frac{P R_n}{S E - 0.6 P} = \frac{450.00 * 0.9695}{17100 * 1 - 0.6 * 450.00} = 0.0259 \text{ in.}$$

Strength Reduction Factors

$$f r_1 = \frac{S_n}{S_v} = \frac{17100}{17100} = 1.0000$$

$$f r_2 = \frac{S_n}{S_v} = \frac{17100}{17100} = 1.0000$$

$$f r_3 = \frac{S_n}{S_v} = \frac{17100}{17100} = 1.0000$$

UG-45 Thickness Calculations

Nozzle Thickness for Pressure Loading (plus corrosion) per Paragraph UG-45(a)

$$t = \frac{P R_n}{S E - 0.6 P} + C_a + \text{ext. } C_a = \frac{450.00 * 0.9695}{17100 * 1.00 - 0.6 * 450.00} + 0.1250 + 0.0000 = 0.1509 \text{ in.}$$

Nozzle Thickness for Internal Pressure (plus corrosion) per Paragraph UG-45(b)(1)

$$t = \frac{P R_o}{S E + 0.4 P} + C_a + \text{ext. } C_a = \frac{450.00 * 6.3750}{17100 * 1 + 0.4 * 450.00} + 0.1250 + 0.0000 = 0.2910 \text{ in.}$$

Minimum Thickness of Standard Wall Pipe (plus corrosion) per Paragraph UG-45(b)(4)

$$t = \text{minimum thickness of standard wall pipe} + C_a + \text{ext. } C_a = 0.2597 \text{ in.}$$

Nozzle Minimum Thickness per Paragraph UG-45(b)

$$t = \text{Smallest of UG-45(b)(1) or UG-45(b)(4)} = 0.2597 \text{ in.}$$

Wall thickness = $t_n * 0.875(\text{pipe}) = 0.3001$ is greater than or equal to UG-45 value of 0.2597

NGC Process Systems Ltd.

1.5" PIPE IN BOTTOM HEAD (DRAIN)

Customer: **CONCEPT STOCK**

Job No: 16821-CS

Number: 2

ID Number: 3

Vessel Number: V-102 REV.1

Mark Number: N3

Date Printed: 20/03/2008

Nozzle Design Information

Design Pressure:	450.00 PSI	Design Temperature:	250 °F
Static Head:	2.00 PSI	Nozzle Efficiency (E):	100 %
Nozzle Material:	SA-106 Gr B	Joint Efficiency (E ₁):	1.00
		Factor B Chart:	CS-2
External Projection:	1.0000 in.	Allowable Stress at Design Temperature (S):	17100 PSI
Internal Projection:	0.0000 in.	Allowable Stress at Ambient Temperature:	17100 PSI
Inside Corrosion Allowance:	0.1250 in.	Correction Factor (F):	1.00
External Corrosion Allowance:	0.0000 in.	Nozzle Path:	None
Nozzle Pipe Size:	1.5	Nozzle Pipe Schedule:	XXH
Nozzle ID (new):	1.1000 in.	Nozzle Wall Thickness(new):	0.4000 in.
Nozzle ID (corroded):	1.3500 in.	Nozzle Wall Thickness(corroded):	0.2750 in.
Outer "h" Limit:	0.5078 in.	Upper Weld Leg Size(Weld 41):	0.3750 in.
Internal "h" Limit:	0.3750 in.	Internal Weld Leg Size(Weld 43):	0.0000 in.
OD, Limit of Reinforcement:	2.7000 in.	Outside Groove Weld Depth:	0.3750 in.

Minimum Design Metal Temperature

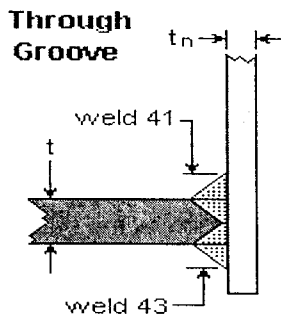
Minimum Design Metal Temperature: -20 °F

Material is exempt from impact testing per UG-20(f), 1 through 5

Host Component: Head 2 - 12" OD, 2:1 SE, SEAMLESS WELD CAP (BOTTOM)

Material:	SA-234 Gr WPB	Head wall thickness(new):	0.3750 in.
Material Stress(S _y):	17100 PSI	Head wall thickness - 12% for pipe:	0.2031 in.

Nozzle Detail Information



Upper Weld Leg Size(Weld 41):	0.3750 in.
Internal Weld Leg Size(Weld 43):	0.0000 in.
Nozzle Wall Thickness(t _n):	0.4000 in.
Outside Groove Weld Depth:	0.3750 in.

Nozzle passes through the vessel, attached by a groove weld.

Pipe Size: 1.5 Schedule: XXH

Nozzle is adequate for UG-45 requirements.

Opening is adequately reinforced for Internal Pressure.

Reinforcement calculations are not required per UG-36(c)(3)(a) See Uw-14 for exceptions.

Weld Strength Paths are adequate.

NGC Process Systems Ltd.
1.5" PIPE IN BOTTOM HEAD (DRAIN)

Job No: 16821-CS
Number: 2
ID Number: 3

Vessel Number: V-102 REV. 1
Mark Number: N3

Date Printed: 20/03/2008

Required Head Thickness per Paragraph UG-37(a)

$$tr = \frac{P K_1 D_o}{(2SE + 0.8P)} = \frac{452.00 * 0.8800 * 12.7500}{(2 * 17100 * 1 + 0.8 * 452.00)} = 0.1467 \text{ in.}$$

Nozzle Required Thickness Calculations

Required Nozzle Thickness for Internal Pressure per Paragraph UG-37(a)

$$trn = \frac{PR_n}{SE - 0.6P} = \frac{452.00 * 0.6750}{17100 * 1 - 0.6 * 452.00} = 0.0181 \text{ in.}$$

Strength Reduction Factors

$$fr1 = \frac{S_n}{S_v} = \frac{17100}{17100} = 1.0000$$

$$fr2 = \frac{S_n}{S_v} = \frac{17100}{17100} = 1.0000$$

$$fr3 = \frac{S_n}{S_v} = \frac{17100}{17100} = 1.0000$$

UG-45 Thickness Calculations

Nozzle Thickness for Pressure Loading (plus corrosion) per Paragraph UG-45(a)

$$t = \frac{PR_n}{SE - 0.6P} + Ca + \text{ext. Ca} = \frac{452.00 * 0.6750}{17100 * 1.00 - 0.6 * 452.00} + 0.1250 + 0.0000 = 0.1431 \text{ in.}$$

Nozzle Thickness for Internal Pressure (plus corrosion) per Paragraph UG-45(b)(1)

$$t = \frac{P K D_o}{(2SE + 2P(K - 0.1))} + Ca + \text{ext. Ca} = \frac{452.00 * 0.9700 * 12.7500}{(2 * 17100 * 1 + 2 * 452.00 * (0.9700 - 0.1))} + 0.1250 + 0.0000 = 0.2848 \text{ in.}$$

Minimum Thickness of Standard Wall Pipe (plus corrosion) per Paragraph UG-45(b)(4)

$$t = \text{minimum thickness of standard wall pipe} + Ca + \text{ext. Ca} = 0.2519 \text{ in.}$$

Nozzle Minimum Thickness per Paragraph UG-45(b)

$$t = \text{Smallest of UG-45(b)(1) or UG-45(b)(4)} = 0.2519 \text{ in.}$$

Wall thickness = $t_n * 0.875(\text{pipe}) = 0.3500$ is greater than or equal to UG-45 value of **0.2519**

NGC Process Systems Ltd.
2"-300CL NOZZLE IN SHELL (INLET)

Customer: **CONCEPT STOCK**
 Job No: 16821-CS
 Number: 3
 ID Number: 1

Vessel Number: V-102 REV.1
 Mark Number: N1

Date Printed: 20/03/2008

Nozzle Design Information

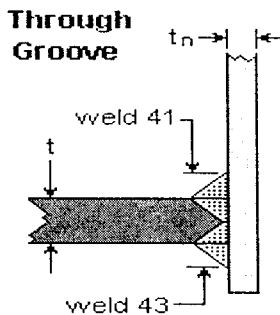
Design Pressure:	450.00 PSI	Design Temperature:	250 °F
Static Head:	0.00 PSI	Nozzle Efficiency (E):	100 %
Nozzle Material:	SA-106 Gr B	Joint Efficiency (E ₁):	1.00
		Factor B Chart:	CS-2
External Projection:	2.0000 in.	Allowable Stress at Design Temperature (S _d):	17100 PSI
Internal Projection:	1.0000 in.	Allowable Stress at Ambient Temperature:	17100 PSI
Inside Corrosion Allowance:	0.1250 in.	Correction Factor (F):	1.00
External Corrosion Allowance:	0.0000 in.	Nozzle Path:	None
Nozzle Pipe Size:	2	Nozzle Pipe Schedule:	160
Nozzle ID (new):	1.6890 in.	Nozzle Wall Thickness(new):	0.3430 in.
Nozzle ID (corroded):	1.9390 in.	Nozzle Wall Thickness(corroded):	0.2180 in.
Outer "h" Limit:	0.5078 in.	Upper Weld Leg Size(Weld 41):	0.3750 in.
Internal "h" Limit:	0.2325 in.	Internal Weld Leg Size(Weld 43):	0.0000 in.
OD, Limit of Reinforcement:	3.8780 in.	Outside Groove Weld Depth:	0.3750 in.

Minimum Design Metal Temperature

Minimum Design Metal Temperature: -20 °F
 Material is exempt from impact testing per UG-20(f), 1 through 5
 Host Component: Shell 1 - SHELL, PIPE, 12"OD, Sch. STD,

Material:	SA-106 Gr B	Shell wall thickness(new):	0.3750 in.
Material Stress(S _y):	17100 PSI	Shell wall thickness - 12% for pipe (corroded):	0.2031 in.

Nozzle Detail Information



Upper Weld Leg Size(Weld 41): 0.3750 in.
 Internal Weld Leg Size(Weld 43): 0.0000 in.
 Nozzle Wall Thickness(t_n): 0.3430 in.
 Outside Groove Weld Depth: 0.3750 in.

Nozzle passes through the vessel, attached by a groove weld.
 Pipe Size: 2 Schedule: 160
 Nozzle is adequate for UG-45 requirements.
 Opening is adequately reinforced for Internal Pressure.
 Reinforcement calculations are not required per UG-36(c)(3)(a) See Uw-14 for exceptions.
 Weld Strength Paths are adequate.

NGC Process Systems Ltd.
2"-300CL NOZZLE IN SHELL (INLET)

Job No: 16821-CS
 Number: 3
 ID Number: 1

Vessel Number: V-102 REV.1
 Mark Number: N1

Date Printed: 20/03/2008

Required Shell Thickness per Paragraph UG-37(a)

$$t_r = \frac{P R_o}{S E + 0.4 P} = \frac{450.00 * 6.3750}{17100 * 1 + 0.4 * 450.00} = 0.1660 \text{ in.}$$

Nozzle Required Thickness Calculations

Required Nozzle Thickness for Internal Pressure per Paragraph UG-37(a)

$$t_{rn} = \frac{P R_n}{S E - 0.6 P} = \frac{450.00 * 0.9695}{17100 * 1 - 0.6 * 450.00} = 0.0259 \text{ in.}$$

Strength Reduction Factors

$$fr1 = \frac{S_n}{S_v} = \frac{17100}{17100} = 1.0000$$

$$fr2 = \frac{S_n}{S_v} = \frac{17100}{17100} = 1.0000$$

$$fr3 = \frac{S_n}{S_v} = \frac{17100}{17100} = 1.0000$$

UG-45 Thickness Calculations

Nozzle Thickness for Pressure Loading (plus corrosion) per Paragraph UG-45(a)

$$t = \frac{P R_n}{S E - 0.6 P} + Ca + \text{ext. Ca} = \frac{450.00 * 0.9695}{17100 * 1.00 - 0.6 * 450.00} + 0.1250 + 0.0000 = 0.1509 \text{ in.}$$

Nozzle Thickness for Internal Pressure (plus corrosion) per Paragraph UG-45(b)(1)

$$t = \frac{P R_o}{S E + 0.4 P} + Ca + \text{ext. Ca} = \frac{450.00 * 6.3750}{17100 * 1 + 0.4 * 450.00} + 0.1250 + 0.0000 = 0.2910 \text{ in.}$$

Minimum Thickness of Standard Wall Pipe (plus corrosion) per Paragraph UG-45(b)(4)

$$t = \text{minimum thickness of standard wall pipe} + Ca + \text{ext. Ca} = 0.2597 \text{ in.}$$

Nozzle Minimum Thickness per Paragraph UG-45(b)

$$t = \text{Smallest of UG-45(b)(1) or UG-45(b)(4)} = 0.2597 \text{ in.}$$

Wall thickness = $t_n * 0.875(\text{pipe}) = 0.3001$ is greater than or equal to UG-45 value of **0.2597**

NGC Process Systems Ltd.

1.5"-3000# CPLG IN SHELL (LEVEL SWITCH)

Customer: **CONCEPT STOCK**

Job No: 16821-CS

Number: 5

ID Number: 1

Vessel Number: V-102 REV.1

Mark Number: C1

Date Printed: 20/03/2008

Nozzle Design Information

Design Pressure:	450.00 PSI	Design Temperature:	250 °F
Static Head:	0.00 PSI	Nozzle Efficiency (E):	100 %
Nozzle Material:	SA-105	Joint Efficiency (E ₁):	1.00
		Factor B Chart:	CS-2
External Projection:	1.0000 in.	Allowable Stress at Design Temperature (S _d):	20000 PSI
Internal Projection:	0.0000 in.	Allowable Stress at Ambient Temperature:	20000 PSI
Inside Corrosion Allowance:	0.1250 in.	Correction Factor (F):	1.00
External Corrosion Allowance:	0.0000 in.	Nozzle Path:	None
Nozzle ID (new):	1.9000 in.	Nozzle Wall Thickness(new):	0.3000 in.
Nozzle ID (corroded):	2.1500 in.	Nozzle Wall Thickness(corroded):	0.1750 in.
Outer "h" Limit:	0.4375 in.	Upper Weld Leg Size(Weld 41):	0.3750 in.
Internal "h" Limit:	0.1250 in.	Internal Weld Leg Size(Weld 43):	0.0000 in.
OD, Limit of Reinforcement:	4.3000 in.	Outside Groove Weld Depth:	0.3750 in.

Minimum Design Metal Temperature

Minimum Design Metal Temperature: -20 °F

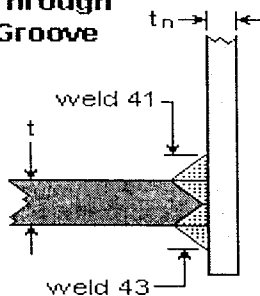
Material is exempt from impact testing per UG-20(f), 1 through 5

Host Component: Shell 1 - SHELL, PIPE, 12"OD, Sch. STD,

Material:	SA-106 Gr B	Shell wall thickness(new):	0.3750 in.
Material Stress(S _y):	17100 PSI	Shell wall thickness - 12% for pipe (corroded):	0.2031 in.

Nozzle Detail Information

Through Groove



Upper Weld Leg Size(Weld 41): 0.3750 in.

Internal Weld Leg Size(Weld 43): 0.0000 in.

Nozzle Wall Thickness(t_n): 0.3000 in.

Outside Groove Weld Depth: 0.3750 in.

Nozzle passes through the vessel, attached by a groove weld.

Nozzle is adequate for UG-45 requirements.

Opening is adequately reinforced for Internal Pressure.

Reinforcement calculations are not required per UG-36(c)(3)(a) See Uw-14 for exceptions.

Weld Strength Paths are adequate.

NGC Process Systems Ltd.
1.5"-3000# CPLG IN SHELL (LEVEL SWITCH)

Job No: 16821-CS
Number: 5
ID Number: 1

Vessel Number: V-102 REV.1
Mark Number: C1

Date Printed: 20/03/2008

Required Shell Thickness per Paragraph UG-37(a)

$$t_r = \frac{P R_o}{S E + 0.4 P} = \frac{450.00 * 6.3750}{17100 * 1 + 0.4 * 450.00} = 0.1660 \text{ in.}$$

Nozzle Required Thickness Calculations

Required Nozzle Thickness for Internal Pressure per Paragraph UG-37(a)

$$t_{rn} = \frac{P R_n}{S E - 0.6 P} = \frac{450.00 * 1.0750}{20000 * 1 - 0.6 * 450.00} = 0.0245 \text{ in.}$$

Strength Reduction Factors

$$fr1 = \frac{S_n}{S_v} = \frac{20000}{17100} = 1.0000$$

$$fr2 = \frac{S_n}{S_v} = \frac{20000}{17100} = 1.0000$$

$$fr3 = \frac{S_n}{S_v} = \frac{20000}{17100} = 1.0000$$

UG-45 Thickness Calculations

This calculation is for an access or inspection opening.

Nozzle Thickness for Pressure Loading (plus corrosion) per Paragraph UG-45(a)

$$t = \frac{P R_n}{S E - 0.6 P} + C_a + \text{ext. } C_a = \frac{450.00 * 1.0750}{20000 * 1.00 - 0.6 * 450.00} + 0.1250 + 0.0000 = 0.1495 \text{ in.}$$

NGC Process Systems Ltd.

Lifting Lug 1

Customer: **CONCEPT STOCK**

Job No: 16821-CS

Mark Number: LL1

Vessel Number: V-102 REV.1

Date Printed: 20/03/2008

Lifting Lug Information

Material:	SA-516 Gr 70	Design Temperature:	70 °F
Condition:		Material Stress (Hot):	20000 PSI
Type:	Type 3	Material Stress (Cold):	20000 PSI
Width (L):	4.0000 in.	Yield Strength:	38000 PSI
Thickness:	0.5000 in.	Radius:	2.0000 in.
Weld Joint Efficiency:	45 %	Weld Leg:	9.0000 in.
Shackle Hole Diameter:	2.0000 in.	Shackle Hole Centerline Height:	2.0000 in.
Weld Height (L _w):	0.3750 in.	Weld Len. Omitted over Head Weld (L _{wo}):	0.0000 in.

Vessel Information

Material:	SA-106 Gr B	Design Temperature:	70 °F
Condition:		Material Stress (Hot):	17100 PSI
Radius:	6.3750 in.	Material Stress (Cold):	17100 PSI
Thickness:	0.3750 in.	Yield Strength:	35000 PSI
Vertical Lift Angle:	0 °	Impact Factor:	1.50
Weight:	1250.00 lb.		

Design Calculations

$$W_i = \frac{W * L}{2} = \frac{1250.00 * 1.50}{2} = 938$$

$$\text{Vertical Lift Force, } F_v = W_i = 938 \quad = 938 \text{ lb.}$$

$$\text{Horizontal Lift Force, } F_h = W_i * \tan(\theta) = 938 * \tan(0) = 0 \text{ lb.}$$

$$\text{Total Lift Force, } F_t = \sqrt{F_v^2 + F_h^2} = \sqrt{938^2 + 0^2} = 938 \text{ lb.}$$

Lug Stress Calculation

$$S_l = \frac{F_t}{T * (2 * r' - d)} = \frac{938}{0.5000 * (2 * 2.0000 - 2.0000)} = 938 \text{ PSI}$$

$$\text{Shear Stress Ratio, } S_{rl} = \frac{S_l}{0.4 * S_{ly}} = \frac{938}{0.4 * 38000} = 0.0617$$

NGC Process Systems Ltd.

Lifting Lug 1

Job No: 16821-CS
Mark Number: LL1

Vessel Number: V-102 REV.1

Date Printed: 20/03/2008

Lug Weld Calculations

$$\begin{aligned}
 \text{Eff}_{LW} &= L_W - L_{W0} = 0.3750 - 0.0000 && = 0.3750 \text{ in.} \\
 L_{Wl} &= L + (2 * \text{Eff}_{LW}) = 4.0000 + (2 * 0.3750) && = 4.7500 \text{ in.} \\
 Z_{Wl} &= \frac{\text{Eff}_{LW}^2 (2 * L + \text{Eff}_{LW})}{3 * (L + \text{Eff}_{LW})} = \frac{0.3750^2 (2 * (4.0000) + 0.3750)}{3 * (4.0000 + 0.3750)} && = 0.0897 \text{ sq. in.} \\
 f_1 &= \frac{M_l}{Z_{Wl}} = \frac{0}{0.0897} && = 0.0 \text{ lb./in.} \\
 F_2 &= \frac{F_h}{L_{Wl}} = \frac{0}{4.7500} && = 0.0 \text{ lb./in.} \\
 F_3 &= \frac{F_v}{L_{Wl}} = \frac{938}{4.7500} && = 197.5 \text{ lb./in.} \\
 f &= \sqrt{((f_1 + f_2)^2 + f_3^2)} = \sqrt{(0.0 + 0.0)^2 + 197.5^2} && = 197.5 \text{ lb./in.} \\
 f_w &= E * \min(S_{la}, S_{va}) = 0.45 * \min(20000, 17100) && = 7695 \text{ PSI} \\
 W_{La} &= \frac{f}{f_w} = \frac{197.5}{7695} && = 0.0257 \text{ in.} \\
 \text{Lug Weld Leg Ratio, } W_{LRI} &= \frac{W_{La}}{W_L} = \frac{0.0257}{9.0000} && = 0.0029
 \end{aligned}$$

NGC Process Systems Ltd.

SKIRT, PIPE, 10OD", Sch. STD

Customer: **CONCEPT STOCK**

Job No: 16821-CS

Number: 1

Vessel Number: V-102 REV.1

Mark Number: SK1

Date Printed: 20/03/2008

Cylindrical Skirt Design Information

Design Temperature: 250 °F

Skirt Material: SA-106 Gr B

Skirt Length: 9.0000 in.

Corrosion Allowance: 0.0000 in.

Outside Diameter: 10.7500 in.

Surface Area: 2.1108 Sq. Ft.

Long. Factor A: 0.0084884

Joint Efficiency: 60 %

Factor B Chart: CS-2

Material Stress(hot): 17100 PSI

Material Stress(cold): 17100 PSI

Yield Strength: 31500 PSI

Modulus of Elasticity: 28.6 10⁶ PSIDensity: 0.2830 lb/in.³

Weight: 30.33 lb.

Long. Factor B: 17270 PSI

Nominal Skirt Thickness Selected = 0.3650 in.

NGC Process Systems Ltd.

12" OD x 68.7" S/FOF, OIL SEPARATOR

Customer: **CONCEPT STOCK**

Job No: 16821-CS

Vessel Number: V-102 REV.1

Date Printed: 20/03/2008

ASME Flange Design Information

Host	Description	Type	Size (in.)	Material	ASME Class	Material Group	MAP (PSI)
	2"-300CL NOZZLE IN SHELL (INLET"-300CL RFWN (INLET)	Weld Neck	2	SA-105	300	1.1	667.50
	2"-300CL NOZZLE IN SHELL (OUTLET-300CL RFWN (OUTLET)	Weld Neck	2	SA-105	300	1.1	667.50
	SHELL, PIPE, 12"OD, Sch. STD, 12"-300CL RFWN (ACCESS)	Weld Neck	12	SA-105	300	1.1	667.50
	12"-300CL BLIND	Blind	12	SA-105	300	1.1	667.50

NGC Process Systems Ltd.

Customer: **CONCEPT STOCK**
Job No: 16821-CS

Vessel Number: V-102 REV.1

Date Printed: 20/03/2008

Tower Analysis

Test Condition

First Period of Natural Vibration for Test Condition conditions: 0.0176 seconds/cycle

Moment Analysis

Segment Type	Segment No.	Weight (lb.)	Elevation (in.)	Segment Force (lb.)	Shear @ Top (lb.)	Moment @ Bottom (Ft.-lb.)	Stress (PSI)
Shell	1	152.42	63.2813	0	0	0	0
Shell	2	49.27	51.0000	0	0	0	0
Shell	3	320.24	28.5000	0	0	0	0
Head	4t	42.31	9.0000	0			
Skirt	4	30.33	4.5000	0	0	0	0
Total		594.57					

Stress Summary

Segment Type	Segment No.	Sm Attachments With Wind or Seismic (PSI)	Sp Internal Pressure Stress (PSI)	Sp External Pressure Stress (PSI)	Sw Weight Stress (PSI)	Maximum Tensile Stress (PSI)	Maximum Compressive Stress (PSI)
Shell	1	0	3713	0	5	3707	-5
Shell	2	0	3713	0	7	3706	-7
Shell	3	0	3713	0	18	3695	-18
Skirt	4	0	0	0	50	-50	-50

Positive values represent tensile stress, and negative values represent compressive.
Stress ratios greater than 1.0 represent overstressed conditions.

Stress Comparisons

Segment Type	Segment No.	Maximum Tensile Stress (PSI)	Allowable Stress (PSI)	Maximum Tensile Stress Ratio	Maximum Compressive Stress (PSI)	Allowable Stress (PSI)	Maximum Compressive Stress Ratio	Critical Buckling Stress (PSI)	Critical Buckling Ratio
Shell	1	3707	17100	0.2168	-5	-17100	0.0003	-15750	0.0003
Shell	2	3706	17100	0.2167	-7	-17100	0.0004	-15750	0.0004
Shell	3	3695	17100	0.2161	-18	-17100	0.0011	-15750	0.0011
Skirt	4	-50	-17100	0.0029	-50	-17100	0.0029	-15750	0.0032

NGC Process Systems Ltd.

Customer: **CONCEPT STOCK**
Job No: 16821-CS

Vessel Number: V-102 REV.1

Date Printed: 20/03/2008

MDMT Report by Components

Design MDMT is -20 °F

Component	Material	Curve	Pressure	MDMT
SHELL, PIPE, 12"OD, Sch. STD,	SA-106 Gr B			Exempt per UG-20(f), 1-5
2"-300CL NOZZLE IN SHELL (OUTLET)	SA-106 Gr B			Exempt per UG-20(f), 1-5
2"-300CL NOZZLE IN SHELL (INLET)	SA-106 Gr B			Exempt per UG-20(f), 1-5
1.5"-3000# CPLG IN SHELL (LEVEL SWITC	SA-105			Exempt per UG-20(f), 1-5
12" OD, 2:1 SE, SEAMLESS WELD CAP (BOT	SA-234 Gr WPB	B	450.00 PSI	-20 °F
1.5" PIPE IN BOTTOM HEAD (DRAIN)	SA-106 Gr B			Exempt per UG-20(f), 1-5

Component with highest MDMT: 12" OD, 2:1 SE, SEAMLESS WELD CAP (BOTTOM).

Computed MDMT = -20 °F

The required design MDMT of -20 °F has been met or exceeded for the calculated MDMT values.

ASME Flanges Are Not Included in MDMT Calculations.

