



W.O. No. C1014859-23

S.O. No.

### SHOP TEST RUN CERTIFICATE

Customer: Husky Oil Operations Ltd. Customer P.O.: AB0439-002 Date: June 29/07  
 Project Name: IMV Project INC. LSD# / PAD: 07-27-51-19 WSM  
 Compressor Make: Sullair Model: 4570 Rotary Screw SIN: 200706070067  
 Compressor Make: Sullair Model: 4570 Rotary Screw SIN: 200704250117  
 Compressor Capacity: 247 ACFM Rated Pressure: 150 PSIG  
 Rated Power Each: 60 HP 1770 RPM 460 Volts 3 PH 60 HZ  
 Dryer Make: Dominick Hunter Model: MXS-103cc<sup>1 DP</sup>/DD5 SIN: MXS0507010 / MXS0507011  
 Dryer Capacity: 300 SCFM Rated Pressure: 131 PSIG  
 Filter Make: Dominick Hunter Models: AO-040HNFI / AA-040HNFI / AR-040HNFI  
 Receiver Size: 1060 GAL SIN: S-2436 "A" No: 587632  
 Fluid Type: Sullube  24 KT

Description	Checked	Initial
Dimensional check, customer connections	<input checked="" type="checkbox"/>	
Air pressure test piping to <u>148</u> psig for <u>30</u> minutes	<input checked="" type="checkbox"/>	<u>AR</u>
Check for no air leaks	<input checked="" type="checkbox"/>	<u>AR</u>
Check for no fluid leaks	<input checked="" type="checkbox"/>	<u>AR</u>
Check rotation and ensure sticker / mark affixed	<input checked="" type="checkbox"/>	<u>AR</u>
Run machines for 15 minutes minimum	<input checked="" type="checkbox"/> A <input checked="" type="checkbox"/> B	<u>AR</u>
<b>Machine "A"</b>		
- Oil Level in Sight Glass "Off Mode": <input checked="" type="checkbox"/> 1/4 <input type="checkbox"/> 1/2 <input type="checkbox"/> 3/4 max.	<input checked="" type="checkbox"/> A	<u>AR</u>
- Temp. switch at: _____ °F	<input type="checkbox"/> A	
- Press. switch setting: <u>125</u> psig load <u>135</u> psig unload	<input checked="" type="checkbox"/> A	<u>AR</u>
- Full load amps: L1 <u>69.1</u> L2 <u>68.3</u> L3 <u>69.8</u> @ <u>130</u> psig line press	<input checked="" type="checkbox"/> A	<u>AR</u>
- Unload amps: L1 <u>30.7</u> L2 <u>30.2</u> L3 <u>30.8</u> @ <u>14</u> psig sump press.	<input checked="" type="checkbox"/> A	<u>AR</u>
- Control power voltage: <u>24 DC</u> volts <u>132 VAC</u>	<input checked="" type="checkbox"/> A	<u>AR</u>
- Max observed temp: <u>205</u> °F Ambient temp: _____ °F	<input checked="" type="checkbox"/> A	<u>AR</u>
- PRV Serial Number: _____	<input checked="" type="checkbox"/> A	<u>AR</u>
- Pressure Switch: Type: _____ Set Points: _____	<input type="checkbox"/> A	
<b>Machine "B"</b>		
- Oil Level in Sight Glass "Off Mode": <input type="checkbox"/> 1/4 <input type="checkbox"/> 1/2 <input type="checkbox"/> 3/4 max.	<input checked="" type="checkbox"/> B	<u>AR</u>
- Temp. switch at: _____ °F	<input type="checkbox"/> B	
- Press. switch setting: <u>125</u> psig load <u>135</u> psig unload	<input checked="" type="checkbox"/> B	<u>AR</u>
- Full load amps: L1 <u>69.9</u> L2 <u>69.1</u> L3 <u>70.1</u> @ <u>130</u> psig line press	<input checked="" type="checkbox"/> B	<u>AR</u>
- Unload amps: L1 <u>31.7</u> L2 <u>30.1</u> L3 <u>30.2</u> @ <u>16</u> psig sump press	<input checked="" type="checkbox"/> B	<u>AR</u>
- Control power voltage: <u>24 DC</u> volts <u>133 VAC</u>	<input checked="" type="checkbox"/> B	<u>AR</u>
- Max observed temp: <u>209</u> °F Ambient temp: _____ °F	<input checked="" type="checkbox"/> B	<u>AR</u>
- PRV Serial Number: _____	<input checked="" type="checkbox"/> B	<u>AR</u>
- Pressure Switch: Type: _____ Set Points: _____	<input type="checkbox"/> B	
<b>Electrical</b>		
Shop voltage per phase: L1 <u>484</u> L2 <u>485</u> L3 <u>482</u>	<input checked="" type="checkbox"/>	
Check end device electrical function	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	<u>AR</u>
OLS (Over Load Switches)	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	<u>AR</u>
TS (Temperature Switches)	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	<u>AR</u>
PFR (Power Fail Restart)	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	<u>AR</u>
HOA (Hand Off Auto)	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	<u>AR</u>
PSH (Pressure Switch High Alarm)	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	<u>AR</u>
Lead Lag Selector	<input type="checkbox"/>	

Witness:  Y  N Witness Name: Dean Labbe Witness Initial: DL  
 Tested By: Adam Robert Date: June 29/07





DATE: 5-Jul-07

**INSPECTION & TEST PLAN - AIR PACKAGES**

**PROJECTS GROUP**

2907-18 St NE, Calgary, AB, T2E 7K5 Phone (403) 777-1200, Fax (403) 777-1207  
www.chamco.com

DOC. NUMBER: C1014859-02  
REVISION: 0

CLIENT: Husky Oil Operations Ltd., c/o IMV Projects Inc.  
Suite 1400, 500 - 5th Avenue S.W.  
Calgary, AB T2P 3L5

CLIENT PO#: AB0439-002-MAT1790-001

PROJECT: Ansell Compression Expansion 07-27 Detail

No.	Item	Test Req'd	Procedure	Insp Code	Chamco	Client	Date
1	Package Components Receiving Inspection		Chamco	H	<i>[Signature]</i>		06/13/07
2	General Package Assembly Inspection		Chamco	H	<i>[Signature]</i>		06/28/07
3	General Package Mechanical Run Test	X	Sullair	H	<i>[Signature]</i>		06/29/07
4	General Package Final Inspection		Sullair	H	<i>[Signature]</i>		06/29/07
5	ABSA Data Report for Pressure Vessels U-1A Form		ABSA	R	SBC		07/11/07
6	ABSA Construction Data Report for Piping Systems AB-83 Form		Chamco/*Client	R	<i>[Signature]</i>		06/29/07
7	Nameplate Photo		Chamco	V	<i>[Signature]</i>		07/03/07
8	Instrument, Stainless Steel Tags & Nameplates		Chamco	V	N/A None provided by client		
9	General Package Dimension		Chamco	D	<i>[Signature]</i>		06/29/07
10	Final Paint Visual Check		Chamco	V	<i>[Signature]</i>		06/29/07
11	Customer Insp, RIs for Shipping		*Client*	H	SBC		07/05/07
12	Packing List Check		*Client*	R	SBC		06/29/07
13	Documentation Check		*Client*	R	SBC		07/06/07

Inspection Codes:
H-Hold Point
V-Visual Inspection
D-Dimensional Inspection
W-Witness Point
R-Review Data/Test Results





**CHAMCO** *Your Challenges*  
*Our Solutions*

PUMPING AND COMPRESSION EQUIPMENT



ISO 9001:2000 Certified

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**SHOP FABRICATION  
 QUALITY SURVEILLANCE ASSIGNMENT "RELEASE NOTICE"**

Assignment No. 07-139	P.O. Contract No. AFE US-23364-FE PO 4500185688	Change No.	QSI Ref No.	Report No. 07	Page No. 1 of 1
Vendor Chamco Industries Ltd		Location Calgary, AB		Vendor Shop No. IBA	
Project Title Ansell Plant Expansion		Equipment Description Instrument Air Package		Equipment Tag No.(s) IBA	
Surveillance Date(s) July 05, 2007				Date of Report July 05, 2007	

**STATUS OF FABRICATION**  
 COMPLETE       INCOMPLETE      (If "Incomplete" provide "Deficiency List" below)

**PROBLEMS, CONCERNS & NONCONFORMANCES** (Identify all unresolved fabrication concerns, problems, nonconformances and incomplete items / documentation)

1) ~~Sullair compressor coolers to be shipped loose/late to site complete with CRN's.~~ *Dane DC*

2) *Secure items (ship loose canopies etc).*

**QUALITY SURVEILLANCE INSPECTOR COMPLIANCE VERIFICATION**

To the best of my knowledge, the equipment / item(s) described above conforms in every respect to the Purchase / Change Order Contract, approved drawings, Engineering Specifications and referenced Codes and Jurisdictional Authority Regulations.

Dean Labbe  
 PRINT OR TYPE NAME

*[Signature]*  
 QUALITY SURVEILLANCE INSPECTOR SIGNATURE

July 05/07  
 DATE

**VENDOR CONFIRMATION OF COMPLIANCE**

To the best of my knowledge, the equipment / item(s) described above conforms in every respect to the Purchase / Change Order Contract, approved drawings, Engineering Specifications and referenced Codes and Jurisdictional Authority Regulations.

I acknowledge this "Release Notice" does not relieve me from responsibility for quality and all other requirements of the Purchase Order Contract and associated documents.

I fully understand that this "Release Notice" does not constitute final acceptance of the item(s) which will only be confirmed upon successful installation, commissioning and verification of proper operation.

Scott Chouinard  
 PRINT OR TYPE NAME

*[Signature]*  
 VENDOR REPRESENTATIVE SIGNATURE

July 05/07  
 DATE

**SHIPPING DESTINATION :**     To Work-Site       Other Vendor       Storage  
     Other \_\_\_\_\_

**THIS IS NOT A SHIPPING RELEASE.**  
 VENDOR SHALL CONTACT THE HUSKY CONTRACT REPRESENTATIVE FOR SHIPPING INSTRUCTIONS





Pick Up Date: July 4, 2007	IMV CONTROL No. 2508
<b>Seller Pick Up Location:</b> Chamco Industries 2907 18 <sup>th</sup> Street N.E. Calgary, Alberta, T2E 7K5  <b>Attention: Scott Chouinard</b> Telephone: 777-0830	<b>Delivery Location:</b> Husky Ansell Gas Plant LSD 07-27-51-19 W5M  <b>Attention: Rudy Buyze</b> Telephone: 780-668-6266
<b>Project Number / IMV PO Number:</b> AB0439-002-MAT1790-001	<b>Seller's Reference No.:</b> 1014859ABS
<b>Shipment Description / Dimensions / Ship Loose Items</b> 1 Pallet 25' X 12'10" X 15'2" Total Weight 23 425 lbs	
<b>Tag, Module and/or PO Item No.:</b> Complete PO	
<b>Receiving Hours:</b> <i>(Insert specific limitations by receiving entity)</i> Monday thru Friday 08.00 to 16.00	
<b>Carrier: Rebel Transport</b> <b>Carrier Contact: Bernie Stadlwieser</b> Phone: 266-7070	
<b>ETA Destination: July 5, 2007</b>	
<b>Special Instructions:</b>	
<b>Released by:</b>  <b>Print Name: Chris Holman      Position Title: Project Expeditor      Phone: (403) 770-4308</b>	

- The receiver reserves the right to refuse acceptance of any shipment if the following requirements are not met and costs associated with refused shipments will be to Seller's account.
  - Seller has not provided the correct documentation;
  - Seller does not advise the job site personnel to confirm ETA on site.
- All shipments are subject to the purchase order terms and conditions.

C:\Documents and Settings\schouinard\Local Settings\Temporary Internet Files\OLK18E\Shipping Release 2508 ABC439-002-MAT1790-001 to Ansell.doc	Issue No.	0	IMV Standard Number	Page: 1 of 1
	Issue Date	2006 06 07	PEM 5331	

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567632

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 Code Rules, Section VIII, Division 1

- 1. Manufactured and certified by Silverado Oilfield Ventures Ltd., 5200-39139 Hwy 2A, Blindman Industrial Park, Red Deer AB, Canada, T4N 5E6
2. Manufactured for Chamco Industries Ltd., 2907 - 18 St. NE, Calgary, AB T2E 7K5
3. Location of installation Unknown
4. Type Air Receiver, S-2436, T9389.2, SOV-0002 R.2, N/A, 2007
5. The chemical and physical properties of all parts meet the requirements of material specifications of the ASME BOILER AND PRESSURE VESSEL CODE...
6. Shell: SA-516-70N, .375", 1/16", 48" OD, 9-7 5/8" S/S
7. Seams: Type 1, Full, 100, N/A, N/A, Type 1, Full, 100
8. Heads: (a) Matl. SA-516-70N, (b) Matl. SA-516-70N

Table with 11 columns: 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). Rows include Top Head and Bottom Head.

If removable, bolts used (describe other fastenings)
9. MAWP 190 (internal), N/A (external) psi at max temp. 100 (internal), N/A (external) °F
Min design metal temp. -20 °F at 190 psi (Hydro) pneu, or comb test pressure 247 psi.

Table for Nozzles, inspection and safety valve openings with columns: Purpose (Inlet, Outlet, Drain), No, Diam. or Size, Type, Matl., Nom. Thk., Reinforcement Matl., How Attached, Location.

11. Supports: Skirt Yes, Lugs N/A, Legs N/A, Other N/A, Attached Bottom Head - Welded
12. Remarks: Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report: Construction dwg# 998F07 R.1; Impact Test Exempt: per UCS-56a, UG-20 [f] 1-5; Volume: 142 cubic feet; Approx. empty weight: 4000 lbs; WO# 1839

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 Code for Pressure Vessels, Section VIII, Division 1. 'U' Certificate of Authorization No 34,696 expires August 10, 2007.
Date May 24, 2007 Co. name Silverado Oilfield Ventures Ltd. Signed [Signature]
CERTIFICATE OF SHOP/FIELD INSPECTION
Vessel constructed by Silverado Oilfield Ventures Ltd. at 5200-39139 Hwy 2A, Blindman Industrial Park, Red Deer AB, 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 A.B.S.A.
have inspected the component described in this Manufacturer's Data Report on May 24, 2007, and state that to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME Code Section VIII, Division 1. By signing this certificate neither the Inspector nor his employer makes any warranty expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his 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 24, 2007 Signed [Signature] Commissions AB # 261



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

1. Manufactured and certified by Silverado Oilfield Ventures Ltd., #5200-39139, Hwy 2A, Blindman Industrial Park, Red Deer, AB, Canada, T4N 5E8  
(Name and address of Manufacturer)

2. Manufactured for Chamco Industries Ltd., 2907 - 18 St. NE, Calgary, AB T2E 7K5  
(Name and address of Purchaser)

3. Location of installation Unknown  
(Name and address)

4. Type: Vertical Air Receiver S-2436  
(Horiz. vert. or sphere) (Tank, separator, heat exch., etc.) (Mfg's. serial No.)

T9389.2 SOV-0002 R.2 N/A 2007  
(CRN) (Drawing No.) (Nat'l. Bd. No.) (Year built)

Data Report Item Number	Remarks						
Purpose	No / Diameter / Flg. Type	Material	Nozzle Thk / Reinforcement	How	Location		
			/ Nom. / Material	/ Attached /			
M1 - Manway/Inspection	1 / 18" ID	/ CL150 RFWN / SA-106-B, SA-105N, SA-516-70N	/ .750" /	/	/ UW-16.1(c) / Shell		
N1 - Outlet	1 / NPS 6	/ CL150 RFWN / SA-106-B, SA-105N	/ .432" /	/	/ UW-16.1(c) / Shell		
N2 - Inlet	1 / NPS 6	/ CL150 RFWN / SA-106-B, SA-105N	/ .432" /	/	/ UW-16.1(c) / Shell		
C1 - Outlet	1 / NPS 3	/ TOL / SA-105N	/ CL3000 /	/	/ UW-16.1(a) / Shell		
C2 - Outlet	1 / NPS 1/2	/ TOL / SA-105N	/ CL6000 /	/	/ UW-16.1(a) / Shell		
C3 - Outlet	1 / NPS 1	/ TOL / SA-105N	/ CL6000 /	/	/ UW-16.1(a) / Shell		
C4 - Drain	1 / NPS 1	/ TOL / SA-106B, SA-105N	/ CL6000 /	/	/ UW-16.1(a) / Bottom Head		
C5 - Outlet	1 / NPS 1	/ TOL / SA-105N	/ CL6000 /	/	/ UW-16.1(a) / Shell		

Certificate of Authorization: Type 'U' No. 34.696 Expires August 10, 2007

Date May 24, 2007 Name Silverado Oilfield Ventures Ltd. Signed *[Signature]*  
(Manufacturer) (Representative)

Date May 24, 2007 Name *[Signature]* Commission AB #261  
(Authorized Inspector) (Nat'l Board incl. endorsement State, Province and No.)





## BOILER AND PRESSURE VESSEL STATUS REPORT

This status report form has been provided for you to report any changes to your boilers and/or pressure vessels. If you complete the form below, we would be pleased to make the required changes to our records and credit your account if credits are due.

RE: Vessel (A)            1) 567632                    2) \_\_\_\_\_                    3) \_\_\_\_\_  
Serial No.                    S-2436                    \_\_\_\_\_  
CRN                            T9389.2                    \_\_\_\_\_

The above vessel(s) was (were) sold. Please transfer the registration of the vessel(s) to:

Name of New Owner: Husky Oil Operations, c/o IMV Projects Inc.

Mailing Address: 710, 500 - 4<sup>th</sup> Avenue S.W., Calgary, AB T2P 2V6

Location of Vessel: 07-27-51-19 W5M

Contact Person: Marty Paugh                                    Tel: (403) 775-2746

Date of Sale: July 11, 2007                                    P.O. No: AB0439-002-MAT1790

The above vessel(s) was (were) removed from service on \_\_\_\_\_

The above vessel(s) was (were) destroyed and disposed of as scrap material on \_\_\_\_\_ (Date). The Alberta Identification (A) Number has been obliterated.

The above vessel(s) has (have) been relocated to \_\_\_\_\_

The above vessel(s) has (have) been operating outside of the Province of Alberta since \_\_\_\_\_ (Date). Please remove from annual registration.

The above vessel was returned to service on \_\_\_\_\_

Company Name: Chamco Industries Ltd.

Position Title: Project Manager                                    Tel: (403) 777-1200

(Please print name) Scott Chouinard                                    E-Mail: schouinard@chamco.com

Signature:                                     Date: July 11, 2007

**Note:** The owner of the boiler or pressure vessel is responsible for ensuring that the above equipment is inspected by ABSA prior to its being returned to service in the Province of Alberta.

Please Return This Report To: **ABSA, the pressure equipment authority**  
**#200, 4208 - 97 Street, Edmonton, AB T6E 5Z9**  
**(780) 437-9100 Fax (780) 437-7787**



## COMPLETION OF CONSTRUCTION

### DECLARATION

**NOTE:** This declaration shall be completed and signed by the person responsible, in whole or in part, for the construction, installation, testing and inspection of the pressure piping system and forwarded to the Administrator/Chief Inspector.

(1) Owner of Plant: HUSKY OIL OPERATIONS LTD.

(Name and Address)

(2) Engineer or Contractor: IMV PROJECTS INC.