NGC Process Systems Ltd.
12" OD x 68.7" S/FOF, OIL SEPARATOR

Customer: **CONCEPT STOCK**
Job No: 16821-CS

Vessel Number: V-102 REV.1

Date Printed: 20/03/2008

MAWP Report by Components

<u>Component</u>	<u>Design Pressure</u>	<u>Static Head</u>	<u>Vessel MAWP New & Cold UG-98(a)</u>	<u>Component MAWP Hot & Corroded UG-98(b)</u>	<u>Vessel MAWP Hot & Corroded UG-98(a)</u>
SHELL, PIPE, 12"OD, Sch. STD,	450.00 PSI	2.00 PSI	896.65 PSI	551.82 PSI	549.82 PSI
ASME Flange Class: 300 Gr:1.1		0.00 PSI	740.00 PSI	667.50 PSI	667.50 PSI
2"-300CL NOZZLE IN SHELL (OUTLET)	450.00 PSI	0.00 PSI	898.71 PSI	551.95 PSI	551.95 PSI
ASME Flange Class: 300 Gr:1.1		0.00 PSI	740.00 PSI	667.50 PSI	667.50 PSI
2"-300CL NOZZLE IN SHELL (INLET)	450.00 PSI	0.00 PSI	898.71 PSI	551.95 PSI	551.95 PSI
ASME Flange Class: 300 Gr:1.1		0.00 PSI	740.00 PSI	667.50 PSI	667.50 PSI
1.5"-3000# CPLG IN SHELL (LEVEL S	450.00 PSI	0.00 PSI	898.71 PSI	551.95 PSI	551.95 PSI
12" OD, 2:1 SE, SEAMLESS WELD CAP (BOTTOM)SI		2.00 PSI	782.40 PSI	491.43 PSI	489.43 PSI
1.5" PIPE IN BOTTOM HEAD (DRAIN)	450.00 PSI	2.00 PSI	998.91 PSI	628.32 PSI	626.32 PSI

NC = Not Calculated Inc = Incomplete

Summary

Component with the lowest vessel MAWP(New & Cold) : **ASME Flange Class: 300 Gr:1.1**

The lowest vessel MAWP(New & Cold) :

740.00 PSI

Component with the lowest vessel MAWP(Hot & Corroded) : **12" OD, 2:1 SE, SEAMLESS WELD CAP (BOTTOM)**

The lowest vessel MAWP(Hot & Corroded) :

489.43 PSI

Pressures are exclusive of any external loads.

Flange pressures listed here do not consider external loadings

NGC Process Systems Ltd.

Customer: **CONCEPT STOCK**
Job No: 16821-CS

Vessel Number: V-102 REV.1

Date Printed: 20/03/2008

Summary Information

	<u>Dry Weight</u>	<u>Flooded Weight</u>
Shell	262.25 lb.	522.26 lb.
Head	25.97 lb.	42.30 lb.
Nozzle	5.10 lb.	5.10 lb.
ASME Flange	343.00 lb.	343.00 lb.
Skirt	30.33 lb.	30.33 lb.
Totals	666.65 lb.	942.99 lb.

	<u>Volume</u>
Shell	31.12 Gal.
Head	1.96 Gal.
Nozzle	0.09 Gal.
Totals	33.17 Gal.

	<u>Area</u>
Shell	17.68 Sq. Ft.
Head	1.70 Sq. Ft.
Nozzle	0.45 Sq. Ft.
Skirt	2.11 Sq. Ft.
Totals	21.94 Sq. Ft.

Hydrostatic Test Information (UG-99)

Gauge at Top

Component with controlling ratio is : SHELL, PIPE, 12"OD, Sch. STD,
Component with controlling pressure is : SHELL, PIPE, 12"OD, Sch. STD,

$$\text{Calculated Test Pressure} = P * 1.3 * \frac{\text{Cold Stress}}{\text{Hot Stress}} = 450.00 * 1.3 * \frac{17100}{17100} = \mathbf{585.00 \text{ PSI}}$$

Specified Test Pressure : **585.00 PSI**

CONCEPT COMPRESSION JOB START SHEET

Concept #	100627	NGC #	16821	Salesman	Dallas	Rev	1	Date	February 14, 2003
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Client:	Husky	Location:	Galloway	LSD:	TBA
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Unit:	CC100E	Compressor Model:	PDH-12 G1	Sweet/Sour:	Sweet
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Gear Ratio:	1.31	Vi:	2.6	S/N:	2000-09260033
Motor Manufacturer:	TBA	Model:	100 HP	S/N:	TBA
Cooler Manufacturer:	AXH	Model:	36VI-EMD	S/N:	TBA

Options:		Description
Code	Hours	
		This will be built on a standard 60-99 HP skid package (skid steel and vessels).
1b	10	Supply and install a 2" Fisher suction pressure control valve c/w 4150 controller.
14	7	Supply and install a 1" Sur-Flo high discharge/low suction bypass valve.
24b	5	Supply and install a 2" Sur-Flo back pressure control valve.
18	1	High level shutdown switch oil separator
3	28	Supply and install sweet gas purge system.
42	10	Supply and install a waste oil storage tank for compressor oil.
105	1	Supply soft removable bug screen.
Total	62	

Design Conditions	Case 1	Case 2
Suction Pressure (PSIG)	43	51
Discharge Pressure (PSIG)	261	304
Flow (MMSCFD)	0.585	.585

Design Conditions	Case 3	Case 4
Suction Pressure (PSIG)	34	40
Discharge Pressure (PSIG)	261	304
Flow (MMSCFD)	0.48	0.477

Delivery:	April 4, 2008		Sale
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Notes:	This is an electric drive unit, 3/60/460V. This is a very similar to 100602/16727.
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**NGC PROCESS SYSTEMS
DOCUMENTATION REQUEST FORM**

JOB # : 16821-CS CUSTOMER: Concept Compression PROJECT MGR: O.Hajar

MAILING ADDRESS: Concept Compression
2325-20th Ane NE
Calgary, AB
T2E 8S4

LSD: Stock Unit

3RD PARTY INSPECTION YES ☐ NO ☒ CONTACT: _____
PHONE # _____

	YES	NO	REVIEW
STANDARD QUALITY DATA PACKAGE (includes items 1 through 8)	☒	☐	☐
1 ASME/ABSA required documents (U1A, AB-83, AB-40, etc)	☐	☐	☐
2 Quality Department Inspections/Verifications (Travel Sheet)	☐	☐	☐
3 Mill Test Reports (Pressure Envelope only)	☐	☐	☐
4 Nameplate Facsimile	☐	☐	☐
5 NDE Reports (RT, UT, MT, etc.)	☐	☐	☐
6 Production Impact Testing	☐	☐	☐
7 Heat Treatment Chart (time, temp)	☐	☐	☐
8 PSV documentation	☐	☐	☐
9 As Built Drawings	☒	☐	☐
ADDITIONAL QUALITY DATA (if required)			
10 Mill Test Reports flanges, fittings, structural, etc (Specify additional MTR's required)	☐	☒	☐

11 Additional Material Requirements HIC testing, UT on grid, carbon equivalent, NACE, fine grain practice, country of origin (Specify)	☐	☒	☐

12 Material / Radiography location maps (specify)	☐	☒	☐

13 Heat Treatment Specifications Sheet	☐	☒	☐
14 Hydrostatic Test Charts (time, temperature, pressure)	☐	☒	☐
15 Hydrostatic Test Affidavit	☐	☒	☐
16 Welding Procedure Specifications / Performance Qualification Records	☐	☒	☐
17 Welder / Operator Qualification Records	☐	☒	☐
18 Additional Requirements (specify)	☐	☒	☐



Compression Solutions

Data Manual

Job Number

16821/100627

Customer

Concept Compression

Description

Inlet Scrubber

S/N: 16821-101

A#: 583950

Contents

U1A Data Report

U4 Data Report

Nameplate Stencil

NDE Reports

“As Built” Drawings

Vessel Travel Sheets

MTR's

Calculations

FORM U-1A MANUFACTURER'S DATA REPORT FOR PRESSURE VESSELS
(Alternative Form for Single Chamber, Completely Shop or Field Fabricated Vessels Only)
As Required by the Provisions of the ASME Boiler and Pressure Vessel Code Rules, Section VIII, Division 1

A 583950

1. Manufactured and certified by NGC Process Systems Ltd, # 2B, 624 Beaver Dam Rd. N.E Calgary, Alberta T2K 4W6 Calgary Alberta Canada
(Name and Address of Manufacturer)
2. Manufactured for Concept Compression Corp. 2325 - 20 Ave NE Calgary Alberta
(Name and address of purchaser)
3. Location of installation Stock
(Name and address)

4. Type Vertical 16821-101 K 6632.123 16821-101 Rev 1 N/A 2008
(Horizontal or vertical, tank) (Manufacturer's serial number) (CRN) (Drawing Number) (National Board number) (Year built)

5. The chemical and physical properties of all parts meet the requirements of material specifications of the ASME BOILER AND PRESSURE VESSEL CODE. The design, construction, and workmanship conform to ASME Rules, Section VIII, Division 1 2007
Year
- to 2007 N/A N/A
(Addenda Date) (Code Case numbers) (Special service per UG-120(d))

6. Shell: SA-106B 0.375" 0.125" 1 Ft 1.250 In 4 Ft 11.5 In S/S
(Material Spec. number, grade) (Nominal thickness) (Corr. allow.) (Inner diameter) (Length (overall))

7. Seams: Seamless N/A 100 % N/A N/A Type 1 Spot 70 % 1
(Long (welded, dbl., singl., lap, butt)) [R. T. (spot or full)] (Eff., %) (H.T. temp.) (Time, hr) [Girth (welded, dbl., singl., lap, butt)] [R.T. (spot or full)] Eff.(%) (No. of courses)

8. Heads: (a) Material SA-234-WPB (b) Material SA-234-WPB
(Spec. no., grade) (Spec. no., grade)

	Location (Top Bottom, Ends)	Minimum Thickness	Corrosion Allowance	Crown Radius	Knuckle Radius	Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure (Convex or Concave)
(a)	Bottom	0.3281"	0.125"			2:1				Concave
(b)	Top	0.3281"	0.125"			2:1				Concave

If removable, bolts used (describe other fastenings)

9. MAWP 245 psi at max. temp. 250 °F 250 °F
(Internal) (External) (Internal) (External)

Min. design metal temp - 20 °F at 245 psi. Hydro., pneu., or comb. test pressure 319 psi.

10. Nozzles, inspection and safety valve openings:

Purpose (Inlet, Outlet, Drain)	Number	Diameter or Size	Type	Material	Nominal Thickness	Reinforcement Material	How Attached	Location
				SEE ATTACHED	U-4	FORM		

11. Supports: Skirt Yes Lugs Legs Other Attached: Welded to Bottom Head
(Yes or No) (Number) (Number) (Describe) (Where and how)

12. Remarks: Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report:

(Name of part, item number, Manufacturer's name and identifying stamp)

Volume (Cu. Ft.): 5.47 Built to Construction Drawing No: 16821-101 Rev 0
Description: Inlet Scrubber Relief valves supplied by others as per UG 125
Impact Test Exempt per UG 20(f)(1-5) Equipment No: V - 101

CERTIFICATE OF SHOP/FIELD COMPLIANCE

We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship of this vessel conform to the ASME BOILER AND PRESSURE VESSEL CODE, Section VIII, Division 1. "U" Certificate of Authorization Number: 32,986
expires: Dec. 14, 2010

Date APR 30 2008 Co. name NGC Process Systems Ltd. Signed
(Manufacturer) (Representative)

CERTIFICATE OF SHOP/FIELD INSPECTION

Vessel constructed by NGC Process Systems Ltd. at #2B, 624 Beaverdam Road, N.E. Calgary, AB T2K 4W6
I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State or Province of Alberta and employed by ABSA

have inspected the component described in this Manufacturer's Data Report on MAY 13 2008, and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME BOILER AND PRESSURE VESSEL CODE, Section VIII, Division 1. By signing this certificate neither the Inspector nor his/her employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his/her employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date MAY 13 2008 Signed Commissions ALTA # 11
(Authorized Inspector) (Nat'l Board (incl. endorsements), State, Prov. and No.)

FORM U-4 MANUFACTURER'S DATA REPORT SUPPLEMENTARY SHEET
As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

583950

1. Manufactured and certified by NGC Process Systems Ltd., #2B 624 Beaver Dam Road NE Calgary, AB T2K 4W6
 (Name and address of Manufacturer)
2. Manufactured for Concept Compression Corp. 2325 20 Ave NE Calgary Alberta Canada
 (Name and address of Purchaser)
3. Location of installation Stock
 (Name and address)
4. Type: Vertical Inlet Separator 16821-101
 (Horiz., vert., or sphere) (Tank, separator, heat exch., etc.) (Mfg's. serial No.)
- K 6632.123 16821-101 Rev 0 N/A 2008
 (CRN) (Approved Drawing No.) (Nat'l Bd. No.) (Year Built)

Data Report
 Item Number 10
 Continued from Form U1a

Remarks

Purpose (Inlet, Outlet, Drain)	MK No.	No	Diam. or Size	Type	Mat'l	Nom. Thk.	Reinforce- ment Mat'l	How Attached	Location
Inlet	N1	1	3"	PIPE RFWN	SA-106B SA-105N	0.300" CL300	N/A	Fig. UW 16.1(c)	Shell
Outlet	N2	1	3"	ELBOW RFWN	SA-234-WPB SA-105N	0.300" CL150	N/A	Fig. UW 16.1(a)	Top Head
Drain	N3	1	1.5"	ELBOW PIPE	SA-234-WPB SA-106B	0.281" 0.281"	N/A	Fig. UW 16.1(a)	Bottom Head
LC / Inspection	C1	1	2"	CPLG	SA-105N	CL3000	N/A	Fig. UW 16.1(c)	Shell
LSHH	C2	1	1 1/2"	CPLG	SA-105N	CL3000	N/A	Fig. UW 16.1(c)	Shell
LG	C3A/B	2	3/4"	TOL	SA-105N	CL3000	N/A	Fig. UW 16.1(c)	Shell Bottom Head
Equalizing Conn	C4	1	1"	TOL	SA-105N	CL3000	N/A	Fig. UW 16.1(c)	Shell
Inspection	C6	1	1 1/2"	TOL	SA-105N	CL3000	N/A	Fig. UW 16.1(c)	Top Head
PSV	C7	1	1"	TOL	SA-105N	CL3000	N/A	Fig. UW 16.1(c)	N1
Bypass	C8	1	2"	TOL	SA-105N	CL3000	N/A	Fig. UW 16.1(c)	Shell

Certificate of Authorization: Type "U" No. 32986 Expires Dec 14, 2010

Date APR 30 2008 Name NGC Process Systems Ltd. Signed [Signature]
 (Manufacturer) (Representative)

Date MAY 13 2008 Name [Signature] Commission ALTA #11
 (Authorized Inspector) (Nat'l Board incl. Endorsement, State, Province and No.)

(12/91)

This form (E00118) may be obtained from the ASME Order Dept., 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300



W

RT-2

CERTIFIED BY

Process Systems Ltd.
Calgary, Alberta**ASME SECTION VIII DIV. 1**

M.A.W.P.	245	PSI	AT	250	°F
M.D.M.T.	-20	°F	AT	245	PSI
CAN. REG. NO.	K 6632.123				
SHELL THK.	0.375	IN	MAT'L	SA-106B	
HEAD THK.	0.3281	IN	MAT'L	SA-234-WPB	

WT	469.23	LBS	YEAR BUILT	2008	
VOL.	5.470	FT3	SERIAL NO.	16821-101	
CA	0.125	IN	TAG NO.	V-101	

INLET SCRUBBER					
14" O.D. X 59-1/2" S/S					

583950



Process Systems

HYDROSTATIC TEST REPORT

Date: MAR 28 2008

Customer: Concept Compression Corp.

Job # 16821

Drawing #: S/N 16821-101

Description: 14" Inlet Scrubber

Tests Conducted By: QC Dept

Test Pressure: 319 psi Holding Time at Test Pressure: 1 Hour

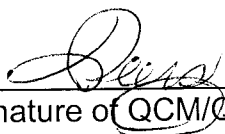
Charted : NO Recorder # : N/A

Results: Passed / OK

Authorized Inspector Witnessing Test: _____

Pressure Gauge ID #: SS-813 ; SS-815 Calibration Due : 20 June 08 ; 12 Feb 09

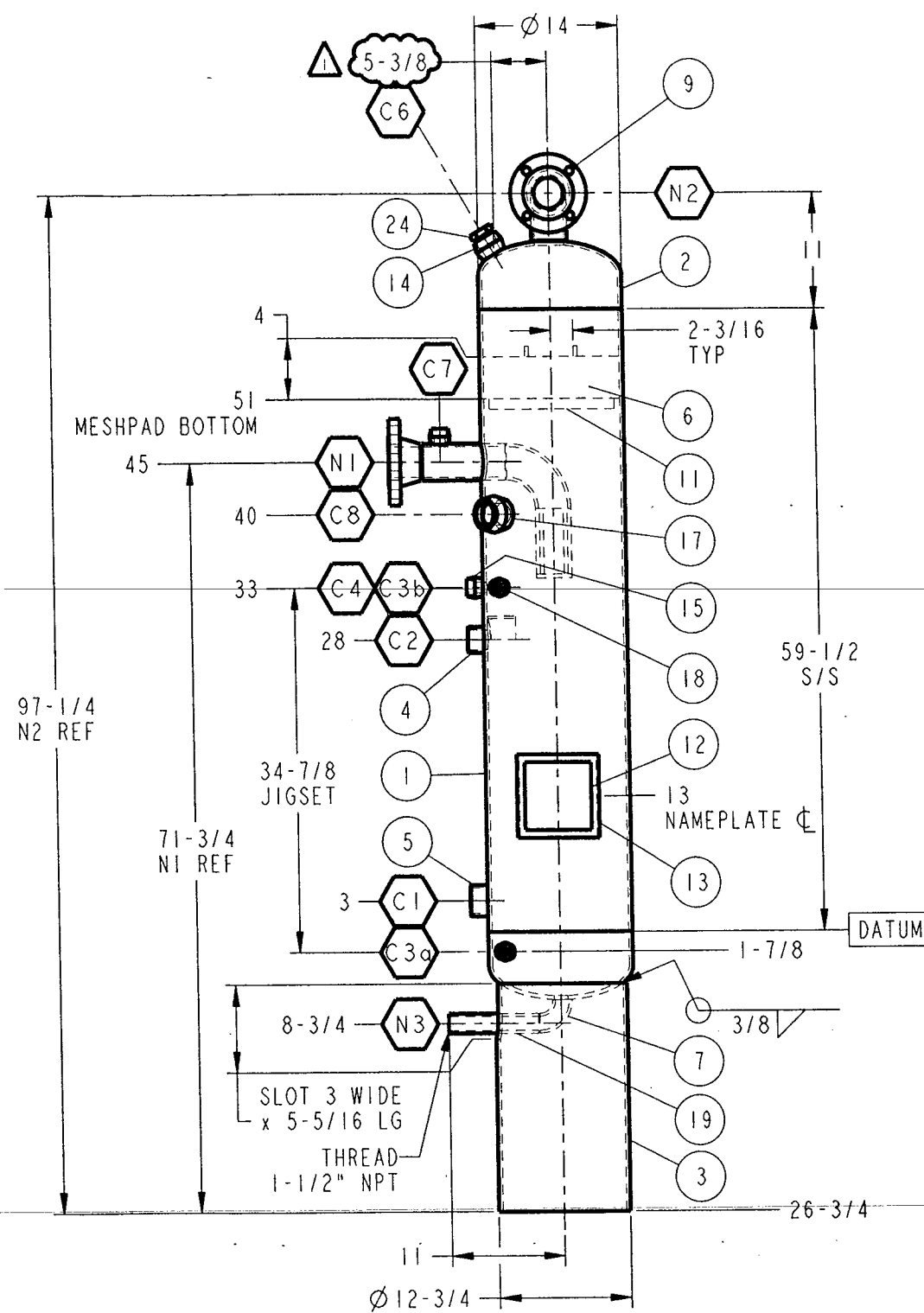
Comments : _____



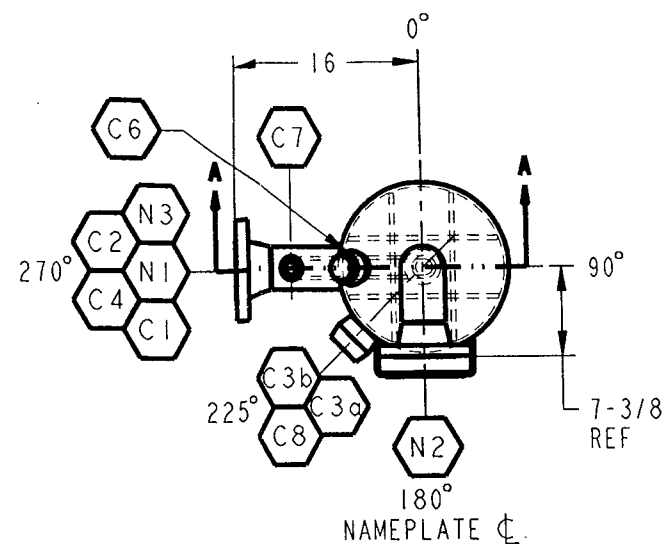
(Signature of QCM/QCI)

(Signature of Owners Inspector)

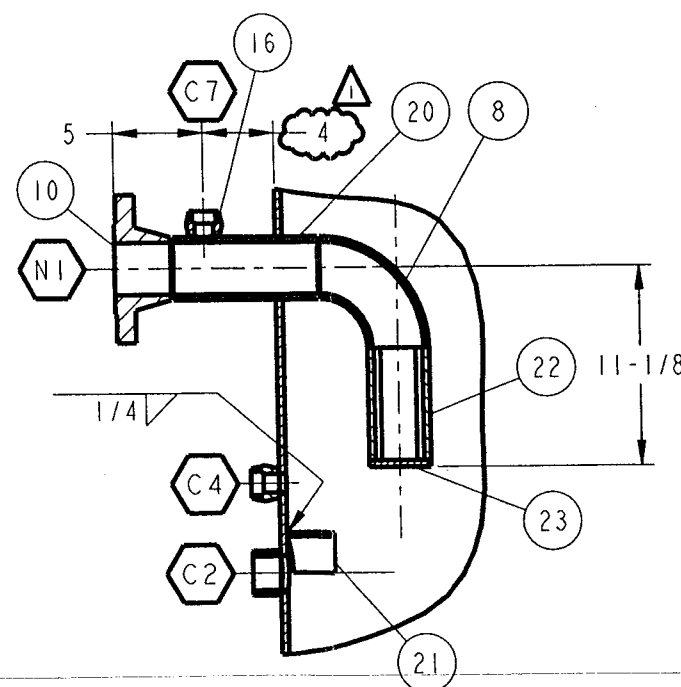
(Signature of Authorized Inspector, if applicable)



ELEVATION VIEW



PLAN VIEW



SECTION A-A
SCALE 0.093

NAME PLATE DATA

CERTIFIED BY NGC Process Systems Ltd. Calgary, Alberta ASME SECTION VIII DIV. 1	
M.A.W.P.	245 PSI AT 250 °F
M.D.M.T.	-20 °F AT 245 PSI
CAN. REG. NO.	
SHELL THK.	0.375 IN MAT'L SA106-B
HEAD THK.	0.3281 IN MAT'L SA234-WPB
WT	469.23 LBS YEAR BUILT 2008
VOL.	5.470 FT³ SERIAL NO. 16821-101
C.A.	0.125 IN TAG NO. V-101
INLET SCRUBBER 14 OD x 59-1/2 S/S	

REVISED COPY - DESTROY
ALL PREVIOUS COPIES
BY:
DATE: 04/09/08

ITEM	QTY.	DESCRIPTION	MATERIAL	COMMENTS
1	1	SHELL, PIPE SMLS, 14 STD x 59-1/2 LG.	SA106-B	
2	2	CAP, BW, 14", STD	SA234-WPB	
3	1	SKIRT, PIPE SMLS, 12 STD x 24-3/4 LG. (CUT TO DWG DIM.)	SA106-B	
4	1	COUPLING, HALF THD, 1-1/2"-3000CL	SA105N	
5	1	COUPLING, HALF THD, 2"-3000CL	SA105N	
6	1	DEMISTER PAD, 13-1/4 OD x 4THK @ 9 LBS/CU.FT. (c/w CS GRID)	SS316LSA-36	
7	1	ELBOW, 90 LR, 1-1/2", S160	SA234-WPB	
8	2	ELBOW, 90 LR, 3", XH	SA105N	
9	1	FLANGE, RF WN, 3-150CL XH	SA105N	
10	1	FLANGE, RF WN, 3-300CL XH	SA105N	
11	4	FLATBAR, 1 x 3/8 THK x 12-1/4 LG.	SA-36	
12	1	NAMEPLATE	SS 316	
13	1	NAMEPLATE BRACKET 1/4 THK x 8 x 8	SA516-70N	
14	1	OLET, THD, 1-1/2"-3000CL (ON 14" RUN)	SA105N	
15	1	OLET, THD, 1"-3000CL (ON 14" RUN)	SA105N	
16	1	OLET, THD, 1"-3000CL (ON 3" RUN)	SA105N	
17	1	OLET, THD, 2"-3000CL (ON 14" RUN)	SA105N	
18	2	OLET, THD, 3/4"-3000CL (ON 14" RUN)	SA105N	
19	1	PIPE, SMLS, 1-1/2 S160 x 8-3/4 LG. TOE	SA106-B	
20	1	PIPE, SMLS, 3 XH x 8-1/8 LG.	SA106-B	
21	1	PIPE, SMLS, 4 STD x 2-3/4 LG. (CUT IN HALF; COPE ONE END TO VESSEL ID)	SA106-B	
22	4	PLATE, 3/8 THK, 2 x 6-1/4	SA-36	
23	1	PLATE, 3/8 THK, 3-1/2 x 3-1/2, SQ.	SA-36	
24	1	PLUG, THD HEX, 1-1/2"-3000/6000CL	SA105N	

NOZZLE SCHEDULE											
MARK	SIZE	RATING	TYPE	SCH.	SERVICE	INT. PROJ.	EXT. PROJ.	WELD DETAIL	WELD SIZE		
									A	B	C
N1	3"	300CL	RF WN	XH	INLET	2.000	SEE DWG	I, III	3/8	-	-
N2	3"	150CL	RF WN	XH	OUTLET	0.000	SEE DWG	III, XI	3/8	-	-
N3	1-1/2"	-	NPT	S160	DRAIN	FLUSH	SEE DWG	XI	3/8	-	-
C1	2"	3000CL	CPLG	-	LC/INSPECTION	0	MAX	IX	3/8	-	-
C2	1-1/2"	3000CL	CPLG	-	LSHH	0	MAX	IX	3/8	-	-
C3a/b	3/4"	3000CL	TOL	-	LG	0	MAX	XI	3/8	-	-
C4	1"	3000CL	TOL	-	EQUALIZING CONN.	0	MAX	XI	3/8	-	-
C6	1-1/2"	3000CL	TOL	-	INSPECTION c/w PLUG	0	MAX	XI	3/8	-	-
C7	1"	3000CL	TOL	-	PSV	0	MAX	XI	3/8	-	-
C8	2"	3000CL	TOL	-	BY-PASS	0	MAX	XI	3/8	-	-

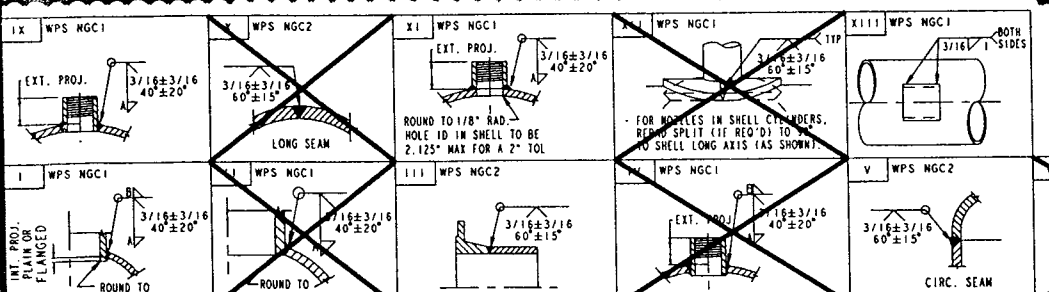
DESIGN DATA			
SERVICE SOUR	NO	LETHAL	NO
HYDROTEST PRESSURE (PSI)	319	WEIGHT FLOODED (LBS)	807.87
CODE	SECTION VIII, DIV. 1, 2007 EDITION		
X-RAY	RT-2		
STRESS RELIEVED	NONE		
ALLOW. STRESS (PSI)	SHELL 17100	HEAD	17100