710, 500- 4<sup>TH</sup> AVE S.W., CALGARY, AB T2P 2V6

(Name and Address)

(3) Type of Plant: \_\_\_\_\_

(4) Location of Plant: 07- 27- 51- 19 W

(Sec, TWP, Rge)

(5) Description of Pressure Piping System(s): Air Compressor Package

2" NPT Piping Sch 80 ASTM A106 Grade B Carbon Steel Galvanized Treaded Pipe

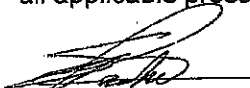
3000# ASTM A 105N Carbon Steel Galvanized Threaded fittings/ ASTM A182-F316/316L Threaded Fittings

1/2", 1/4" .035" wall, 316 SS Tubing. Swagelok S.S tube fittings with S.S ferrules

2" NPT Piping Sch 80 ASTM A312-TP316/316L S.S Threaded pipe

### STATEMENT OF COMPLIANCE

I, the undersigned, declare that the described pressure piping system, approved under design registration number \_\_\_\_\_, complies in all respects with the regulations for construction, installation, testing and inspection and that all applicable pressure piping test data reports have been delivered to the owner

  
(Signature)

SHAWN PARKER  
(Print Name)

Quality Control  
(Title)

July 4/07  
(Date)

Chamco Industries  
(Company)

2907 18ST. N.E  
(Address)

CALGARY, AB T2E 7K5  
(City, Postal Code)





# 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: CHAMCO INDUSTRIES Owner's Job No: C1014859  
(Name of ABSA authorized primary contractor or subcontractor)  
2907 - 18 ST. N.E CALGARY, AB T2E 7K5  
(Address)

Alberta Quality Program No AQP-2672 Expiry Date: APRIL 4, 2008

2 Constructed For: IMV PROJECTS INC.  
(Name of primary contractor if different from above)  
710, 500- 4<sup>TH</sup> AVE S W , CALGARY, AB T2P 2V6  
(Address)

Alberta Quality Program No AQP-2672 Expiry Date: APRIL 4, 2008

3 Owner: HUSKY OIL OPERATIONS LTD.  
(Name and address)  
07-27- 51- 19 W5M  
(Location of installation)

Alberta Quality Program No AQP-2672 Expiry Date: APRIL 4, 2008

4 Piping Design Alberta Registration No : PP-  
(Required if aggregate piping volume is over 0.5m<sup>3</sup>)  
 5 WP No : WP-1404.2 ; Company: Chamco Industries ; Owner's WP No. (If used): WP-  
(Alberta Registration No) (Alberta Registration No )  
 WPS No(s) used: \_\_\_\_\_ ; 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/Stru 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
C1014859-21 REV 1 IA-101-2 - LASSP	AIR	931	-20C TO 130C	1020	AIR	316 S S	N/A	2" SCH 80	3000# ASTM A182- F316/316L	N/A	N/A	VIS
C1014859-21 REV 1 IA-102-2'- LASSP	AIR	931	-20C TO 130C	1020	AIR	316 S S	N/A	2" SCH 80	3000# ASTM A182- F316/316L	N/A	N/A	VIS
C1014859-21 REV 1 IA-103-2'- LASSP	AIR	931	-20C TO 130C	1020	AIR	316 S S	N/A	2" SCH 80	3000# ASTM A182- F316/316L	N/A	N/A	VIS
C1014859-21 REV 1 IA-104-2'- LASSP	AIR	931	-20C TO 130C	1020	AIR	316 S S	N/A	2" SCH 80	3000# ASTM A182- F316/316L	N/A	N/A	VIS
C1014859-21 REV 0 IA-105-2'- LASSP	AIR	931	-20C TO 130C	1020	AIR	316 S S	N/A	2" SCH 80	3000# ASTM A182- F316/316L	N/A	N/A	VIS
C1014859-21 REV 1 IA-106-2'- LACSP	AIR	931	-20C TO 130C	1020	AIR	A106B	N/A	2" SCH 80	3000# ASTM A105N	N/A	N/A	VIS



C1014859-21 REV 1 IA-107-2" IACSP	AIR	931	-20C TO 130C	1020	AIR	A106B	N/A		3000# ASTM A105N	N/A	N/A	VIS
C1014859-21 REV 1 IA-108-2" IACSP	AIR	931	-20C TO 130C	1020	AIR	A106B	N/A		3000# ASTM A105N	N/A	N/A	VIS
C1014859-21 REV 1 IA-109-2" IACSP	AIR	931	-20C TO 130C	1020	AIR	A106B	N/A		3000# ASTM A105N	N/A	N/A	VIS
C1014859-21 REV 1 IA-110-1/2 IASST	AIR	931	-20C TO 130C	1020	AIR	316 S S	N/A	035	Swagelok S S Fittings/ Ferrules	N/A	N/A	VIS
C1014859-21 REV 1 IA-111-1/2 IASST	AIR	931	-20C TO 130C	1020	AIR	316 S S	N/A	035	Swagelok S S Fittings/ Ferrules	N/A	N/A	VIS
C1014859-21 REV 0 IA-112-1/4" IASST	AIR	931	-20C TO 130C	1020	AIR	316 S S	N/A	035	Swagelok S S Fittings/ Ferrules	N/A	N/A	VIS
C1014859-21 REV 0 IA-113-1/4 IASST	AIR	931	-20C TO 130C	1020	AIR	316 S S	N/A	035	Swagelok S S Fittings/ Ferrules	N/A	N/A	VIS
C1014859-21 REV 0 PL-209-1/2' IACSP	AIR	931	-20C TO 130C	1020	AIR	A106B	N/A	1/2" SCH 80	3000# ASTM A105N	N/A	N/A	VIS

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.	Drng. 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: July 4/07 CHAMCO INDUSTRIES LTD  
Subcontractor

SHAWN PARKER

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 \_\_\_\_\_ 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: \_\_\_\_\_  
Primary Contractor

Print Authorized Representative's Name Signature

**CERTIFICATE OF INSPECTION**

I, the undersigned, employed by Global 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: July 5/07 Date: \_\_\_\_\_  
D. LABBE RD. Name: \_\_\_\_\_ Sign.: \_\_\_\_\_

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

ABSA Safety Codes Officer  
(BOILER EXTERNAL PIPING ONLY)





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**Input Echo, Component 1, Description: 48" SHELL**

Design Internal Pressure	P	190.00	psig
Temperature for Internal Pressure		100.00	F
User Entered Minimum Design Metal Temperature		-20.00	F
Include Hydrostatic Head Components		YES	
Operating Liquid Density		62.400	lb./ft <sup>3</sup>
Height of Liquid Column ( Operating )		80.00	in.
Height of Liquid Column ( Hydrotest )		120.00	in.
Material Specification (Normalized)		SA-516 70	
Material UNS Number		K02700	
Material Form used		Plate	
Allowable Stress At Temperature	S	20000.00	psi
Allowable Stress At Ambient	SA	20000.00	psi
Yield Stress At Temperature	Sy	38000.00	psi
Curve Name for Chart UCS 66		D	
Joint efficiency for Shell Joint	E	1.00	
Design Length of Section	L	120.0000	in.
Length of Cylinder for Volume Calcs.	CYLLN	124.0000	in.
Outside Diameter of Cylindrical Shell	D	48.0000	in.
Minimum Thickness of Pipe or Plate	T	0.3750	in.
Shell/Head Int. Corrosion Allowance	CA	0.0625	in.
Skip UG-16(b) Min. thickness calculation		NO	
Type of Element:		Cylindrical Shell	

**Internal pressure results, Shell Number 1, Desc.: 48" SHELL**

ASME Code, Section VIII, Division 1, 2004, A-06

**Thickness Due to Internal Pressure (TR):**

$$= (P * (D/2 - CAE)) / (S * E + 0.4 * P) \text{ per Appendix 1-1 (a) (1)}$$

$$= (192.89 * (48.0000/2 - 0.000)) / (20000.00 * 1.00 + 0.4 * 192.89)$$

$$= 0.2306 + 0.0625 = 0.2931 \text{ in.}$$

**Max. All. Working Pressure at Given Thickness (MAWP):**

Less Operating Hydrostatic Head Pressure of 2.89 psig

$$= (S * E * (T - CA - CAE)) / ((D/2 - CAE) - 0.4 * (T - CA - CAE)) \text{ per Appendix 1-1 (a) (1)}$$

$$= (20000.00 * 1.00 * (0.3125)) / (48.0000/2 - 0.000 - 0.4 * 0.3125)$$

$$= 261.78 - 2.89 = 258.89 \text{ psig}$$

**Maximum Allowable Pressure, New and Cold (MAPNC):**

$$= (SA * E * T) / (D/2 - 0.4 * T) \text{ per Appendix 1-1 (a) (1)}$$

$$= (20000.00 * 1.00 * 0.3750) / (48.0000/2 - 0.4 * 0.3750)$$

$$= 314.47 \text{ psig}$$

**Actual stress at given pressure and thickness (Sact):**

$$= (P * ((D/2 - CAE) - 0.4 * (T - CA - CAE))) / (E * (T - CA - CAE))$$

$$= (192.89 * ((48.0000/2 - 0.000) - 0.4 * (0.3125))) / (1.00 * (0.3125))$$

$$= 14736.71 \text{ psi}$$

**SUMMARY OF INTERNAL PRESSURE RESULTS:**

Required Thickness plus Corrosion Allowance, Trca	0.2931	in.
Actual Thickness as Given in Input	0.3750	in.





**Input Echo, Component 2, Description: 48" HEADS**

Design Internal Pressure	P	190.00	psig
Temperature for Internal Pressure		100.00	F
User Entered Minimum Design Metal Temperature		-20.00	F
Include Hydrostatic Head Components		YES	
Operating Liquid Density		62.400	lb./ft <sup>3</sup>
Height of Liquid Column ( Operating )		80.00	in.
Height of Liquid Column ( Hydrotest )		120.00	in.
Material Specification (Normalized)		SA-516 70	
Material UNS Number		K02700	
Material Form used		Plate	
Allowable Stress At Temperature	S	20000.00	psi
Allowable Stress At Ambient	SA	20000.00	psi
Yield Stress At Temperature	Sy	38000.00	psi
Curve Name for Chart UCS 66		D	
Joint efficiency for Head Joint	E	1.00	
Outside Diameter of Elliptical Head	D	48.0000	in.
Minimum Thickness of Pipe or Plate	T	0.3125	in.
Nominal Thickness of Pipe or Plate	Tnom	0.3750	in.
Shell/Head Int. Corrosion Allowance	CA	0.0625	in.
Aspect Ratio	AR	2.0000	
Length of Straight Flange	STRFLG	2.0000	in.
Skip UG-16(b) Min. thickness calculation		NO	
Type of Element:		Elliptical Head	

**Internal pressure results, Shell Number 2, Desc.: 48" HEADS**

ASME Code, Section VIII, Division 1, 2004, A-06

Thickness Due to Internal Pressure (TR):

$$= (P*(D-2.0*CAE)*K) / (2*S*E+2*P*(K-0.1)) \text{ per Appendix 1-4 (c)}$$

$$= (192.89*(48.0000-2*0.000)*1.00)/(2*20000.00*1.00+2*192.89*(1.00-0.1))$$

$$= 0.2295 + 0.0625 = 0.2920 \text{ in.}$$

Max. All. Working Pressure at Given Thickness (MAWP):

Less Operating Hydrostatic Head Pressure of 2.89 psig

$$= (2*S*E*(T-CA-CAE)) / (K*(D-2*CAE)-2*(T-CA-CAE)*(K-0.1)) \text{ per Appendix 1-4(c)}$$

$$= (2*20000.00*1.00*(0.2500)) / (1.00*48.0000-2*(0.2500)*(1.00-0.1))$$

$$= 210.30 - 2.89 = 207.42 \text{ psig}$$

Maximum Allowable Pressure, New and Cold (MAPNC):

$$= (2*SA*E*T) / (K*D-2*T*(K-0.1)) \text{ per Appendix 1-4 (c)}$$

$$= (2*20000.00*1.00*0.3125) / (1.00*48.0000-2*0.3125*(1.00-0.1))$$

$$= 263.50 \text{ psig}$$

Actual stress at given pressure and thickness (Sact):

$$= (P*(K*(D-2*CAE)-2*(T-CA-CAE)*(K-0.1))) / (2*E*(T-CA-CAE))$$

$$= (192.89*(1.00*48.0000-2*(0.2500)*(1.00-0.1))) / (2*1.00*(0.2500))$$

$$= 18343.73 \text{ psi}$$

**SUMMARY OF INTERNAL PRESSURE RESULTS:**



**Input Echo, Nozzle Item 1, Description: 6" IN SHELL**

Design Internal Pressure ( Case 1 )	P	190.00	psig
Temperature for Internal Pressure	TEMP	100.00	F
Include Hydrostatic Head Components		YES	
Operating Liquid Density		62.400	lb./ft <sup>3</sup>
Height of Liquid Column ( Operating )		120.00	in.
Shell or Head Material (Normalized)		SA-516 70	
Material UNS Number		K02700	
Shell/Head Allowable Stress at Temperature	S	20000.00	psi
Shell/Head Allowable Stress At Ambient	SA	20000.00	psi
Shell/Head Yield Stress at Temperature	Sy	38000.00	psi
Outside Diameter of Cylindrical Shell	D	48.0000	in.
Actual Thickness of Shell or Head	T	0.3750	in.
Corrosion Allowance for Shell or Head	CAS	0.0625	in.
Is this Nozzle a Radial Nozzle		YES	
Is this Nozzle a Lateral Nozzle (Y-angle)		NO	
Nozzle Material (Not Normalized or NA)		SA-106 B	
Material UNS Number		K03006	
Nozzle Allowable Stress at Temperature	SN	17100.00	psi
Nozzle Allowable Stress At Ambient	SNA	17100.00	psi
Diameter Basis for Nozzle	BASIS	OD	
Outside Diameter of Nozzle	DIA	6.6250	in.
Nozzle Size and Thickness Basis	DBN	Actual	
Actual Thickness of Nozzle	THK	0.4320	in.
Corrosion Allowance for Nozzle	CAN	0.0625	in.
Joint Efficiency of Shell Seam at Nozzle	ES	1.00	
Joint Efficiency of Nozzle Neck	EN	1.00	
Insert or Abutting Nozzle Type	NTYP	Insert	
Outward Projection of Nozzle	HO	6.0000	in.
Weld leg size between Nozzle and Pad/Shell	WO	0.3750	in.
Groove weld depth between Nozzle and Vessel	WGNV	0.3750	in.
Inside Projection of Nozzle	H	1.0000	in.
Weld leg size, Inside Nozzle to Shell	WI	0.0000	in.
Is this is Manway/Access/Inspection Opening		No	
Skip Iterative Failure Thickness Calculations		Yes	

**Nozzle Calculation, Nozzle Number 1, Description: 6" IN SHELL**  
**ASME Code, Section VIII, Div. 1, 2004 A-06, UG-37 to UG-45**

Actual Nozzle Outside Diameter Used in Calculation	6.625	in.
Actual Nozzle Thickness Used in Calculation	0.432	in.

**Internal Pressure Results for SHELL/HEAD :**

Reqd thk per UG-37(a) of Cylindrical Shell, Tr [Internal Press]  
 Thickness Due to Internal Pressure:  
 =  $(P*(D/2-CAE)) / (S*E+0.4*P)$  per Appendix 1-1 (a) (1)  
 =  $(194.33*(48.0000/2-0.000)) / (20000.00*1.00+0.4*194.33)$



**UG-45 Minimum Nozzle Neck Thickness Requirement:**

= Max (Min (Max (Max (UG45B1, UG16B), Max (UG45B2, UG16B)), UG45B4), UG45A)  
 = Max (Min (Max (Max (0.2948, 0.1250), Max (0.0625, 0.1250)), 0.3075), 0.1000 )  
 = 0.2948 < Minimum Nozzle Thickness 0.4320 in. OK

Weight of Nozzle, Nozzle Neck Only, Uncorroded 17.54 lb.  
 Weight of Nozzle, Nozzle Neck Only, Corroded 14.53 lb.

**Minimum Design Metal Temperature ( Nozzle Neck ), UCS curve: B**

Minimum Metal Temp. w/o impact per Fig. UCS-66 -15 F  
 Minimum Metal Temp. at operating stress -155 F  
 Minimum Metal Temp. w/o impact per UG-20(f) -20 F

**Minimum Design Metal Temperature ( Shell ), UCS curve: D**

Minimum Metal Temp. w/o impact per Fig. UCS-66 -55 F  
 Minimum Metal Temp. w/o impact per UG-20(f) -20 F

**Nozzle MDMT Thickness Calc. per UCS-66 (a)1(b), MIN(tn,tc), UCS curve: B**

Min. Metal Temp. w/o impact per Fig. UCS-66 -20 F  
 Min. Metal Temp. at Req'd thk. (UCS 66.1)[rat 0.120] -155 F  
 Min. Metal Temp. w/o impact per UG-20(f) -20 F

**Weid Size Calculations, Nozzle Number 1, Desc.: 6" IN SHELL**

Intermediate Calcs. for nozzle/shell welds Tmin 0.3125 in.

**Results Per UW-16.1:**

	Required Thickness	Actual Thickness	
Nozzle Weld	0.2188 = 0.7 * Tmin	0.2652 = 0.707 * WO	, in.

**Weid Strength and Weid Loads per UG-41.1, Sketch (a) or (b):**

W = (AR-A1+2\*(THK-CAN)\*FFR1\*(E1(T-CAS)-TR))\*S  
 W = (1.3922 - 0.4635 + 2 \* ( 0.4320 - 0.0625 ) \* 0.8550 \*  
 (1.00 \* ( 0.3750 - 0.0625 ) - 0.2323 ) ) \* 20000  
 W = 19588. lb.  
 W1 = (A2+A5+A4-(WI-CAN/.707)^2\*FFR2)\*S  
 W1 = ( 0.4436 + 0.0000 + 0.1202 - 0.0000 \* 0.86 ) \* 20000  
 W1 = 11276. lb.  
 W2 = (A2+A3+A4+(2\*(THK-CAN)\*(T-CAS)\*Fr1))\*S  
 W2 = ( 0.4436 + 0.4029 + 0.1202 + 0.1975 ) \* 20000  
 W2 = 23283. lb.  
 W3 = (A2+A3+A4+A5+(2\*(THK-CAN)\*(T-CAS)\*Fr1))\*S  
 W3 = ( 0.4436 + 0.4029 + 0.0000 + 0.1202 + 0.1975 ) \* 20000  
 W3 = 23283. lb.

**Strength of Connection Elements for Failure Path Analysis :**

Shear, Outward Nozzle Weid:

SONW = (PI/2)\*DLO\*WO\*0.49\*SNW  
 SONW = ( 3.1416 / 2.0 ) \* 6.6250 \* 0.3750 \* 0.49 \* 17100  
 SONW = 32699. lb.

Shear, Nozzle Wall:

SNW = (PI\*(DLR+DLO)/4.0)\*(THK-CAN)\*0.7\*SN  
 SNW = ( 3.1416 \* 3.1277 ) \* ( 0.4320 - 0.0625 ) \* 0.7 \* 17100  
 SNW = 43460. lb.

Tension, Nozzle Groove Weid:

TNGW = (PI/2)\*DLO\*(WGNVI-CAS)\*0.74\*SNG  
 TNGW = ( 3.1416 / 2.0 ) \* 6.6250 \* ( 0.3750 - 0.0625 ) \* 0.74 \* 17100

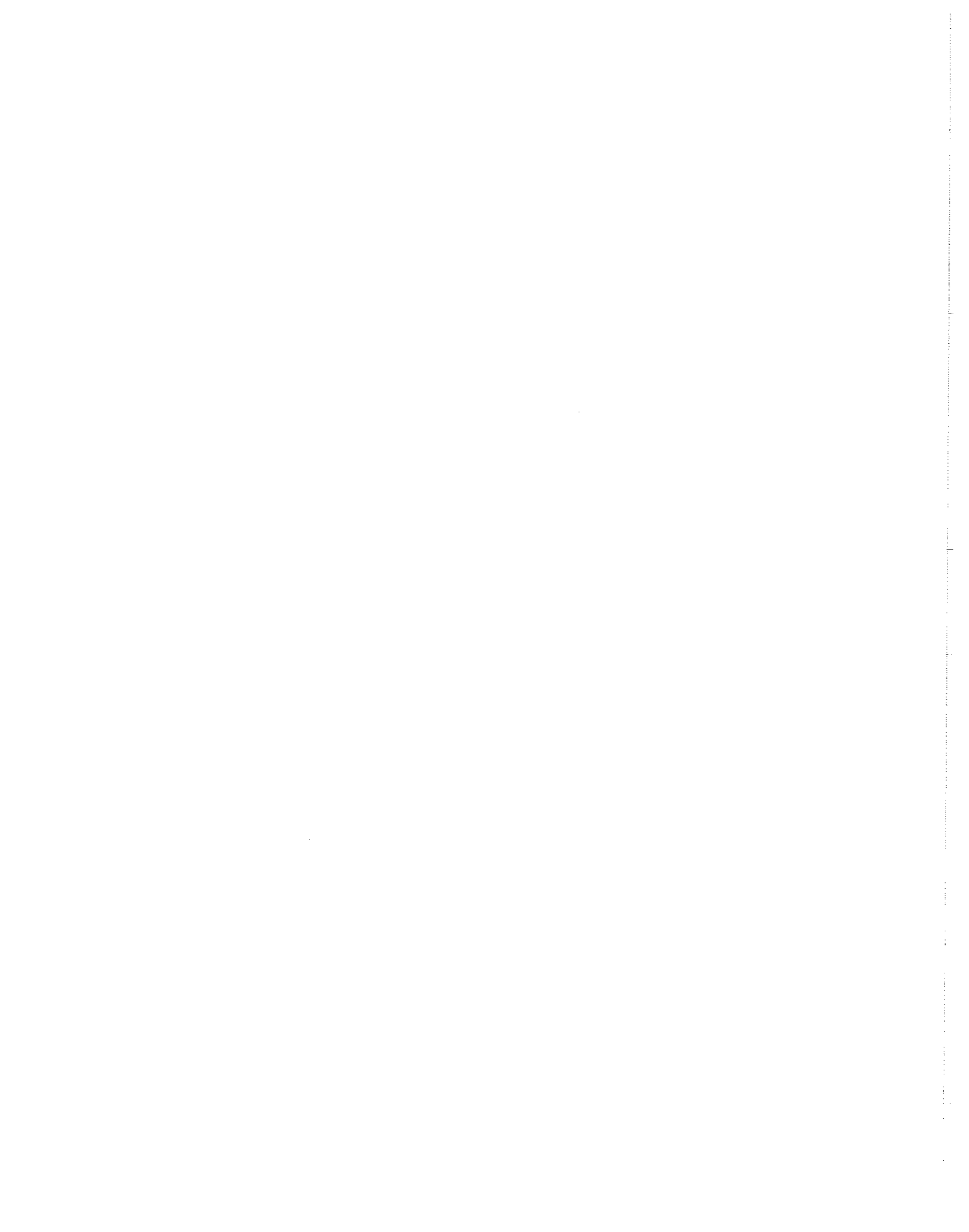


**Input Echo, Nozzle Item 2, Description: 18" IN SHELL**

Design Internal Pressure ( Case 1 )	P	190.00	psig
Temperature for Internal Pressure	TEMP	100.00	F
Include Hydrostatic Head Components		YES	
Operating Liquid Density		62.400	lb./ft <sup>3</sup>
Height of Liquid Column ( Operating )		120.00	in.
Shell or Head Material (Normalized)		SA-516 70	
Material UNS Number		K02700	
Shell/Head Allowable Stress at Temperature	S	20000.00	psi
Shell/Head Allowable Stress At Ambient	SA	20000.00	psi
Shell/Head Yield Stress at Temperature	Sy	38000.00	psi
Outside Diameter of Cylindrical Shell	D	48.0000	in.
Actual Thickness of Shell or Head	T	0.3750	in.
Corrosion Allowance for Shell or Head	CAS	0.0625	in.
Is this Nozzle a Radial Nozzle		YES	
Is this Nozzle a Lateral Nozzle (Y-angle)		NO	
Nozzle Material (Not Normalized or NA)		SA-106 B	
Material UNS Number		K03006	
Nozzle Allowable Stress at Temperature	SN	17100.00	psi
Nozzle Allowable Stress At Ambient	SNA	17100.00	psi
Diameter Basis for Nozzle	BASISN	OD	
Outside Diameter of Nozzle	DIA	18.0000	in.
Nozzle Size and Thickness Basis	DEN	Actual	
Actual Thickness of Nozzle	THK	0.5000	in.
Corrosion Allowance for Nozzle	CAN	0.0625	in.
Joint Efficiency of Shell Seam at Nozzle	ES	1.00	
Joint Efficiency of Nozzle Neck	EN	1.00	
Insert or Abutting Nozzle Type	NTYP	Insert	
Outward Projection of Nozzle	HO	6.0000	in.
Weld leg size between Nozzle and Pad/Shell	WO	0.3750	in.
Groove weld depth between Nozzle and Vessel	WGNV	0.3750	in.
Inside Projection of Nozzle	H	0.5000	in.
Weld leg size, Inside Nozzle to Shell	WI	0.0000	in.
Pad Material (Not Normalized or NA)		SA-516 70	
Pad Allowable Stress at Temperature	SN	20000.00	psi
Pad Allowable Stress At Ambient	SNA	20000.00	psi
Diameter of Pad along vessel surface	DP	24.0000	in.
Thickness of Pad	TP	0.3750	in.
Weld leg size between Pad and Shell	WP	0.3000	in.
Groove weld depth between Pad and Nozzle	WGPN	0.3750	in.
Is this is Manway/Access/Inspection Opening		No	
Skip Iterative Failure Thickness Calculations		Yes	

**Nozzle Calculation, Nozzle Number 2, Description: 18" IN SHELL**  
**ASME Code, Section VIII, Div. 1, 2004 A-06, UG-37 to UG-45**

Actual Nozzle Outside Diameter Used in Calculation 18 000 in.





Area Available in Nozzle Wall, no Pad:

$$A2np = ( 2 * \text{MIN}(\text{TLNP}, \text{HO}) ) * ( \text{THK} - \text{CAN} - \text{TRN} ) * \text{FFR2}$$

$$A2np = ( 2 * 0.7812 ) * ( 0.5000 - 0.0625 - 0.1018 ) * 0.86$$

$$A2np = 0.448 \text{ in}^2$$

Area Available in Nozzle Wall, with Pad:

$$A2wp = ( 2 * \text{MIN}(\text{TLWP}, \text{HO}) ) * ( \text{THK} - \text{CAN} - \text{TRN} ) * \text{FFR2}$$

$$A2wp = ( 2 * 0.7812 ) * ( 0.5000 - 0.0625 - 0.1018 ) * 0.86$$

$$A2wp = 0.448 \text{ in}^2$$

Area Available in Nozzle Penetration:

$$A3 = 2 * ( \text{TN} - \text{CAN} - \text{CAN} ) * \text{MIN}(\text{H} - \text{CAN}, \text{TL}, 2.5 * ( \text{TN} - \text{CAN} - \text{CAN} ) ) * \text{FFR2}$$

$$A3 = 2 * ( 0.3750 ) * ( 0.4375 ) * 0.86$$

$$A3 = 0.281 \text{ in}^2$$

Area Available in Welds, no Pad:

$$A4np = \text{Wo}^2 * \text{FFR2} + ( \text{Wi} - \text{Can} / 0.707 )^2 * \text{FFR2}$$

$$A4np = 0.3750^2 * 0.8550 + ( 0.0000 )^2 * 0.8550$$

$$A4np = 0.120 \text{ in}^2$$

Area Available in Welds, with Pad:

$$A4wp = \text{Wo}^2 * \text{FFR3} + ( \text{Wi} - \text{Can} / 0.707 )^2 * \text{FFR2} + \text{Wp}^2 * \text{FFR4}$$

$$A4wp = ( 0.3750 )^2 * 0.86 + ( 0.0000 )^2 * 0.86 + 0.3000^2 * 1.00$$

$$A4wp = 0.210 \text{ in}^2$$

Area Available in Pad:

$$A5 = ( \text{MIN}(\text{DP}, \text{DL}) - ( \text{DIA} + 2 * \text{THK} ) ) * ( \text{Min}(\text{TP}, \text{TLWP}, \text{TE}) ) * \text{FFR4}$$

$$A5 = ( 24.0000 - 18.0000 ) * 0.3750 * 1.00$$

$$A5 = 2.250 \text{ in}^2$$

**UG-45 Minimum Nozzle Neck Thickness Requirement:**

$$= \text{Max}(\text{Min}(\text{Max}(\text{Max}(\text{UG45B1}, \text{UG16B}), \text{Max}(\text{UG45B2}, \text{UG16B})), \text{UG45B4}), \text{UG45A})$$

$$= \text{Max}(\text{Min}(\text{Max}(\text{Max}(0.2948, 0.1250), \text{Max}(0.0625, 0.1250)), 0.3906), 0.1643)$$

$$= 0.2948 < \text{Minimum Nozzle Thickness } 0.5000 \text{ in. OK}$$

Weight of Nozzle, with Pad, Uncorroded 74.49 lb.  
 Weight of Nozzle, with Pad, Corroded 66.95 lb.

**Minimum Design Metal Temperature Results:**

	Nozzle	Shell	Pad	
Minimum Temp. w/o impact per Fig. UCS-66	-6	-55	-20	F
Minimum Temp. at operating stress	-146	-55	-20	F
Minimum Temp. w/o impact per UG-20(f)	-20	-20	-20	F

**Nozzle MDMT Thickness Calc. per UCS-66 (a)1(b), MIN(tn,t,te), UCS curve: B**

Min. Metal Temp. w/o impact per Fig. UCS-66	-20	F
Min. Metal Temp. at Req'd thk. (UCS 66.1) [rat 0.326]	-155	F
Min. Metal Temp. w/o impact per UG-20(f)	-20	F

**Weld Size Calculations, Nozzle Number 2, Desc.: 18" IN SHELL**

Intermediate Calcs. for nozzle/shell welds Tmin 0.3750 in.  
 Intermediate Calcs. for pad/shell welds TminPad 0.3125 in.

**Results Per UW-16.1:**

	Required Thickness	Actual Thickness	
Nozzle Weld	0.2500 = Min per Code	0.2652 = 0.707 * WO	, in.
Pad Weld	0.1562 = 0.5 * TminPad	0.2121 = 0.707 * WP	, in.



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FileName : 48 x 10 x 190 psi ----- Page 15 of 28

Nozzle Analysis : 18" IN SHELL Item: 2 9:37a Mar 29,2007

Converged M.A.P. (NC) for given geometry AMAPNC 241.500 psig

Shell M.A.P. (NC) 314.400 psig

Warning: Nozzle MAPnc is < Shell MAPnc, Nozzle is governing the MAP of Shell !

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$$= (P*(D-2*CAE)*K) / (2*S*E+0.8*P) \text{ per Appendix 1-1 (a) (2)}$$

$$= (194.33*(48.0000-2*0.000)*0.90)/(2*20000.00*1.00+0.8*194.33)$$

$$= 0.2091 + 0.0625 = 0.2716 \text{ in.}$$

**Internal Pressure Results for NOZZLE :**

Reqd thk per UG-37(a) of Nozzle Wall, Trn [Internal Press]

Thickness Due to Internal Pressure:

$$= (P*(D/2-CAE)) / (S*E+0.4*P) \text{ per Appendix 1-1 (a) (1)}$$

$$= (194.33*(4.5000/2-0.000))/(17100.00*1.00+0.4*194.33)$$

$$= 0.0255 + 0.0625 = 0.0880 \text{ in.}$$

**UG-40, Thickness and Diameter Limit Results : Internal Pressure**

Effective material diameter limit,	DL	7.9020	in.
Effective material thickness limit, no pad	TLNP	0.6250	in.

**Results of Nozzle Reinforcement Area Calculations:**

Area Available, A1 to A5	Design	External	Mapnc	
Area Required	Ar	0.843	NA	NA in <sup>2</sup>
Area in Shell	A1	0.158	NA	NA in <sup>2</sup>
Area in Nozzle Wall	A2	0.266	NA	NA in <sup>2</sup>
Area in Inward Nozzle	A3	0.159	NA	NA in <sup>2</sup>
Area in Welds	A4	0.284	NA	NA in <sup>2</sup>
Area in Pad	A5	0.000	NA	NA in <sup>2</sup>
Total Area Available	Atot	0.867	NA	NA in <sup>2</sup>

Internal Pressure Case Governs the Analysis

Nozzle Tangent Angle Used in Area Calculations 90.00 Degr.

The area available without a pad is Sufficient.

Reinforcement Area Required for Nozzle:

$$Ar = (DLR*TR+2*THK*TR*(1-FFR1)) \text{ UG-37(c) or UG-39}$$

$$Ar = (3.9510*0.2091+2*(0.3370-0.0625)*0.2091*(1.0-0.86))$$

$$Ar = 0.843 \text{ in}^2$$

Areas per UG-37.1 but with DL = Diameter Limit, DLR = Nozzle Opening size:

Area Available in Shell (A1):

$$A1 = (DL-DLR)*(ES*(T-CAS)-TR)-2*(THK-CAN)*(ES*(T-CAS)-TR)*(1-FFR1)$$

$$A1 = (7.902-3.951)*(1.00*(0.3125-0.062)-0.209)-2*(0.337-0.062)$$

$$* (1.00*(0.3125-0.0625)-0.2091)*(1.0-0.86)$$

$$A1 = 0.158 \text{ in}^2$$

Area Available in Nozzle Wall, no Pad:

$$A2np = (2 * \text{MIN}(TLNP, HO)) * (THK - CAN - TRN) * FFR2$$

$$A2np = (2 * 0.6250) * (0.3370 - 0.0625 - 0.0255) * 0.86$$

$$A2np = 0.266 \text{ in}^2$$

Area Available in Nozzle Penetration:

$$A3 = 2 * (TN-CAN-CAN) * \text{MIN}(H-CAN, TL, 2.5*(TN-CAN-CAN)) * FFR2$$

$$A3 = 2 * (0.2120) * (0.4375) * 0.86$$

$$A3 = 0.159 \text{ in}^2$$

Area Available in Welds, no Pad:

$$A4np = Wo^2*FFR2 + (Wi-Can/0.707)^2*FFR2$$

$$A4np = 0.5000^2 * 0.8550 + (0.2866)^2 * 0.8550$$



$$\begin{aligned} \text{SNW} &= (\text{PI} * (\text{DLR} + \text{DLO}) / 4.0) * (\text{THK} - \text{CAN}) * 0.7 * \text{SN} \\ \text{SNW} &= (3.1416 * 2.1128) * (0.3370 - 0.0625) * 0.7 * 17100 \\ \text{SNW} &= 21809. \text{ lb.} \end{aligned}$$

Tension, Nozzle Groove Weld:

$$\begin{aligned} \text{TNGW} &= (\text{PI} / 2) * \text{DLO} * (\text{WGNVI} - \text{CAS}) * 0.74 * \text{SNG} \\ \text{TNGW} &= (3.1416 / 2.0) * 4.5000 * (0.3125 - 0.0625) * 0.74 * 17100 \\ \text{TNGW} &= 22361. \text{ lb.} \end{aligned}$$

Strength of Failure Paths:

$$\begin{aligned} \text{PATH11} &= (\text{SONW} + \text{SNW}) = (29613 + 21808) = 51422 \text{ lb.} \\ \text{PATH22} &= (\text{SONW} + \text{TPGW} + \text{TNGW} + \text{SINW}) \\ &= (29613 + 0 + 22361 + 16975) = 68950 \text{ lb.} \\ \text{PATH33} &= (\text{SONW} + \text{TNGW} + \text{SINW}) \\ &= (29613 + 22361 + 16975) = 68950 \text{ lb.} \end{aligned}$$

Summary of Failure Path Calculations:

Path 1-1 = 51422 lb., must exceed W = 14068 lb. or W1 = 9598 lb.  
Path 2-2 = 68950 lb., must exceed W = 14068 lb. or W2 = 16522 lb.  
Path 3-3 = 68950 lb., must exceed W = 14068 lb. or W3 = 16522 lb.

M.A.W.P. Results Based on Areas, Head and Nozzle neck:

Converged M.A.W.P for given geometry	AMAP	192.800	psig
Head M.A.W.P		205.900	psig

Warning: Nozzle MAWP is < Shell MAWP, Nozzle is governing the MAWP of Shell !

Converged M.A.P.(NC) for given geometry	AMAPNC	266.500	psig
Head M.A.P.(NC)		291.000	psig

Warning: Nozzle MAPnc is < Shell MAPnc, Nozzle is governing the MAP of Shell !





$$= (P*(D-2*CAE)*K) / (2*S*E+0.8*P) \text{ per Appendix 1-1 (a)(2)}$$

$$= (194.33*(48.0000-2*0.000)*0.90)/(2*20000.00*1.00+0.8*194.33)$$

$$= 0.2091 + 0.0625 = 0.2716 \text{ in.}$$

**Internal Pressure Results for NOZZLE :**

Reqd thk per UG-37(a) of Nozzle Wall, Trn [Internal Press]

Thickness Due to Internal Pressure:

$$= (P*(D/2-CAE)) / (S*E+0.4*P) \text{ per Appendix 1-1 (a)(1)}$$

$$= (194.33*(6.6250/2-0.000))/(17100.00*1.00+0.4*194.33)$$

$$= 0.0375 + 0.0625 = 0.1000 \text{ in.}$$

**UG-40, Thickness and Diameter Limit Results : Internal Pressure**

Effective material diameter limit, DL 11.7720 in.  
 Effective material thickness limit, no pad TLNP 0.6250 in.

**Results of Nozzle Reinforcement Area Calculations:**

Area Available, A1 to A5	Design	External	Mapnc	
Area Required Ar	1.253	NA	NA	in <sup>2</sup>
Area in Shell A1	0.237	NA	NA	in <sup>2</sup>
Area in Nozzle Wall A2	0.355	NA	NA	in <sup>2</sup>
Area in Inward Nozzle A3	0.328	NA	NA	in <sup>2</sup>
Area in Welds A4	0.359	NA	NA	in <sup>2</sup>
Area in Pad A5	0.000	NA	NA	in <sup>2</sup>
Total Area Available Atot	1.278	NA	NA	in <sup>2</sup>

Internal Pressure Case Governs the Analysis

Nozzle Tangent Angle Used in Area Calculations 90.00 Degs.

The area available without a pad is Sufficient.