GENERAL NOTES

- FLANGE HOLES TO STRADDLE MAJOR CENTERLINES.
- ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED.
- IMPACT TEST EXEMPT AS PER UG-20(c)(1)-(5).
- THE FOLLOWING MATERIALS MAY BE SUBSTITUTED:
SA-36 WITH W44 OR SA-516-70, SA-106 GR.B WITH SA-333 GR.6, SA-516-70N WITH SA106-C (REPADS), SA-105 WITH SA-350 LF2 CL.1, SA-234 WPB WITH SA-420 WPL6.
- ATTACHMENT WELDS WILL USE WPS NGC 1. FILLET WELDS WILL BE 3/16", UNLESS OTHERWISE NOTED.
- FINISH TO SSPC-SP2 AND ONE COAT OF ZINC CHROMATE PRIMER (GREY).
- TOLERANCES TO MEET D-SID-09-06 REV. 2, UNLESS OTHERWISE NOTED.
- IF SOUR SERVICE OPTION REQUESTED, THE FOLLOWING APPLIES:
DESIGN DATA SERVICE - SOUR - YES;
STRESS RELIEVE VESSEL TO 1 HR @ 1150 °F ± 25 °F
NOTING THAT THE FOLLOWING WPS REQUIREMENTS APPLY: WPS NGC3 IN LIEU OF NGC1;
WPS NGC4 IN LIEU OF NGC2;
X-RAY VESSEL TO RT-1;
NAMEPLATE DATA: ADD RT-1 AND HT
REGISTER IN ALBERTA, BC, SASKATCHEWAN
- CUT PLATE AND OTHER STOCK COMPLIES WITH UG-76

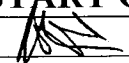
NO.	DATE	REVISION	BY
0	03/05/08	ISSUED FOR FABRICATION	ATE
1	04/09/08	ADD TOL DIMS, REV NI INT PROJ. WAS 1", ADD NOTE 10, REV. WELD DETAILS.	ATE
2			
3			
4			

	5120 6th STREET N.E. CALGARY, ALBERTA T2K 4W5	DRAWN BY: RR	DATE: 02/13/08
	TEL: 403.274.6106 FAX: 403.730.1644 www.ngc-ltd.com	CHECKED BY: AH	DATE: 02/13/08
		JOB NO.: 16821-CC	EQUIP. NO.: V-101
		TITLE: INLET SCRUBBER 14 OD x 59-1/2 S/S	
THIS DRAWING IS THE EXCLUSIVE PROPERTY OF NGC PROCES SYSTEMS LTD., AND CANNOT BE REPRODUCED OR DISTRIBUTED WITHOUT THE PERMISSION OF NGC PROCES SYSTEMS LTD.		END USER: CONCEPT COMPRESSION CORP	
SCALE: NTS	DWG. NO. 16821-101	REV: 1	



VESSEL TRAVEL SHEET (FRONT)

DO NOT START CONSTRUCTION WITHOUT AI REVIEW

AI REVIEW: 

REVIEW DATE: MAR - 7 2008

Serial No: 16821-101 Job No: 16821 Vessel Type: Inlet Scrubber

DRAWING NO.: 16821-101 REVISION NO.: 0

Seq	Item	Comments	Q.C.	Date	A.I. Hold Points	A.I.	Date	Owner	Date
1.	Calculations in file			07-03-08	*		MAR - 7 2008		
2.	Release of Approved Drawing			07-03-08	*		"		
3.	Heat Numbers Recorded			MAR 2 8 2008			MAR 2 8 2008		
4.	M.T.R.'s Checked			APR 1 0 2008	*		MAY 1 3 2008		
5.	W.P.S. Checked			MAR 0 7 2008					
6.	Welders Qualified			MAR 0 7 2008					
7.	Thickness Recorded			MAR 2 8 2008					
8.	Shell & Head Fitted			MAR 2 4 2008					
9.	Nozzles & Fittings Fitted			MAR 1 0 2008					
10.	Nozzle Orientation			MAR 0 7 2008					
11.	Nozzle & Flange Rating Checked			MAR 0 7 2008					
12.	Impact Tests	Exempt per UG-20(f)(1-5)							
13.	Internals Checked			MAR 2 4 2008					
14.	Partial Internal - Head			MAR 2 4 2008					
15.	Partial Internal - Nozzle			MAR 2 4 2008					
16.	Final Internal Inspection	Shell Side		MAR 2 4 2008	**		MAR 2 4 2008		
17.	Weld Size Checked			MAR 2 8 2008					
18.	Welder I.D. Checked			MAR 2 8 2008					
19.	Radiography	RT-2 /Spot		MAR 2 6 2008	*		MAY 1 3 2008		
20.	Other N.D.E.								
21.	Final Ext. Prior to P.W.H.T.				**				
22.	PWHT Chart Checked								
23.	Final Ext. Inspection			MAR 2 8 2008	**		MAR 2 8 2008		
24.	Hydrostatic Test 319 psig As per QCM Rev. 1	Gauge # 20 TURNER SS-813 Gauge # 12 FERGUSON SS-815		MAR 2 8 2008	**		MAR 2 8 2008 MAY 1 3 2008		
25.	CRN #				*				
26.	N.C.R. #								
27.	Nameplate Stamped				**		MAY 1 3 2008		
28.	Manuf. Data Report				**		"		
29.	Completed as built drawing due on:								
30.	Other								
31.	Nameplate Installed								

NOTE: * DENOTES A.I. INSP. POINT AND ** DENOTES A.I. HOLD POINT

SN:16821-101

[illegible]

DRAWING AND CALCULATION REVISION SHEET

Date 3/20/2008
Job 16821-CS

	Document	Revision
Drawing	16821-101	0
Vessel Calculation	16821-VC-101	1
Skirt/Baseplate Calculation	N/A	N/A
Saddle Calculation	N/A	N/A
Lifting Lug Calculation	N/A	N/A

Signature 

***Revised CS Calc. to 85% Joint Efficiency**

14 STD A106

Sheet: 12

252040



VALVEDUC & HANNEWMANN TUBES



ECOTUBE 15001 NUMBER 31732
ECOTUBE 15001 NUMBER 31732
ECOTUBE 15001 NUMBER 31732

INSPECTION CERTIFICATE
(According to EN 10204 / DIN 50049 3.1.B)

Nº.: 0050300299

Sheet: 2 / 2

MECHANICAL TESTS

Tensile

Area(MM²)

Y₀(MPa)

S.Direction: Longitudinal

T₀(MPa)

E₀(%)

Temperature: Room Temperature

R.A.0

Gage Length: L₀=2"

Y₀T₀

Required:

Min:

Max:

290

415

28

Heat N./ Batch

10695 / 0007539021

10743 / 0007539159

10744 / 0007539016

253,4

247,4

250,4

373

340

384

468

457

462

40

43

37

Hardness

Required:

Min:

Max:

246

149

143

152

Heat N./ Batch

10695 / 0007539021

10743 / 0007539159

10744 / 0007539016

149

143

152

Remarks:

1. MATERIAL IN ACCORDANCE WITH NACE MR 0175 PAR. 3.2/ISO 15156-2, ANNEX A.2.1/2/NACE MR0103 PAR.2.1.
3. MATERIAL SOUR SERVICE ACCORDING § 16 OF CSAZ245.1.

We hereby certify that this product has been manufactured and examined in accordance with all requirements of the standards and specifications and all the results are found to be satisfactory. This testimonial and certificate respectively is recorded by a computer system and is valid without signature. Alteration or use for other's products are regarded as falsification of documents and will be subject to criminal jurisdiction.

QUALITY CONTROL DEPARTMENT

FAX: (55-31) 3328-2617

e-mail: jmsilva@vmtubes.com.br

TECHNICAL RESPONSIBLE

DR. JUDILIA M. RIBEIRO E SILVA - CREA-MG 346510

DATE

17.09.2007

Ecotubes: The tubes from V&M do BRASIL, are manufactured with steel which uses charcoal as a source of energy in its production. This coal comes from more than 100.000 ha of forest planted by V&M do Brasil. With the acquisition of 76,1 tons of steel tubes from V&M do BRASIL, your company contributed to the reduction of the greenhouse effect, avoiding the accumulation of 137,0 tons of Carbon Dioxide CO₂ in the atmosphere.

HEAT NUMBER : 7A0253
 TRANS AM PIPING PRODUCTS - REV'D BY: *al*
 Shipment/Seq #: S 7 - 5996 1

14" STD BW CAPS A234-WPB

BOTH HEADS .390" THK

PURCHASER : SEYBOLD
 STANDARD : ASTM A234 WPB-07
 ASTM SA234 WPB-04



INSPECTION CERTIFICATE
RIEID INDUSTRIES CO., LTD.
 8, MEI-CHUNG RD, NAO-SONG,
 KAOHSIUNG HSIEN, 83301 TAIWAN
 TEL: 886-77310527-8
 FAX: 886-77315887

MATERIALS : JIS G3103 SB410
 INSPECTION : ASME B16.9 - 03

ACCORDING TO EN10204/DIN50049/3.1

DATE: 2007 - 09 - 06
 ORDER NO: 6932/4800893
 P.I. NO: 7G04-1
 CERTIF. NO: 499

ITEM NO.	PRODUCT & SIZE	QUANTITY PCS	MFG NO.	VISUAL & DIMENSIONAL INSPECTION	HARDNESS MAX 197 HB	HEAT TREATMENT (NOTE)	MAGNETIC PARTICLE EXAMINATION	IMPACT TEST (J)
1	CAP 3"	30	7C4246	GOOD	130 - 142	N	7516.525	
2	CAP 14"	15	7A0253	GOOD	134 - 137	N	7511.418	
3	CAP 16"	10	7D3953	GOOD	130 - 136	N	7519.214	
4	CAP 18"	5	8K4313	GOOD	132 - 139	N	7519.516	

ITEM NO.	MATERIAL CHARGE NO.	CHEMICAL COMPOSITION %										PHYSICAL TEST			
		C x100	Si x100	Mn x100	P x1000	S x1000	Cu x100	Ni x100	Cr x100	Mo x100	V x100	Nb x1000	Y S KSI	T S KSI	E %
	STANDARD	MIN	10	29	50	50	40	40	40	15	8	20	35.0	60.0	
	MAX	30		135	50	50									
1	3J546	20	27	109	19	3	<1	1	2	<1	<1	12	56.3	79.4	25.9
2	2E653	18	22	76	23	5	<1	1	<1	1	<1	<1	48.6	69.2	27.8
3	2E653	18	22	76	23	5	<1	1	<1	1	<1	<1	43.7	67.3	28.7
4	3H013	17	22	72	22	5	<1	1	1	<1	<1	<1	42.2	65.9	29.6
															50

(NOTE): A. HOT FORMED WITH FINAL TEMPERATURE BETWEEN 820°C - 980°C, AIR COOLING.
 N. NORMALIZING AT TEMPERATURE 880°C X 0.5 HR, AIR COOLING.
 NACE MR-01-75 & NACE MR 0103 : SATISFACTORY
 WE HEREBY CERTIFY THAT THE PRODUCT DESCRIBED HEREIN HAS BEEN MANUFACTURED IN ACCORDANCE WITH THE SPECIFICATIONS CONCERNED AND ALSO WITH THE PURCHASER'S REQUIREMENTS AND THAT THE TEST RESULTS SHOWN HEREIN ARE CORRECT

NGC Process Systems Ltd.

Qu E Lam

CHECKED TO ASME
 SECT IIA 2007 Ed1
 MTR ACCEPTED
 REJECTED
 PER
 DATE APR 10 2008

MANAGER OF Q.A. DEPT.

405

V&M FRANCE TUBES SAINT SAULVE SAINT SAULVE ZONE INDUSTRIELLE F-59880 SAINT SAULVE 	 VALLOUREC & MANNESMANN TUBES	INSPECTION CERTIFICATE CERTIFICAT DE RECEPTION 3.1 EN 10204 : 2004 No. / N° : 6353Sv06 Page/Page: 1 / 5 Date/Date: 24.07.2006
---	---	---

V&M FRANCE	(A09.1) V&M-Order-No. / N° de Cde V&M TH2908 (A08.2) Suborder / Suborder 856/4054 2
(A06.1) Customer / Client SEAMLESS STEEL PIPE LTD SSP 7007-84 TH STREET S.E. T2C 4T6 CALGARY	(A07.1) Order-No. / N° de Cde VM1674
(A06.2) Orderer / Emetteur VALLOUREC TUBES CANADA / BURLINGTON, ONTARIO L7R 3X5	(A07.2) Order-No. / N° de Cde VM1674 Date / Date 29.03.2006
	(A07.3) Order-No. / N° de Cde 6085
(B01, B02, B04) Description of the product Description du produit	Hot finished seamless line pipe angle 30° (+5 / -0), root face 1.6 mm (± 0.8) Ends bevelled, Inside without rust protection - Outside dry varnish Tubes sans soudure, finis à chaud, pour conduite angle 30° (+5 / -0), méplat 1,6 mm (± 0,8) Extrémités chanfreinées, Inter sans protection - Exter vernis sec ASTM A 106 - 04 A ASTM A 530 - 04 / ASTM A 53 - 04 ASME SA 106, Edition 2004 / ASME SA 530, Edition 2004 ASME SA 53, Edition 2004 ASME Boiler and Pressure Vessel Code, Sect. II, Part. A, Edition 2004, Addenda 2005 Nace Standard MR 0175-2003 Paragraph 3.2 Grade B NGC Process Systems Ltd. CHECKED TO ASME SECT. II A 2007 EdT MTR ACCEPTED REJECTED PER DATE APR 10 2008
ROCKWELL C HARDNESS <= 22 GUARANTEED DURETE ROCKWELL C <= 22 GARANTIE	

(A13) V&M Item Poste	(A09) Cust. Item Poste	(B14) Item text Texte du poste	(B04) Dimensions Dimensions	(B10) Single length Long. indiv.
11			NPS 3 SCH 80 OD-Tolerance + 0.031 in - 0.031 in WT-Tolerance + 15 % - 12.5 % NPS 3 SCH 80 Tol. sur DE + 0.031 in - 0.031 in Tol. sur EP + 15 % - 12.5 %	Fixed length 38.6 Ft + 4 in - 0 in Longueur fixe 38.6 Ft + 4 in - 0 in

3 S/SO ASTM A1SA 106B HT 40779

431

V&M FRANCE TUBERIE SAINT SAULVE SAINT SAULVE ZONE INDUSTRIELLE F-59880 SAINT SAULVE 	(A01)	 VALLOUREC & MANNESMANN TUBES	INSPECTION CERTIFICATE CERTIFICAT DE RECEPTION 3.1 EN 10204 : 2004 No. / N° : 6353Sv06 Page/Page: 2 / 5 Date/Date: 24.07.2006	(A02)
			(A03) No. / N° : 6353Sv06 Page/Page: 2 / 5 Date/Date: 24.07.2006	

(A13) V&M Item Poste	(A29) Cust. Item Poste	(B07.1) Heat Coulée	(B08) Quantity Nombre	(B11) Total length Long. totale ft	(B13) Weight Poids lb
11		40779	42	1.618,67	16.391

(C71)

HEAT CHEMICAL ANALYSIS / ANALYSE CHIMIQUE COULEE

For each reduction of 0,01 % carbon below 0,30 %, an increase of 0,06 % manganese above 1,06 % will be permitted up to a maximum of 1,20 % manganese

(B07.1) Heat Coulée	(B15) Process Procédé	C %	Si %	Mn %	P %	S %	Cr %	Mo %	Ni %	Cu %	V %
min	-	-	0,10	0,29	-	-	-	-	-	-	-
max	-	0,30	-	1,06	0,035	0,035	0,40	0,15	0,40	0,40	0,08
40779	Electric (EAF)	0,16	0,21	0,76	0,014	0,005	0,10	0,02	0,07	0,16	0,00

(B07.1) Heat Coulée	0014 %										
min	-										
max	1,00										
40779	0,35										

0014	CR+CU+MO+NI+V
------	---------------

Heats fully killed Acier Calmé

(C72)

PRODUCT CHEMICAL ANALYSIS / ANALYSE CHIMIQUE PRODUIT

For each reduction of 0,01 % carbon below 0,30 %, an increase of 0,06 % manganese above 1,06 % will be permitted up to a maximum of 1,20 % manganese

V&M, FRANCE TUBERIE SAINT SAULVE SAINT SAULVE ZONE INDUSTRIELLE F-59880 SAINT SAULVE 	 VALLOUREC & MANNESMANN TUBES	INSPECTION CERTIFICATE CERTIFICAT DE RECEPTION 3.1 EN 10204 : 2004 No. / N° : 6353Sv06 Page/Page: 3 / 5 Date/Date: 24.07.2006
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(C72)

PRODUCT CHEMICAL ANALYSIS / ANALYSE CHIMIQUE PRODUIT

(B07.1) Heat Coulée	(C00.1) Test Piece Eprouvette	C %	Si %	Mn %	P %	S %	Cr %	Mo %	Ni %	CU %	...
min		-	0,10	0,29	-	-	-	-	-	-	-
max		0,30	-	1,06	0,035	0,035	0,40	0,15	0,40	0,40	0,06
40779	01KD647	0,17	0,21	0,76	0,015	0,004	0,09	0,02	0,07	0,17	0,00
40779	02KD647	0,16	0,21	0,77	0,015	0,004	0,09	0,02	0,07	0,17	0,00

(B07.1) Heat Coulée	(C00.1) Test Piece Eprouvette	0014 %									
min		-									
max		1,00									
40779	01KD647	0,36									
40779	02KD647	0,35									

0014

CR+CU+MO+NI+V

(B04)

HEAT TREATMENT / TRAITEMENT THERMIQUE

HOT FINISHED NORMALIZED CONDITION MIN 920°C (1688 F) COOLING AIR
 FINI A CHAUD ETAT NORMALISE MIN 920°C (1688 F) REFROIDISSEMENT AIR

TENSILE TEST RESULTS / RESULTATS D'ESSAI DE TRACTION

(C10.1) Type / Type	Tube strip specimen / Eprouvette prismatique
(C03) Test temperature / Température d'essai	Room temperature / Température ambiante
(C02) Direction / Orientation	longitudinal / longitudinal

V&M FRANCE TUBERIE SAINT SAULVE SAINT SAULVE ZONE INDUSTRIELLE F-59880 SAINT SAULVE 	(A01)	 VALLOUREC & MANNESMANN TUBES	INSPECTION CERTIFICATE CERTIFICAT DE RECEPTION 3.1 EN 10204 : 2004 No. / N° : 6353Sv06 Page/Page: 4 / 5 Date/Date: 24.07.2006	(A02) (A03)
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TENSILE TEST RESULTS / RESULTATS D'ESSAI DE TRACTION

(B07.1) Heat Coulée	(C00.1) Test Piece Eprouvette	(C10.2) Dimension Dimension	(C11) YS LimElast	(C12) TS Résist.	(C13.2) Elong. Allong.						
		in / sq in	R _{p0.2} psi	R _m psi	2" %						
min		-	35000	60000	29						
max		-	-	-	-						
40779	01KD647	1,18x0,31 374,02	45265	70074	38						

(C10.2) Dimension / Dimension	Test piece dimensions / Dimension de l'éprouvette Test piece area / Section de l'éprouvette
----------------------------------	--

(C50)

TECHNOLOGICAL AND OTHER TESTS ON SPECIMENS / ESSAIS TECHNOLOGIQUES ET AUTRES ESSAIS SUR ECHANTILLON

Test Nature d'essai	Conditions Conditions	Test rate Ampleur du contrôle	Result Résultat
Flattening test Essai d'aplatissement			Satisfactory Satisfaisant

(D54)

OTHER TESTS ON PIPE / AUTRES ESSAIS SUR TUBE

Test Nature d'essai	Conditions Conditions	Test rate Ampleur du contrôle	Result Résultat
Hydrostatic test Epreuve hydrostatique	2500 PSI 5 SEC	100% each lot 100% Lot	Satisfactory Satisfaisant
Appearance & Dimensions Aspect & Dimensions		100% each lot 100% Lot	Satisfactory Satisfaisant
Eddy Current test Courants de Foucault	E309 + NORME	100% each lot 100% Lot	Satisfactory Satisfaisant

(A04, B06)

MARKING, IDENTIFICATION / MARQUAGE, IDENTIFICATION

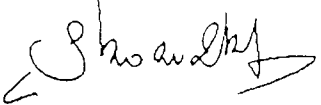
Paint stenciling Marquage peinture	 VALLOUREC & MANNESMANN FRANCE A/SA53 A/SA106 B HT HEAT NUMBER 2500 PSI NDE 3 0.300 SCH 80 LENGTH VM1674 I-6085
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(Z01)

The supplied products are in compliance with the requirements of the order
 Les produits livrés sont conformes aux stipulations de la commande

V&M FRANCE TUBERIE SAINT SAULVE SAINT SAULVE ZONE INDUSTRIELLE F-59880 SAINT SAULVE 	 VALLOUREC & MANNESMANN TUBES	INSPECTION CERTIFICATE CERTIFICAT DE RECEPTION 3.1 EN 10204 : 2004 No. / N° : 6353Sv06 Page/Page: 5 / 5 Date/Date: 24.07.2006
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(A05 Z02, Z03)

Date / Date	24.07.2006
Validated by Validé par	Inspection Representative Agent Réceptionnaire
	HERVE SKORUPKA 
	+ (33) 3 27 23 14 56
	+ (33) 3 27 23 15 25
@	herve.skorupka@vmtubes.fr
Stamp / Cachet	

This testimonial and certification respectively may neither be modified nor used for other products. Offences are regarded as falsification of documents and will be subject to criminal prosecution.
Ce certificat, ou cette attestation ne doit être ni modifié ni appliqué pour d'autres produits. Tous changements ou application pour d'autres produits seront considérés comme falsification de documents et fraude et seront sujet à la juridiction pénale.

N 2 . 343" THK

3" XH LR 90 BW ELLS A234-WPB

HEAT NUMBER : 2332
 TRANS AM PIPING PRODUCTS - REV'D BY: *SB*
 Shipment/Seq #: S 7 - 1593 8



INSPECTION CERTIFICATE

(MILL TEST)

CHUP HSIN ENTERPRISE CO., LTD.

17, TUNG LI ROAD HSIAO KANG
 KAOHSIUNG, TAIWAN R.O.C.
 TEL: (07) 831-9157-9
 FAX: (07) 831-2942, 821-7500

Customer: TRANS AM PIPING PRODUCTS LTD.
 Product: SEAMLESS STEEL PIPE FITTING
 Spec: ASME SA/ASTM A234 WPB-054
 DIN 50026/1B EN 10203 3.1B NACE MR 0175-03

Certificate No: 09600056-0501
 Order No: CI-07-327
 Date: 2007/12/14

PER *[Signature]*
 DATE APR 10 2008
 REJECTED
 MTR ACCEPTED *[Signature]*
 2007 For

Specification for Raw Material			Specification for Inspection			Visual Examination			Dimensional Inspection										
ASTM A106 GR.B			ASME B16.9-2001			GOOD			GOOD										
Item	Description				Quantity	Heat ID.	Heat No.	Raw Material Mfg	Raw Certificate NO.										
65	90 ELR STD 90 ELR XS				10 3	2830 2332	16K2830 16K2332	SUMITOMO SUMITOMO	WYTL5554 BYTL8203										
Chemical Composition %						Tension Test													
Specification	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V	Nb	C.E.	Y.S	T.S	E	HARDNESS TEST	Heat Treatment	Magnetic Particle Exam.	Remark
MIX	100	100	100	100	1000	1000	100	100	100	1000	1000	100	P.S.I	P.S.I	%	HB			
MAX	30	106	50	58	40	40	40	40	15	80	20	50	35000	60000	30	197			
	17	17	70	12	9	9	3	2	2	0	0	30	48600	75400	40	135	620°C TO 980°C		
	13	14	74	8	6	5	3	2	1	0	0	26	45000	61200	41	135	HOT FORMED		
E=C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15																			
We hereby certify that the product described herein has manufactured in accordance with the specifications concerned and is fit for the purpose intended.																			

E=C+Mn/6+(CR+MO+V)/5+(NI+CU)/15
 We hereby certify that the product described herein has manufactured in accordance
 with the specifications concerned and also with the purchaser's requirements and that the
 test results shown herein are correct.

Chief of Quality Assurance Section

L.S. Jai

NGC Process Systems Ltd.
 CHECKED TO ASME
 SECT. II A 2007 For

NGC Process Systems Ltd.
5120 - 6th St. NE Calgary, AB T2K 4W5

Date Printed: 20/03/2008

CUSTOMER

CONCEPT STOCK

CALGARY, ALBERTA

VESSEL LOCATION

CONCEPT STOCK

CALGARY, ALBERTA

VESSEL DESCRIPTION

14" OD x 59.5" S/S, INLET SCRUBBER

Vessel designed per the ASME Boiler & Pressure Vessel Code,
Section VIII, Division 1, 2007 Edition
with Advanced Pressure Vessel, Version: 10.0.0
Vessel is ASME Code Stamped

Job No: 16821-CS

Vessel Number: V-101 REV.1

NAMEPLATE INFORMATION

Vessel MAWP: 245.00 PSI at 250 °F

MDMT: -20 °F at 245.00 PSI

Serial Number(s): 16821-101

Canadian Registration Number(s): -

Year Built: 2008

Radiography: RT 2

Postweld Heat Treated: NONE

Construction Type: W

Notes

All loadings per UG-22 (a) to (d) & (f) have been considered.
Loadings per UG-22 (e) & (g) to (i) do not apply.
This vessel is NOT in lethal service.
Over pressure protection devices by others.

Signatures

APPROVED BY::

ALAN HALBERT



Date: 03 / 20 / 08

NGC Process Systems Ltd.
5120 - 6th St. NE Calgary, AB T2K 4W5

Date Printed: 20/03/2008

Project Description

Rev. A: Issued for Approval
Rev. 0: Issued for Fabrication
Rev. 1: Rev. circ. seam joint efficiency to 85%

NGC Process Systems Ltd.

SHELL, PIPE, 14"OD, Sch. STD,

Customer: **CONCEPT STOCK**

Job No: 16821-CS

Number: 1

Vessel Number: V-101 REV.1

Mark Number: S1

Date Printed: 20/03/2008

Cylindrical Shell Design Information

Design Pressure:	245.00 PSI	Design Temperature:	250 °F
Static Head:	2.00 PSI	Long. Joint Efficiency:	100 %
Shell Material:	SA-106 Gr B	Factor B Chart:	CS-2
Shell Length:	59.5000 in.	Material Stress (hot):	17100 PSI
Corrosion Allowance:	0.1250 in.	Material Stress (cold):	17100 PSI
External Corrosion Allowance:	0.0000 in.	Compressive Stress:	17018 PSI
Outside Diameter (new):	14.0000 in.	Actual Circumferential Stress:	8414 PSI
Outside Diameter (corroded):	14.0000 in.	Actual Longitudinal Stress:	4771 PSI
Shell Surface Area:	18.17 Sq. Ft.	Specific Gravity:	1.00
Shell Estimated Volume:	35.52 Gal.	Weight of Fluid:	296.74 lb.
Circ. Joint Efficiency:	85 %	Total Flooded Shell Weight:	567.02 lb.
		Shell Weight:	270.28 lb.