Reinforcement Area Required for Nozzle:

$$Ar = (DLR*TR+2*THK*TR*(1-FFR1)) \text{ UG-37(c) or UG-39}$$

$$Ar = (5.8860*0.2091+2*(0.4320-0.0625)*0.2091*(1.0-0.86))$$

$$Ar = 1.253 \text{ in}^2$$

Areas per UG-37.1 but with DL = Diameter Limit, DLR = Nozzle Opening size:

Area Available in Shell (A1):

$$A1 = (DL-DLR) * (ES*(T-CAS) - TR) - 2*(THK-CAN) * (ES*(T-CAS) - TR) * (1-FFR1)$$

$$A1 = (11.772-5.886) * (1.00*(0.3125-0.062) - 0.209) - 2*(0.432-0.062)$$

$$* (1.00*(0.3125-0.0625) - 0.2091) * (1.0-0.86)$$

$$A1 = 0.237 \text{ in}^2$$

Area Available in Nozzle Wall, no Pad:

$$A2np = ( 2 * MIN(TLNP,HO) ) * ( THK - CAN - TRN ) * FFR2$$

$$A2np = ( 2 * 0.6250 ) * ( 0.4320 - 0.0625 - 0.0375 ) * 0.86 )$$

$$A2np = 0.355 \text{ in}^2$$

Area Available in Nozzle Penetration:

$$A3 = 2 * (TN-CAN-CAN) * MIN(H-CAN, TL, 2.5*(TN-CAN-CAN)) * FFR2$$

$$A3 = 2 * ( 0.3070 ) * ( 0.6250 ) * 0.86$$

$$A3 = 0.328 \text{ in}^2$$

Area Available in Welds, no Pad:

$$A4np = Wo^2*FFR2 + ( Wi-Can/0.707 )^2*FFR2$$

$$A4np = 0.5000^2 * 0.8550 + ( 0.4116 )^2 * 0.8550$$



$$\begin{aligned} \text{SNW} &= (\text{PI} * (\text{DLR} + \text{DLO}) / 4.0) * (\text{THK} - \text{CAN}) * 0.7 * \text{SN} \\ \text{SNW} &= (3.1416 * 3.1277) * (0.4320 - 0.0625) * 0.7 * 17100 \\ \text{SNW} &= 43460. \text{ lb.} \end{aligned}$$

**Tension, Nozzle Groove Weld:**

$$\begin{aligned} \text{TNGW} &= (\text{PI} / 2) * \text{DLO} * (\text{WGNVI} - \text{CAS}) * 0.74 * \text{SNG} \\ \text{TNGW} &= (3.1416 / 2.0) * 6.6250 * (0.3125 - 0.0625) * 0.74 * 17100 \\ \text{TNGW} &= 32921. \text{ lb.} \end{aligned}$$

**Strength of Failure Paths:**

$$\begin{aligned} \text{PATH11} &= (\text{SONW} + \text{SNW}) = (43598 + 43460) = 87058 \text{ lb.} \\ \text{PATH22} &= (\text{SONW} + \text{TPGW} + \text{TNGW} + \text{SINW}) \\ &= (43598 + 0 + 32921 + 35890) = 112410 \text{ lb.} \\ \text{PATH33} &= (\text{SONW} + \text{TNGW} + \text{SINW}) \\ &= (43598 + 32921 + 35890) = 112410 \text{ lb.} \end{aligned}$$

**Summary of Failure Path Calculations:**

Path 1-1 = 87058 lb., must exceed W = 20845 lb. or W1 = 11372 lb.  
Path 2-2 = 112410 lb., must exceed W = 20845 lb. or W2 = 23990 lb.  
Path 3-3 = 112410 lb., must exceed W = 20845 lb. or W3 = 23990 lb.

**M.A.W.P. Results Based on Areas, Head and Nozzle neck:**

Converged M.A.W.P for given geometry	AMAP	191.900	psig
Head M.A.W.P		205.900	psig

Warning: Nozzle MAWP is < Shell MAWP, Nozzle is governing the MAWP of Shell !

Converged M.A.P.(NC) for given geometry	AMAPNC	262.700	psig
Head M.A.P.(NC)		291.000	psig

Warning: Nozzle MAPnc is < Shell MAPnc, Nozzle is governing the MAP of Shell !



$$= 0.2323 + 0.0625 = 0.2948 \text{ in.}$$

**Internal Pressure Results for NOZZLE :**

Reqd thk per UG-37(a) of Nozzle Wall, Trn [Internal Press]

Thickness Due to Internal Pressure:

$$= (P*(D/2-CAE)) / (S*E+0.4*P) \text{ per Appendix 1-1 (a)(1)}$$

$$= (194.33*(4.5000/2-0.000)) / (17100.00*1.00+0.4*194.33)$$

$$= 0.0255 + 0.0625 = 0.0880 \text{ in.}$$

**UG-40, Thickness and Diameter Limit Results : Internal Pressure**

Effective material diameter limit, DL 7.9020 in.

Effective material thickness limit, no pad TLNP 0.6863 in.

**Results of Nozzle Reinforcement Area Calculations:**

Area Available, A1 to A5	Design	External	Mapnc
Area Required Ar	0.936	NA	NA in <sup>2</sup>
Area in Shell A1	0.310	NA	NA in <sup>2</sup>
Area in Nozzle Wall A2	0.292	NA	NA in <sup>2</sup>
Area in Inward Nozzle A3	0.159	NA	NA in <sup>2</sup>
Area in Welds A4	0.190	NA	NA in <sup>2</sup>
Area in Pad A5	0.000	NA	NA in <sup>2</sup>
Total Area Available Atot	0.952	NA	NA in <sup>2</sup>

Internal Pressure Case Governs the Analysis

Nozzle Tangent Angle Used in Area Calculations 90.00 Degs.

The area available without a pad is Sufficient.

Reinforcement Area Required for Nozzle:

$$Ar = (DLR*TR+2*THK*TR*(1-FFR1)) \text{ UG-37(c) or UG-39}$$

$$Ar = (3.9510*0.2323+2*(0.3370-0.0625)*0.2323*(1.0-0.86))$$

$$Ar = 0.936 \text{ in}^2$$

Areas per UG-37.1 but with DL = Diameter Limit, DLR = Nozzle Opening size:

Area Available in Shell (A1):

$$A1 = (DL-DLR)*(ES*(T-CAS)-TR)-2*(THK-CAN)*(ES*(T-CAS)-TR)*(1-FFR1)$$

$$A1 = (7.902-3.951)*(1.00*(0.3750-0.062)-0.232)-2*(0.337-0.062)$$

$$*(1.00*(0.3750-0.0625)-0.2323)*(1.0-0.86)$$

$$A1 = 0.310 \text{ in}^2$$

Area Available in Nozzle Wall, no Pad:

$$A2np = (2 * \text{MIN}(TLNP, HO)) * (THK - CAN - TRN) * FFR2$$

$$A2np = (2 * 0.6863) * (0.3370 - 0.0625 - 0.0255) * 0.86$$

$$A2np = 0.292 \text{ in}^2$$

Area Available in Nozzle Penetration:

$$A3 = 2 * (TN-CAN-CAN) * \text{MIN}(H-CAN, TL, 2.5*(TN-CAN-CAN)) * FFR2$$

$$A3 = 2 * (0.2120) * (0.4375) * 0.86$$

$$A3 = 0.159 \text{ in}^2$$

Area Available in Welds, no Pad:

$$A4np = Wo^2*FFR2 + (Wi-Can/0.707)^2*FFR2$$

$$A4np = 0.3750^2 * 0.8550 + (0.2866)^2 * 0.8550$$

$$A4np = 0.190 \text{ in}^2$$



SNW = 21809. lb.

Tension, Nozzle Groove Weld:

$$TNGW = (PI/2) * DLO * (WGNVI-CAS) * 0.74 * SNG$$

$$TNGW = ( 3.1416 / 2.0 ) * 4.5000 * ( 0.3750 - 0.0625 ) * 0.74 * 17100$$

$$TNGW = 27952. lb.$$

Strength of Failure Paths:

$$PATH11 = ( SONW + SNW ) = ( 22210 + 21808 ) = 44019 lb.$$

$$PATH22 = ( SONW + TPGW + TNGW + SINW )$$

$$= ( 22210 + 0 + 27951 + 16975 ) = 67137 lb.$$

$$PATH33 = ( SONW + TNGW + SINW )$$

$$= ( 22210 + 27951 + 16975 ) = 67137 lb.$$

Summary of Failure Path Calculations:

Path 1-1 = 44019 lb., must exceed W = 13268 lb. or W1 = 8249 lb.  
 Path 2-2 = 67137 lb., must exceed W = 13268 lb. or W2 = 15760 lb.  
 Path 3-3 = 67137 lb., must exceed W = 13268 lb. or W3 = 15760 lb.

M.A.W.P. Results Based on Areas, Shell and Nozzle neck:

Converged M.A.W.P for given geometry	AMAP	191.600	psig
Shell M.A.W.P		257.400	psig

Warning: Nozzle MAWP is < Shell MAWP, Nozzle is governing the MAWP of Shell !

Converged M.A.P. (NC) for given geometry	AMAPNC	258.700	psig
Shell M.A.P. (NC)		314.400	psig

Warning: Nozzle MAPnc is < Shell MAPnc, Nozzle is governing the MAP of Shell !





FOR Drawing 50V-0009

CodeCalc 2007 Licensee: SILVERADO OILFIELD VENTURES LTD.

FileName : 48 x 10 x 190 psi

Page 1 of 3

*L J K*

Nozzle Analysis : 3" NPT IN SHELL

Item: 6 10:28a Apr 11, 2007

**Input Echo, Nozzle Item 6, Description: 3" NPT IN SHELL**

Design Internal Pressure ( Case 1 )	P	190.00	psig
Temperature for Internal Pressure	TEMP	100.00	F
Include Hydrostatic Head Components		YES	
Operating Liquid Density		62.400	lb./ft <sup>3</sup>
Height of Liquid Column ( Operating )		120.00	in.
Shell or Head Material (Normalized)		SA-516 70	
Material UNS Number		K02700	
Shell/Head Allowable Stress at Temperature	S	20000.00	psi
Shell/Head Allowable Stress At Ambient	SA	20000.00	psi
Shell/Head Yield Stress at Temperature	Sy	38000.00	psi
Outside Diameter of Cylindrical Shell	D	48.0000	in.
Actual Thickness of Shell or Head	T	0.3750	in.
Corrosion Allowance for Shell or Head	CAS	0.0625	in.
Is this Nozzle a Radial Nozzle		YES	
Is this Nozzle a Lateral Nozzle (Y-angle)		NO	
Nozzle Material (Normalized)		SA-105	
Material UNS Number		K03504	
Nozzle Allowable Stress at Temperature	SN	20000.00	psi
Nozzle Allowable Stress At Ambient	SNA	20000.00	psi
Diameter Basis for Nozzle	BASIS	OD	
Outside Diameter of Nozzle	DIA	4.3125	in.
Nozzle Size and Thickness Basis	DBN	Actual	
Actual Thickness of Nozzle	THK	0.3125	in.
Corrosion Allowance for Nozzle	CAN	0.0625	in.
Joint Efficiency of Shell Seam at Nozzle	ES	1.00	
Joint Efficiency of Nozzle Neck	EN	1.00	
Insert or Abutting Nozzle Type	NTYP	Abutting	
Outward Projection of Nozzle	HO	1.5000	in.
Weld leg size between Nozzle and Pad/Shell	WO	0.6250	in.
Groove weld depth between Nozzle and Vessel	WGNV	0.0000	in.
Is this is Manway/Access/Inspection Opening		No	
Skip Iterative Failure Thickness Calculations		Yes	

**Nozzle Calculation, Nozzle Number 6, Description: 3" NPT IN SHELL**  
**ASME Code, Section VIII, Div. 1, 2004 A-06, UG-37 to UG-45**

Actual Nozzle Outside Diameter Used in Calculation	4.313	in.
Actual Nozzle Thickness Used in Calculation	0.312	in.

**Internal Pressure Results for SHELL/HEAD :**

Reqd thk per UG-37(a) of Cylindrical Shell, Tr [Internal Press]

Thickness Due to Internal Pressure:

$$= (P*(D/2-CAE)) / (S*E+0.4*P) \text{ per Appendix 1-1 (a) (1)}$$

$$= (194.33*(48.0000/2-0.000)) / (20000.00*1.00+0.4*194.33)$$

$$= 0.2323 + 0.0625 = 0.2948 \text{ in.}$$



**Minimum Design Metal Temperature ( Nozzle Neck ), UCS curve: C**

Minimum Metal Temp. w/o impact per Fig. UCS-66	-55	F
Minimum Metal Temp. at operating stress	-155	F
Minimum Metal Temp. w/o impact per UG-20(f)	-20	F

**Minimum Design Metal Temperature ( Shell ), UCS curve: D**

Minimum Metal Temp. w/o impact per Fig. UCS-66	-55	F
Minimum Metal Temp. w/o impact per UG-20(f)	-20	F

**Nozzle MDMT Thickness Calc. per UCS-66 (a)1(b), MIN(tn,t,te), UCS curve: C**

Min. Metal Temp. w/o impact per Fig. UCS-66	-55	F
Min. Metal Temp. at Req'd thk. (UCS 66.1) [rat 0.083]	-155	F
Min. Metal Temp. w/o impact per UG-20(f)	-20	F

**Weld Size Calculations, Nozzle Number 6, Desc.: 3" NPT IN SHELL**

Intermediate Calcs. for nozzle/shell welds                      T<sub>min</sub>              0.2500 in.

**Results Per UW-16.1:**

	Required Thickness	Actual Thickness	
Nozzle Weld	0.1750 = 0.7 * T <sub>min</sub>	0.4419 = 0.707 * W <sub>O</sub>	, in.

**Weld Strength and Weld Loads per UG-41.1, Sketch (a) or (b):**

$W = (AR-A1)*S$   
 $W = ( 0.8856 - 0.3058 ) * 20000$   
 $W = 11597. \text{ lb.}$   
 $W1 = (A2+A5+A4 - (WI-CAN/.707)^2*EFR2)*S$   
 $W1 = ( 0.2864 + 0.0000 + 0.3906 - 0.0000 * 1.00 ) * 20000$   
 $W1 = 13541. \text{ lb.}$

**Strength of Connection Elements for Failure Path Analysis :**

Shear, Outward Nozzle Weld:

$SONW = (PI/2)*DLO*WO*0.49*SNW$   
 $SONW = ( 3.1416 / 2.0 ) * 4.3125 * 0.6250 * 0.49 * 20000$   
 $SONW = 41491. \text{ lb.}$

Strength of Failure Paths:

PATH11 = ( SONW + SNGW ) = ( 41491 + 0 ) = 41491 lb

**Summary of Failure Path Calculations:**

Path 1-1 = 41491 lb., must exceed W = 11597 lb. or W1 = 13540 lb.

**M.A.W.P. Results Based on Areas, Shell and Nozzle neck:**

Converged M.A.W.P for given geometry	AMAP	200.500	psig
Shell M.A.W.P		257.400	psig

Warning: Nozzle MAWP is < Shell MAWP, Nozzle is governing the MAWP of Shell !

Converged M.A.P. (NC) for given geometry	AMAPNC	252.000	psig
Shell M.A.P. (NC)		314.400	psig

Warning: Nozzle MAPnc is < Shell MAPnc, Nozzle is governing the MAP of Shell !





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PUMPING AND COMPRESSION EQUIPMENT

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VESSEL (A): 0567632  
DATE OF INSPECTION: 2007 May 24



# Certificate of Inspection Permit

CHAMCO INDUSTRIES LTD  
2907 18 STREET NE  
  
CALGARY, AB  
T2E 7K5

PREFERRED RE-INSP. INTERVAL: 1 00 Yr.

YEAR BUILT: 2007

CRN: T9389 2

SERIAL #: S-2436

VOLUME: 4.021 M3

HEATING SURFACE:  
SURFACE AREA:

COMPANY CODE:

DESCRIPTION: AIR RECEIVER

LOCATION: STOCK, CALGARY

MANUFACTURER: SILVERADO OILFIELD VENTURES LTD

Safety Valves \_\_\_\_\_

PART	MAX. AUTHORIZED WORKING PRESSURE	MAX. TEMP	MIN. TEMP	VALVE ID	SETTING	CAPACITY	LOCATION
VESSEL	1310 KPA	38 C	-29 C	SV1			TO BE INSTALLED

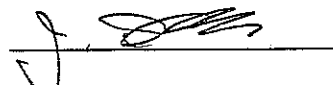
**OWNER INSTRUCTIONS/REMARKS:**

Contact the ABSA Safety Codes Officer before placing the vessel/boiler in service.

~~Vessel/Boiler to be installed in accordance with the Safety Codes Act and Regulations.~~

Verify that vessel/boiler is protected by an acceptable ASME Code pressure relief device, of adequate capacity, set at no more than maximum pressure authorized and installed in accordance with the Safety Codes Act & Regulations.

Safety Codes Officer: TWOREK, JOE

Signature: 

**REQUIREMENTS OF THE SAFETY CODES ACT AND THE REGULATIONS ISSUED THEREUNDER:**

The owner or person in charge shall report all accidents involving Pressure Equipment to the district Safety Codes Officer immediately and shall send a full report in writing to the Administrator as required by the Act. No repairs or alterations may be made unless authorized by a Safety Codes Officer







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CERTIFIED BY  
Silverado Oilfield Ventures Ltd.  
Red Deer, AB (403) 340-1900

MAWP  
INT.

EXT.

AT

MDMT

AT

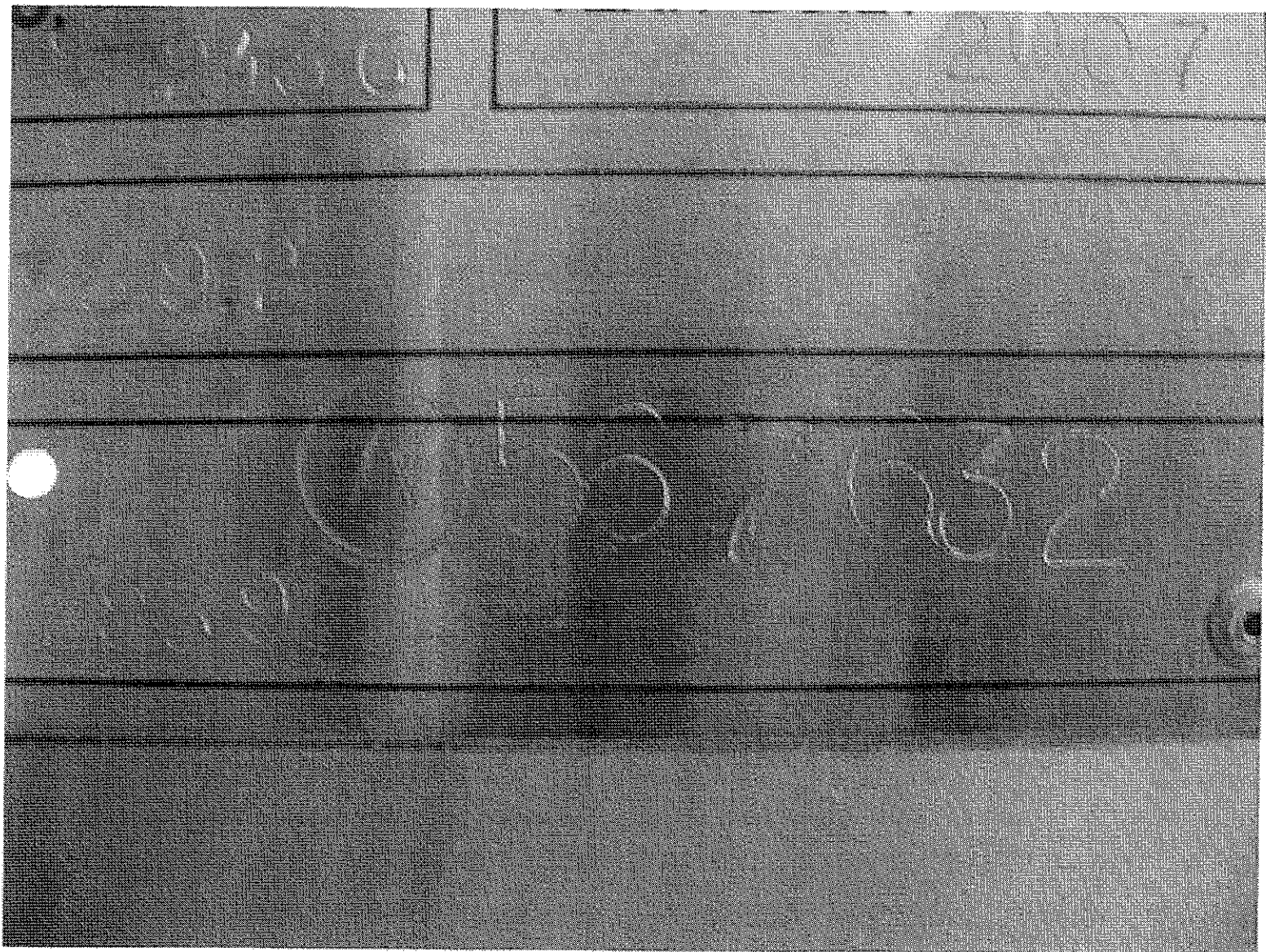
SERIAL NO.

YEAR BUILT

CRN

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P1014859-15



**ENLIN STEEL PHILS. CORPORATION** PHILS. : TEL 63-46-4371023 FAX 63-46-4371021

**MILL TEST REPORT**

DATE: Sep/23/2008  
 PURCHASE ORDER NO.: 31985  
 ENLIN S/C NO.: G103PN

PURCHASER: PINACLE STAINLESS STEEL INC

PRODUCT : STAINLESS STEEL FORGED FITTING

HEAT NO.	QTY	TYPE	DESIGNATION	SIZE	SPECIFICATION
614K9	17	316L/316	3000# 90 ELBOW NPT	2"	ANSI B16 11-05

CHEMICAL ANALYSIS OF MATERIAL

HEAT NO.	C	Mn	Si	P	S	Cr	Ni	Mo	N	SPECIFICATION
Maxi	0.030	2.00	1.00	0.045	0.030	16 - 18	10 - 15	2 - 3	0.100	ASME SA182
614K9	0.014	0.96	0.47	0.032	0.023	16.41	10.38	2.01	0.073	ASTM A182-04

MECHANICAL CHARACTERISTICS

HEAT NO	T.S. -PSI	Y.S. -PSI	%-E.L.	%-R.A	HEAT-TREAT	DIMENSION	PMI
Mini	70,000	25,000	30	50	1050- 1150 °C		
614K9	83,900	41,200	54	80	1060 °C	OK	OK

MATERIAL RESISTANT TO INTERCRYSTALLINE CORROSION ACCORDING TO  
 ASTM A262 PRACTICE E. FREE FROM MERCURY CONTAMINATION.  
 MATERIAL IN ACCORDANCE WITH NACE MR0175-2003 & MR0103-2003  
 ISO 9001:2000, PED 97/23/EC CERTIFIED  
 EN10204 3 1B

CRN NUMBERS :

AB - 0A0826.92, BC - 0A0826.91, MB - 0A0826.94, YT - 0A0826.9Y  
 NB - 0A0826.97, NL - 0A0826.90, NT - 0A0826.9T  
 NS - 0A0826.98, NU - 0A0826.9N, ON - 0A0826.95  
 PE - 0A0826.9, QC - 0A0826.96, SK - 0A0826.93

FACTORY INSPECTOR :

*Yi Tsai Lin*  
 YI TSAI LIN

QUALITY ASSURANCE DEPARTMENT



# 拍緯鐵工股份有限公司

高雄縣仁武鄉烏林村仁心路 303 號

## BOTH-WELL STEEL FITTINGS CO., LTD.

NO.303, JEN-HSIN ROAD JEN-WU HSIANG  
 KAOHSIUNG HSIEN, TAIWAN R.O.C (81460)

TEL: (07) 371-0497, 371-1536, 372-0260 FAX: (886-7) 371-3864, 371-3882

WEB SITE: <http://www.bothwell.com.tw> E-MAIL: [bothwell@www.bothwell.com.tw](mailto:bothwell@www.bothwell.com.tw) or [box@mail.bothwell.com.tw](mailto:box@mail.bothwell.com.tw)

An ISO-9001 Registered Manufacturer



### MILL TEST & INSPECTION CERTIFICATE

ACCORDING TO EN10204/DIN50049/3 1.B

ORIGIN: TAIWAN

CUSTOMER: PINACLE STAINLESS STEEL INC.

INVOICE NO: BW059412013

DATE: 01/27/06

CERT NO: 60191

ORDER NO: 31167


L/C NO:

PAGE: 6

ITEM	RAW MATERIAL HEAT NO.	BOTH WELL HI CD	DESCRIPTION	QUANTITY	SPECIFICATION: A182/SA182 -04a F316 / 316L DIMENSION: ASME B16 11 - 2001 SURFACE: BY VISUAL GOOD
063	9T025	T698	RED CPLG 1" x 3/8" 3000# NPT	2 PC	
063	9T035	T693	RED.CPLG 1" x 3/8" 3000# NPT	68 PC	
064	9T001	T710	SQUARE PLUG 1/2" NPT	600 PC	
065	9T035	T693	SQUARE PLUG 3/4" NPT	600 PC	
066	S2518	T695	TEE 1" 3000# NPT	105 PC	
067	863845	T726	TEE 2" 3000# NPT	100 PC	
074	868091	T721	45D ELBOW 1-1/4" 3000# S/W	100 PC	

ITEM	CHEMICAL COMPOSITION (%)											
	C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V	Nb	N
Min	-	-	-	-	-	-	16.000	10.000	2.000	-	-	-
Max	0.030	1.000	2.000	0.045	0.030	-	18.000	15.000	3.000	-	-	0.100
063	0.028	0.420	1.550	0.022	0.023	-	17.060	10.470	2.000	-	-	0.080
063	0.023	0.430	1.620	0.027	0.026	-	17.170	10.190	2.050	-	-	0.080
064	0.018	0.360	1.700	0.027	0.025	-	17.510	10.200	2.070	-	-	0.080
065	0.023	0.430	1.620	0.027	0.026	-	17.170	10.190	2.050	-	-	0.080
066	0.010	0.360	1.620	0.035	0.028	-	16.340	10.310	2.100	-	-	0.100
067	0.022	0.330	1.610	0.028	0.025	-	16.700	10.050	2.030	-	-	0.038
074	0.018	0.270	1.650	0.029	0.025	-	16.600	10.150	2.120	-	-	0.035

ITEM	MECHANICAL TEST					Remark: SOLUTION TREATED : 1040 °C, W Q CONFORMS TO NACE MR0175-2003 STEEL MARKING PROCESS : ELECTRIC FURNACE MERCURY FREE
	Tensile Strength (KSI)	Yield Strength (KSI)	Elongation (%)	R of A (%)	Hardness (HB)	
Min	75.0	30.0	30.0	50.0	-	
Max	-	-	-	-	235	

063	78.1	33.8	61.0	75.4	156	WE CERTIFY THE ABOVE MENTIONED FITTINGS HAVE BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH THE SPECIFICATIONS SHOWN   Q.C. MANAGER SHENG CHENG LBE
063	78.5	32.3	62.6	77.4	152	
064	83.4	40.3	61.6	76.2	163	
065	78.5	32.3	62.6	77.4	152	
066	76.9	33.7	62.0	77.6	149	
067	84.2	41.2	58.4	73.0	163	
074	84.3	42.6	55.0	74.6	167	

Crane Packing Station: 886-7-371-0497, 886-7-371-1536, 886-7-372-0260



**柏緯鋼鐵有限公司**  
 高雄縣仁武鄉烏林村仁心路 303 號  
**BOTH-WELL STEEL FITTINGS CO., LTD.**

NO.303, JEN-HSIN ROAD JEN-WU HSIANG  
 KAOHSIUNG HSIEN, TAIWAN R.O.C.(81405)  
 TEL: (07) 371-0497, 371-1536, 372-0260 FAX: (886-7) 371-3864, 371-3882  
 WEB SITE: http://www.bothwell.com.tw E-MAIL: bothwell@www.bothwell.com.tw or bax@mail.bothwell.com.tw



**MILL TEST & INSPECTION CERTIFICATE**

ACCORDING TO EN10204/DIN50049/3 1 B

ORIGIN: TAIWAN

CUSTOMER: CRANE SUPPLY  
 CERT NO: 62842



ORDER NO: 0003 231183

INVOICE NO: BW069510023  
 L/C NO:

DATE: 12/27/06  
 PAGE: 4

ITEM	RAW MATERIAL HEAT NO	BOTH WELL HT CD	DESCRIPTION	QUANTITY	SPECIFICATION: ASTM / ASME A/SA 105N -03 DIMENSION: ASME B16 11 2001 SURFACE: BY VISUAL GOOD
019	9T064	2393	CROSS 2" 2000# NPT	4 PC	
020	387631	2544	90D ELBOW 3/8" 3000# NPT	50 PC	
021	386151	2482	90D ELBOW 1/2" 3000# NPT	700 PC	
022	387359	2524	90D ELBOW 3/4" 3000# NPT	550 PC	
023	388842	2572	90D ELBOW 1" 3000# NPT	1000 PC	
024	387939	2555	90D ELBOW 1-1/2" 3000# NPT	100 PC	
025	6202060825	AB083	90D ELBOW 2" 3000# NPT	100 PC	

ITEM	CHEMICAL COMPOSITION (%)											
	C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V	Cb(Nb)	N
Min	-	0.100	0.600	-	-	-	-	-	-	-	-	-
Max	0.350	0.350	1.050	0.035	0.040	0.400	0.300	0.400	0.120	0.050	0.020	-
019	0.190	0.210	0.930	0.014	0.007	0.070	0.090	0.030	0.010	0.003	0.010	-
020	0.200	0.200	0.860	0.013	0.012	0.110	0.110	0.070	0.020	0.003	0.003	-
021	0.200	0.190	0.840	0.015	0.007	0.120	0.090	0.050	0.020	0.002	0.001	-
022	0.200	0.200	0.860	0.014	0.007	0.110	0.080	0.040	0.020	0.003	0.002	-
023	0.210	0.200	0.840	0.021	0.011	0.130	0.100	0.050	0.010	0.002	0.003	-
024	0.190	0.200	0.830	0.015	0.011	0.140	0.080	0.040	0.010	0.002	0.003	-
025	0.200	0.230	0.870	0.011	0.016	0.070	0.060	0.030	0.020	0.010	0.001	-

ITEM	MECHANICAL TEST					Remark: NORMALIZED : 850°C
	Tensile Strength (KSI)	Yield Strength (KSI)	Elongation (%)	R of A (%)	Hardness (HB)	
Min	70.0	36.0	22.0	30.0	-	WE CERTIFY THE ABOVE MENTIONED FITTINGS HAVE BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH THE SPECIFICATIONS SHOWN   Q C MANAGER SHENG-CHENG LEE
Max	-	-	-	-	187	
019	79.6	62.3	32.4	67.3	156	
020	78.3	60.5	31.0	64.1	143	
021	76.7	59.2	32.0	63.0	145	
022	78.7	58.6	29.2	63.2	143	
023	78.6	58.5	29.2	64.1	143	
024	78.5	61.5	29.2	64.1	142	
025	72.6	42.3	34.6	65.3	143	 INSPECTOR CHUN-CHIEH HUANG

HEAT NUMBER : 2508  
 TRANS AM PIPING PRODUCTS - REV'D BY: *SA*  
 Shipment/Seq #: S 6 - 1642 14

2" CL 3000 FS SCRD 90 ELL  
 A105N



**柏維鐵工股份有限公司**

高雄縣仁武鄉烏林村仁心路 303 號

**BOTH-WELL STEEL FITTINGS CO., LTD.**

NO.303, JEN HSIN ROAD JEN-WU HSIANG

KAHSIUNG HSIEN, TAIWAN R.O.C (81405)

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An ISO-9001 Registered Manufacturer



**MILL TEST & INSPECTION CERTIFICATE**

ACCORDING TO EN10204/DIN50049/3.1 B

ORIGIN: TAIWAN

CUSTOMER: TRANS AM

INVOICE NO: BW069507100

DATE: 11/04/06

CERT NO: 62304

ORDER NO: 5878(CI-06-512)

L/C NO:

PAGE: 4

ITEM	RAW MATERIAL HEAT NO.	BOTH WELL HT. CD.	DESCRIPTION	QUANTITY	SPECIFICATION: ASTM / ASME A/SA 105N 03  DIMENSION: ASME B16.11 2001  SURFACE: BY VISUAL...GOOD
009	6202068527	AB057	90D ELBOW 1" 3000# NPT		
009	6202080212	AB024	90D ELBOW 1" 3000# NPT		
010	386635	2498	90D ELBOW 2" 3000# NPT		
010	387834	2508	90D ELBOW 2" 3000# NPT		
010	387635	2527	90D ELBOW 2" 3000# NPT		
011	381658	2398	TEE 1/4" 3000# NPT		
012	386150	2485	TEE 1/2" 3000# NPT		

**CHEMICAL COMPOSITION (%)**

ITEM	C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V	Co(Nb)	CE
Min	-	0.180	0.600	-	-	-	-	-	-	-	-	-
Max	0.350	0.350	1.050	0.035	0.040	0.400	0.300	0.400	0.120	0.050	0.020	0.430
009	0.200	0.220	0.850	0.013	0.013	0.120	0.950	0.040	0.010	0.010	0.003	0.365
009	0.190	0.230	0.890	0.012	0.011	0.130	0.930	0.040	0.020	0.001	0.001	0.360
010	0.230	0.180	0.870	0.015	0.014	0.150	0.160	0.060	0.020	0.002	0.000	0.413
010	0.210	0.198	0.860	0.014	0.011	0.090	0.080	0.040	0.010	0.002	0.000	0.380
010	0.190	0.200	0.850	0.012	0.008	0.090	0.110	0.080	0.010	0.003	0.004	0.368
011	0.200	0.200	0.840	0.018	0.012	0.110	0.080	0.060	0.020	0.001	0.002	0.372
012	0.200	0.190	0.840	0.013	0.008	0.110	0.080	0.050	0.010	0.001	0.000	0.365

**MECHANICAL TEST**

ITEM	MECHANICAL TEST					Remark: NORMALIZED : 850 °C CONFORMS TO NACE MR0175-2003/MR0103. STEEL MAKING PROCESS: ELECTRIC FURNACE
	Tensile Strength (KSI)	Yield Strength (KSI)	Elongation (%)	R of A (%)	Hardness (HB)	
Min	70.0	36.0	22.0	30.0	-	
Max	-	-	-	-	187	
009	76.3	45.0	30.2	64.0	145	WE CERTIFY THE ABOVE MENTIONED FITTINGS HAVE BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH THE SPECIFICATIONS SHOWN  <i>S.C. Lee</i> <i>C.C. Huang</i> ----- Q.C. MANAGER      INSPECTOR SHENG CHENG LEE      CHUN CHYEH HUANG
009	72.8	52.6	32.6	66.8	143	
010	76.9	58.4	30.4	63.0	142	
010	77.8	57.5	32.8	64.0	141	
010	77.3	60.5	30.0	64.0	141	
011	78.6	49.7	30.0	63.9	142	
012	76.8	57.2	31.4	63.9	143	

BW-D0839 REV:0

304690 ABS

HEAT NUMBER : 2557

TRANS AM PIPING PRODUCTS - REV'D BY: *AB*  
 Shipment/Seq #: S 7 - 1010 6

2" CL 3000 FS SCR'D 90 ELL  
 A105N



**柏緯鋼鐵股份有限公司**

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An ISO-9001 Registered Manufacturer



**MILL TEST & INSPECTION CERTIFICATE**

ACCORDING TO EN10204/DIN50049/3 1 B

ORIGIN: TAIWAN

CUSTOMER: TRANS AM

CERI NO: 62303

ORDER NO: 5888(CI-06 838)

INVOICE NO: BW069509067

I/C NO:

DATE: 01/03/07

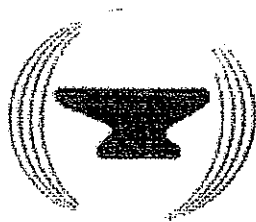
PAGE: 4

ITEM	RAW MATERIAL HEAT NO	BOTH WELD HT. CD.	DESCRIPTION	QUANTITY	SPECIFICATION: ASTM / ASME A/SA 105N .03 DIMENSION: ASME B16.11 2001 SURFACE: BY VISUAL... GOOD
012	6202060828	AB081	90D ELBOW 1-1/2" 3000# NPT		
012	6202060826	AB091	90D ELBOW 1-1/2" 3000# NPT		
012	6202060826	AB086	90D ELBOW 1-1/2" 3000# NPT		
013	388169	2557	90D ELBOW 2" 3000# NPT		
014	388011	2560	TEE 1" 3000# NPT		
014	388839	2571	TEE 1" 3000# NPT		
015	387636	2528	TEE 2" 3000# NPT		

ITEM	CHEMICAL COMPOSITION (%)											
	C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V	Co(Nb)	CE
Min	-	0.100	0.500	-	-	-	-	-	-	-	-	-
Max	0.350	0.350	1.050	0.035	0.040	0.400	0.300	0.400	0.120	0.050	0.020	0.430
012	0.190	0.180	0.850	0.010	0.020	0.160	0.050	0.060	0.020	0.010	0.001	0.358
012	0.200	0.190	0.890	0.011	0.018	0.120	0.050	0.040	0.020	0.010	0.001	0.375
012	0.210	0.220	0.960	0.014	0.019	0.120	0.050	0.020	0.020	0.010	0.001	0.385
013	0.210	0.220	0.870	0.017	0.009	0.130	0.080	0.050	0.010	0.003	0.000	0.386
014	0.190	0.190	0.820	0.023	0.011	0.140	0.100	0.040	0.018	0.004	0.002	0.361
014	0.200	0.190	0.850	0.019	0.009	0.120	0.120	0.050	0.020	0.002	0.002	0.381
015	0.190	0.180	0.850	0.015	0.008	0.080	0.090	0.070	0.010	0.002	0.002	0.362

ITEM	MECHANICAL TEST					Remark: NORMALIZED : 850°C CONFORMS TO NACE MR0175/0103-2903 STEEL MAKING PROCESS: ELECTRIC FURNACE
	Tensile Strength (KSI)	Yield Strength (KSI)	Elongation (%)	R of A (%)	Hardness (HB)	
Min	70.0	36.0	22.0	30.0	-	
Max	-	-	-	-	187	
012	70.6	38.1	30.8	64.7	142	WE CERTIFY THE ABOVE MENTIONED FITTINGS HAVE BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH THE SPECIFICATIONS SHOWN  <i>S.C. Lee</i> <i>C.C. Huang</i> Q.C. MANAGER      INSPECTOR SHENG CHENG LEE      CHUN CHIH HUANG
012	73.5	46.9	34.0	65.9	145	
012	72.5	43.4	31.4	60.1	144	
013	78.1	59.9	30.8	63.3	141	
014	78.1	58.1	32.0	64.3	142	
014	77.5	60.2	30.8	64.1	142	
015	78.4	58.3	28.4	63.2	141	

BW-D0839 REV:0



**ANVIL**  
INTERNATIONAL, INC



Simcoe, Ontario  
Edmonton, Alberta  
Montreal, Quebec

## Certificate of Test

Part Number: F32031 Description: 2 3M I-ID 105N  
 Heat Code: 2304  
 Reference No :  
 Specification: ASTM A105/ASME SA105  
 TO ASTM A 105/A 105M - 03  
 Fitting Trademark: CANVIL

### Chemical Analysis %

Heat No.	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb/Nb
9I049	0.20	0.91	0.013	0.007	0.18	0.06	0.04	0.05	0.01	<0.01	
CE (LONG FORMULA) = 0.38											

### Mechanical Properties

Yield Strength	Tensile Strength	Elongation % 2	Reduction Area	Hardness BHN
psi 50,900	psi 73,900	32.60	68.70	140
MPa 000	MPa 000			
Heat Treatment: N NORMALIZED				

We certify that this is a true and correct copy of the mill certificate, issued by the manufacturer of the steel employed or the laboratory which has determined it, as retained in the records of the company. We make no representation beyond those of the manufacturer or its agent.