Minimum Design Metal Temperature Data

Minimum Design Metal Temperature: -20 °F

Material is exempt from impact testing per UG-20(f), 1 through 5

Design Thickness Calculations**Longitudinal Stress Calculations per Paragraph UG-27(c)(2)**

$$t = \frac{PR}{2SE + 0.4P} = \frac{247.00 * 6.7500}{2 * 17100 * 0.85 + 0.4 * 247.00}$$

$$= \text{Greater Of } (0.0572 \text{ (Calculated)}, 0.0625 \text{ (Minimum Allowed)}) + 0.1250 \text{ (corrosion)} + 0.0000 \text{ (ext. corrosion)} + 0.0469 \text{ (12 1/2\% for pipe)}$$

$$= \text{minimum of } \mathbf{0.2344 \text{ in.}}$$

Circumferential Stress Calculations per Appendix 1-1(a)(1)

$$t = \frac{PR_o}{SE + 0.4P} = \frac{247.00 * 7.0000}{17100 * 1.00 + 0.4 * 247.00} = 0.1006 + 0.1250 \text{ (corrosion)} + 0.0000 \text{ (ext. corrosion)} + 0.0469 \text{ (12 1/2\% for pipe)}$$

$$= \text{minimum of } \mathbf{0.2725 \text{ in.}}$$

MAWP for this Shell Section Only

$$P = \frac{SEt}{R_o - 0.4t} = \frac{17100 * 1.00 * 0.2031}{7.0000 - 0.4 * 0.2031} = \text{maximum design pressure of } \mathbf{501.97 \text{ PSI}}$$

External loads do not control design.

Pipe Selected: Size = **14 in.**, Schedule = **STD**, Diameter = **14.0000 in.**, Wall = **0.3750 in.**

NGC Process Systems Ltd.

14" OD, 2:1 SE, SEAMLESS WELD CAP (TOP)

Customer: **CONCEPT STOCK**

Job No: 16821-CS

Number: 1

Vessel Number: V-101 REV.1

Mark Number: H1

Date Printed: 20/03/2008

Ellipsoidal Head Design Information

Design Pressure:	245.00 PSI	Design Temperature:	250 °F
Static Head:	0.00 PSI	Joint Efficiency:	85 %
Head Material:	SA-234 Gr WPB	Factor B Chart:	CS-2
Corrosion Allowance:	0.1250 in.	Material Stress (hot):	17100 PSI
External Corrosion Allowance:	0.0000 in.	Material Stress (cold):	17100 PSI
Head Location:	Top	Actual Head Stress:	9482 PSI
Outside Diameter :	14.0000 in.	Straight Flange :	2.0000 in.
12.5 % pipe undertolerance:	0.0469 in.	Head Depth (ho) :	3.6875 in.
$K = \frac{1}{6}[2 + (D/2h)^2]$:	0.98		
Head Surface Area:	2.00 Sq. Ft.	Specific Gravity:	1.00
Head Estimated Volume:	2.51 Gal.	Weight of Fluid:	20.95 lb.
Head Weight:	30.56 lb.	Total Flooded Head Weight:	51.51 lb.

Minimum Design Metal Temperature Data

Minimum Design Metal Temperature: -20 °F

Material is exempt from impact testing per UG-20(f), 1 through 5

Design Thickness Calculations

Design Thickness Calculations per Appendix 1-4(c)

$$t = \frac{PD_oK}{2SE + 2P(K - 0.1)} = \frac{245.00 * 14.0000 * 0.98}{2 * 17100 * 0.85 + 2 * 245.00 * (0.98 - 0.1)}$$

$$= 0.1140 + 0.1250 \text{ (corrosion)} + 0.0000 \text{ (ext. corrosion)} + 0.0469 \text{ (12.5 \%)} = \text{minimum of } \mathbf{0.2859 \text{ in.}}$$

MAWP per UG-32 for this Head Only

$$P = \frac{2SEt}{KD_o - 2t(K - 0.1)} = \frac{2 * 17100 * 0.85 * 0.2031}{0.98 * 14.0000 - 2 * 0.2031 * (0.98 - 0.1)} = \mathbf{441.84 \text{ PSI}}$$

External loads do not control design.

Nominal Head Thickness Selected = **0.3750 in.**

Minimum Thickness after forming, t_s (uncorroded) = **0.3281 in.**

Pipe Cap

Size: 14 Schedule: STD

NGC Process Systems Ltd.

14" OD, 2:1 SE, SEAMLESS WELD CAP (BOTTOM)

Customer: **CONCEPT STOCK**

Job No: 16821-CS

Number: 2

Vessel Number: V-101 REV.1

Mark Number: H2

Date Printed: 20/03/2008

Ellipsoidal Head Design Information

Design Pressure:	245.00 PSI	Design Temperature:	250 °F
Static Head:	2.00 PSI	Joint Efficiency:	85 %
Head Material:	SA-234 Gr WPB	Factor B Chart:	CS-2
Corrosion Allowance:	0.1250 in.	Material Stress (hot):	17100 PSI
External Corrosion Allowance:	0.0000 in.	Material Stress (cold):	17100 PSI
Head Location:	Bottom	Actual Head Stress:	9559 PSI
Outside Diameter :	14.0000 in.	Straight Flange :	2.0000 in.
12.5 % pipe undertolerance:	0.0469 in.	Head Depth (ho) :	3.6875 in.
K = $\frac{1}{6}[2 + (D/2h)^2]$:	0.98		
Head Surface Area:	2.00 Sq. Ft.	Specific Gravity:	1.00
Head Estimated Volume:	2.51 Gal.	Weight of Fluid:	20.95 lb.
Head Weight:	30.56 lb.	Total Flooded Head Weight:	51.51 lb.

Minimum Design Metal Temperature Data

Minimum Design Metal Temperature: -20 °F

Material is exempt from impact testing per UG-20(f), 1 through 5

Design Thickness Calculations

Design Thickness Calculations per Appendix 1-4(c)

$$t = \frac{PD_o K}{2SE + 2P(K - 0.1)} = \frac{247.00 * 14.0000 * 0.98}{2 * 17100 * 0.85 + 2 * 247.00 * (0.98 - 0.1)}$$

$$= 0.1149 + 0.1250 \text{ (corrosion)} + 0.0000 \text{ (ext. corrosion)} + 0.0469 \text{ (12.5 \%)} = \text{minimum of } \mathbf{0.2868 \text{ in.}}$$

MAWP per UG-32 for this Head Only

$$P = \frac{2SEt}{KD_o - 2t(K - 0.1)} = \frac{2 * 17100 * 0.85 * 0.2031}{0.98 * 14.0000 - 2 * 0.2031 * (0.98 - 0.1)} = \mathbf{441.84 \text{ PSI}}$$

External loads do not control design.

Nominal Head Thickness Selected = **0.3750 in.**

Minimum Thickness after forming, t_s (uncorroded) = **0.3281 in.**

Pipe Cap

Size: 14 Schedule: STD

NGC Process Systems Ltd.

3" - 150CL, RFWN NOZZLE IN TOP HEAD (OUTLET)

Customer: **CONCEPT STOCK**

Job No: 16821-CS

Number: 1

ID Number: 2

Vessel Number: V-101 REV. 1

Mark Number: N2

Date Printed: 20/03/2008

Nozzle Design Information

Design Pressure:	245.00 PSI	Design Temperature:	250 °F
Static Head:	0.00 PSI	Nozzle Efficiency (E):	100 %
Nozzle Material:	SA-106 Gr B	Joint Efficiency (E _j):	1.00
		Factor B Chart:	CS-2
External Projection:	2.0000 in.	Allowable Stress at Design Temperature (S _d):	17100 PSI
Internal Projection:	0.0000 in.	Allowable Stress at Ambient Temperature:	17100 PSI
Inside Corrosion Allowance:	0.1250 in.	Correction Factor (F):	1.00
External Corrosion Allowance:	0.0000 in.	Nozzle Path:	None
Nozzle Pipe Size:	3	Nozzle Pipe Schedule:	XH
Nozzle ID (new):	2.9000 in.	Nozzle Wall Thickness(new):	0.3000 in.
Nozzle ID (corroded):	3.1500 in.	Nozzle Wall Thickness(corroded):	0.1750 in.
Outer "h" Limit:	0.4375 in.	Upper Weld Leg Size(Weld 41):	0.3750 in.
Internal "h" Limit:	0.1250 in.	Internal Weld Leg Size(Weld 43):	0.0000 in.
OD, Limit of Reinforcement:	6.3000 in.	Outside Groove Weld Depth:	0.3750 in.

Minimum Design Metal Temperature

Minimum Design Metal Temperature: -20 °F

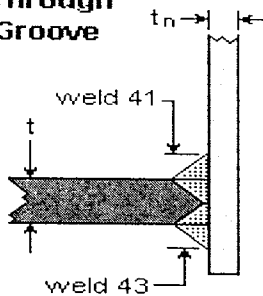
Material is exempt from impact testing per UG-20(f), 1 through 5

Host Component: Head 1 - 14" OD, 2:1 SE, SEAMLESS WELD CAP (TOP)

Material:	SA-234 Gr WPB	Head wall thickness(new):	0.3750 in.
Material Stress(S _y):	17100 PSI	Head wall thickness - 12% for pipe:	0.2031 in.

Nozzle Detail Information

Through Groove



Upper Weld Leg Size(Weld 41):	0.3750 in.
Internal Weld Leg Size(Weld 43):	0.0000 in.
Nozzle Wall Thickness(t _n):	0.3000 in.
Outside Groove Weld Depth:	0.3750 in.

Nozzle passes through the vessel, attached by a groove weld.

Pipe Size: 3 Schedule: XH

Nozzle is adequate for UG-45 requirements.

Opening is adequately reinforced for Internal Pressure.

Reinforcement calculations are not required per UG-36(c)(3)(a) See Uw-14 for exceptions.

Weld Strength Paths are adequate.

NGC Process Systems Ltd.

3" - 150CL, RFWN NOZZLE IN TOP HEAD (OUTLET)

Job No: 16821-CS
Number: 1
ID Number: 2

Vessel Number: V-101 REV.1
Mark Number: N2

Date Printed: 20/03/2008

Required Head Thickness per Paragraph UG-37(a)

$$tr = \frac{P K_1 D_o}{(2SE + 0.8P)} = \frac{245.00 * 0.8800 * 14.0000}{(2 * 17100 * 1 + 0.8 * 245.00)} = 0.0878 \text{ in.}$$

Nozzle Required Thickness Calculations

Required Nozzle Thickness for Internal Pressure per Paragraph UG-37(a)

$$trn = \frac{PR_n}{SE - 0.6P} = \frac{245.00 * 1.5750}{17100 * 1 - 0.6 * 245.00} = 0.0228 \text{ in.}$$

Strength Reduction Factors

$$fr1 = \frac{S_n}{S_v} = \frac{17100}{17100} = 1.0000$$

$$fr2 = \frac{S_n}{S_v} = \frac{17100}{17100} = 1.0000$$

$$fr3 = \frac{S_n}{S_v} = \frac{17100}{17100} = 1.0000$$

UG-45 Thickness Calculations

Nozzle Thickness for Pressure Loading (plus corrosion) per Paragraph UG-45(a)

$$t = \frac{PR_n}{SE - 0.6P} + Ca + \text{ext. Ca} = \frac{245.00 * 1.5750}{17100 * 1.00 - 0.6 * 245.00} + 0.1250 + 0.0000 = 0.1478 \text{ in.}$$

Nozzle Thickness for Internal Pressure (plus corrosion) per Paragraph UG-45(b)(1)

$$t = \frac{P K D_o}{(2SE + 2P(K - 0.1))} + Ca + \text{ext. Ca} = \frac{245.00 * 0.9800 * 14.0000}{(2 * 17100 * 1 + 2 * 245.00 * (0.9800 - 0.1))} + 0.1250 + 0.0000 = 0.2221 \text{ in.}$$

Minimum Thickness of Standard Wall Pipe (plus corrosion) per Paragraph UG-45(b)(4)

$$t = \text{minimum thickness of standard wall pipe} + Ca + \text{ext. Ca} = 0.3140 \text{ in.}$$

Nozzle Minimum Thickness per Paragraph UG-45(b)

$$t = \text{Smallest of UG-45(b)(1) or UG-45(b)(4)} = 0.2221 \text{ in.}$$

Wall thickness = $t_n * 0.875(\text{pipe}) = 0.2625$ is greater than or equal to UG-45 value of 0.2221

NGC Process Systems Ltd.
1.5" PIPE IN BOTTOM HEAD (DRAIN)

Customer: **CONCEPT STOCK**
 Job No: 16821-CS
 Number: 2
 ID Number: 3

Vessel Number: V-101 REV.1
 Mark Number: N3

Date Printed: 20/03/2008

Nozzle Design Information

Design Pressure:	245.00 PSI	Design Temperature:	250 °F
Static Head:	2.00 PSI	Nozzle Efficiency (E):	100 %
Nozzle Material:	SA-106 Gr B	Joint Efficiency (E ₁):	1.00
		Factor B Chart:	CS-2
External Projection:	1.0000 in.	Allowable Stress at Design Temperature (S):	17100 PSI
Internal Projection:	0.0000 in.	Allowable Stress at Ambient Temperature:	17100 PSI
Inside Corrosion Allowance:	0.1250 in.	Correction Factor (F):	1.00
External Corrosion Allowance:	0.0000 in.	Nozzle Path:	None
Nozzle Pipe Size:	1.5	Nozzle Pipe Schedule:	160
Nozzle ID (new):	1.3370 in.	Nozzle Wall Thickness(new):	0.2810 in.
Nozzle ID (corroded):	1.5870 in.	Nozzle Wall Thickness(corroded):	0.1560 in.
Outer "h" Limit:	0.3900 in.	Upper Weld Leg Size(Weld 41):	0.3750 in.
Internal "h" Limit:	0.0775 in.	Internal Weld Leg Size(Weld 43):	0.0000 in.
OD, Limit of Reinforcement:	3.1740 in.	Outside Groove Weld Depth:	0.3750 in.

Minimum Design Metal Temperature

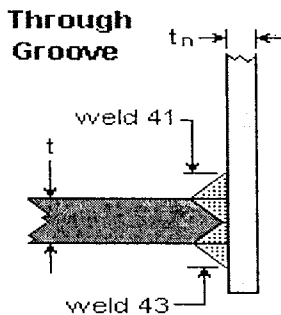
Minimum Design Metal Temperature: -20 °F

Material is exempt from impact testing per UG-20(f), 1 through 5

Host Component: Head 2 - 14" OD, 2:1 SE, SEAMLESS WELD CAP (BOTTOM)

Material:	SA-234 Gr WPB	Head wall thickness(new):	0.3750 in.
Material Stress(S _y):	17100 PSI	Head wall thickness - 12% for pipe:	0.2031 in.

Nozzle Detail Information



Upper Weld Leg Size(Weld 41):	0.3750 in.
Internal Weld Leg Size(Weld 43):	0.0000 in.
Nozzle Wall Thickness(t_n):	0.2810 in.
Outside Groove Weld Depth:	0.3750 in.

Nozzle passes through the vessel, attached by a groove weld.

Pipe Size: 1.5 Schedule: 160

Nozzle is adequate for UG-45 requirements.

Opening is adequately reinforced for Internal Pressure.

Reinforcement calculations are not required per UG-36(c)(3)(a) See Uw-14 for exceptions.

Weld Strength Paths are adequate.

NGC Process Systems Ltd.
1.5" PIPE IN BOTTOM HEAD (DRAIN)

Job No: 16821-CS
Number: 2
ID Number: 3

Vessel Number: V-101 REV.1
Mark Number: N3

Date Printed: 20/03/2008

Required Head Thickness per Paragraph UG-37(a)

$$tr = \frac{P K_1 D_o}{(2SE + 0.8P)} = \frac{247.00 * 0.8800 * 14.0000}{(2 * 17100 * 1 + 0.8 * 247.00)} = 0.0885 \text{ in.}$$

Nozzle Required Thickness Calculations

Required Nozzle Thickness for Internal Pressure per Paragraph UG-37(a)

$$trn = \frac{PRn}{SE - 0.6P} = \frac{247.00 * 0.7935}{17100 * 1 - 0.6 * 247.00} = 0.0116 \text{ in.}$$

Strength Reduction Factors

$$fr1 = \frac{S_n}{S_v} = \frac{17100}{17100} = 1.0000$$

$$fr2 = \frac{S_n}{S_v} = \frac{17100}{17100} = 1.0000$$

$$fr3 = \frac{S_n}{S_v} = \frac{17100}{17100} = 1.0000$$

UG-45 Thickness Calculations

Nozzle Thickness for Pressure Loading (plus corrosion) per Paragraph UG-45(a)

$$t = \frac{PRn}{SE - 0.6P} + Ca + \text{ext. Ca} = \frac{247.00 * 0.7935}{17100 * 1.00 - 0.6 * 247.00} + 0.1250 + 0.0000 = 0.1366 \text{ in.}$$

Nozzle Thickness for Internal Pressure (plus corrosion) per Paragraph UG-45(b)(1)

$$t = \frac{P K D_o}{(2SE + 2P(K - 0.1))} + Ca + \text{ext. Ca} = \frac{247.00 * 0.9800 * 14.0000}{(2 * 17100 * 1 + 2 * 247.00 * (0.9800 - 0.1))} + 0.1250 + 0.0000 = 0.2228 \text{ in.}$$

Minimum Thickness of Standard Wall Pipe (plus corrosion) per Paragraph UG-45(b)(4)

$$t = \text{minimum thickness of standard wall pipe} + Ca + \text{ext. Ca} = 0.2519 \text{ in.}$$

Nozzle Minimum Thickness per Paragraph UG-45(b)

$$t = \text{Smallest of UG-45(b)(1) or UG-45(b)(4)} = 0.2228 \text{ in.}$$

Wall thickness = $t_n * 0.875(\text{pipe}) = 0.2459$ is greater than or equal to UG-45 value of **0.2228**

NGC Process Systems Ltd.
3"-300CL NOZZLE IN SHELL (INLET)

Customer: **CONCEPT STOCK**
 Job No: 16821-CS
 Number: 3
 ID Number: 1

Vessel Number: V-101 REV.1
 Mark Number: N1

Date Printed: 20/03/2008

Nozzle Design Information

Design Pressure:	245.00 PSI	Design Temperature:	250 °F
Static Head:	0.00 PSI	Nozzle Efficiency (E):	100 %
Nozzle Material:	SA-106 Gr B	Joint Efficiency (E ₁):	1.00
		Factor B Chart:	CS-2
External Projection:	6.0000 in.	Allowable Stress at Design Temperature (S):	17100 PSI
Internal Projection:	1.0000 in.	Allowable Stress at Ambient Temperature:	17100 PSI
Inside Corrosion Allowance:	0.1250 in.	Correction Factor (F):	1.00
External Corrosion Allowance:	0.0000 in.	Nozzle Path:	None
Nozzle Pipe Size:	3	Nozzle Pipe Schedule:	XH
Nozzle ID (new):	2.9000 in.	Nozzle Wall Thickness(new):	0.3000 in.
Nozzle ID (corroded):	3.1500 in.	Nozzle Wall Thickness(corroded):	0.1750 in.
Outer "h" Limit:	0.4375 in.	Upper Weld Leg Size(Weld 41):	0.3750 in.
Internal "h" Limit:	0.1250 in.	Internal Weld Leg Size(Weld 43):	0.0000 in.
OD, Limit of Reinforcement:	6.3000 in.	Outside Groove Weld Depth:	0.3750 in.

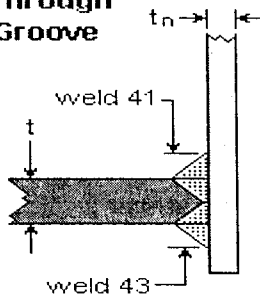
Minimum Design Metal Temperature

Minimum Design Metal Temperature: -20 °F
 Material is exempt from impact testing per UG-20(f), 1 through 5
 Host Component: Shell 1 - SHELL, PIPE, 14"OD, Sch. STD,

Material:	SA-106 Gr B	Shell wall thickness(new):	0.3750 in.
Material Stress(S _y):	17100 PSI	Shell wall thickness - 12% for pipe (corroded):	0.2031 in.

Nozzle Detail Information

Through Groove



Upper Weld Leg Size(Weld 41): 0.3750 in.
 Internal Weld Leg Size(Weld 43): 0.0000 in.
 Nozzle Wall Thickness(t_n): 0.3000 in.
 Outside Groove Weld Depth: 0.3750 in.

Nozzle passes through the vessel, attached by a groove weld.

Pipe Size: 3 Schedule: XH

Nozzle is adequate for UG-45 requirements.

Opening is adequately reinforced for Internal Pressure.

Reinforcement calculations are not required per UG-36(c)(3)(a) See Uw-14 for exceptions.

Weld Strength Paths are adequate.

NGC Process Systems Ltd.
3"-300CL NOZZLE IN SHELL (INLET)

Job No: 16821-CS
 Number: 3
 ID Number: 1

Vessel Number: V-101 REV.1
 Mark Number: N1

Date Printed: 20/03/2008

Required Shell Thickness per Paragraph UG-37(a)

$$tr = \frac{PR_o}{SE + 0.4P} = \frac{245.00 * 7.0000}{17100 * 1 + 0.4 * 245.00} = 0.0997 \text{ in.}$$

Nozzle Required Thickness Calculations

Required Nozzle Thickness for Internal Pressure per Paragraph UG-37(a)

$$trn = \frac{PR_n}{SE - 0.6P} = \frac{245.00 * 1.5750}{17100 * 1 - 0.6 * 245.00} = 0.0228 \text{ in.}$$

Strength Reduction Factors

$$fr1 = \frac{S_n}{S_v} = \frac{17100}{17100} = 1.0000$$

$$fr2 = \frac{S_n}{S_v} = \frac{17100}{17100} = 1.0000$$

$$fr3 = \frac{S_n}{S_v} = \frac{17100}{17100} = 1.0000$$

UG-45 Thickness Calculations

Nozzle Thickness for Pressure Loading (plus corrosion) per Paragraph UG-45(a)

$$t = \frac{PR_n}{SE - 0.6P} + Ca + \text{ext. Ca} = \frac{245.00 * 1.5750}{17100 * 1.00 - 0.6 * 245.00} + 0.1250 + 0.0000 = 0.1478 \text{ in.}$$

Nozzle Thickness for Internal Pressure (plus corrosion) per Paragraph UG-45(b)(1)

$$t = \frac{PR_o}{SE + 0.4P} + Ca + \text{ext. Ca} = \frac{245.00 * 7.0000}{17100 * 1 + 0.4 * 245.00} + 0.1250 + 0.0000 = 0.2247 \text{ in.}$$

Minimum Thickness of Standard Wall Pipe (plus corrosion) per Paragraph UG-45(b)(4)

$$t = \text{minimum thickness of standard wall pipe} + Ca + \text{ext. Ca} = 0.3140 \text{ in.}$$

Nozzle Minimum Thickness per Paragraph UG-45(b)

$$t = \text{Smallest of UG-45(b)(1) or UG-45(b)(4)} = 0.2247 \text{ in.}$$

Wall thickness = $t_n * 0.875(\text{pipe}) = 0.2625$ is greater than or equal to UG-45 value of **0.2247**

NGC Process Systems Ltd.

2" - 3000# CPLG IN SHELL (LC/INSPECTION)

Customer: **CONCEPT STOCK**

Job No: 16821-CS

Number: 4

ID Number: 4

Vessel Number: V-101 REV.1

Mark Number: C1

Date Printed: 20/03/2008

Nozzle Design Information

Design Pressure:	245.00 PSI	Design Temperature:	250 °F
Static Head:	0.00 PSI	Nozzle Efficiency (E):	100 %
Nozzle Material:	SA-105	Joint Efficiency (E ₁):	1.00
		Factor B Chart:	CS-2
External Projection:	1.0000 in.	Allowable Stress at Design Temperature (S _m):	20000 PSI
Internal Projection:	0.0000 in.	Allowable Stress at Ambient Temperature:	20000 PSI
Inside Corrosion Allowance:	0.1250 in.	Correction Factor (F):	1.00
External Corrosion Allowance:	0.0000 in.	Nozzle Path:	None
Nozzle ID (new):	2.3750 in.	Nozzle Wall Thickness(new):	0.3125 in.
Nozzle ID (corroded):	2.6250 in.	Nozzle Wall Thickness(corroded):	0.1875 in.
Outer "h" Limit:	0.4688 in.	Upper Weld Leg Size(Weld 41):	0.3750 in.
Internal "h" Limit:	0.1563 in.	Internal Weld Leg Size(Weld 43):	0.0000 in.
OD, Limit of Reinforcement:	5.2500 in.	Outside Groove Weld Depth:	0.3750 in.

Minimum Design Metal Temperature

Minimum Design Metal Temperature: -20 °F

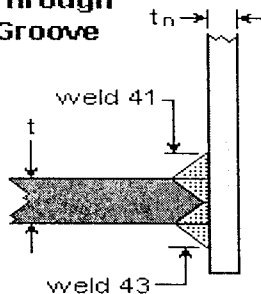
Material is exempt from impact testing per UG-20(f), 1 through 5

Host Component: Shell 1 - SHELL, PIPE, 14"OD, Sch. STD,

Material:	SA-106 Gr B	Shell wall thickness(new):	0.3750 in.
Material Stress(S _y):	17100 PSI	Shell wall thickness - 12% for pipe (corroded):	0.2031 in.

Nozzle Detail Information

Through Groove



Upper Weld Leg Size(Weld 41):	0.3750 in.
Internal Weld Leg Size(Weld 43):	0.0000 in.
Nozzle Wall Thickness(t _n):	0.3125 in.
Outside Groove Weld Depth:	0.3750 in.

Nozzle passes through the vessel, attached by a groove weld.

Nozzle is adequate for UG-45 requirements.

Opening is adequately reinforced for Internal Pressure.

Reinforcement calculations are not required per UG-36(c)(3)(a) See Uw-14 for exceptions.

Weld Strength Paths are adequate.

NGC Process Systems Ltd.

2" - 3000# CPLG IN SHELL (LC/INSPECTION)

Job No: 16821-CS
Number: 4
ID Number: 4

Vessel Number: V-101 REV.1
Mark Number: C1

Date Printed: 20/03/2008

Required Shell Thickness per Paragraph UG-37(a)

$$tr = \frac{PR_o}{SE + 0.4P} = \frac{245.00 * 7.0000}{17100 * 1 + 0.4 * 245.00} = 0.0997 \text{ in.}$$

Nozzle Required Thickness Calculations

Required Nozzle Thickness for Internal Pressure per Paragraph UG-37(a)

$$trn = \frac{PR_n}{SE - 0.6P} = \frac{245.00 * 1.3125}{20000 * 1 - 0.6 * 245.00} = 0.0162 \text{ in.}$$

Strength Reduction Factors

$$fr1 = \frac{S_n}{S_v} = \frac{20000}{17100} = 1.0000$$

$$fr2 = \frac{S_n}{S_v} = \frac{20000}{17100} = 1.0000$$

$$fr3 = \frac{S_n}{S_v} = \frac{20000}{17100} = 1.0000$$

UG-45 Thickness Calculations

This calculation is for an access or inspection opening.

Nozzle Thickness for Pressure Loading (plus corrosion) per Paragraph UG-45(a)

$$t = \frac{PR_n}{SE - 0.6P} + Ca + \text{ext. Ca} = \frac{245.00 * 1.3125}{20000 * 1.00 - 0.6 * 245.00} + 0.1250 + 0.0000 = 0.1412 \text{ in.}$$

NGC Process Systems Ltd.

1.5" - 3000# CPLG IN SHELL (LSHH)

Customer: **CONCEPT STOCK**

Job No: 16821-CS

Number: 5

ID Number: 5

Vessel Number: V-101 REV.1

Mark Number: C2

Date Printed: 20/03/2008

Nozzle Design Information

Design Pressure:	245.00 PSI	Design Temperature:	250 °F
Static Head:	0.00 PSI	Nozzle Efficiency (E):	100 %
Nozzle Material:	SA-105	Joint Efficiency (E _j):	1.00
		Factor B Chart:	CS-2
External Projection:	1.0000 in.	Allowable Stress at Design Temperature (S):	20000 PSI
Internal Projection:	0.0000 in.	Allowable Stress at Ambient Temperature:	20000 PSI
Inside Corrosion Allowance:	0.1250 in.	Correction Factor (F):	1.00
External Corrosion Allowance:	0.0000 in.	Nozzle Path:	None
Nozzle ID (new):	1.9000 in.	Nozzle Wall Thickness(new):	0.3000 in.
Nozzle ID (corroded):	2.1500 in.	Nozzle Wall Thickness(corroded):	0.1750 in.
Outer "h" Limit:	0.4375 in.	Upper Weld Leg Size(Weld 41):	0.3750 in.
Internal "h" Limit:	0.1250 in.	Internal Weld Leg Size(Weld 43):	0.0000 in.
OD, Limit of Reinforcement:	4.3000 in.	Outside Groove Weld Depth:	0.3750 in.

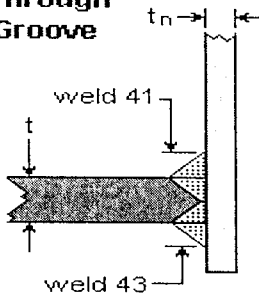
Minimum Design Metal Temperature

Minimum Design Metal Temperature: -20 °F

Material is exempt from impact testing per UG-20(f), 1 through 5

Host Component: Shell 1 - SHELL, PIPE, 14"OD, Sch. STD,

Material:	SA-106 Gr B	Shell wall thickness(new):	0.3750 in.
Material Stress(S _y):	17100 PSI	Shell wall thickness - 12% for pipe (corroded):	0.2031 in.

Nozzle Detail Information**Through Groove**

Upper Weld Leg Size(Weld 41): 0.3750 in.

Internal Weld Leg Size(Weld 43): 0.0000 in.

Nozzle Wall Thickness(t_n): 0.3000 in.

Outside Groove Weld Depth: 0.3750 in.

Nozzle passes through the vessel, attached by a groove weld.

Nozzle is adequate for UG-45 requirements.

Opening is adequately reinforced for Internal Pressure.

Reinforcement calculations are not required per UG-36(c)(3)(a) See Uw-14 for exceptions.

Weld Strength Paths are adequate.

NGC Process Systems Ltd.
1.5" - 3000# CPLG IN SHELL (LSHH)

Job No: 16821-CS
Number: 5
ID Number: 5

Vessel Number: V-101 REV.1
Mark Number: C2

Date Printed: 20/03/2008

Required Shell Thickness per Paragraph UG-37(a)

$$tr = \frac{PR_o}{SE + 0.4P} = \frac{245.00 * 7.0000}{17100 * 1 + 0.4 * 245.00} = 0.0997 \text{ in.}$$

Nozzle Required Thickness Calculations

Required Nozzle Thickness for Internal Pressure per Paragraph UG-37(a)

$$trn = \frac{PR_n}{SE - 0.6P} = \frac{245.00 * 1.0750}{20000 * 1 - 0.6 * 245.00} = 0.0133 \text{ in.}$$

Strength Reduction Factors

$$fr1 = \frac{S_n}{S_v} = \frac{20000}{17100} = 1.0000 \quad fr2 = \frac{S_n}{S_v} = \frac{20000}{17100} = 1.0000 \quad fr3 = \frac{S_n}{S_v} = \frac{20000}{17100} = 1.0000$$

UG-45 Thickness Calculations

This calculation is for an access or inspection opening.

Nozzle Thickness for Pressure Loading (plus corrosion) per Paragraph UG-45(a)

$$t = \frac{PR_n}{SE - 0.6P} + Ca + \text{ext. Ca} = \frac{245.00 * 1.0750}{20000 * 1.00 - 0.6 * 245.00} + 0.1250 + 0.0000 = 0.1383 \text{ in.}$$

NGC Process Systems Ltd.

SKIRT, PIPE, 12OD", Sch. STD

Customer: **CONCEPT STOCK**

Job No: 16821-CS

Number: 1

Vessel Number: V-101 REV.1

Mark Number: SK1

Date Printed: 20/03/2008

Cylindrical Skirt Design Information

Design Temperature:	250 °F	Joint Efficiency:	60 %
Skirt Material:	SA-106 Gr B	Factor B Chart:	CS-2
		Material Stress(hot):	17100 PSI
Skirt Length:	24.7500 in.	Material Stress(cold):	17100 PSI
Corrosion Allowance:	0.0000 in.	Yield Strength:	31500 PSI
Outside Diameter:	12.7500 in.	Modulus of Elasticity:	28.6 10 ⁶ PSI
		Density:	0.2830 lb/in. ³
Surface Area:	6.8845 Sq. Ft.	Weight:	102.11 lb.
Long. Factor A:	0.0073529	Long. Factor B:	17247 PSI

Nominal Skirt Thickness Selected = 0.3750 in.

NGC Process Systems Ltd.

14" OD x 59.5" S/S, INLET SCRUBBER

Customer: **CONCEPT STOCK**

Job No: 16821-CS

Vessel Number: V-101 REV.1

Date Printed: 20/03/2008

ASME Flange Design Information

Host	Description	Type	Size (in.)	Material	ASME Class	Material Group	MAP (PSI)
	3"-300CL NOZZLE IN SHELL (INLET)"-300CL INLET	Weld Neck	3	SA-105	300	1.1	667.50
	3" - 150CL, RFWN NOZZLE IN TOP H "-150CL OUTLET	Weld Neck	3	SA-105	150	1.1	245.00

NGC Process Systems Ltd.

Customer: **CONCEPT STOCK**
Job No: 16821-CS

Vessel Number: V-101 REV.1

Date Printed: 20/03/2008

Tower Analysis

Test Condition

First Period of Natural Vibration for Test Condition conditions: 0.0251 seconds/cycle

Moment Analysis

Segment Type	Segment No.	Weight (lb.)	Elevation (in.)	Segment Force (lb.)	Shear @ Top (lb.)	Moment @ Bottom (Ft.-lb.)	Stress (PSI)
Head	1	51.52	86.0938	0	0	0	0
Shell	2	288.08	69.1250	0	0	0	0
Shell	3	57.14	51.0000	0	0	0	0
Shell	4	221.42	36.3750	0	0	0	0
Head	5t	51.52	24.7500	0			
Skirt	5	102.11	12.3750	0	0	0	0
Total		771.80					

Stress Summary

Segment Type	Segment No.	Sm Attachments With Wind or Seismic (PSI)	Sp Internal Pressure Stress (PSI)	Sp External Pressure Stress (PSI)	Sw Weight Stress (PSI)	Maximum Tensile Stress (PSI)	Maximum Compressive Stress (PSI)
Head	1	0	2225	0	2	2224	-2
Shell	2	0	2225	0	10	2215	-10
Shell	3	0	2225	0	12	2213	-12
Shell	4	0	2225	0	19	2207	-19
Skirt	5	0	0	0	53	-53	-53

Positive values represent tensile stress, and negative values represent compressive.

Stress ratios greater than 1.0 represent overstressed conditions.

Stress Comparisons

Segment Type	Segment No.	Maximum Tensile Stress (PSI)	Allowable Stress (PSI)	Maximum Tensile Stress Ratio	Maximum Compressive Stress (PSI)	Allowable Stress (PSI)	Maximum Compressive Stress Ratio	Critical Buckling Stress (PSI)	Critical Buckling Ratio
Head	1	2224	14535	0.1530	-2	-17018	0.0001	-15750	0.0001
Shell	2	2215	17100	0.1295	-10	-17018	0.0006	-15750	0.0007
Shell	3	2213	17100	0.1294	-12	-17018	0.0007	-15750	0.0008
Shell	4	2207	17100	0.1290	-19	-17018	0.0011	-15750	0.0012
Skirt	5	-53	-17100	0.0031	-53	-17100	0.0031	-15750	0.0034

NGC Process Systems Ltd.

Customer: **CONCEPT STOCK**
Job No: 16821-CS

Vessel Number: V-101 REV.1

Date Printed: 20/03/2008

MDMT Report by Components

Design MDMT is -20 °F

Component	Material	Curve	Pressure	MDMT
SHELL, PIPE, 14"OD, Sch. STD,	SA-106 Gr B			Exempt per UG-20(f), 1-5
3"-300CL NOZZLE IN SHELL (INLET)	SA-106 Gr B			Exempt per UG-20(f), 1-5
2" - 3000# CPLG IN SHELL (LC/INSPECTIO	SA-105			Exempt per UG-20(f), 1-5
1.5" - 3000# CPLG IN SHELL (LSHH)	SA-105			Exempt per UG-20(f), 1-5
14" OD, 2:1 SE, SEAMLESS WELD CAP (TOP)	SA-234 Gr WPB			Exempt per UG-20(f), 1-5
3" - 150CL, RFWN NOZZLE IN TOP HEAD (	SA-106 Gr B			Exempt per UG-20(f), 1-5
14" OD, 2:1 SE, SEAMLESS WELD CAP (BOT	SA-234 Gr WPB			Exempt per UG-20(f), 1-5
1.5" PIPE IN BOTTOM HEAD (DRAIN)	SA-106 Gr B			Exempt per UG-20(f), 1-5

The required design MDMT of -20 °F has been met or exceeded for the calculated MDMT values.

ASME Flanges Are Not Included in MDMT Calculations.

NGC Process Systems Ltd.
14" OD x 59.5" S/S, INLET SCRUBBER

Customer: **CONCEPT STOCK**
Job No: 16821-CS

Vessel Number: V-101 REV.1

Date Printed: 20/03/2008

MAWP Report by Components

<u>Component</u>	<u>Design Pressure</u>	<u>Static Head</u>	<u>Vessel MAWP New & Cold UG-98(a)</u>	<u>Component MAWP Hot & Corroded UG-98(b)</u>	<u>Vessel MAWP Hot & Corroded UG-98(a)</u>
SHELL, PIPE, 14"OD, Sch. STD,	245.00 PSI	2.00 PSI	814.88 PSI	501.97 PSI	499.97 PSI
3"-300CL NOZZLE IN SHELL (INLET)	245.00 PSI	0.00 PSI	816.94 PSI	338.67 PSI	338.67 PSI
ASME Flange Class: 300 Gr:1.1		0.00 PSI	740.00 PSI	667.50 PSI	667.50 PSI
2" - 3000# CPLG IN SHELL (LC/INSP	245.00 PSI	0.00 PSI	816.94 PSI	502.09 PSI	502.09 PSI
1.5" - 3000# CPLG IN SHELL (LSHH)	245.00 PSI	0.00 PSI	816.94 PSI	502.09 PSI	502.09 PSI
14" OD, 2:1 SE, SEAMLESS WELD CAP (TOP)	.00 PSI	0.00 PSI	711.28 PSI	441.84 PSI	441.84 PSI
3" - 150CL, RFWN NOZZLE IN TOP HE	245.00 PSI	0.00 PSI	886.40 PSI	349.03 PSI	349.03 PSI
ASME Flange Class: 150 Gr:1.1		0.00 PSI	285.00 PSI	245.00 PSI	245.00 PSI
14" OD, 2:1 SE, SEAMLESS WELD CAP (BOTTOM)	SI	2.00 PSI	709.28 PSI	441.84 PSI	439.84 PSI
1.5" PIPE IN BOTTOM HEAD (DRAIN)	245.00 PSI	2.00 PSI	907.64 PSI	306.24 PSI	304.24 PSI

NC = Not Calculated Inc = Incomplete

Summary

Component with the lowest vessel MAWP(New & Cold) : **ASME Flange Class: 150 Gr:1.1**
The lowest vessel MAWP(New & Cold) : **285.00 PSI**

Component with the lowest vessel MAWP(Hot & Corroded) : **ASME Flange Class: 150 Gr:1.1**
The lowest vessel MAWP(Hot & Corroded) : **245.00 PSI**

Pressures are exclusive of any external loads.

Flange pressures listed here do not consider external loadings

NGC Process Systems Ltd.

Customer: **CONCEPT STOCK**
Job No: 16821-CS

Vessel Number: V-101 REV.1

Date Printed: 20/03/2008

Summary Information

	<u>Dry Weight</u>	<u>Flooded Weight</u>
Shell	270.28 lb.	567.02 lb.
Head	61.12 lb.	103.02 lb.
Nozzle	10.71 lb.	10.71 lb.
ASME Flange	25.00 lb.	25.00 lb.
Skirt	102.11 lb.	102.11 lb.
Totals	469.23 lb.	807.87 lb.
	<u>Volume</u>	
Shell	35.52 Gal.	
Head	5.02 Gal.	
Nozzle	0.34 Gal.	
Totals	40.88 Gal.	
	<u>Area</u>	
Shell	18.17 Sq. Ft.	
Head	4.00 Sq. Ft.	
Nozzle	1.11 Sq. Ft.	
Skirt	6.88 Sq. Ft.	
Totals	30.17 Sq. Ft.	

Hydrostatic Test Information (UG-99)

Gauge at Top

Component with controlling ratio is : SHELL, PIPE, 14"OD, Sch. STD,
Component with controlling pressure is : SHELL, PIPE, 14"OD, Sch. STD,

$$\text{Calculated Test Pressure} = P * 1.3 * \frac{\text{Cold Stress}}{\text{Hot Stress}} = 245.00 * 1.3 * \frac{17100}{17100} = \mathbf{318.50 \text{ PSI}}$$

Specified Test Pressure : **319.00 PSI**



Compression Solutions

Data Manual

Job Number

16821/100627

Customer

Concept Compression

Description

Spooling

Contents

AB-83

NDE Reports

“As Built” Drawings



CONSTRUCTION DATA REPORT FOR PIPING SYSTEMS

In accordance with the provisions of the Safety Codes Act

Shop Construction ☒; Field Construction ☐; Final Data Report ☒;
 Partial Data Report ☐ (from one ABSA-authorized Contractor to another
 ABSA- authorized Contractor).

Complete both sides of this Form

1. Constructed By: NGC Process Systems Owner's Job No: 16821
 (Name of ABSA authorized primary contractor or subcontractor)
5110 - 6th Street NE, Calgary, AB T2K 4W5
 (Address)

Alberta Quality Program No. AQP-1282(s) Expiry Date: December 14, 2010

2. Constructed For: Concept Compression
 (Name of primary contractor if different from above)
#2 3530 11A Street, NE, Calgary, Alberta
 (Address)

Alberta Quality Program No. AQP- Expiry Date:
 (Required when the primary contractor undertakes some/all of the quality functions, e.g., Mat'l supply, NDE, PWHT, Tie-in, fabrication, hydro test, final assembly etc.)

3. Owner: Concept / Husky
 (Name and address)
Galloway Alberta
 (Location of installation)

Alberta Quality Program No. AQP- Expiry Date:
 (Required when the owner undertakes some/all of the quality functions, e.g., Mat'l supply, NDE, PWHT, Tie-in, fabrication, hydro test, final assembly etc.)

4. Piping Design Alberta Registration No.: PP-
 (Required if aggregate piping volume is over 0.5m³)

5. WP No.: WP-1801.2 ; Company: NGC Process Systems ; Owner's WP No. (If used): WP-
 (Alberta Registration No.) (Alberta Registration No.)
 WPS No(s). used: NGC 1, NGC 2 ; Owner's WPS No(s). (If used):

6. Code: ASME B31.1 Non Boiler External Piping ☐; ASME B31.1 Boiler External Piping ☐;
 ASME B31.3 ☒ - Service category: Normal ☒, D ☐, M ☐, High Pressure ☐; B31.5 ☐; B31.9 ☐.

Drawing No. Rev. No. Line No.	Fluid (Air/Stm. Etc.)	Des. Press. kPa	Des. Temp. °C	Test Press. kPa	Test Medium	Pipe Mat'l Spec. & Grade	C.A. mm	Pipe NPS & Schedule	Flange Material & Rating	PWHT/ Preheat Temp. °C	R.T. %	Other NDE
16821-601A	HC	4585.0	121.1	6881.0	H2O	SA-106B SA-234-WPB	3.2	2" XH	SA-105N CL300	N/A	10 %	Visual
16821-601B	HC	4585.0	121.1	6881.0	H2O	SA-234-WPB	3.2	2" XH	SA-105N CL300	N/A	10 %	Visual
16821-602A	HC	1689.2	121.1	2530.4	H2O	SA-106B SA-234-WPB	3.2	3" STD	SA-105N CL150	N/A	10 %	Visual
16821-602B	HC	1689.2	121.1	2530.4	H2O	SA-106B SA-234-WPB	3.2	3" STD	SA-105N CL150/300	N/A	10 %	Visual
16821-603A	HC	4585.0	121.1	6881.0	H2O	SA-106B SA-234-WPB	3.2	4" STD	SA-105N CL300	N/A	10 %	Visual
16821-603B	HC	4585.0	121.1	6881.0	H2O	SA-234-WPB	3.2	4" STD	SA-105N CL300	N/A	10 %	Visual
16821-604	HC	4585.0	121.1	6881.0	H2O	SA-106B SA-234-WPB	3.2	2" XH 2 1/2" STD	SA-105N CL300	N/A	10 %	Visual
16821-605A	HC	3102.6	148.9	4654.0	H2O	SA-234-WPB	3.2	2" XH	SA-105N CL300	N/A	10 %	Visual
16821-605B	HC	3102.6	148.9	4654.0	H2O	SA-234-WPB	3.2	2" XH	SA-105N CL300	N/A	10 %	Visual
16821-606	HC	4585.0	121.1	6881.0	H2O	SA-106B SA-234-WPB	3.2	2" XH 3" STD	SA-105N CL300	N/A	10 %	Visual
16821-607A	HC	4585.0	121.1	6881.0	H2O	SA-106B	3.2	2" XH	SA-105N CL300	N/A	10 %	Visual
16821-607B	HC	4585.0	121.1	6881.0	H2O	SA-234-WPB	3.2	2" XH 3" STD	SA-105N CL300	N/A	10 %	Visual
16821-610	HC	1689.2	121.1	2530.4	H2O	SA-106B SA-234-WPB	3.2	4" STD	SA-105N CL150	N/A	10 %	Visual

Threaded Pipe SUCTION	HC		148.9	861.9	H2O	SA-106B SA-105N	3.2	½" / ¾" / 1" XH	N/A	N/A	N/A	Visual
Threaded Pipe DISCHARGE	HC		148.9	861.9	H2O	SA-106B SA-105N	3.2	½" / ¾" / 1" XH	N/A	N/A	N/A	Visual

Partial Data Reports, properly identified and certified by ABSA-authorized contractors, as listed below are attached to and form part of this Data Report ☐

No.	Line No.	Spool No.	Drg. No. (with Rev. No.)	Contractor (Name)	AQP No.	Expiry date

Remarks: Provide additional comments including noting any code work that was not performed by the ABSA-authorized contractor(s) supplying this document as a Partial Data Report but which must be completed by another ABSA-authorized contractor who assumes overall responsibility for conformance with the Safety Codes Act & Regulations and applicable ASME Codes, and who assures that all required code work is completed prior to putting the piping system into service.

Endorse certificate 'A' or 'B'

A. CERTIFICATE OF COMPLIANCE

Signed by the subcontractor when supplying this certificate as a
Partial Data Report

We certify that the statements in this Data Report are correct and that materials, construction and workmanship of the piping fabrication conform to the registered quality system and the applicable Piping code(s).

Date: _____
Subcontractor

Print Authorized Representative's Name Signature

**This certificate is not valid unless it forms part of a
Final Data Report signed by Primary Contractor**

B. CERTIFICATE OF COMPLIANCE

Signed by the primary contractor when supplying this certificate as a
Final Data Report

We certify that the statements in this Data Report are correct and that piping job no. 16821

described in this Data Report was constructed in accordance with the Province of Alberta Safety Codes Act and Regulations, and applicable ASME Piping Code(s).

Date: 16 April, 2008 NGC Process Systems

Primary Contractor

Lorne Peers

Print Authorized Representative's Name Signature

CERTIFICATE OF INSPECTION

I, the undersigned, employed by _____ have inspected the piping
job no. _____ described in this Construction Data Report and state that, to the best of my
knowledge and belief, the Contractor has constructed this piping in accordance with the applicable Sections of
the ASME Piping Codes and Province of Alberta Safety Codes Act and Regulations.

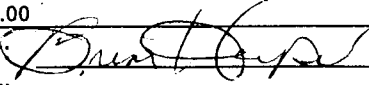
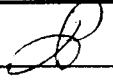
Date: _____ Date: _____

Print Owner's Inspector's Name Owner's Inspector's Signature

Name: _____ Sign.: _____

ABSA Safety Codes Officer
(BOILER EXTERNAL PIPING ONLY)

Non Conformance Report (N.C.R)

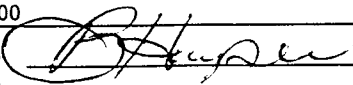
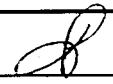
Employee	Date: <u>April-03-08</u>		Client: <u>Concept Compression</u>	
	Initiated by: <u>G.Lloyd</u>		Job No: <u>16821</u>	
	Department: <u>Ass.Dept.</u>		Written by: <u>G.Lloyd</u>	
	Product Line: ☐ Static Mixer, ☐ Custom Fab, ☐ Revamp, Compressor-HP: ☐ 0-100, ☒ 101-200, ☐ 201-400, ☐ Over 400			
Employee	Description of Nonconformance: Final discharge spool does not match the			
	customer P&ID. Spool 16821-607 drawn as 3"- 300# , needs to swage down to 2" 300#			
	from spool 16821-606. Skid edge conection to be 2"- 300#.			
Employee or Supervisor	Proposed Disposition: <u>Build [2] new spools so spooling matches P&ID.</u>			
Quality Control	Disposition Approvals:			
	Quality Manager: <u></u>	Date: <u>APR 03 2008</u>		
	A.I.: _____	Date: _____		
	Customer: _____	Date: _____		
	Department(s) responsible for actual disposition: _____			
	Root Cause: NGC ☐ Vendor ☐ Customer ☐			
Supervisor	Actual Disposition: <u>Same as proposed disposition.</u>			
	Manpower			
	Pressure Shop : Process spool fitter --- 1.5 hrs, Process B-welder --- 1.5 hrs,			
	Hydro helper --- 1 hr , Materials Helper --- 1 hr			
	Estimated Material: \$ 150.00		Estimated Man-hours: 5 manhours	
	Department Manager: <u></u>		Date Completed: <u>APR 03 2008</u>	
	Department Manager: _____		Date Completed: _____	
Quality Control	Quality Manager: <u></u>		Date: <u>APR 03 2008</u>	
	A.I.: _____		Date: _____	
	Customer: _____		Date: _____	
	<u>Implemented NCR received by Q.C.</u>		<u></u> <u>APR 03 2008</u> Signature Date	



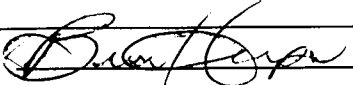
Compression Solutions

N.C.R.# 16821-02

Non Conformance Report (N.C.R)

Employee	Date: <u>April-04-08</u>	Client: <u>Concept Compression</u>
	Initiated by: <u>G.Lloyd</u>	Job No: <u>16821</u>
	Department: <u>Ass.Dept.</u>	Written by: <u>G.Lloyd</u>
	Product Line: ☐ Static Mixer, ☐ Custom Fab, ☐ Revamp, Compressor-HP: ☐ 0-100, ☒ 101-200, ☐ 201-400, ☐ Over 400	
Employee	Description of Nonconformance: <u>Concept B.O.M incorrect Item #107 the suction strainer is called up as a 3"- 150#, we require a 4"- 300 # suction strainer.</u>	
Employee or Supervisor	Proposed Disposition: <u>Order a new suction strainer to be 4"- 300#. Concept to correct their B.O.M. to reflect change.</u>	
Quality Control	Disposition Approvals:	
	Quality Manager: <u></u>	Date: <u>APR 04 2008</u>
	A.I.: _____	Date: _____
	Customer: _____	Date: _____
	Department(s) responsible for actual disposition: _____	
	Root Cause: NGC ☐ Vendor ☐ Customer ☒	
Supervisor	Actual Disposition: <u>Same as proposed disposition.</u>	
	Manpower ---- Material handling ---1.5 hrs	
	Estimated Material: \$ 150.00	Estimated Man-hours: 1.5 manhours
	Department Manager: <u></u>	Date Completed: <u>APR 04 2008</u>
	Department Manager: _____	Date Completed: _____
Quality Control	Quality Manager: <u></u>	Date: <u>APR 04 2008</u>
	A.I.: _____	Date: _____
	Customer: _____	Date: _____
	Implemented NCR received by Q.C. <u></u> <u>APR 04 2008</u>	
	Signature	Date

Non Conformance Report (N.C.R)

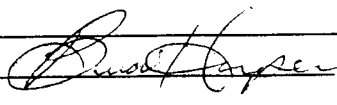
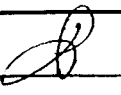
Employee	Date: <u>April-04-08</u>		Client: <u>Concept Compression</u>	
	Initiated by: <u>G.Lloyd</u>		Job No: <u>16821</u>	
	Department: <u>Ass.Dept.</u>		Written by: <u>G.Lloyd</u>	
	Product Line: ☐ Static Mixer, ☐ Custom Fab, ☐ Revamp, Compressor-HP: ☐ 0-100, ☒ 101-200, ☐ 201-400, ☐ Over 400			
Employee	Description of Nonconformance: Spool 16821-602b is 7/8" long on the vertical leg			
Employee or Supervisor	Proposed Disposition: <u>Remove and send back to the pressure shop, shorten spool to suit the new dimension.</u>			
Quality Control	Disposition Approvals:		Date: <u>APR 04 2008</u>	
	Quality Manager: <u></u>		Date: _____	
	A.I.: _____		Date: _____	
	Customer: _____		Date: _____	
	Department(s) responsible for actual disposition: _____			
	Root Cause: NGC ☐ Vendor ☐ Customer ☐			
Supervisor	Actual Disposition: <u>Same as proposed disposition.</u>			
	Manpower ---- Material handling ---1.5 hrs / Spool Fitter --- 1.5 hr / Spool B-welder --- 1.5 hr.			
	Hydro Helper --- 1 hr. Assembly Pipefitter --- 1.5 hr.			
	Estimated Material: \$ 15.00		Estimated Man-hours: 6.5 manhours	
	Department Manager: <u></u>		Date Completed: <u>APR 11 4/08</u>	
	Department Manager: _____		Date Completed: _____	
Quality Control	Quality Manager: <u></u>		Date: <u>APR 04 2008</u>	
	A.I.: _____		Date: _____	
	Customer: _____		Date: _____	
<u>Implemented NCR received by Q.C.</u> <u></u> <u>APR 04 2008</u> Signature Date				



Compression Solutions

N.C.R.# 16821-04

Non Conformance Report (N.C.R)

Employee	Date: <u>April-04-08</u>	Client: <u>Concept Compression</u>
	Initiated by: <u>G.Lloyd</u>	Job No: <u>16821</u>
	Department: <u>Ass.Dept.</u>	Written by: <u>G.Lloyd</u>
	Product Line: ☐ Static Mixer, ☐ Custom Fab, ☐ Revamp, Compressor-HP, ☐ 0-100, ☒ 101-200, ☐ 201-400, ☐ Over 400	
Employee	Description of Nonconformance: <u>4"-150# flare header spool not in the spooling design package.</u>	
Employee or Supervisor	Proposed Disposition: <u>Design and fabricate 4"-150# header spool.</u>	
Quality Control	Disposition Approvals:	
	Quality Manager: <u></u>	Date: <u>APR 08 2008</u>
	A.I.: _____	Date: _____
	Customer: _____	Date: _____
	Department(s) responsible for actual disposition: _____	
	Root Cause: NGC ☐ Vendor ☐ Customer ☐	
Supervisor	Actual Disposition: <u>Same as proposed disposition.</u>	
	Manpower ---- Material handling ---1.5 hrs / Spool Fitter --- 1.5 hr / Spool B-welder --- 1.5 hr.	
	Hydro Helper --- 1 hr. Assembly J-Welder --- 1.5 hr Assembly pipefitter --- 1.5 hr.	
	Estimated Material: \$ 45.00	Estimated Man-hours: 8.5 manhours
	Department Manager: <u></u>	Date Completed: <u>APR 08 2008</u>
	Department Manager: _____	Date Completed: _____
Quality Control	Quality Manager: <u></u>	Date: <u>APR 08 2008</u>
	A.I.: _____	Date: _____
	Customer: _____	Date: _____
	Implemented NCR received by Q.C. <u></u>	<u>APR 08 2008</u>
	Signature	Date

Item: fitting Material: CS.