# 柏緯鐵工股份有限公司

高雄縣仁武鄉烏林村仁心路 303 號

## BOTH-WELL STEEL FITTINGS CO., LTD.

NO.303, JEN-HSIN ROAD JEN-WU HSIANG  
KAOHSIUNG HSIEN, TAIWAN R.O.C (81460)

TEL: (07) 371-0497, 371-1536, 372-0260 FAX: (886-7) 371-3864, 371-3882

WEB SITE: <http://www.bothwell.com.tw> E-MAIL: [bothwell@www.bothwell.com.tw](mailto:bothwell@www.bothwell.com.tw) or [box@mail.bothwell.com.tw](mailto:box@mail.bothwell.com.tw)

An ISO-9001 Registered Manufacturer



### MILL TEST & INSPECTION CERTIFICATE

ACCORDING TO EN10204/DIN50049/3 I.B

CUSTOMER: CRANE SUPPLY

INVOICE NO: BW059404073

DATE: 08/04/05

CERT NO: 51425

ORDER NO: 0003-076110

L/C NO:


PAGE: 10

ITEM	RAW MATERIAL HEAT NO	BOTH WELL HT CD	DESCRIPTION	QUANTITY	SPECIFICATION: ASTM / ASME A/SA 105N-03 DIMENSION: ASME B16.11 - 2001 SURFACE: BY VISUAL GOOD
033	376425	2230	45D ELBOW 2" 3000# NPT	20 PC	
038	377619	2273	TEE 1/2" 3000# NPT	1000 PC	
039	379191	2316	TEE 3/4" 3000# NPT	200 PC	
040	378226	2297	TEE 1" 3000# NPT	519 PC	
040	377048	2264	TEE 1" 3000# NPT	231 PC	
041	375748	2243	TEE 1-1/2" 3000# NPT	20 PC	
042	97068	2266	TEE 2" 3000# NPT	25 PC	

#### CHEMICAL COMPOSITION (%)

ITEM	C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V	Nb	N
Min	-	0.100	0.600	-	-	-	-	-	-	-	-	-
Max	0.350	0.350	1.050	0.035	0.040	0.400	0.300	0.400	0.120	0.080	-	-
033	0.190	0.230	0.880	0.018	0.011	0.220	0.100	0.080	0.010	0.002	0.001	-
038	0.200	0.220	0.860	0.014	0.009	0.140	0.090	0.050	0.010	0.002	0.000	-
039	0.200	0.230	0.890	0.016	0.011	0.150	0.110	0.060	0.020	0.003	0.001	-
040	0.190	0.190	0.860	0.010	0.014	0.120	0.090	0.040	0.020	0.002	0.001	-
040	0.210	0.200	0.870	0.011	0.012	0.190	0.070	0.060	0.010	0.002	0.001	-
041	0.200	0.190	0.830	0.011	0.012	0.230	0.090	0.070	0.010	0.001	0.003	-
042	0.190	0.230	0.930	0.013	0.006	0.060	0.050	0.040	0.010	0.003	0.010	-

#### MECHANICAL TEST

ITEM	MECHANICAL TEST					Remark: NORMALIZED : 850°C
	Tensile Strength (KSI)	Yield Strength (KSI)	Elongation (%)	R of A (%)	Hardness (HB)	
Min	70.0	36.0	22.0	30.0	-	WE CERTIFY THE ABOVE MENTIONED FITTINGS HAVE BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH THE SPECIFICATIONS SHOWN   Q.C. MANAGER SHENG CHNG LEE
Max	-	-	-	-	187	
033	80.0	58.6	30.8	65.6	141	
038	79.5	58.7	32.4	65.1	143	
039	80.0	55.1	30.0	65.9	143	
040	79.1	58.9	29.4	64.9	142	
040	80.3	59.3	34.4	65.8	142	
041	75.2	51.0	32.0	62.0	140	
042	76.2	53.8	34.0	67.5	140	



**拾錄鐵工股份有限公司**  
 高雄縣仁武鄉烏林村仁心路 303 號  
**BOTH-WELL STEEL FITTINGS CO., LTD.**  
 ROAD JEN-WU HSIANG  
 TAIWAN R.O.C (81460)

An ISO-9001 Registered Manufacturer



**MILL TEST & INSPECTION CERTIFICATE**

ACCORDING TO EN10204/DIN50049/3 LB

ORIGIN: TAIWAN  
 DATE: 09/01/06  
 PAGE: 3

CUSTOMER: CRANE SUPPLY HAMILTON  
 CERT NO: 61785 ORDER NO: 0008 201670

INVOICE NO: BW069585013  
 L/C NO:

ITEM	RAW MATERIAL HEAT NO	BOTH WELL HT CD	DESCRIPTION	QUANTITY	SPECIFICATION: ASTM / ASME A/S A 105N -03 DIMENSION: MSS-SP 83 - 2001 SURFACE: BY VISUAL GOOD
091	382402	2396	UNION 1/4" 3000# NPT	100 PC	
092	382402	2396	UNION 3/8 3000# NPT	200 PC	
093	385897	2468	UNION 1" 3000# NPT	100 PC	
093	380918	2362	UNION 1 3000# NPT	400 PC	
094	382405	2419	UNION 1-1/4" 3000# NPT	200 PC	
095	384299	2435	UNION 1-1/2" 3000# NPT	100 PC	
096	385904	2474	UNION 2" 3000# NPT	400 PC	

**CHEMICAL COMPOSITION (%)**

ITEM	C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V	Cb(Nb)	N
Min	-	0.100	0.600	-	-	-	-	-	-	-	-	-
Max	0.350	0.350	1.050	0.035	0.040	0.400	0.300	0.400	0.120	0.050	0.020	-
091	0.220	0.200	0.860	0.012	0.010	0.180	0.060	0.040	0.010	0.001	0.003	-
092	0.220	0.200	0.860	0.012	0.010	0.180	0.060	0.040	0.010	0.001	0.003	-
093	0.210	0.190	0.840	0.014	0.010	0.160	0.080	0.070	0.020	0.002	0.004	-
093	0.200	0.200	0.850	0.017	0.014	0.150	0.060	0.050	0.010	0.002	0.001	-
094	0.190	0.190	0.850	0.013	0.010	0.120	0.140	0.050	0.020	0.001	0.004	-
095	0.220	0.220	0.840	0.018	0.009	0.100	0.080	0.040	0.010	0.003	0.002	-
096	0.210	0.200	0.850	0.017	0.010	0.140	0.090	0.050	0.010	0.002	0.002	-

**MECHANICAL TEST**

Remark: NORMALIZED : 850°C

ITEM	Tensile Strength (KSI)	Yield Strength (KSI)	Elongation (%)	R of A (%)	Hardness (HB)
Min	70 0	36 0	22 0	30 0	-
Max	-	-	-	-	187
091	78 6	57 6	30 0	64 9	140
092	78 6	57 6	30 0	64 9	140
093	77 7	56 1	31 2	65 0	145
093	77 6	60 4	32 4	65 0	142
094	78 7	57 3	35 4	63 9	143
095	78 1	56 8	32 0	65 7	149
096	78 2	56 9	28 4	65 1	145

WE CERTIFY THE ABOVE MENTIONED FITTINGS HAVE BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH THE SPECIFICATIONS SHOWN

*S.C. Lee*      *C. H. Huang*  
 Q.C. MANAGER      INSPECTOR  
 SHENG CHENG LEE      CHUN CHIEH HUANG





**INDUSTRIA MECCANICA LIGURE SPA**

10120 CASARZA LIGURE - Genova - Italy - P.zza Marco Capinelli,4 - Tel.010/247661 - Fax 010/646310 / MATERIAL TEST DEPARTMENT This certificate has been generated by computer and need not to be signed for validity according to EN EN 10204

INSPECTION CERTIFICATE BY 10204/2004/31  
 COMPANY WITH QUALITY SYSTEM ISO 9001:2000  
 CERTIFIED BY NQA

MIL (UK) LTD.  
 8/04 2, 1ST FLOOR, Castle House, 51 Broomfield Road  
 NEW BARNET, HERTFORDSHIRE SG9 1PFR

Certificate No: 10204  
 Invoice No: 1114  
 Date: 20 10 2003  
 Date: 19 10 2003  
 Date: 19 10 2006

Page 2 of 2

HEAT CODE	HEAT	ITEM	YOUR P.O.	OUR REFERENCE	QTY	DESCRIPTION	DIM. ACC. TO	VISUAL & DIMENS.												
U04	22489	7	1070	2009-0231-000483-007	225	FITTING UNION 6/8 THIRD NPT 3/4" 1/2" AX/SN PACKAGE NO. 3022-43 CARTONS FOR 6 PCSO 10204/2004/31	SEE NOTE	SATISFACTORY												
HEAT CODE	HEAT	ITEM	MATERIAL	C%	Si%	Mn%	P%	S%	Cr%	Ni%	Mo%	Ti%	Cu%	V%	Nb%	N%	As%	C.E.%	OTHER ELEMENTS	
U04	22489	7	ASTM A105	0.180	0.280	0.050	0.017	0.010	0.090	0.020	0.010	0.007	0.170	0.001	0.002	0.000	0.002	0.002	0.368	
HEAT CODE	HEAT	ITEM	RECT. DIA1	LEGHT mm	RECT. DIA2	LEGHT mm	RECT. DIA3	LEGHT mm	RECT. DIA4	LEGHT mm	RECT. DIA5	LEGHT mm	RECT. DIA6	LEGHT mm	RECT. DIA7	LEGHT mm	RECT. DIA8	LEGHT mm	RECT. DIA9	LEGHT mm
U04	22489	7	122,85	50,00	122,85	50,00	122,85	50,00	122,85	50,00	122,85	50,00	122,85	50,00	122,85	50,00	122,85	50,00	122,85	50,00
HEAT CODE	HEAT	ITEM	MATERIAL IN ACCORDANCE TO		HEAT TREATMENT		FURNACE		STEEL MILL		QUI PRL									
U04	22489	7	ASME SA ASTM A105-05		Normalized at 1800-520°C / Air Cool		ELECTRIC FURNACE LEAL SPA		STEEL MILL		1861270									

NOTES ASME B16.1005 - ANSI B1.1 B31.3 - MIL STD - ANSI B1.1 B18.2.2 - NACE  
 MR0175 ISO 15156-1 - MSS SP 80 - SUPPLIED MATERIAL MEETS  
 SPECIFICATIONS AND P.D. REQUIREMENTS



INSPECTION AUTHORITY  
 QUALITY CONTROL DEPARTMENT  
 SCORIS FIZZOTTI

FITTINGS  
 IMML

STUDSOLITE

2300

# BENTELE


## Stahl/Rohr

Benteler Stahl/Rohr GmbH  
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 33043 Peaceborn  
 Deutschland  
 Tel.: +49 5254 81-0 Fax: +49 5254 13666

**ABNAHMEPRÜFZEUGNIS EN 10204-3.1**  
 INSPECTION CERTIFICATE EN 10204-3.1  
 CERTIFICAT DE RECEPTION EN 10204-3.1  
 EN 10204:2005-01

Benteler Stahl/Rohr GmbH - Postfach 1340 - 33043 Peaceborn - Deutschland  
 Crane Supply Inc.  
 PO Box 5650 A  
 CALGARY, AB T2H 0P2  
 KANADA

**Dokument-Nr.:** 65-262570/001/P  
**Document No.:**  
**Kunden-Bestell-Nr.:** 05-5383  
**Purchase Order No.:**  
**No. de commande du client:**  
**Benteler Auftrags-Nr.:** 1124162  
**Benteler Order No.:**  
**No. de commande Benteler:**  
**Versandanzweigen-Nr.:** 65533633  
**Dispatch Note No.:**  
**No. d'avis d'expédition:**  
**Produkt:** NAHTLOSE STAHLROHRE  
**Product:** SEAMLESS STEEL TUBES  
**Produit:** TUBES D'ACIER SANS SOUDURE

**Prof-Nr.:**  
**Inspection No.:**  
**No. du certificat:**  
**Hersteller:** Warmrohrwerk Dinslaken  
**Manufacturer:** ISO 9001 ISO 9001 DNV CERT-13705-2003  
**Producteur:** PED 87/23/EC TÜV Cert 07 202 4111/ZE001/1R  
**Herstellerzeichen:**   
**Manufacturer's brand:**  
**Marque du producteur:**  
**Stempel des Abnahmebeauftragten:** WA  
**Stamp of the inspection representative:**  
**Timbre du contrôleur:**  
**Stahlerschmelzungsverfahren:** ELEKTROSTAHL  
**Steelmaking process:** ELECTRIC FURNACE  
**Procédé d'élaboration de l'acier:** FOUR ELECTRIQUE

**Lieferbedingungen:** CSA Standard Z245.1-02 Category I, API Specification 5L, March 2004, PSL 1, ASTM-A 106-2002a, S5, ASME SA-106, ASME Section II Part A Edition 2004, S5, NACE MR0175-03  
**Terms of delivery:**  
**Conditions de livraison:**

**Maße - Toleranzen:** ASME B36.10M-1996, ASME SA-530, ASME Section II Part A Edition 2004, ASTM-A 530-2003  
**Dimensions-tolérances:**  
**Dimensions-tolérances:**

**Stahlsorte:** GRADE 280, GRADE B, GRADE X 42  
**Steel grade:**  
**Nuance d'acier:**

**Lieferzustand:** Hot rolled  
**Delivery condition:**  
**État de livraison:**

**Produktkennzeichnung:** see attachment product marking  
**Product marking:**  
**Marquage du produit:**

Pos.	Stück	Maße	Länge	Gewicht	Schmelzen-Nr.	Prüfdruck	Rohr-Nr.-Gruppe	Vielfach
Item	Number	Dimensions	Length	Weight	Heat No.	Test pressure	Tube number group	Multiple
Poste	Nombre	Dimensions	Longueur	Poids	No. de coulée	Pression d'épreuve	Série de no. des tubes	Longueur
			feet	lbs		PSI		
0008	100	1 1/4" NPS * Sched. 80 18 FT - 22 FT	2124,38	6266	735230	3000		5
0009	104	1 1/2" NPS * Sched. 40 18 per 22 per	2117,95	5506	52	4000		

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 JK8 Paderborn  
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# BENTELE

## Stahl/Rohr

ABNAHMEPRÜFZEUGNIS EN 10204-3.1  
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 CERTIFICAT DE RECEPTION EN 10204-3.1

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Pos.	Stück	Masse	Länge	Gewicht	Schmelzen-Nr.	Prüfdruck	Rohr-Nr.-Gruppe	Vielfach
Item	Number	Dimensions	Length	Weight	Heat No.	Test pressure	Tube number group	Multiple
Poste	Nombre	Dimensions	Longueur	Poids	No. de coulée	Pression d'épreuve	Série de no. des tubes	Longueur
			feet	lbs		PSI		
0010	492	1 1/2" NPS * Sched. 80 18 FT - 22 FT	10495,67	38129	735552	3000	5	
0011	48	1 1/2" NPS * Sched. 160 18 FT - 22 FT	1018,80	4941	735443	3000	5	
0012	100	2" NPS * Sched. 40 18 FT - 22 FT	2081,63	7533	735198	3000	5	
0013	268	2" NPS * Sched. 80 18 FT - 22 FT	5267,06	26416	735457	3000	5	
0014	238	3" NPS * Sched. 40 18 FT - 22 FT	5008,10	37554	526033	3000	5	
0015	191	4" NPS * Sched. 40 18 FT - 22 FT	4125,92	45517	735287	3000	5	
0017	126	2" NPS * Sched. 80 38 FT - 42 FT	5257,02	26497	735547	3000	5	
0018	95	4" NPS * Sched. 40 38 FT - 42 FT	3801,48	41928	735320	3000	5	

Schmelzenanalyse [%] / Heat analysis [%] / Analyse sur coulée [%]

Pos.	Schmelzen-Nr.	C	SI	MIN	P	S	CR	MO	NI	CU	V	NB	TI	B
Item	Heat No.													
Poste	No. de coulée													
0008	735230	0,135	0,210	0,84	0,008	0,005	0,13	0,04	0,13	0,17	0,001	0,010	0,003	0,
0009	526018	0,140	0,210	0,82	0,010	0,004	0,13	0,03	0,12	0,17	0,001	0,010	0,003	0,
0010	735532	0,140	0,230	0,81	0,011	0,004	0,15	0,06	0,13	0,16	0,001	0,010	0,003	0,
0011	735444	0,130	0,185	0,81	0,005	0,001	0,09	0,02	0,06	0,10	0,001	0,010	0,003	0,
0012	735198	0,130	0,220	0,83	0,008	0,006	0,11	0,04	0,10	0,14	0,001	0,010	0,002	0,
0013	735457	0,130	0,195	0,83	0,009	0,005	0,09	0,03	0,10	0,12	0,001	0,010	0,004	0,
0014	526031	0,130	0,200	0,82	0,006	0,001	0,12	0,04	0,11	0,18	0,001	0,010	0,003	0,
0015	735287	0,130	0,200	0,82	0,007	0,007	0,11	0,01	0,10	0,08	0,001	0,010	0,003	0,

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**BENTELE**  
 Stahl/Rohr

ABNAHMEPRÜFZEUGNIS EN 10204-3.1 Dokument-Nr.: 65-262570/001/P  
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Schmelzenanalyse [%] / Heat analysis [%] / Analyse sur coulée [%]

Pos.	Schmelzen-Nr.	C	SI	MN	P	S	CR	MO	NI	CU	V	NB	TI	B
Item	Heat No.													
Poste	No. de coulée													
0017	735547	0,135	0,215	0,80	0,010	0,003	0,18	0,08	0,13	0,17	0,001	0,010	0,003	0,
0018	735320	0,135	0,210	0,83	0,010	0,003	0,15	0,04	0,13	0,18	0,002	0,010	0,003	0,