Mailing Address
5311 - 86 Street
Edmonton, Alberta
T6E 5T8

Item: PIPING Material: C.S

IRISNDT 2004N



Process Systems

HYDROSTATIC TEST REPORT

Date: APR 22/08

Customer: CONCEPT

Job # 16821

Drawing #: GC1A

Description: SPOOL

Tests Conducted By: QC Dept. B HARPER FCC Q.C.

Test Pressure: 998 PSI Holding Time at Test Pressure: 1 Hour / 15 Minutes

Charted: No / Yes Recorder #: N/A /

Results: PASSED / OK

Authorized Inspector Witnessing Test: B Harper

Pressure Gauge ID #: SS124 / SS125 Calibration Due: 12/FEB/09 / 12/FEB/09

Comments: HYDRO C.K.

(Signature of QCM/QCI)

(Signature of Owners Inspector)

(Signature of Authorized Inspector, if applicable)



Process Systems

HYDROSTATIC TEST REPORT

Date: 4/1/08

Customer: CONCEPT COMPRESSION

Job # 16821

Drawing #: 602A+B

Description: SPOOLS

Tests Conducted By: QC Dept. J. PARKER

Test Pressure: 367 PSI Holding Time at Test Pressure: 1 Hour / 15 Minutes

Charted: No / Yes Recorder #: N/A /

Results: PASSED / OK

Authorized Inspector Witnessing Test: J. PARKER

Pressure Gauge ID #: SS812 SS814 Calibration Due: 20 JUN 08 12 FEB 09

Comments: HYDRO GOOD

(Signature of QCM/QCI)

(Signature of Owners Inspector)

(Signature of Authorized Inspector, if applicable)

4



Process Systems

HYDROSTATIC TEST REPORT

Date: April 6/08

Customer: CONCEPT

Job # 16821 - NCR-C3

Drawing #: GC 2 B

Description: SPOOL

Tests Conducted By: QC Dept. BHARPER FOR Q.C.

Test Pressure: 367 PSI Holding Time at Test Pressure: 1 Hour / (15 Minutes)

Charted: No / Yes Recorder #: N/A /

Results: PASSED / OK

Authorized Inspector Witnessing Test: B. Harper

Pressure Gauge ID #: 55421 / 55422 Calibration Due: 12/10/09 / 12/10/09

Comments: HYDRO OK (AS PER NCR-C3)

(Signature of QCM/QCI)

D. Cahill
(Signature of Owners Inspector)

(Signature of Authorized Inspector, if applicable)



Process Systems

HYDROSTATIC TEST REPORT

Date: 4/1/08

Customer: CONCEPT COMPRESSION

Job # 16821

Drawing #: 603A+B, 607, 601B

Description: SPOOLS

Tests Conducted By: QC Dept. J. PARKER

Test Pressure: 998 PSI Holding Time at Test Pressure: 1 Hour / 15 Minutes

Charted : (No) Yes Recorder #: (N/A)

Results: PASSED / OK

Authorized Inspector Witnessing Test: J. PARKER

Pressure Gauge ID #: SS122 SS123 Calibration Due : 20JUN09 12FEB09

Comments : HYDRO'S GOOD

(Signature of QCM/QCI)

(Signature of Owners Inspector)

(Signature of Authorized Inspector, if applicable)

[Handwritten signature]



Process Systems

HYDROSTATIC TEST REPORT

Date: 4/1/08

Customer: CONCEPT COMPRESSION

Job # 16821

Drawing #: 604

Description: SPOOL

Tests Conducted By: QC Dept. J. PARKER

Test Pressure: 998 PSI Holding Time at Test Pressure: 1 Hour / 15 Minutes

Charted: No / Yes Recorder #: N/A

Results: PASSED / OK

Authorized Inspector Witnessing Test: J. PARKER

Pressure Gauge ID #: SS122 SS123 Calibration Due: 20 JUN 09 12 FEB 09

Comments: HYDRO GOOD

(Signature of QCM/QCI)

(Signature of Owners Inspector)

(Signature of Authorized Inspector, if applicable)



Process Systems

HYDROSTATIC TEST REPORT

Date: 11/27/08

Customer: CONCEPT

Job # 16821

Drawing #: 605 A+B

Description: PLATE COOLER

Tests Conducted By: QC Dept. B HARPER FOR Q.C.

Test Pressure: 615 PSI Holding Time at Test Pressure: 1 Hour (15 Minutes)

Charted: No / Yes Recorder #: N/A /

Results: PASSED / OK

Authorized Inspector Witnessing Test: B Harper

Pressure Gauge ID #: 55612 / 55613 Calibration Due: 12/15/09 / 12/15/09

Comments: HYDRO C.K.

(Signature of QCM/QCI)

(Signature of Owners Inspector)

(Signature of Authorized Inspector, if applicable)



Process Systems

HYDROSTATIC TEST REPORT

Date: 4/2/08

Customer: CONCEPT COMPRESSION

Job # 16821

Drawing #: 606

Description: SPool

Tests Conducted By: QC Dept. J. PARKER

Test Pressure: 998 PSI Holding Time at Test Pressure: 1 Hour 15 Minutes

Charted: No Yes Recorder #: N/A

Results: PASSED OK

Authorized Inspector Witnessing Test: J. PARKER

Pressure Gauge ID #: SS124 SS125 Calibration Due: 2 x 12 FEB 09

Comments: HYDRO GOOD

(Signature of QCM/QCI)

(Signature of Owners Inspector)

(Signature of Authorized Inspector, if applicable)



Process Systems

HYDROSTATIC TEST REPORT

Date: 4/4/08

Customer: CONCEPT COMPRESSION

Job # 16821

Drawing #: 607.4, B NCR-01

Description: SPOOLS

Tests Conducted By: QC Dept. J. PARKER

Test Pressure: 998 PSI Holding Time at Test Pressure: 1 Hour 15 Minutes

Charted: No / Yes Recorder #: N/A /

Results: PASSED / OK

Authorized Inspector Witnessing Test: J. PARKER

Pressure Gauge ID #: 55122 55123 Calibration Due: 20JUN08 12FEB09

Comments: HYDRO GOOD

(Signature of QCM/QCI)

(Signature of Owners Inspector)

(Signature of Authorized Inspector, if applicable)

✓



Process Systems

HYDROSTATIC TEST REPORT

Date: APRIL 9/08

Customer: CONCEPT

Job # 16821

Drawing #: 610 (NCR C4)

Description: SPOOL

Tests Conducted By: QC Dept. BHADDER FOR QC

Test Pressure: 367 PSI Holding Time at Test Pressure: 1 Hour / 15 Minutes

Charted: No / Yes Recorder #: N/A /

Results: PASSED / OK

Authorized Inspector Witnessing Test: BHADDER

Pressure Gauge ID #: 55421 / 55422 Calibration Due: 12/FEB/09 / 12/FEB/09

Comments: HYDRO OK (PER NCR C4 SPOOL 610)

(Signature of QCM/QCI)

(Signature of Owners Inspector)

(Signature of Authorized Inspector, if applicable)



Process Systems

PNEUMATIC TEST REPORT

Date: APR 23-08

Customer: CONCEPT

Job # 16821

Drawing #: 100-627

Description: UTILITY PROCESS

APR 21-08

CHYCOL 15 PSI

Tests Conducted By: QC Dept.

Test Pressure: 125 PSI Holding Time at Test Pressure: 15 min

Charted: No / Yes Recorder #: N/A /

Results: PASSED / OK

Authorized Inspector Witnessing Test: _____

Pressure Gauge ID #: GL 910 GL 911 Calibration Due: 05-05-08

Comments: RM FOR Q.C.

[Signature]
(Signature of QCM/QCI)

(Signature of Owners Inspector)

(Signature of Authorized Inspector, if applicable)

Central Valve Calgary

5308 - 4th Street, S.E., Calgary, AB, T2H 1K5

GST 866836893RT0003

Service Report

PSV Tag #

SR #

30850

Invoice No.

PSV 2099

Date In Customer Name

24-Mar-08

NGC COMPRESSION SOLUTIONS

Location/Area

Ordered By

Shipped in Via

OMAR HAJAR

Valve ID

Serial No.

Vessel ID

Vessel

568768-11

Make

Orifice

Inlet

Outlet

Type

Connection

Tag #

HYDROSEAL

E

1

1

1400

Thread

Preliminary Inspection and Service Required

Required Service

Turn Around Time

Seal

Condition

Sold To

Normal

Unbroken

New Valve

Service Details

Disc Seat

Nozzle Seat

Spring

Spring #

Spring Type

OK

OK

OK

OK

Stem

Bellows

Bellows Test

Bubble Test

Medium

OK

N/A

N/A

OK

Air

Tag Set Pressure

Back Pressure

Temp. Correction

Actual Set Pressure (psi)

Capacity

Units

180

0

0

180

752

SCFM

Parts Used

Qty

Part No.

Part Description

1

BESNOYD

HYDROSEAL 1" - STANDARD

Comments

Job Completed

Ship via

Assembled by

Tested By

24-Mar-08

BADGER

JS

JS

Initials

JS

Central Valve Calgary

5308 - 4th Street, S.E., Calgary, AB, T2H 1K5

GST 866836893RT0003

Service Report

PSV Tag #

SR #

30851

Invoice No.

PSV

2000

Date In Customer Name

24-Mar-08

NGC COMPRESSION SOLUTIONS

Location/Area

Ordered By

Shipped in Via

OMAR HAJAR

Issue

Valve ID

Serial No.

Vessel ID

Vessel

549438-16

Make

Orifice

Inlet

Outlet

Type

Connection

Tag #

HYDROSEAL

E

1

1

1400

Thread

Preliminary Inspection and Service Required

Required Service

Turn Around Time

Seal

Condition

Sold To

Normal

Unbroken

New Valve

Service Details

Disc Seat

Nozzle Seat

Spring

Spring #

Spring Type

OK

OK

OK

OK

Stem

Bellows

Bellows Test

Bubble Test

Medium

OK

N/A

N/A

OK

Air

Tag Set Pressure

Back Pressur

Temp. Correction

Actual Set Pressure (psi)

Capacity

Units

245

0

0

245

1005

SCFM

Parts Used

Qty

Part No.

Part Description

1

14E3MOV00

HYDROSEAL 1" - STANDARD

Comments

Date Completed

Ship via

Assembled by

Tested By

24-Mar-08

BADGER

JS

JS

Initials

JS

Central Valve Calgary

5308 - 4th Street, S.E., Calgary, AB, T2H 1K5

GST 866836893RT0003

Service Report

PSV Tag #

SR #

30943

Invoice No.

PSV

2139

Date In Customer Name

17-Apr-08

NGC COMPRESSION SOLUTIONS

Location/Area

CALGARY

Ordered By

JEAN

Shipped in Via

BADGER

Code

16821-31

Valve ID

Serial No.

Vessel ID

Vessel

549438-16

Make	Orifice	Inlet	Outlet	Type	Connection	Tag #
HYDROSEAL	E	1	1	1400	Thread	

Preliminary Inspection and Service Required

Required Service

Turn Around Time

Seal

Condition

Reset Only

Normal

Unbroken

New Valve

Service Details

Disc Seat Nozzle Seat Spring Spring # Spring Type

OK

OK

OK

OK

Stem Bellows Bellows Test Bubble Test Medium

OK

N/A

N/A

OK

Air

Tag Set Pressure Back Pressure Temp. Correction Actual Set Pressure (psi) Capacity Units

245

0

0

450

1803

SCFM

Parts Used

Qty	Part No.	Part Description
-----	----------	------------------

Comments

Date Completed

17-Apr-08

Ship via

BADGER

Assembled by

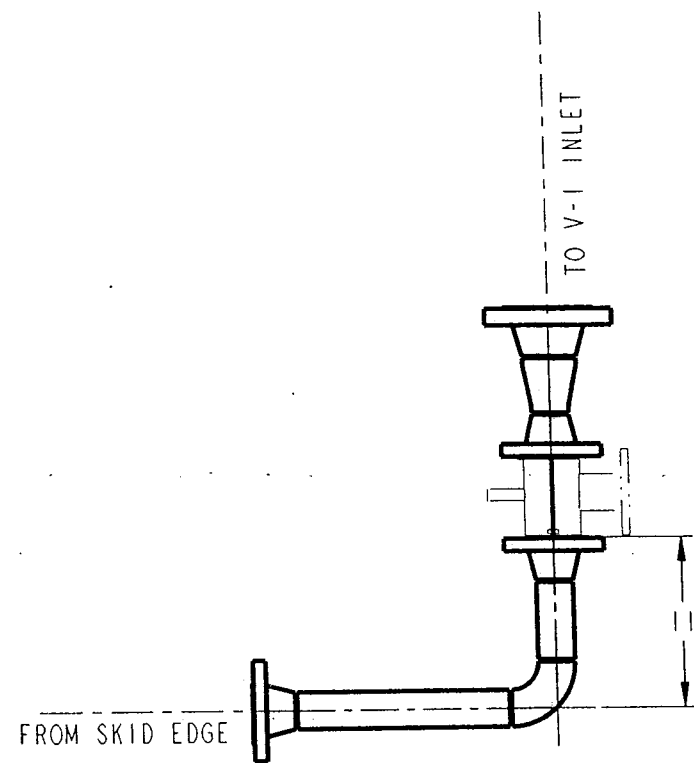
CH

Tested By

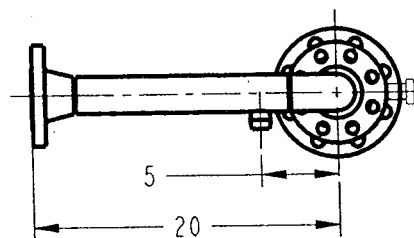
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Initials:

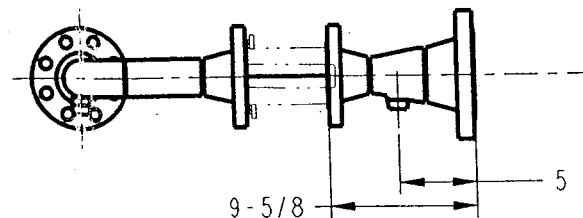
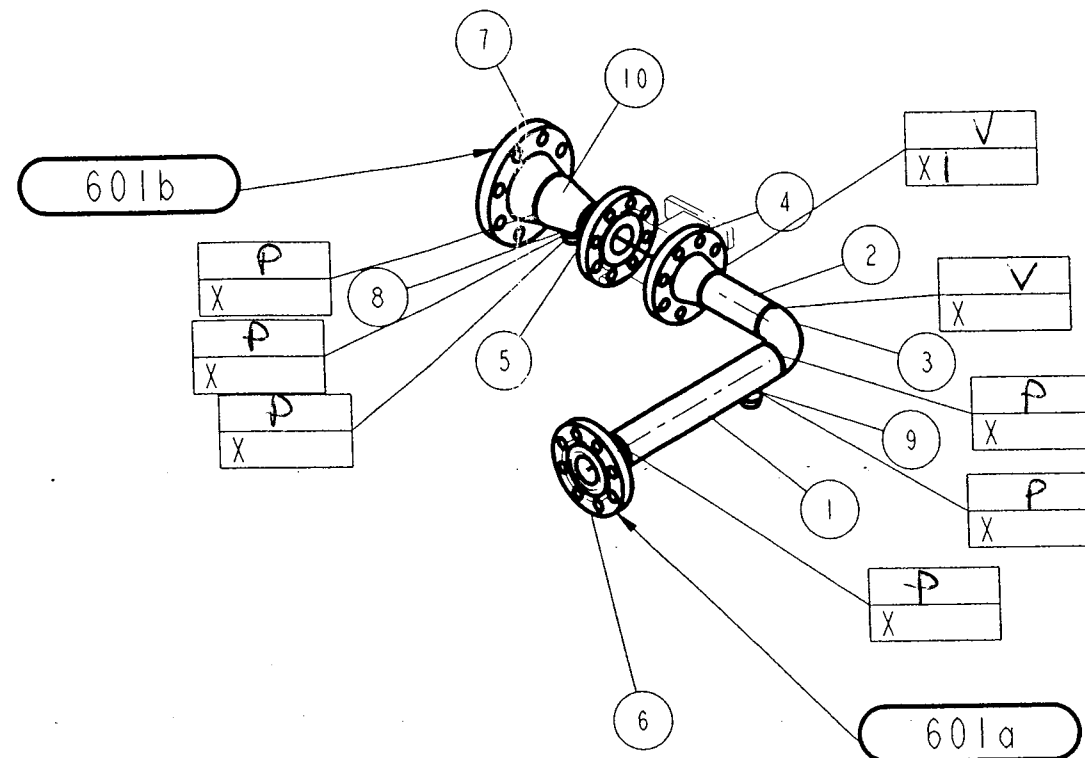
CH



PLAN VIEW



ELEVATION VIEW



RIGHT SIDE VIEW

ITEM	QTY.	DESCRIPTION	MATERIAL	HEAT NO.
1	14	PIPE, SMLS, 2", XH	SA106-B	4708-116
2	5	PIPE, SMLS, 2", XH	SA106-B	4708-116
3	1	ELBOW, 90 LR, 2", XH	SA234-WPB	505C
4	1	FLANGE, RF WN, 2-300CL XH	SA105N	54A7
5	1	FLANGE, RF WN, 2-300CL XH	SA105N	54A7
6	1	FLANGE, RF WN, 2-300CL XH	SA105N	54A7
7	1	FLANGE, RF WN, 3-300CL STD	SA105N	32559
8	1	OLET, THD, 1/2"-3000CL	SA105N	57071
9	1	OLET, THD, 1/2"-3000CL (ON 2" RUN)	SA105N	57071
10	1	REDUCER, CONC. BW, 3" x 2", STD/XH	SA234-WPB	4999

44200 - 601A / 998 PSI / SS-124; SS-125 /
 02 APRIL 08 / B. HARPER
 - 601B / 998 PSI / SS-122; SS-123 /
 01 APRIL 08 / J. PARKER

ISSUED FOR FABRICATION
 BY:
 DATE: Mar 18, 08

DESIGN DATA	300 CL	SPOOL TAG NO.	16821-601 a/b
DESIGN PRESSURE	665 PSIG	TEST GAUGE ID NO.	
DESIGN TEMP.	250°F / -20°F	CHART RECORDER REQD.	NO
TEST PRESSURE	998 PSIG	CHART RECORDER ID NO.	
TEST MEDIUM	WATER	ACTUAL TEST PRESSURE	PSIG
HOLDING TIME	15 MINUTES	FLUID SERVICE CATEGORY	NORMAL
Q.C. REP. SIGNATURE		AUTH. INSP. SIGNATURE	

GENERAL NOTES

- ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED
- ALL DIMENSIONS FTG/FTG UNLESS OTHERWISE NOTED
- TOLERANCE FOR OVERALL DIMENSIONS IS $\pm 1/16"$
- ALL FLANGE HOLES TO STRADDLE MAJOR CENTERLINES, UNLESS OTHERWISE NOTED
- THE FOLLOWING MATERIALS MAY BE SUBSTITUTED:
 SA106-B WITH SA333-6
 SA105N WITH SA350-LF2
 SA234-WPB WITH SA420-WPL6

GENERAL SPECS.

BUILD CODE	ASME B31.3 - 2006
CORROSION ALLOW.	1/8"
PWHT	NONE
WELD PROCEDURE	WPS NGC1 & NGC2
RADIOGRAPHY	10% N
SURFACE PREP.	SSPC-SP2
PICKLING	NO
PRIME	YES
PAINT	YES

NO.	DATE	REVISION	BY
0	03/17/08	ISSUED FOR FABRICATION	ATE
1			
2			
3			
4			



5120 6th STREET N.E.
 CALGARY, ALBERTA
 T2K 4W5
 TEL: 403. 274.6106
 FAX: 403. 730.1644
 www.ngc-ltd.com

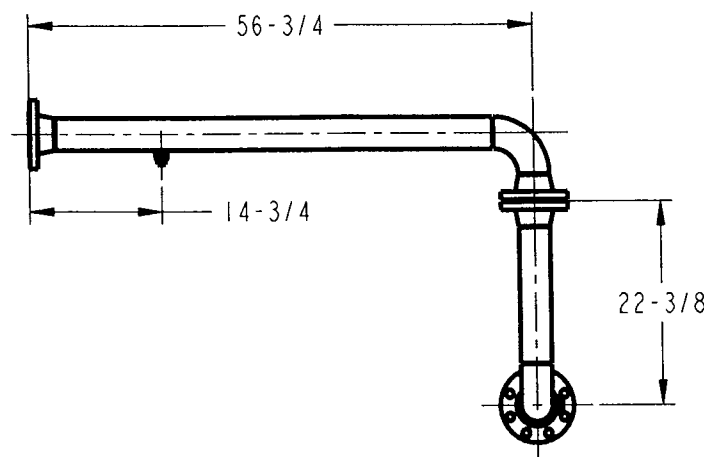
DRAWN BY:	ATE	DATE:	03/14/08
CHECKED BY:	OH	DATE:	03/17/08
JOB NO.:	16821-CS	EQUIP. NO.:	

TITLE: PROCESS SPOOL
 FROM SKID EDGE TO V-1 INLET

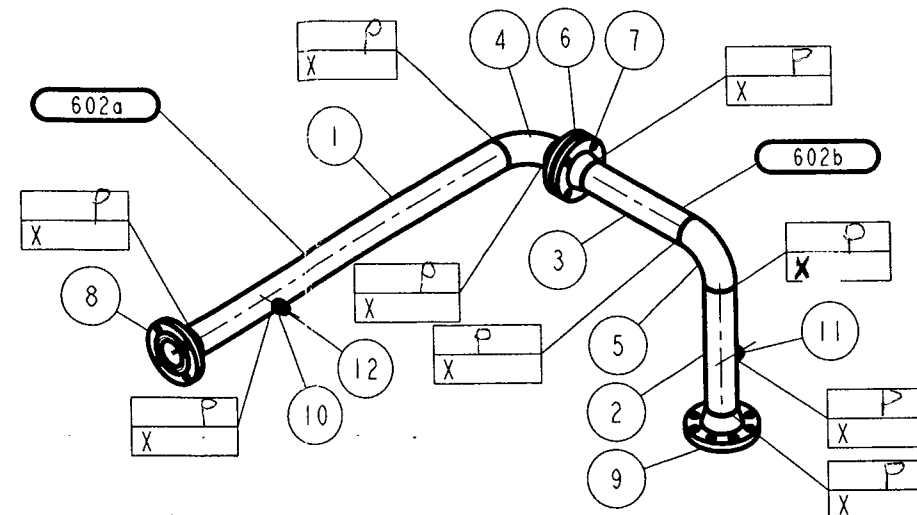
THIS DRAWING IS THE EXCLUSIVE PROPERTY OF NGC
 COMPRESSION SOLUTIONS LTD., AND CANNOT BE
 REPRODUCED OR DISTRIBUTED WITHOUT THE
 PERMISSION OF NGC COMPRESSION SOLUTIONS LTD.

END USER:	CONCEPT COMPRESSION - CC100E CONCEPT JOB: 100627
SCALE:	NTS
DWG. NO.:	16821-601
REV	0

A/B



PLAN VIEW



BILL OF MATERIALS				
ITEM	QTY.	DESCRIPTION	MATERIAL	HEAT NO.
1	49-1/4	PIPE,SMLS,3",STD	SA106-B	82-6987
2	16-1/2	PIPE,SMLS,3",STD	SA106-B	"
3	14-7/8	PIPE,SMLS,3",STD	SA106-B	"
4	1	ELBOW, 90 LR, 3", STD	SA234-WPB	2530
5	1	ELBOW, 90 LR, 3", STD	SA234-WPB	"
6	1	FLANGE,RF WN,3-150CL STD	SA105N	73426
7	1	FLANGE,RF WN,3-150CL STD	SA105N	"
8	1	FLANGE,RF WN,3-150CL STD	SA105N	"
9	1	FLANGE,RF WN,3-300CL STD	SA105N	32559
10	1	OLET, THD, 1/2"-3000CL (ON 3" RUN)	SA105N	57071
11	1	OLET, THD, 1/2"-3000CL (ON 3" RUN)	SA105N	"
12	1	PLUG, THD HEX, 1/2"-3000/6000CL	SA105N	"

HYDRO-602 A+B / 367 psi / SS-812; SS-814 /
 01 APRIL 08 / J. PARKER
 (NCR)-602 B / 367 psi / SS-421; SS-422 /
 08 APRIL 08 / B. HARPER

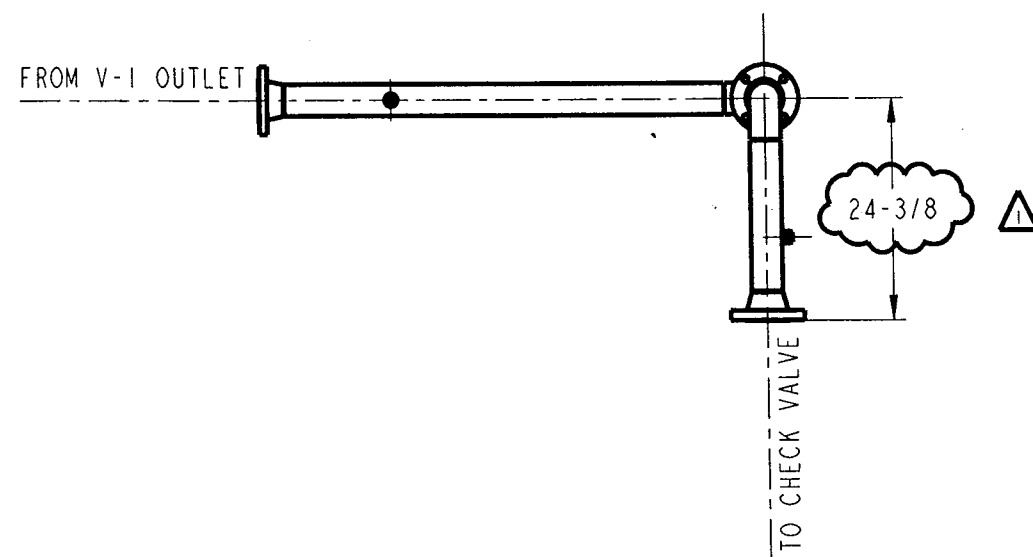
16821-NCR03

ISSUED FOR FABRICATION	
BY:	<i>[Signature]</i>
DATE:	Apr 4, 08.

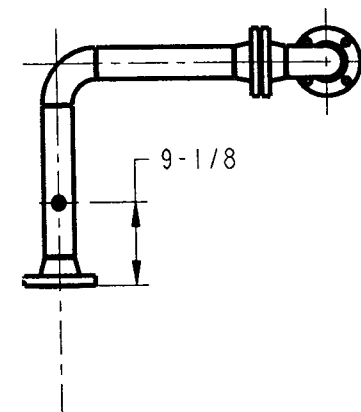
DESIGN DATA	150 CL	SPOOL TAG NO.	16821-602 a/b
DESIGN PRESSURE	245 PSIG	TEST GAUGE ID NO.	
DESIGN TEMP.	250F / -20F	CHART RECORDER REQD.	NO
TEST PRESSURE	367 PSIG	CHART RECORDER ID NO.	
TEST MEDIUM	WATER	ACTUAL TEST PRESSURE	PSIG
HOLDING TIME	15 MINUTES	FLUID SERVICE CATEGORY	NORMAL
Q.C.REP SIGNATURE		AUTH. INSP. SIGNATURE	

GENERAL NOTES	GENERAL SPECS.
1. ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED	BUILD CODE ASME B31.3 - 2006
2. ALL DIMENSIONS FTG/FTG UNLESS OTHERWISE NOTED	CORROSION ALLOW. 1/8"
3. TOLERANCE FOR OVERALL DIMENSIONS IS $\pm 1/16"$	PWHT NONE
4. ALL FLANGE HOLES TO STRADDLE MAJOR CENTERLINES, UNLESS OTHERWISE NOTED	WELD PROCEDURE WPS NGC1 & NGC2
5. THE FOLLOWING MATERIALS MAY BE SUBSTITUTED: SA106-B WITH SA333-6 SA105N WITH SA350-LF2 SA234-WPB WITH SA420-WPL6	RADIOGRAPHY 10% N
	SURFACE PREP. SSPC-SP2
	PICKLING NO
	PRIME YES
	PAINT YES

NO.	DATE	REVISION	BY
0	03/17/08	ISSUED FOR FABRICATION	ATE
1	04/04/08	CNG DIM 24-3/8 WAS 25-1/8	ATE
2			
3			
4			



ELEVATION VIEW



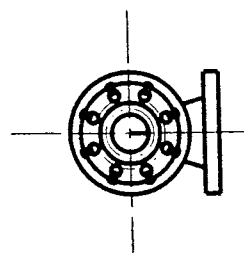
RIGHT SIDE VIEW



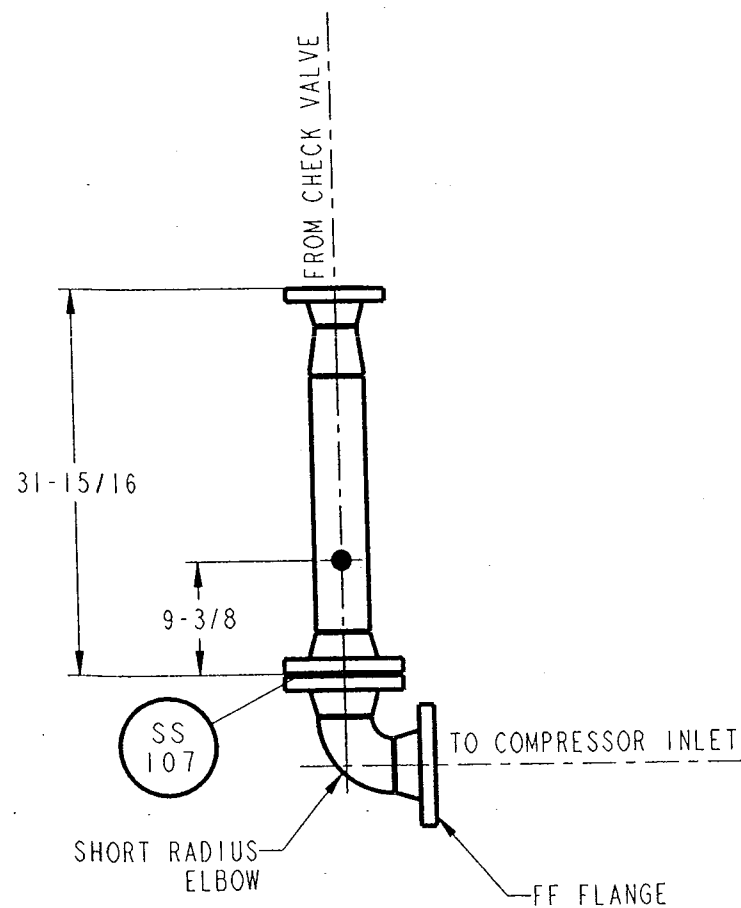
5120 6th STREET N.E.
 CALGARY, ALBERTA
 T2K 4W5
 TEL: 403. 274.6106
 FAX: 403. 730.1644
 www.ngc-ltd.com

DRAWN BY:	ATE	DATE:	03/14/08
CHECKED BY:	OH	DATE:	03/17/08
JOB NO:	16821-CS	EQUIP. NO:	
TITLE: PROCESS SPOOL FROM V-1 OUTLET TO CHECK VALVE			
END USER: CONCEPT COMPRESSION - CC100E CONCEPT JOB: 100627			
SCALE	DWG. NO.	16821-602	REV 1

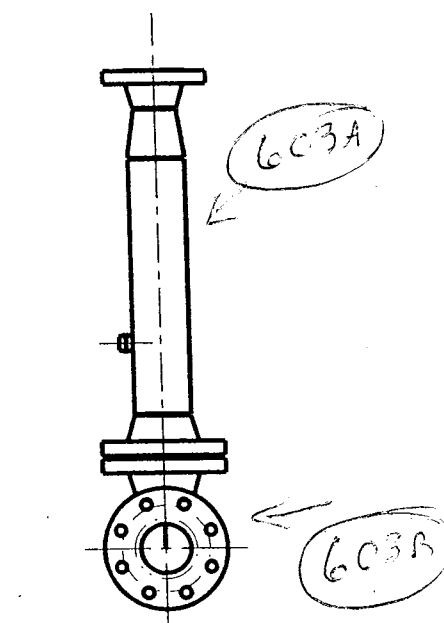
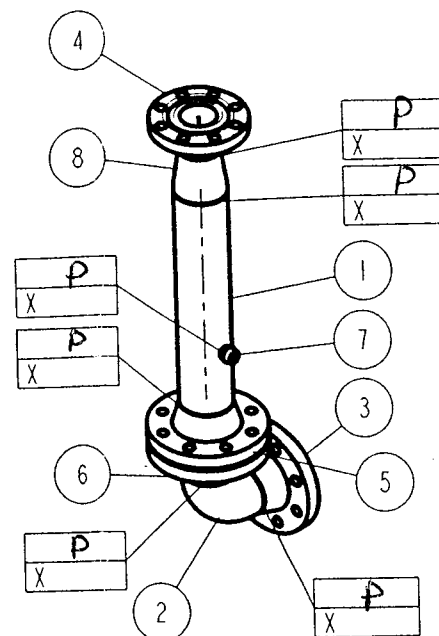
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PLAN VIEW



ELEVATION VIEW



RIGHT SIDE VIEW

BILL OF MATERIALS				MATERIAL	HEAT NO.
1	21-1/8	PIPE, SMLS, 4, STD		SA106-B	41055
2	1	ELBOW, 90 SR, 4", STD		SA234-WPB	1642
3	1	FLANGE, FF WN, 4-300CL STD		SA105N	38486
4	1	FLANGE, RF WN, 3-300CL STD		SA105N	32559
5	1	FLANGE, RF WN, 4-300CL STD		SA105N	38486
6	1	FLANGE, RF WN, 4-300CL STD		SA105N	38486
7	1	OLET, THD, 1/2"-3000CL (ON 4" RUN)		SA105N	57071
8	1	REDUCER, CONC. BW, 4" x 3", STD		SA234-WPB	4023

Hydro-603A+B / 998 PSI / 55-122;
55-123 / 01 APRIL 08 / J. PARKER

ISSUED FOR FABRICATION

BY: [Signature]
DATE: Mar 18, 08

DESIGN DATA	300 CL	SPOOL TAG NO.	16821-603 <u>A/B</u>
DESIGN PRESSURE	665 PSIG	TEST GAUGE ID NO.	
DESIGN TEMP.	250°F / -20°F	CHART RECORDER REQD.	NO
TEST PRESSURE	998 PSIG	CHART RECORDER ID NO.	
TEST MEDIUM	WATER	ACTUAL TEST PRESSURE	PSIG
HOLDING TIME	15 MINUTES	FLUID SERVICE CATEGORY	NORMAL
Q.C. REP. SIGNATURE		AUTH. INSP. SIGNATURE	

GENERAL NOTES

- ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED
- ALL DIMENSIONS FTG/FTG UNLESS OTHERWISE NOTED
- TOLERANCE FOR OVERALL DIMENSIONS IS $\pm 1/16"$
- ALL FLANGE HOLES TO STRADDLE MAJOR CENTERLINES, UNLESS OTHERWISE NOTED
- THE FOLLOWING MATERIALS MAY BE SUBSTITUTED:
SA106-B WITH SA333-6
SA105N WITH SA350-LF2
SA234-WPB WITH SA420-WPL6

GENERAL SPECS.

BUILD CODE	ASME B31.3 - 2006
CORROSION ALLOW.	1/8"
PWHT	NONE
WELD PROCEDURE	WPS NGC1 & NGC2
RADIOGRAPHY	10% N
SURFACE PREP.	SSPC-SP2
PICKLING	NO
PRIME	YES
PAINT	YES

NO.	DATE	REVISION	BY
0	03/17/08	ISSUED FOR FABRICATION	ATE
1			
2			
3			
4			



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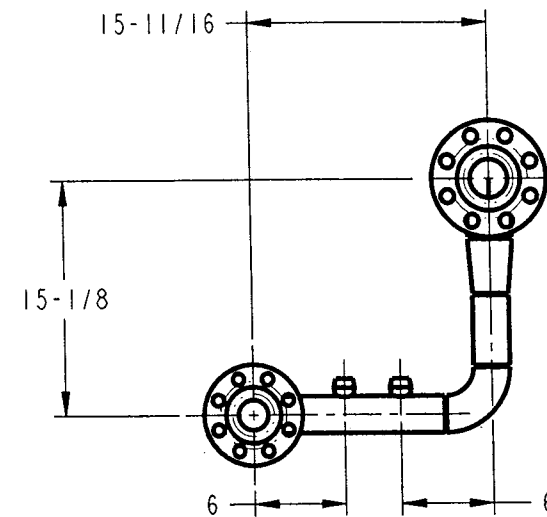
DRAWN BY:	ATE	DATE:	03/14/08
CHECKED BY:	OH	DATE:	03/17/08
JOB NO.:	16821-CS	EQUIP. NO.:	

TITLE: PROCESS SPOOL
FROM CHECK VALVE TO COMPRESSOR INLET

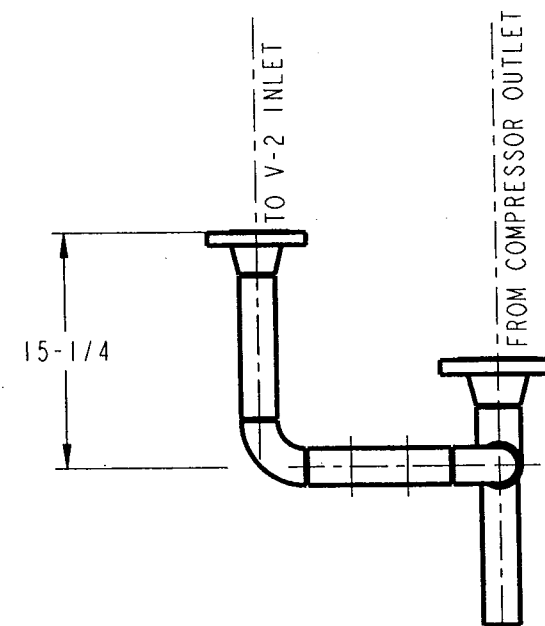
END USER: CONCEPT COMPRESSION - CC100E
CONCEPT JOB: 100627

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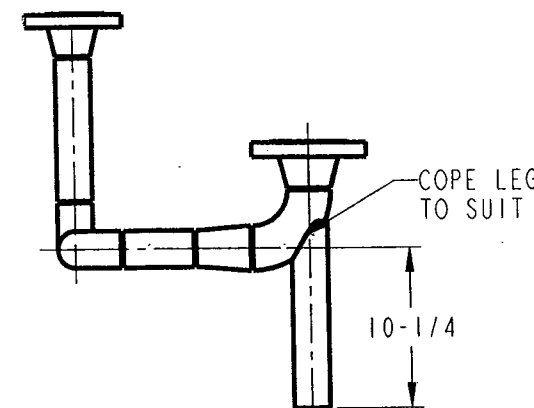
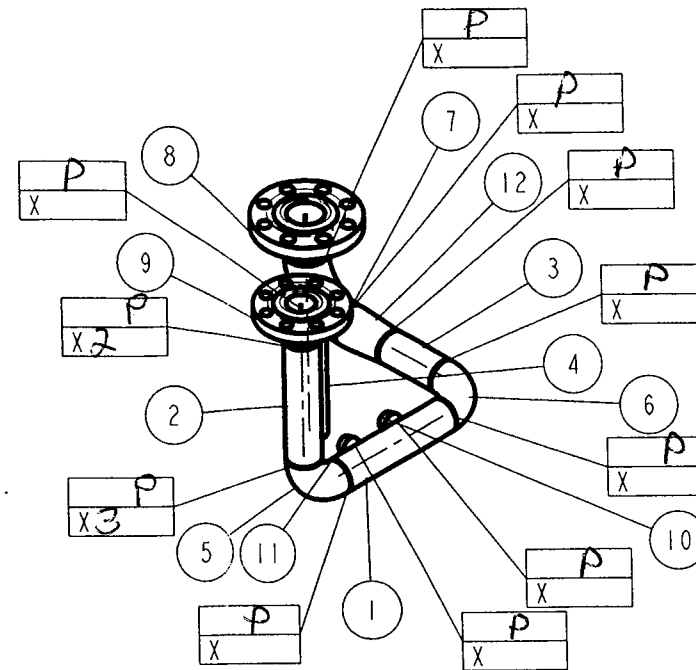
SCALE	DWG. NO.	16821-603 <u>A/B</u>	REV	0
-------	----------	----------------------	-----	---



PLAN VIEW



ELEVATION VIEW



RIGHT SIDE VIEW

BILL OF MATERIALS				
ITEM	QTY.	DESCRIPTION	MATERIAL	HEAT NO.
1	9-1/2	PIPE,SMLS,2",XH	SA106-B	Y708-116
2	9-1/4	PIPE,SMLS,2",XH	SA106-B	Y708-116
3	4-1/2	PIPE,SMLS,2",XH	SA106-B	Y708-116
4	12	PIPE,SMLS,2",STD	SA106-B	33604
5	1	ELBOW, 90 LR, 2", XH	SA234-WPB	505C
6	1	ELBOW, 90 LR, 2", XH	SA234-WPB	505C
7	1	ELBOW, 90 LR, 2-1/2", STD	SA234-WPB	5388
8	1	FLANGE,RF WN,2-1/2-300CL STD	SA105N	661578
9	1	FLANGE,RF WN,2-300CL XH	SA105N	54A7
10	1	OLET, THD, 1/2"-3000CL (ON 2" RUN)	SA105N	56599
11	1	OLET, THD, 1/2"-3000CL (ON 2" RUN)	SA105N	57071
12	1	REDUCER,CONC. BW,2-1/2" x 2",STD/XH	SA234-WPB	600222

HYDRO-604/998 PSI/55-122;55-123/
01 APRIL 08/ J. PARKER

ISSUED FOR FABRICATION

BY:
DATE: Mar 18, 08.

DESIGN DATA	300 CL	SPOOL TAG NO.	16821-604
DESIGN PRESSURE	665 PSIG	TEST GAUGE ID NO.	
DESIGN TEMP.	250°F / -20°F	CHART RECORDER REQD.	NO
TEST PRESSURE	998 PSIG	CHART RECORDER ID NO.	
TEST MEDIUM	WATER	ACTUAL TEST PRESSURE	PSIG
HOLDING TIME	15 MINUTES	FLUID SERVICE CATEGORY	NORMAL
Q.C.REP. SIGNATURE	AUTH. INSP. SIGNATURE		

GENERAL NOTES	GENERAL SPECS.	
1. ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED	BUILD CODE	ASME B31.3 - 2006
2. ALL DIMENSIONS FTG/FTG UNLESS OTHERWISE NOTED	CORROSION ALLOW.	1/8"
3. TOLERANCE FOR OVERALL DIMENSIONS IS $\pm 1/16"$	PWHT	NONE
4. ALL FLANGE HOLES TO STRADDLE MAJOR CENTERLINES, UNLESS OTHERWISE NOTED	WELD PROCEDURE	WPS NGC1 & NGC2
5. THE FOLLOWING MATERIALS MAY BE SUBSTITUTED: SA106-B WITH SA333-6 SA105N WITH SA350-LF2 SA234-WPB WITH SA420-WPL6	RADIOGRAPHY	10% N
	SURFACE PREP.	SSPC-SP2
	PICKLING	NO
	PRIME	YES
	PAINT	YES

NO.	DATE	REVISION	BY
0	03/17/08	ISSUED FOR FABRICATION	ATE
1			
2			
3			
4			



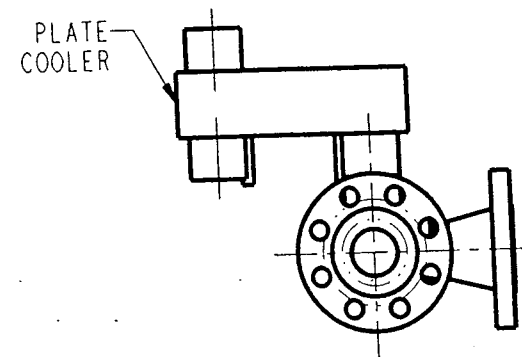
5120 6th STREET N.E.
CALGARY, ALBERTA
T2K 4W5
TEL: 403. 274.6106
FAX: 403. 730.1644
www.ngc-ltd.com

DRAWN BY: ATE DATE: 03/14/08
CHECKED BY: OH DATE: 03/17/08
JOB NO.: 16821-CS EQUIP. NO.: -

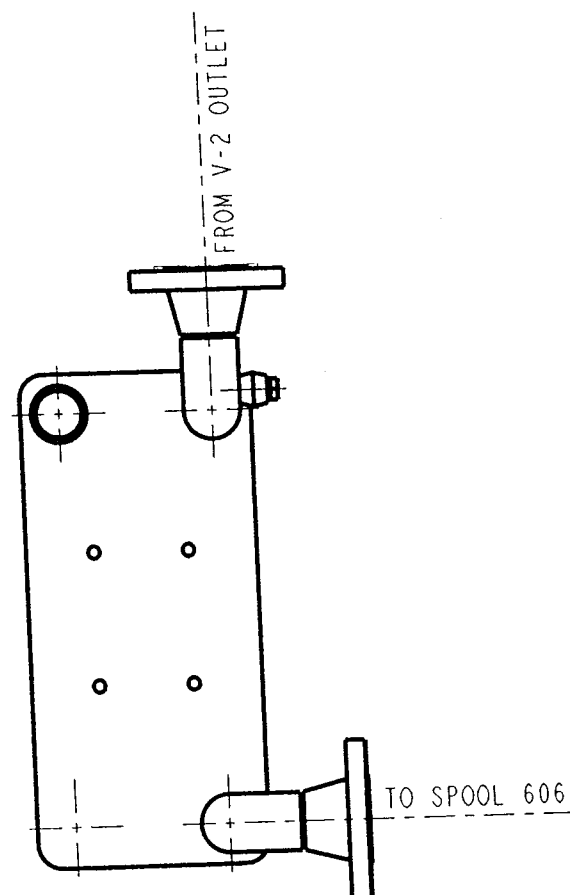
TITLE: PROCESS SPOOL
FROM COMPRESSOR OUTLET TO V-2 INLET

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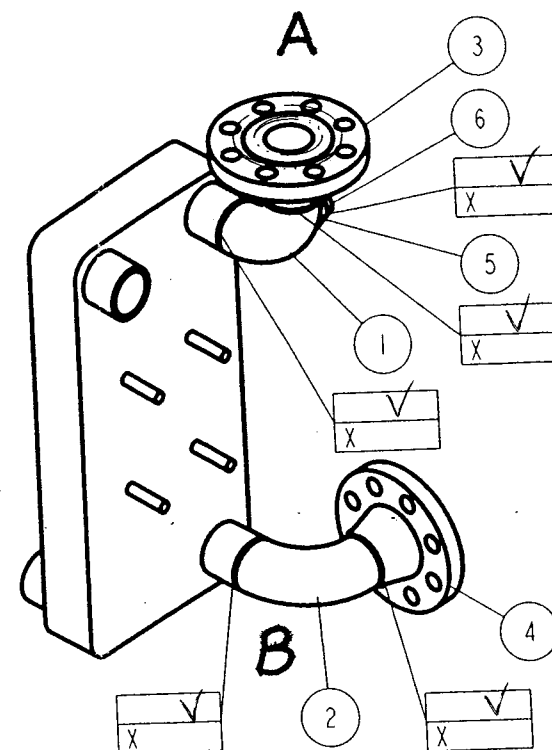
END USER: CONCEPT COMPRESSION - CC100E
CONCEPT JOB: 100627
SCALE: NTS DWG. NO.: 16821-604 REV: 0



PLAN VIEW



ELEVATION VIEW



RIGHT SIDE VIEW

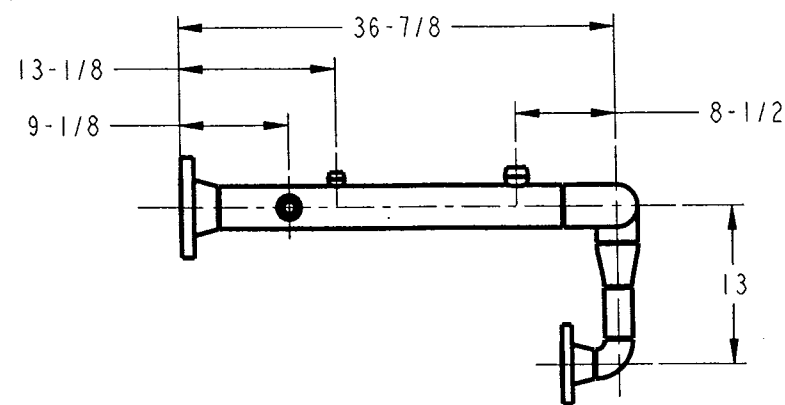
BILL OF MATERIALS				
ITEM	QTY.	DESCRIPTION	MATERIAL	HEAT NO.
1	1	ELBOW, 90 LR, 2", XH	SA234-WPB	05P00067
2	1	ELBOW, 90 LR, 2", XH	SA234-WPB	05P00067
3	1	FLANGE, RF WN, 2-300CL XH	SA105N	1A6
4	1	FLANGE, RF WN, 2-300CL XH	SA105N	1A6
5	1	OLET, THD, 1/2"-3000CL	SA105N	50599
6	1	PLUG, THD HEX, 1/2"-3000/6000CL	SA105N	

H4100-605A+B / 675 PSI / 55-612;
55-613 / 27 MARCH 08 / B. HARPER

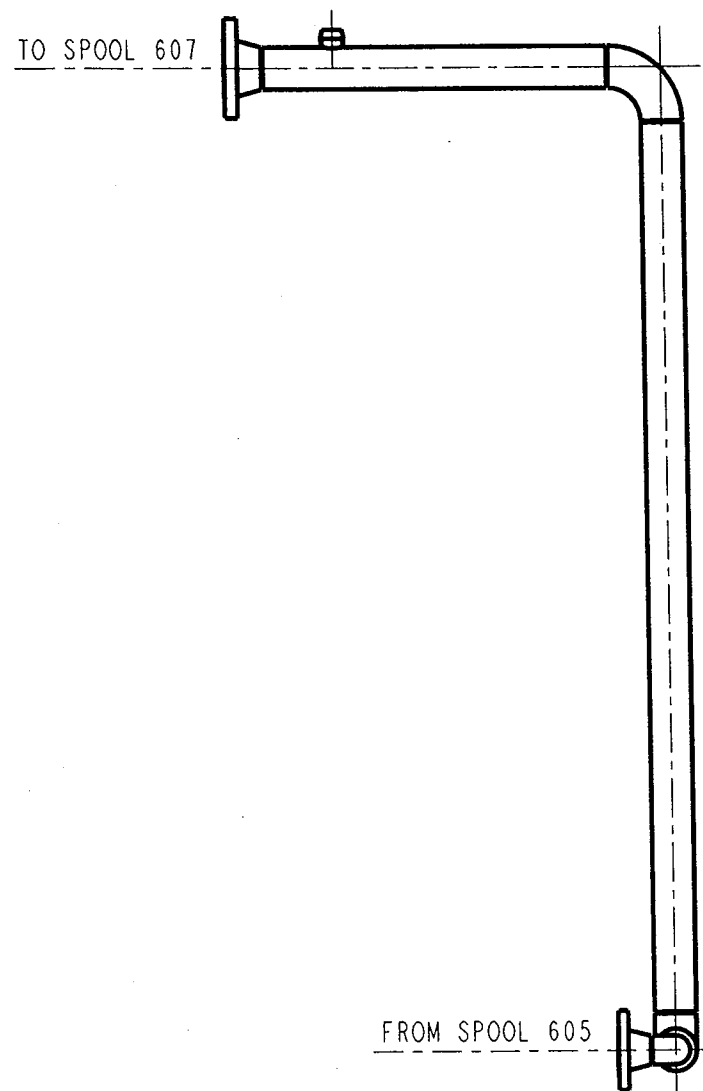
ISSUED FOR FABRICATION	
BY:	DATE: Mar 18, 08