1. Formel:  $CE\ IIW = C + (Mn/6) + (Cr + Mo + V)/5 + ((Cu + Ni)/15) \leq 0,40\%$
2. Formel:  $CEV = C + F + ((Mn/6) + (Si/24) + (Cu/15) + (Ni/20) + ((Cr + Mo + V + Nb)/5) + (5 * B)) \leq 0,40\%$
3. Formel:  $Mn/Cs \leq 3/1$
4. Formel:  $Cr + Cu + Mo + Ni + V \leq 1,00\%$

Formelergebnisse / Formula results / Résultats des formules

Pos.	Schmelzen-Nr.	1. Formel	2. Formel	3. Formel	4. Formel
Item	Heat No.	1. Formula	2. Formula	3. Formula	4. Formula
Poste	No. de coulée	1. Formule	2. Formule	3. Formule	4. Formule
0008	735230	0,329	0,308	6,222	0,471
0009	521018	0,328	0,308	5,857	0,451
0010	735552	0,337	0,315	5,786	0,501
0011	735443	0,298	0,272	6,231	0,271
0012	735198	0,315	0,286	6,385	0,391
0013	735457	0,305	0,278	6,385	0,311
0014	526033	0,318	0,288	6,308	0,451
0015	735287	0,307	0,279	6,308	0,301
0017	735547	0,341	0,318	5,926	0,561
0018	733320	0,332	0,311	6,148	0,502

Produktanalyse [%] / Product analysis [%] / Analyse sur produit [%]

Pos.	Schmelzen-Nr.	C	SI	MN	P	S	CR	MO	NI	CU	V	NB	TI	B
Item	Heat No.													
Poste	No. de coulée													
0008	735230	0,130	0,200	0,82	0,009	0,006	0,11	0,04	0,10	0,12	0,002	0,010	0,003	0,
0008	735236	0,130	0,200	0,81	0,009	0,006	0,11	0,04	0,10	0,12	0,002	0,010	0,003	0,

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**BENTELEI**  
 Stahl/Rohr

ABNAHMEPRÜFZEUGNIS EN 10204-3.1

65-262570/001/P

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INSPECTION CERTIFICATE EN 10204-3.1  
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 Produktanalyse [%] / Product analysis [%] / Analyse sur produit [%]

Pos.	Schmelzen-Nr.	C	SI	MIN	P	S	CR	MO	NI	CU	V	NB	TI	B
Item	Heat No.													
Poste	No. de coulée													
0009	526018	0,140	0,200	0,81	0,009	0,004	0,12	0,04	0,11	0,16	0,001	0,010	0,002	0,
0009	526018	0,140	0,210	0,82	0,009	0,005	0,13	0,04	0,12	0,16	0,001	0,010	0,002	0,
0010	735552	0,130	0,210	0,80	0,012	0,004	0,11	0,04	0,14	0,14	0,001	0,010	0,002	0,
0010	735552	0,130	0,210	0,80	0,012	0,003	0,11	0,04	0,14	0,14	0,001	0,010	0,002	0,
0011	735443	0,140	0,170	0,87	0,007	0,002	0,07	0,02	0,06	0,09	0,001	0,010	0,002	0,
0011	731143	0,130	0,170	0,87	0,007	0,002	0,05	0,02	0,06	0,10	0,001	0,010	0,002	0,
0012	735 98	0,140	0,190	0,81	0,010	0,008	0,11	0,04	0,09	0,13	0,002	0,010	0,002	0,
0012	73 98	0,130	0,200	0,81	0,010	0,006	0,11	0,04	0,10	0,13	0,002	0,010	0,003	0,
0013	731 57	0,140	0,190	0,81	0,011	0,005	0,09	0,03	0,08	0,14	0,001	0,010	0,003	0,
0013	731 57	0,140	0,190	0,81	0,011	0,005	0,09	0,03	0,08	0,14	0,001	0,010	0,003	0,
0014	526033	0,130	0,200	0,82	0,011	0,005	0,09	0,03	0,08	0,14	0,001	0,010	0,002	0,
0014	526033	0,130	0,200	0,82	0,009	0,002	0,10	0,04	0,11	0,18	0,001	0,010	0,002	0,
0015	735287	0,130	0,200	0,82	0,009	0,002	0,10	0,04	0,11	0,18	0,001	0,010	0,001	0,
0015	735287	0,130	0,190	0,83	0,007	0,006	0,13	0,04	0,06	0,08	0,002	0,010	0,002	0,
0017	735547	0,130	0,210	0,80	0,012	0,005	0,13	0,04	0,06	0,08	0,002	0,010	0,002	0,
0017	735547	0,130	0,210	0,80	0,012	0,004	0,11	0,04	0,14	0,14	0,001	0,010	0,002	0,
0018	735320	0,140	0,200	0,81	0,012	0,003	0,11	0,04	0,14	0,14	0,001	0,010	0,002	0,
0018	735320	0,130	0,200	0,81	0,008	0,003	0,12	0,04	0,14	0,18	0,002	0,010	0,002	0,
					0,008	0,003	0,12	0,04	0,14	0,18	0,002	0,010	0,002	0,

1. Formel:  $CE \leq W-C+(Mn/6)+((Cr+Mo+V)/5)+((Cu+Ni)/15) \leq 0,40 \%$
2. Formel:  $CEV=C+F*((Mn/6)+(Si/24)+(Cu/15)+(Ni/20))+((Cr+Mo+V+Nb)/5) + (5*B) \leq 0,40$
3. Formel:  $Mn/C \geq 3/1$
4. Formel:  $Cr+Cu+Mo+Ni+V \leq 1,00 \%$

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**BENTELE**  
 Stahl/Rohr

**ABNAHMEPRÜFZEUGNIS EN 10204-3.1**  
 INSPECTION CERTIFICATE EN 10204-3.1  
 CERTIFICAT DE RECEPTION EN 10204-3.1

Dokument-Nr.: 65-282570/001/P  
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Formelergebnisse / Formula results / Résultats des formules

Pos. Item	Schmelzen-Nr. Heat No.	1. Formel 1. Formula		2. Formel 2. Formula		3. Formel 3. Formula		4. Formel 4. Formula	
		i. Formule	0,312	0,283	0,305	0,283	0,308	0,283	0,308
0008	735230	0,310	0,281	0,305	0,283	0,308	0,283	0,308	0,372
0009	526018	0,325	0,305	0,309	0,283	5,786	0,431	0,431	
0010	735552	0,312	0,283	0,283	0,283	5,857	0,451	0,431	
0011	735443	0,313	0,295	0,273	0,283	6,154	0,431	0,431	
0011	735443	0,300	0,273	0,295	0,283	6,154	0,431	0,431	
0012	735198	0,320	0,301	0,273	0,283	6,214	0,241	0,241	
0012	735198	0,311	0,282	0,301	0,282	6,592	0,231	0,231	
0013	735457	0,314	0,296	0,296	0,282	5,786	0,382	0,382	
0013	735457	0,316	0,298	0,298	0,296	5,786	0,341	0,341	
0014	525033	0,314	0,285	0,285	0,298	5,857	0,342	0,342	
0014	525033	0,314	0,285	0,285	0,285	6,308	0,431	0,431	
0015	735287	0,312	0,283	0,285	0,285	6,308	0,431	0,431	
0015	735287	0,312	0,283	0,283	0,283	6,385	0,312	0,312	
0017	735547	0,312	0,283	0,283	0,283	6,385	0,312	0,312	
0017	735547	0,312	0,283	0,283	0,283	6,154	0,431	0,431	
0018	715320	0,329	0,308	0,283	0,283	6,154	0,431	0,431	
0018	735320	0,319	0,288	0,308	0,308	5,786	0,482	0,482	
0018	735320	0,319	0,288	0,288	0,288	6,231	0,482	0,482	

Prüfergebnisse / Test results / Résultats des essais

Die Röhre sind auf Dichtheit geprüft durch:

The tubes have been submitted to a leak tightness test by:

Les tubes ont passé un contrôle d'étanchéité par:

Hydrostatic test: acc. to CSA Z245.1, holding time min 5 seconds, Test pressure/Time-record

PASSEI

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# BENTELE

## Stahl/Rohr

**ABNAHMEPRÜFZEUGNIS EN 10204-3.1**      **Dokument-Nr.:** 65-262570/001/P      **Prüf-Nr.:** Blatt: 6  
**INSPECTION CERTIFICATE EN 10204-3.1**      **Document No.:**      **Inspection No.:** Page:      **Page:**  
**CERTIFICAT DE RECEPTION EN 10204-3.1**      **No. du document:**      **No. du certificat**      **Page:**

**Augensichtkontrolle:** PASSED      **Biegeversuch:** PASSED      **Maßkontrolle:** PASSEI  
**Visual inspection:**      **Bending test:**      **Dimensions examination:**  
**Examen visuel:**      **Essai de cintrage:**      **Vérification des dimensions:**  
**Pos. / Item / Poste:** 0008, 0009, 0010, 0011, 0012, 0013, 0017

**Ringflattversuch:** PASSED  
**Flattening test:**  
**Essai d'aplatissement:**  
**Pos. / Item / Poste:** 0014, 0015, 0018

**Ergebnisse der mechanischen Prüfung / Results of mechanical testing / Résultats des essais mécaniques**  
**Die Probenahme erfolgte an Vieltachlängen.**  
**The sampling was carried out on multiple lengths.**  
**L'échantillonnage était réalisé aux longueurs multiples.**

Zugversuch / Tensile test / Essai de traction

Pos. Item Poste	Proben-Nr. Specimen No. No. de l'éprouvette	Schmelzen-Nr. Heat No. No. de coulée	Probenabmessung Specimen dimensions Dimensions de l'éprouv.	Streckgrenze		Zugfestigkeit Tensile strength Résistance à la traction	Dehnung Elongation Allongement	Einschnürung Area reduction Coefficient de striction	Rt Re Ro
				Yield strength Limite élastique	Rm				
0008	000001	735230	12,60 X 5,10	52504	60191-110229	71504	32,00		
0008	000002	735230	12,60 X 5,30	50908		69763	34,00		
0009	000001	526018	12,70 X 3,60	56710		70488	38,00		
0009	000002	526018	12,70 X 3,60	57435		71649	35,00		
0010	000001	735552	12,70 X 5,10	50763		68748	35,00		
0010	000002	735552	12,70 X 5,10	51408		69038	35,00		
0011	000001	735443	12,70 X 7,20	47717		67298	44,00		
0011	000002	735443	12,70 X 7,20	47863		66137	44,00		
0012	000001	735198	19,00 X 3,80	57290		70343	35,00		
0012	000002	735198	19,00 X 3,80	56855		71214	37,00		
0013	000001	735457	19,20 X 3,90	49603		58312	44,00		

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Stahl/Rohr

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Zugversuch / Tensile test / Essai de traction

Dokument-Nr.: 65-262570/001/P

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Pos.	Proben-Nr.	Schmelzen-Nr.	Probenabmessung	Streckgrenze	Zugfestigkeit	Dehnung	Einschnürung
Item	Specimen No.	Heat No.	Specimen dimensions	Yield strength	Tensile strength	Elongation	Area reduction
Poste	No. de l'éprouvette	No. de coulée	Dimensions de l'éprouv.	Limite élastique	Résistance à la traction	Allongement	Coefficient de striction
Anforderungen	mm	ReH	Rm	A2%	1. Formel		
Requirements	mm	PSI	PSI	%	1. Formula		
Exigences		42061-71794	80191-110229	MIN 30	1. Formula		
0013	000002	735457	19,20 X 6,00	49458	68313	36,00	
0013	000003	735457	19,20 X 5,90	50038	69038	36,00	
0013	000004	735457	19,20 X 6,70	50908	68458	40,00	
0013	000005	735457	19,20 X 5,60	48008	67733	34,00	
0013	000006	735457	19,20 X 5,80	51053	69473	38,00	
0014	000001	526033	25,40 X 5,50	51198	70488	42,00	
0014	000002	526033	25,40 X 5,50	50763	69618	37,00	
0015	000001	735287	25,40 X 6,00	49748	65847	40,00	
0015	000002	735287	25,40 X 6,00	50038	66427	41,00	
0017	000001	735547	19,00 X 5,50	51198	68458	34,00	
0017	000002	735547	19,00 X 5,50	51053	68748	35,00	
0018	000001	735320	25,60 X 6,10	51198	69908	40,00	
0018	000002	735320	25,60 X 6,30	51053	67878	38,00	

**Härteprüfung / Hardness test / Essai de dureté**

Pos.	Proben-Nr.	Schmelzen-Nr.	Härte
Item	Specimen No.	Heat No.	Hardness
Poste	No. de l'éprouv.	No. de coulée	Dureté

Anforderungen HRC HB HV HRB

Requirements  
Exigences

0008	000001	735230	MAX 200
0009	000001	526018	138
0010	000001	735552	146
0011	000001	73544	142
			144



Benteler Stahl/Rohr GmbH  
 Postfach 13 40  
 33043 Paderborn  
 Deutschland  
 Tel.: +49.5254.81-0 Fax: +49.5254.13686

**BENTELE**  
 Stahl/Rohr

ABNAHMEPRÜFZEUGNIS EN 10204-3.1      Dokument-Nr.: 65-262570/001/P      PRÜF-Nr.:  
 INSPECTION CERTIFICATE EN 10204-3.1      Document No.:      Inspection No.:  
 CERTIFICAT DE RECEPTION EN 10204-3.1      No. du document:      No. du certificat:

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 Page:  
 Page:

Härtprüfung / Hardness test / Essai de dureté

Pos.	Proben-Nr.	Schmelzen-Nr.	Härte			
Item	Specimen No.	Heat No.	Hardness			
Poste	No. de l'éprouv.	No. de coulée	Dureté			
Anforderungen			HRC	HB	HV	HRB
Requirements						
Exigences				MAX 200		
0012	000001	735198		145		
0013	000001	735457		133		
0013	000002	735457		136		
0013	000003	735457		136		
0013	000004	735457		137		
0013	000005	735457		136		
0013	000006	735457		135		
0014	000001	526033		156		
0015	000001	735287		148		
0017	000001	735547		145		
0018	000001	735320		145		

Resmagnetismus (Demagnetize / Démagnétiser)  
 residual magnetic field intensity max 3,5 millitesla

Pos.	Ihr Zeichen	Kundenmaterial	Kundenbestell-Nr.
Item	Your reference	Customer's Material No.	Purchase Order No.
Poste	Votre référence	No. de matière du client	No. de commande du client
0008		P.O. 0003-043474	05-5383
0009		P.O. 0003-043474	05-5383
0010		P.O. 0003-043474	05-5383
0011		P.O. 0003-043474	05-5383
0012		P.O. 0003-043474	05-5383
0013		P.O. 0003-043474	05-5383



# BENTELE

Stahl/Rohr

Benteler Stahl/Rohr GmbH  
Postfach 1340  
53043 Paderborn  
Deutschland  
Tel.: +49 5254 81-0 Fax: +49 5254 13665

**ABNAHMEPRÜFZEUGNIS EN 10204-3.1**  
**INSPECTION CERTIFICATE EN 10204-3.1**  
**CERTIFICAT DE RECEPTION EN 10204-3.1**

65-262570/001/P

Dokument-Nr.:  
Document No.:  
No. du document:

Prüf-Nr.:  
Inspection No.:  
No. du certificat:

Blatt: 10  
Page:  
Page:

Dinslaken, 06.04.2005, TEL.: 02064-623-571 FAX: 02064-623-575

It is hereby certified, that the mentioned products comply with the order specification. This document was prepared by means of electronic data processing and is valid without signature.  
Nous attestons que les produits livrés sont conformes aux stipulations de la commande. Ce document a été établi par traitement électronique et est valide sans signature.



Abnahmebeauftragter  
Inspection representative

Contrôleur

JAN FREERKS / WIL

2 Sch 80

TUBULAR PRODUCTS  
CERTIFIED TEST REPORT

TIME: 11:02:31  
SERIAL NO:

(TYPE B - IN ACCORDANCE WITH ISO 10474/EN10204/DIN50049 3.1.1b)

MILL ORDER/ITEM NO. TT08204 11	SHIPPER'S NO.	VEHICLE ID.	VENDOR
SOLD TO ADDRESS CRANE SUPPLY DIV OF CRANF CANADA CO 324 58TH AVE SE CALGARY AB T2H 0P2	MAIL TO ADDRESS 0003-086153	USS TUBULAR PRODUCTS 2199 EAST 28TH ST. LORAIN, OH 44055	

SPECIFICATION AND GRADE

PIPE CARBON SMLS STD PIPE API 5L-X43RD EDITION DATED 3/04 PSL-1 GRADE B AND GRADE X42 ASTM A53-X02 ASTM A106-X02A GRADE B QUAD STENCIL ASME SA53-X2001 EDITION 2003 ADDENDA ASME SA106-X2001 EDITION 2003 ADDENDA GRADE B BLK REG MILL COAT PE BEV 30 DEG MEETING ALL THE APPLICABLE REQUIREMENTS OF NACE STANDARD MR-01-75 X2002

MATERIAL COND: AS ROLLED	YIELD	TENSILE	Y/T	ELONG %	HARDNESS	MIN HYDRO	WELL (SEC)
	MIN: 42000 MAX: 51500	MIN: 70000 MAX: 77500	MIN: 0.66 MAX: 0.67	MIN: 22.0 MAX: 37.0	MIN: 99.0 MAX: 86.3	3000	5
PRODUCT IDENTIFICATION A85768 CH0002	GAUGE WIDTH IN MIN: 0.750 MAX: 0.750	EXT % .50					

PRODUCT IDENTIFICATION	T - TRANSVERSE N - NORMALIZED										QT - QUENCHED & TEMPERED SR - STRESS RELIEVED										AR - AS ROLLED										B - BODY										W - WELD																																																										
	C	G	MIN	P	S	SI	CU	NI	OR	MO	AL	N	V	B	TI	CB	CO	C.E.*	MAX	C	G	MIN	P	S	SI	CU	NI	OR	MO	AL	N	V	B	TI	CB	CO	C.E.*	MAX	C	G	MIN	P	S	SI	CU	NI	OR	MO	AL	N	V	B	TI	CB	CO	C.E.*	MAX	C	G	MIN	P	S	SI	CU	NI	OR	MO	AL	N	V	B	TI	CB	CO	C.E.*	MAX	C	G	MIN	P	S	SI	CU	NI	OR	MO	AL	N	V	B	TI	CB	CO	C.E.*	MAX				
A85768	15	11	010	007	18	02	03	09	02	030										15	11	010	007	18	02	03	09	02	030											15	11	010	007	18	02	03	09	02	030											15	11	010	007	18	02	03	09	02	030											15	11	010	007	18	02	03	09	02	030										
A85768	18	106	008	009	17	02	03	09	02	028										18	106	008	009	17	02	03	09	02	028											18	106	008	009	17	02	03	09	02	028											18	106	008	009	17	02	03	09	02	028											18	106	008	009	17	02	03	09	02	028										
A85768	20	108	008	008	17	02	03	09	02	027										20	108	008	008	17	02	03	09	02	027											20	108	008	008	17	02	03	09	02	027											20	108	008	008	17	02	03	09	02	027											20	108	008	008	17	02	03	09	02	027										
CH0002	22	109	012	002	26	02	02	02	00	018										22	109	012	002	26	02	02	02	00	018											22	109	012	002	26	02	02	02	00	018											22	109	012	002	26	02	02	02	00	018											22	109	012	002	26	02	02	02	00	018										
CH0002	18	107	011	006	24	02	01	02	00	021										18	107	011	006	24	02	01	02	00	021											18	107	011	006	24	02	01	02	00	021											18	107	011	006	24	02	01	02	00	021											18	107	011	006	24	02	01	02	00	021										
CH0002	17	106	010	006	24	02	01	02	00	020										17	106	010	006	24	02	01	02	00	020											17	106	010	006	24	02	01	02	00	020											17	106	010	006	24	02	01	02	00	020											17	106	010	006	24	02	01	02	00	020										