DESIGN DATA		SPOOL TAG NO.		16821-605
DESIGN PRESSURE	450 PSIG	TEST GAUGE ID NO.		
DESIGN TEMP.	300°F / -20°F	CHART RECORDER REQD.	NO	
TEST PRESSURE	675 PSIG	CHART RECORDER ID NO.		
TEST MEDIUM	WATER	ACTUAL TEST PRESSURE	PSIG	
HOLDING TIME	15 MINUTES	FLUID SERVICE CATEGORY	NORMAL	
Q.C. REP. SIGNATURE		AUTH. INSP. SIGNATURE		
GENERAL NOTES		GENERAL SPECS.		
1. ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED		BUILD CODE		
2. ALL DIMENSIONS FTG/FTG UNLESS OTHERWISE NOTED		CORROSION ALLOW.		
3. TOLERANCE FOR OVERALL DIMENSIONS IS $\pm 1/16"$		PWHT		
4. ALL FLANGE HOLES TO STRADDLE MAJOR CENTERLINES, UNLESS OTHERWISE NOTED		WELD PROCEDURE		
5. THE FOLLOWING MATERIALS MAY BE SUBSTITUTED:		RADIOGRAPHY		
SA106-B WITH SA333-6		SURFACE PREP.		
SA105N WITH SA350-LF2		PICKLING		
SA234-WPB WITH SA420-WPL6		PRIME		
		PAINT		
NO.	DATE	REVISION	BY	
0	03/17/08	ISSUED FOR FABRICATION	ATE	
1				
2				
3				
4				
		5120 6th STREET N.E. CALGARY, ALBERTA T2K 4W5 TEL: 403.274.6106 FAX: 403.730.1644 www.ngc-ttd.com		
THIS DRAWING IS THE EXCLUSIVE PROPERTY OF NGC COMPRESSION SOLUTIONS LTD., AND CANNOT BE REPRODUCED OR DISTRIBUTED WITHOUT THE PERMISSION OF NGC COMPRESSION SOLUTIONS LTD.		DRAWN BY: ATE DATE: 03/14/08 CHECKED BY: OH DATE: 03/17/08 JOB NO.: 16821-CS EQUIP. NO.: TITLE: PROCESS SPOOL FROM V-2 OUTLET TO SPOOL 606 END USER: CONCEPT COMPRESSION - CCI CONCEPT JOB: 10127 SCALE: NTS DWG. NO.: 16821-605		

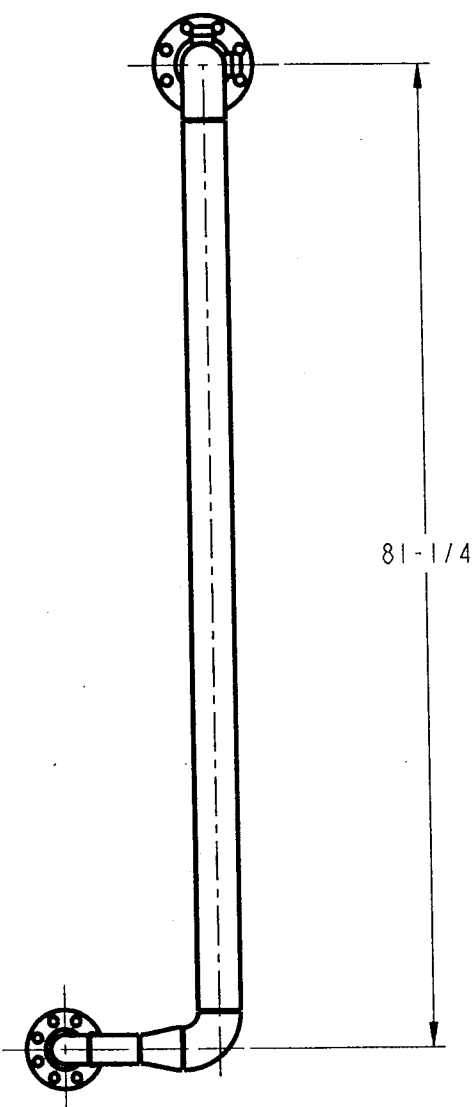
A/B



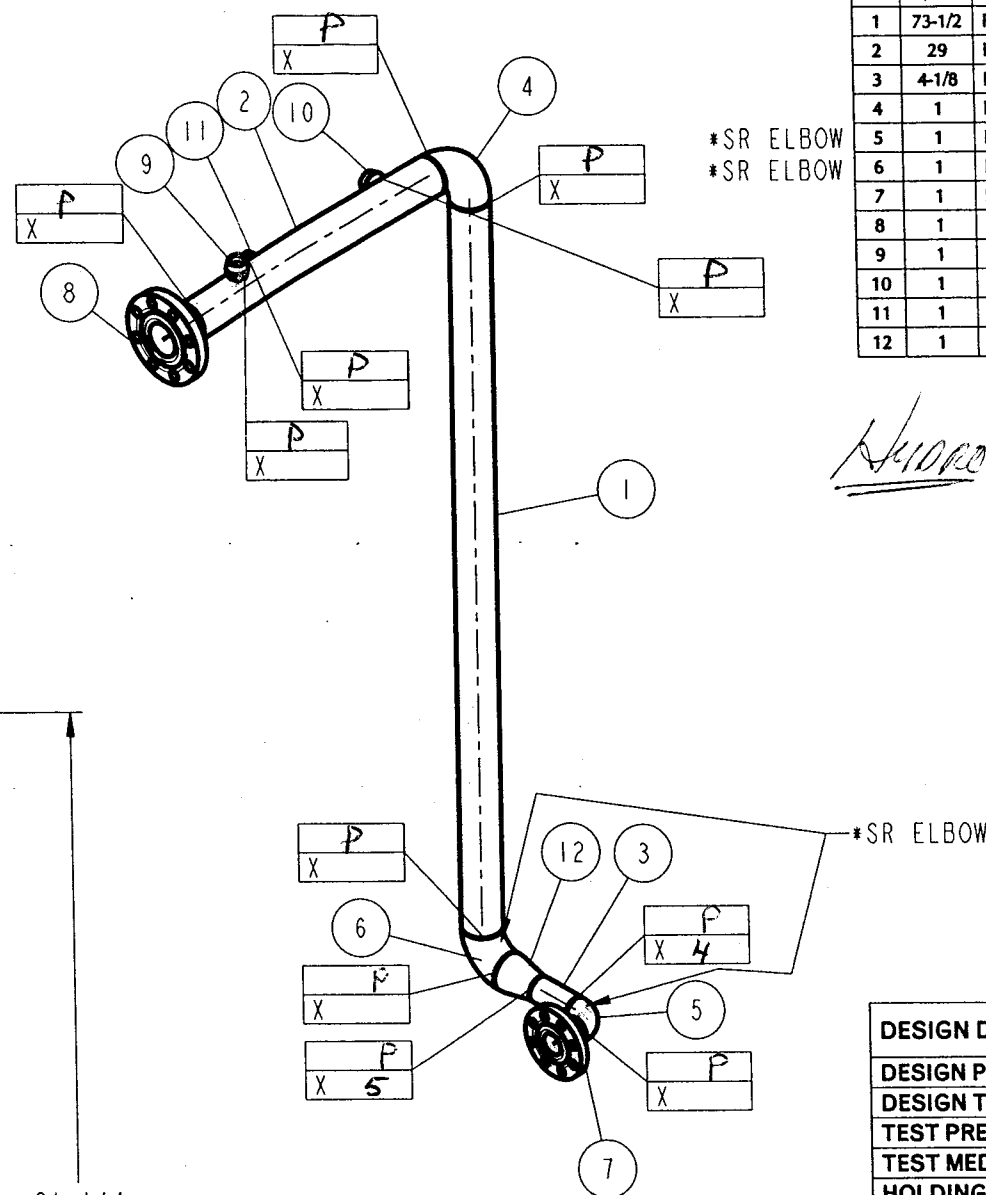
PLAN VIEW



ELEVATION VIEW



RIGHT SIDE VIEW



BILL OF MATERIALS				
ITEM	QTY.	DESCRIPTION	MATERIAL	HEAT NO.
1	73-1/2	PIPE,SMLS,3",STD	SA106-B	
2	29	PIPE,SMLS,3",STD	SA106-B	B2-6987
3	4-1/8	PIPE,SMLS,2",XH	SA106-B	Y708-116
4	1	ELBOW, 90 LR, 3", STD	SA234-WPB	2530
5	1	ELBOW, 90 SR, 2", XH	SA234-WPB	5052
6	1	ELBOW, 90 SR, 3", STD	SA234-WPB	6164
7	1	FLANGE,RF WN,2-300CL XH	SA105N	5447
8	1	FLANGE,RF WN,3-300CL STD	SA105N	32559
9	1	OLET, THD, 1"-3000CL (ON 3" RUN)	SA105N	57103
10	1	OLET, THD, 1"-3000CL (ON 3" RUN)	SA105N	57103
11	1	OLET, THD, 1/2"-3000CL (ON 3" RUN)	SA105N	57071
12	1	REDUCER,CONC. BW,3" x 2",STD/XH	SA234-WPB	4852064

*Hydro-606/998 PSI/SS-124; SS-125/
02 APRIL 08/J. PARKER*

ISSUED FOR FABRICATION
BY: *[Signature]*
DATE: *Mar 18, 08*

DESIGN DATA	300 CL	SPOOL TAG NO.	16821-606
DESIGN PRESSURE	665 PSIG	TEST GAUGE ID NO.	
DESIGN TEMP.	250°F / -20°F	CHART RECORDER REQD.	NO
TEST PRESSURE	998 PSIG	CHART RECORDER ID NO.	
TEST MEDIUM	WATER	ACTUAL TEST PRESSURE	PSIG
HOLDING TIME	15 MINUTES	FLUID SERVICE CATEGORY	NORMAL
Q.C.REP SIGNATURE	AUTH. INSP. SIGNATURE		

GENERAL NOTES		GENERAL SPECS.	
1. ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED 2. ALL DIMENSIONS FTG/FTG UNLESS OTHERWISE NOTED 3. TOLERANCE FOR OVERALL DIMENSIONS IS $\pm 1/16"$ 4. ALL FLANGE HOLES TO STRADDLE MAJOR CENTERLINES, UNLESS OTHERWISE NOTED 5. THE FOLLOWING MATERIALS MAY BE SUBSTITUTED: SA106-B WITH SA333-6 SA105N WITH SA350-LF2 SA234-WPB WITH SA420-WPL6		BUILD CODE	ASME B31.3 - 2006
		CORROSION ALLOW.	1/8"
		PWHT	NONE
		WELD PROCEDURE	WPS NGC1 & NGC2
		RADIOGRAPHY	10% N
		SURFACE PREP.	SSPC-SP2
		PICKLING	NO
		PRIME	YES
		PAINT	YES

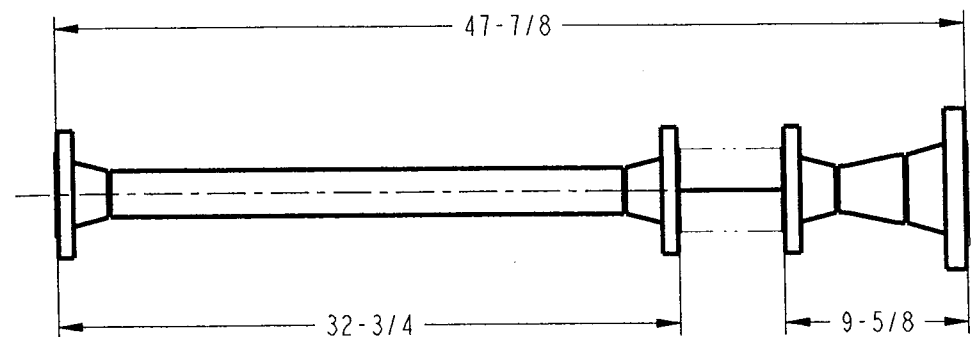
NO.	DATE	REVISION	BY
0	03/17/08	ISSUED FOR FABRICATION	ATE
1			
2			
3			
4			



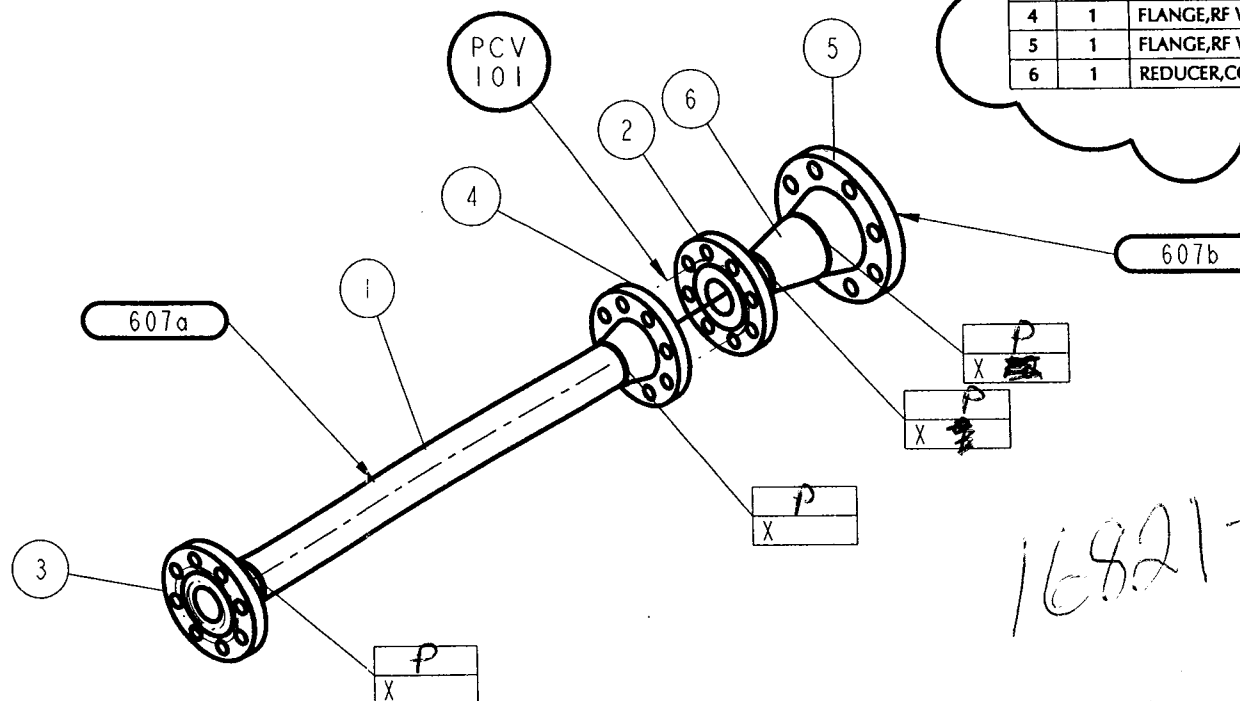
5120 6th STREET N.E.
CALGARY, ALBERTA
T2K 4W5
TEL: 403. 274.6106
FAX: 403. 730.1644
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DRAWN BY:	ATE	DATE:	03/14/08
CHECKED BY:	OH	DATE:	03/17/08
JOB NO:	16821-CS	EQUIP. NO:	
TITLE: PROCESS SPOOL FROM SPOOL 605 TO SPOOL 607			
END USER: CONCEPT COMPRESSION - CC100E CONCEPT JOB: 100627			
SCALE: NTS	DWG. NO: 16821-606	REV:	0

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PLAN VIEW



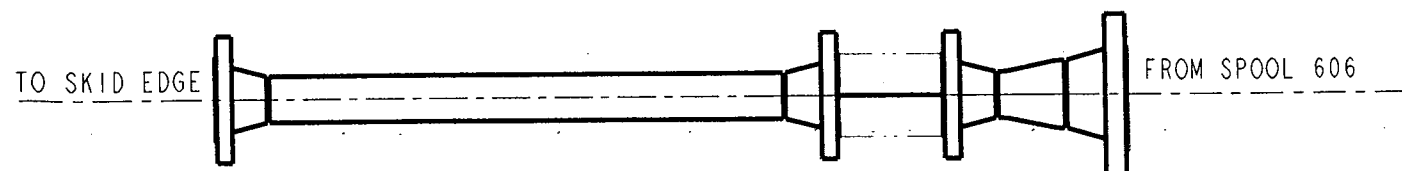
BILL OF MATERIALS				
ITEM	QTY.	DESCRIPTION	MATERIAL	HEAT NO.
1	27	PIPE, SMLS, 2", XH	SA106-B	90709028
2	1	FLANGE, RF WN, 2-300CL XH	SA105N	5447
3	1	FLANGE, RF WN, 2-300CL XH	SA105N	241A4
4	1	FLANGE, RF WN, 2-300CL XH	SA105N	241A4
5	1	FLANGE, RF WN, 3-300CL STD	SA105N	32557
6	1	REDUCER, CONC. BW, 3" x 2", STD/XH	SA234-WPB	4999

16821-NCR-01

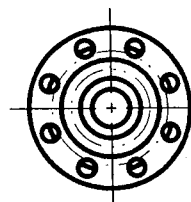
REVISED COPY - DESTROY
ALL PREVIOUS COPIES

BY: [Signature]
DATE: Apr 3, 08

Hydro - 607/998 psi / 55-122; 55-123/
01 April 08 / J. P. Parker
(NCR - 01) 607-44B/998 psi / 55-122; 55-123/
04 April 08 / J. P. Parker



ELEVATION VIEW



RIGHT SIDE VIEW

DESIGN DATA	300 CL	SPOOL TAG NO.	16821-607 a/b
DESIGN PRESSURE	665 PSIG	TEST GAUGE ID NO.	
DESIGN TEMP.	250°F / -20°F	CHART RECORDER REQD.	NO
TEST PRESSURE	998 PSIG	CHART RECORDER ID NO.	-
TEST MEDIUM	WATER	ACTUAL TEST PRESSURE	PSIG
HOLDING TIME	15 MINUTES	FLUID SERVICE CATEGORY	NORMAL
Q.C. REP. SIGNATURE	AUTH. INSP. SIGNATURE		

GENERAL NOTES		GENERAL SPECS.	
1. ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED 2. ALL DIMENSIONS FTG/FTG UNLESS OTHERWISE NOTED 3. TOLERANCE FOR OVERALL DIMENSIONS IS $\pm 1/16"$ 4. ALL FLANGE HOLES TO STRADDLE MAJOR CENTERLINES, UNLESS OTHERWISE NOTED 5. THE FOLLOWING MATERIALS MAY BE SUBSTITUTED: SA106-B WITH SA333-6 SA105N WITH SA350-LF2 SA234-WPB WITH SA420-WPL6		BUILD CODE	ASME B31.3 - 2006
		CORROSION ALLOW.	1/8"
		PWHT	NONE
		WELD PROCEDURE	WPS NGC1 & NGC2
		RADIOGRAPHY	10% N
		SURFACE PREP.	SSPC-SP2
		PICKLING	NO
		PRIME	YES
		PAINT	YES

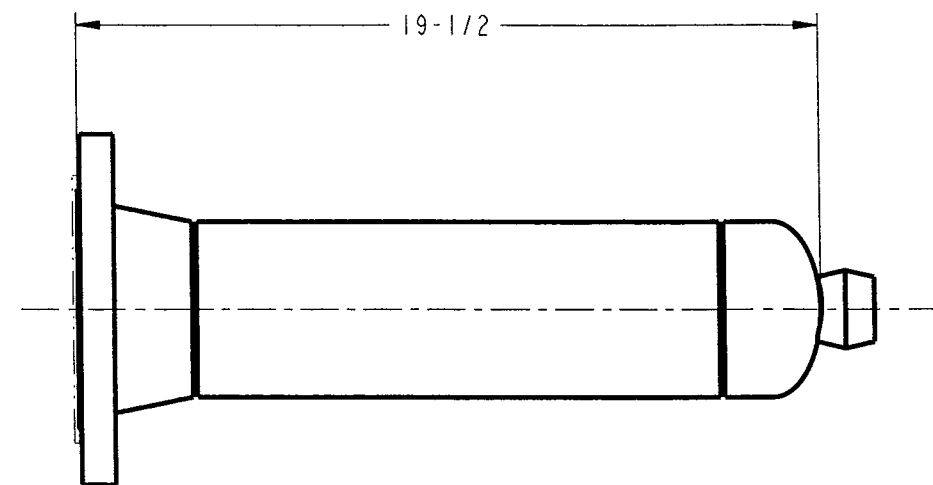
NO.	DATE	REVISION	BY
0	03/17/08	ISSUED FOR FABRICATION	ATE
1	04/03/08	REVISED TO 2" DISCHARGE, ADD SPOOL 607b	ATE
2			
3			
4			



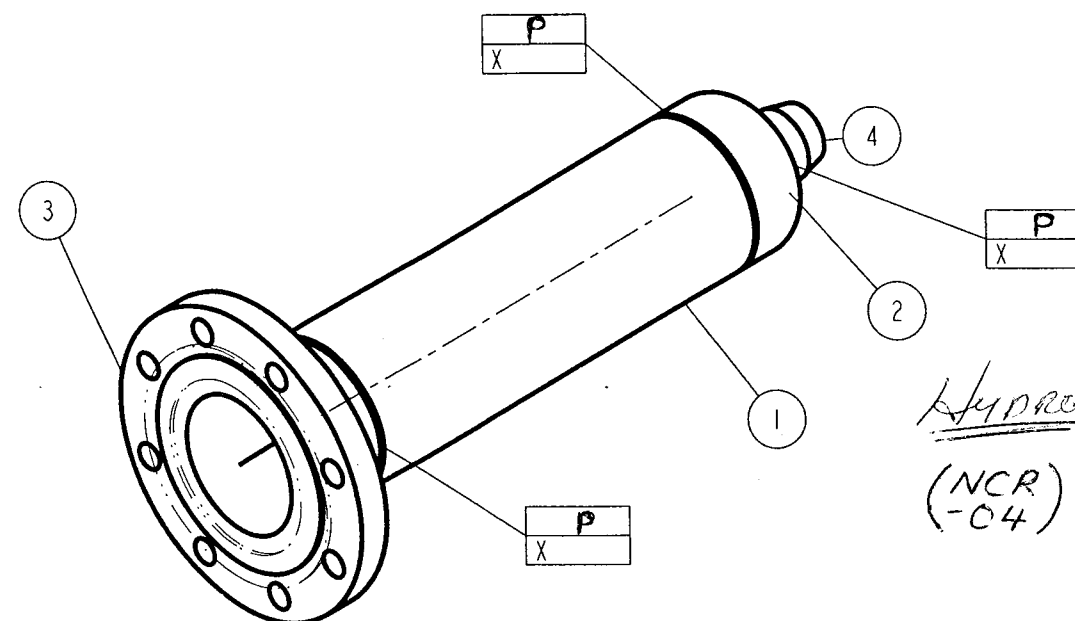
5120 6th STREET N.E.
CALGARY, ALBERTA
T2K 4W5
TEL: 403. 274.6106
FAX: 403. 730.1644
www.ngc-td.com

DRAWN BY:	ATE	DATE	03/14/08
CHECKED BY:	OH	DATE	03/17/08
JOB NO.:	16821-CS	EQUIP. NO.:	-
TITLE:	PROCESS SPOOL FROM SPOOL 606 TO SKID EDGE		
END USER:	CONCEPT COMPRESSION - CC100E CONCEPT JOB: 100627		
SCALE	DWG. NO.	16821-607	REV 1

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PLAN VIEW

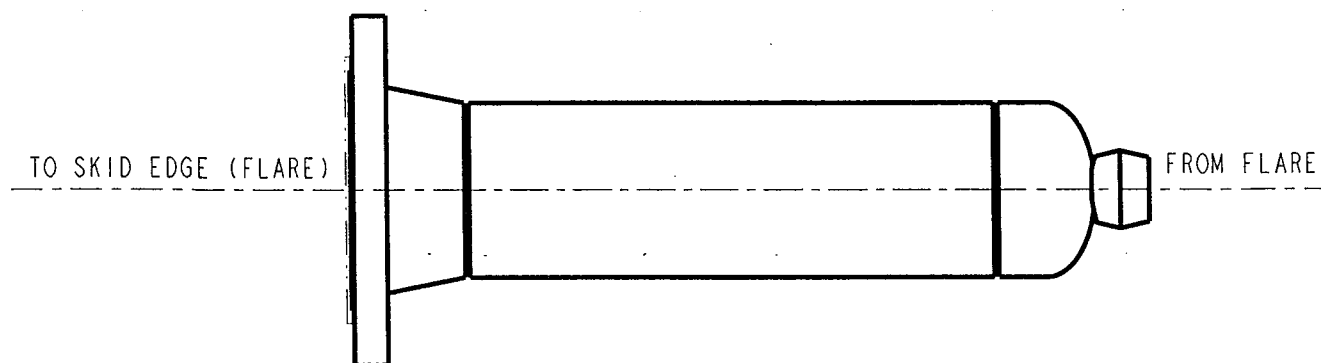


BILL OF MATERIALS				
ITEM	QTY.	DESCRIPTION	MATERIAL	HEAT NO.
1	13-3/4	PIPE, SMLS, 4", STD	SA106-B	38627
2	1	CAP, BW, 4", STD	SA234-WPB	6E0331
3	1	FLANGE, RF WN, 4-150CL STD	SA105N	38149
4	1	OLET, THD, 1"-3000CL (ON 4" RUN)	SA105N	56503

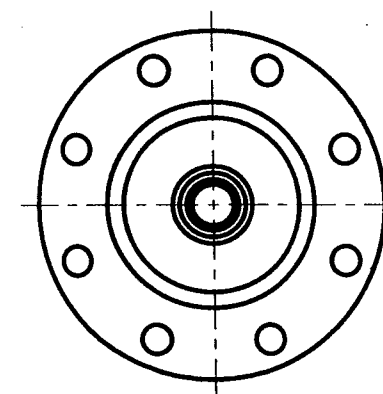
NCR-04

Hydro - 610 / 367 psi / SS-421; SS-422
(NCR) 09 April 08 / B. H. H. H.

ISSUED FOR FABRICATION
BY:
DATE: 04/09/08



ELEVATION VIEW



RIGHT SIDE VIEW

DESIGN DATA		150 CL	SPOOL TAG NO.	16821-610
DESIGN PRESSURE	245 PSIG		TEST GAUGE ID NO.	
DESIGN TEMP.	250°F / -20°F		CHART RECORDER REQD.	NO
TEST PRESSURE	367 PSIG		CHART RECORDER ID NO.	
TEST MEDIUM	WATER		ACTUAL TEST PRESSURE	PSIG
HOLDING TIME	15 MINUTES		FLUID SERVICE CATEGORY	NORMAL
Q.C. REP. SIGNATURE			AUTH. INSP. SIGNATURE	

GENERAL NOTES		GENERAL SPECS.	
1. ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED		BUILD CODE	ASME B31.3 - 2006
2. ALL DIMENSIONS FTG/FTG UNLESS OTHERWISE NOTED		CORROSION ALLOW.	1/8"
3. TOLERANCE FOR OVERALL DIMENSIONS IS $\pm 1/16"$		PWHT	NONE
4. ALL FLANGE HOLES TO STRADDLE MAJOR CENTERLINES, UNLESS OTHERWISE NOTED		WELD PROCEDURE	WPS NGC1 & NGC2
5. THE FOLLOWING MATERIALS MAY BE SUBSTITUTED:		RADIOGRAPHY	10% N
SA106-B WITH SA333-6		SURFACE PREP.	SSPC-SP2
SA105N WITH SA350-LF2		PICKLING	NO
SA234-WPB WITH SA420-WPL6		PRIME	YES
		PAINT	YES

NO.	DATE	REVISION	BY
0	04/09/08	ISSUED FOR FABRICATION	ATE
1			
2			
3			
4			



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FAX: 403. 730.1644
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DRAWN BY:	ATE	DATE:	04/09/08
CHECKED BY:	OH	DATE:	04/09/08
JOB NO.:	16821-CS	EQUIP. NO.:	
TITLE:	PROCESS SPOOL FROM FLARE TO SKID EDGE (FLARE)		
END USER:	CONCEPT COMPRESSION - CC100E CONCEPT JOB: 100627		
SCALE:	NTS	DWG. NO.:	16821-610
REV	0		

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