\*C.E. IS BASED ON THE FOLLOWING EQUATIONS: CE=C+(MN/6)+(CR+MO+V)/5+(NI+CU)/15

DECIMAL POSITIONS FOR ELEMENTS ARE INDICATED BY THE LEFT MARGIN, VERTICAL DOTTED LINE OR DECIMAL POINT

2" x 1/4"

UNITED STATES STEEL  
 TUBULAR PRODUCTS  
 CERTIFIED TEST REPORT  
 SERIAL NO: 11:02:31

(TYPE B - IN ACCORDANCE WITH ISO 10474/EN10204/DIN50049 3.1.b)

SHIPERS NO. 0803-086153

MILL ORDER/ITEM NO. TT08204 11	SHIPERS NO. 0803-086153		P.O. NUMBER		Q.C. NO. 2.375 ( 50.325)		WALL: 0.218 ( 5.537)		IN (mm)		IN (mm)		
MATERIAL CODE AS ROLLED	MIN COLLAPSE		GRAIN SIZE		BEND		FLAT		PRODUCT IDENTIFICATION		CHABRY V-NOTCH IMPACT TESTING		
A85768 CH0002	OK OK		OK OK		OK OK		OK OK		OK OK		OK OK		
LEGEND:		T - TRANSVERSE		B - BODY		W - WELD		HAZ - HEAT AFFECTED ZONE		TEST COND.		% SHEAR	
L - LONGITUDINAL		T - TRANSVERSE		B - BODY		W - WELD		HAZ - HEAT AFFECTED ZONE		TEST COND.		% SHEAR	
TEST / INSPECTION		YES		RESULTS / COMMENTS		TESTING / INSPECTION INFORMATION		RESULTS / COMMENTS		TEST COND.		% SHEAR	
FULL LENGTH VISUAL		X								1		2	
FULL LENGTH EMI										2		3	
FULL LENGTH MPI										3		AVG	
FULL LENGTH UT										AVG		AVG	
END AREA INSPECTION (PLAIN END)										1		2	
SPECIAL END AREA (SEA) INSP.										2		3	
FULL LENGTH DRIFT										3		AVG	
ADDITIONAL NOTES/COMMENTS MANUFACTURED IN THE USA. NO REPAIRS BY WELDING. NO MERCURY OR MERCURY COMPOUNDS ARE ADDED TO THE STEEL AND ALL MERCURY BEARING EQUIPMENT IS PROTECTED BY A DOUBLE BOUNDARY OF CONTAINMENT. PIPE ALSO MEET THE REQUIREMENTS OF ASTM A106 GRADE C & ASME SA106 GRADE C													

THIS IS TO CERTIFY THAT THE PRODUCT DESCRIBED HEREIN WAS MANUFACTURED, SAMPLED, TESTED AND/OR INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND FULFILLS THE REQUIREMENTS IN SUCH RESPECTS.

PREPARED BY THE OFFICE OF: J. MAJZRZAK - MANAGER. O.A.

DATE 07/19/05



**Phoenix \* Capitol \* Camco  
Cap Products**

Commanding a Higher Standard™

**Certified Mill Test Report**

2/14/2006

Customer  
CRANE SUPPLY WESTERN  
615 DIXON ROAD  
TORONTO ON M9W 1H9

P O 0003-175723

Heat No 53270  
Heat Code NTM  
Phoenix Order # 386612

Material ASTM A106-1999e B / ASME SA106 2001 Edition No Adden

Part Number  
15112008

Description  
2 X 4" XHSMI BK STL NIPI

**Chemical Properties**

C	Mn	P	S	Si	Cu	Cr	Ni	C Eq. Long		
0.190	0.670	0.013	0.010	0.220	0.210	0.050	0.070	0.333		
Mo	V	Co	Al	Cb	N	Pb	Sn	Ta	Ti	
0.010	0.005									

**Additional Chemical Properties**


Cr + Cu + Ni
0.330

**Mechanical Properties**

**Charpy Minimum Impact -**

Tensile (PSI)	Yield (PSI)	Elong. % in 2 in.	R of A	BHN	Test 1	Test 2	Test 3	Average
72,650	53,510	35.0%			N/A	N/A	N/A	N/A

\* Hydro test passed at 2500 psi

\* Bend test passed

This material meets the requirements of the governing specifications. We certify that the above material has been inspected and tested in accordance with the methods prescribed in the governing specification and the results of such inspections and test conform with applicable requirements.

**Comments:**

MEETS HARDNESS REQUIREMENTS OF NACE MRO175 LATEST EDITION CONFORMS TO ASME SA106 GRADE B REQUIREMENTS

**CapProducts. Ltd.**  
25 Winnipeg St  
Vanara, ON NOM110



P.O. Box 40, Simcoe, Ontario N3Y 4K9  
Tel. (519) 426-1551 Fax (519) 426-5509

### Certificate of Test

Part Number: Y3204 Description: 2x4 B X5 SML NIP 105B  
Heat Code: AH59  
Reference No.:  
Specification: ASTM A106-04 GRADE B/ ASME SA106 GRADE B  
Fitting Trademark: NIKO TUBE

#### Chemical Analysis %

Heat No	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb/Nb
38509	0.18	0.59	0.009	0.010	0.25	0.10	0.05	0.05	<0.01	<0.01	

CE (LONG FORMULA) = 0.31

#### Mechanical Properties

Yield Strength PSI :49,000 MPa :000	Tensile Strength PSI :74,000 MPa:000
Elongation % 2" : 31.00	Reduction in Area % : 0.00
Hardness BHN : N/R	
Heat Treatment: MEETS NACE MR0175 HARDNESS LESS THAN OR EQUAL 22 HRC	
Hydrotest/NDE: 2500 PSI	End: GOOD

We certify that this is a true and correct copy of the mill certificate, issued by the manufacturer of the steel employed or the laboratory which has determined it, as retained in the records of the company CANVIL makes no representation beyond those of the manufacturer or its agent



Simcoe, Ontario  
Edmonton, Alberta  
Montreal, Quebec

A Division of Mueller Canada, LTD



# Phoenix \* Capitol \* Camco

## Cap Products

### Certified Mill Test Report

Heat Code: 92J  
 Heat Number: P610657  
 Item: 15112012: 2X6 XHSML BK SII NIPL  
 Material: ASIM A106-1999e B / ASME SA106-2001 Edition, No Addenda

**Chemistry Properties**

<b>C</b>	<b>Mn</b>	<b>P</b>	<b>S</b>	<b>Si</b>	<b>Cu</b>	<b>Cr</b>
0.220	0.530	0.015	0.027	0.240	0.020	0.020
<b>Ni</b>	<b>Mo</b>	<b>V</b>	<b>Co</b>	<b>Al</b>	<b>Cb</b>	<b>N</b>
0.010	0.000	0.001				
<b>Pb</b>	<b>Sn</b>	<b>Ta</b>	<b>Ti</b>	<b>C Eq. Long</b>		
				0.315		

**Additional Chemical Properties**


**Mechanical Properties**

<b>Tensile(PSI)</b>	<b>Yield(PSI)</b>	<b>Elong. % in 2 in.</b>	<b>Reduction</b>	<b>BHN</b>
75130	46990	30%		

**Charpy Minimum Impact - ft/lbs**

<b>Test 1</b>	<b>Test 2</b>	<b>Test 3</b>	<b>Avg.</b>	<b>Test Temp.</b>

**Bend Test Passed**

**Hydro Test Passed at 2500 psi**

This material meets the requirements of the governing specifications. We certify that the above material has been inspected and tested in accordance with the methods prescribed in the governing specification and the results of such inspections and tests conform with applicable requirements.

**Specification comments:**

MEETS HARDNESS REQUIREMENTS OF NACE MRO175 LATEST EDITION CONFORMS TO ASME SA106 GRADE B REQUIREMENTS

**Heat Code Remarks:**



HEAT NUMBER : R4K  
 TRANS AM PIPING PRODUCTS - REV'D BY: *[Signature]* 2 X 4 1/2 XH SMLS STEEL NIPPLES A106 TBE  
 Shipment/Seq #: S 7 - 1273 29



**Phoenix \* Capitol \* Camco  
 Cap Products**

**Certified Mill Test Report**

*Commanding a Higher Standard*

4/30/2007  
 Customer  
 TRANS AM PIPING PRODUCTS LTD AB  
 233061 ENDEAVOUR DRIVE S E  
 CALGARY, AB T2P 2G6  
 Part Number  
 15112009

P.O. CI-07-324

Heat No 24178  
 Heat Code R4K  
 Phoenix Order # 470912

Material ASIM A106-1999c B / ASME SA106-2001 Edition, No Adden

Description  
 2 X 4 1/2" XH SMLS BK STL NIPL

**Chemical Properties**

C	Mn	P	S	Si	Cu	Cr	Ni	C Eq. Long	
0.210	0.430	0.007	0.005	0.280	0.050	0.030	0.040	0.298	
Mo	V	Co	Al	Cb	N	Pb	Sn	Ta	Ti
0.010	0.010								

**Additional Chemical Properties**


Cr + Cu + Ni  
 0.120

**Mechanical Properties**

**Charpy Minimum Impact -**

Tensile (PSI)	Yield (PSI)	Elong. % in 2 in.	R of A	BHN	Test 1	Test 2	Test 3	Average
69,500	46,300	30.0%			N/A	N/A	N/A	N/A

\* Bend test passed

This material meets the requirements of the governing specifications We certify that the above material has been inspected and tested in accordance with the methods prescribed in the governing specification and the results of such inspections and test conform with applicable requirements.

Comments:

MEETS HARDNESS REQUIREMENTS OF NACE MRO175 LATEST EDITION CONFORMS TO ASME SA106 GRADE B REQUIREMENTS

**CapProducts. Ltd.**  
 25 Winnipeg St  
 Vanastara, ON N0M 1L0



**WUXI DINGYUAN PRECISION COLD-DRAWN STEEL PIPE CO.,LTD.**  
**MATERIAL TEST REPORT**

CUSTOMER: CRANE SUPPLY  
 PRODUCT: SMIS STEEL PIPE  
 SPEC.: ASTM A106 GR.B AND ASME SA106 GR.B-2004

ISO REGISTRATION NO.: 00516511803721M  
 INVOICE NO.: 00084785  
 QUALITY NUMBER: 1-1

TOTAL: 6 BUNDLES 62 PIECES 9173 KG

NO.	HEAT NO.	BATCH NO.	STEEL GRADE	SIZE Mm	PIECES	WEIGHT Kg	CHEMICAL COMPOSITION%										V.
							C	Si	Mn	P	S	Cu	Cr	Ni	Mo	Ti	
1	Y605-1084	R000000000	A106B	14 EX HY SRL	5	25	0.18	0.21	0.38	0.017	0.008	0.04	0.05	0.02	0.031	0.001	
2	Y605-1085	R000000001	A106B	12 EX HY SRL	217	2214	0.19	0.23	0.37	0.018	0.007	0.05	0.05	0.01	0.032	0.001	
3	Y605-1082	R000000002	A106B	14 EX HY SRL	127	1786	0.19	0.23	0.37	0.018	0.007	0.05	0.05	0.01	0.032	0.001	
4	Y605-1085	R000000000	A106B	1 STD SRL	91	1457	0.19	0.23	0.37	0.018	0.007	0.05	0.05	0.01	0.032	0.001	
5	Y605-1210	R000000002	A106B	1 EX HY SRL	91	1825	0.18	0.19	0.69	0.014	0.005	0.07	0.06	0.01	0.025	0.005	
6	Y603-0154	R000000000	A106B	14 STD SRL	91	1976	0.16	0.21	0.58	0.015	0.009	0.05	0.02	0.01	0.026	0.006	

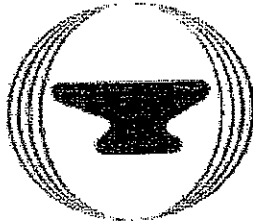
  

NO.	MECHANICAL PROPERTIES			TECHNOLOGICAL PROPERTIES			NONDESTRUCTIVE TEST			SURFACE QUALITY			DIMENSION TOLERANCE		
	YIELD POINT MPa (Min)	TENSILE STRENGTH MPa (Min)	ELONGATION %	HARDNESS HRB	FLATTENING TEST	FLARING TEST	E.C.T.	H.T.	IN	OUT	O.D.	W.T.			
1	345/355	460/470	42.5/44.5	---	Satisfactory	---	Satisfactory	---	Satisfactory	Satisfactory	Satisfactory	Satisfactory			
2	350/360	460/470	48.0/46.6	---	Satisfactory	---	Satisfactory	---	Satisfactory	Satisfactory	Satisfactory	Satisfactory			
3	355/365	475/485	42.5/41.5	---	Satisfactory	---	Satisfactory	---	Satisfactory	Satisfactory	Satisfactory	Satisfactory			
4	355/365	470/480	48.0/47.0	---	Satisfactory	---	Satisfactory	---	Satisfactory	Satisfactory	Satisfactory	Satisfactory			
5	345/355	465/475	50.0/49.0	---	Satisfactory	---	Satisfactory	---	Satisfactory	Satisfactory	Satisfactory	Satisfactory			
6	350/360	460/470	46.5/45.0	---	Satisfactory	---	Satisfactory	---	Satisfactory	Satisfactory	Satisfactory	Satisfactory			

REMARKS: SMIS PIPE IS IN COMPLIANCE TO FACE STANDARD: SA106 GR.B-2004

1. We hereby certify that this certificate is issued and signed by the manufacturer.  
 2. Material is annealed.  
 3. All pipes have passed the eddy current (E.C.T.) and ultrasonic (U.S.) test.  
 4. All pipes have passed the eddy current (E.C.T.) and ultrasonic (U.S.) test.

MANAGING REPRESENTATIVE: Sum STAMPER: \_\_\_\_\_ DATE: JUL 21, 2016



**ANVIL**  
INTERNATIONAL, INC.



Sarnia, Ontario  
Edmonton, Alberta  
Montreal, Quebec

## Certificate of Test

Part Number: U30521 Description: 1/2 3M ID UN 105N  
 Heat Code: M411  
 Reference No :  
 Specification: ASTM A105N/ASME SA105N  
 TO ASIM A 105/A 105M - 98  
 Fitting Trademark: GSB (LP UNIONS)

### Chemical Analysis %

Heat No.	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb/Nb
X18894	0.20	1.03	0.023	0.035	0.30	0.15	0.09	0.11	0.03	<0.01	<0.01
CE (LONG FORMULA) = 0.42											

### Mechanical Properties

Yield Strength	Tensile Strength	Elongation % 2	Reduction Area	Hardness BHN
psi 58,400	psi 79,800	30.80	52.10	161
MPa 403	MPa 550			
Heat Treatment: N NORMALIZED MECHANICALS SHOWN ARE AS FORGED/ROLLED				

We certify that this is a true and correct copy of the mill certificate, issued by the manufacturer of the steel employed or the laboratory which has determined it, as retained in the records of the company. We make no representation beyond those of the manufacturer or its agent.



P.O. Box 40, Simcoe, Ontario N3Y 4K9  
 Tel. (519) 426-1551 Fax (519) 426-5509

## Certificate of Test

Part Number: F30531 Description: 1/2 3M -TD 105N  
 Heat Code: 2119  
 Reference No :  
 Specification: ASIM A105/ASME SA105  
 TO ASIM A 105/A 105M - 03  
 Fitting Trademark: CANVIL

### Chemical Analysis %

Heat No	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb/Nb
372122	0.21	0.85	0.016	0.006	0.20	0.15	0.06	0.10	0.01	<0.01	
(C LONG FORMULA) = 0.39											

### Mechanical Properties

Yield Strength PSI : 54,200	Tensile Strength PSI : 79,300
MPa : 000	MPa: 000
Elongation % 2" : 33.80	Reduction in Area % : 66.40
Heat Treatment: N	Hardness BHN : 152
NORMALIZED	

We certify that this is a true and correct copy of the mill certificate, issued by the manufacturer of the steel employed or the laboratory which has determined it, as retained in the records of the company CANVIL makes no representation beyond those of the manufacturer or its agent.



Simcoe, Ontario  
 Edmonton, Alberta  
 Montreal, Quebec

A Division of Mueller Canada, LTD



P.O. Box 40, Simcoe, Ontario N3Y 4K9  
 Tel (519) 426-1551 Fax (519) 426-5509

## Certificate of Test

Part Number: F30511 Description: 1/2 3M D 90 105N  
 Heat Code: 2009  
 Reference No :  
 Specification: ASTM A105/ASME SA105  
 TO ASIM A 105/A 105M - 03  
 Fitting Remark: CANVIL

### Chemical Analysis %

Heat No	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb/Nb
366125	0.19	0.81	0.016	0.010	0.20	0.22	0.07	0.10	0.02	0.01	
CDE (LONG FORMULA) = 0.37											

### Mechanical Properties

Yield Strength PSI :54,500	Tensile Strength PSI :77,800
MPa :000	MPa:000
Elongation % 2" : 32.60	Reduction in Area % : 66.40
Heat Treatment: N	Hardness BHN : 138
NORMALIZED	

We certify that this is a true and correct copy of the mill certificate, issued by the manufacturer of the steel employed or the laboratory which has determined it, as retained in the records of the company CANVIL makes no representation beyond those of the manufacturer or its agent.



Simcoe, Ontario  
 Edmonton, Alberta  
 Montreal, Quebec

A Division of Mueller Canada, LTD



HEAT NUMBER : 55175

TRANS AM PIPING PRODUCTS - REV'D BY: TBE

33

1/2X21/2 KH SMLS STEEL NIPPLES A106



**INDUSTRIA MECCANICA LIGURE SPA**

4639 CASARZA LIGURE - Genova - Italy - P.zza Marco Cappella, 4 - Tel. 010.85.46761 - Fax 010.85.46761 - This certificate has been generated by computer and need not to be signed for validity according to DIN EN 10204

INSPECTION CERTIFICATE EN 10204:2004 / 3-1  
 COMPANY WITH QUALITY SYSTEM ISO 9001:2000  
 CERTIFIED BY ROMA

TRANS AM PIPING PRODUCTS LTD.  
 7025 - 4th Street S.E.  
 Calgary, Alberta T2C 4E8  
 CA

Certificate Nr 16609  
 Invoice Nr 714  
 Dated 21.03.2005  
 Del. Note Nr 1315  
 Dated 21.03.2005

HEAT CODE	HEAT	ITEM	YOUR P.O.	OUR REFERENCE	QTY	DESCRIPTION	HEAT TREATMENT	INSPECTION AUTHORITY	QUALITY CONTROL DEPARTMENT	MANUFACTURER'S SYMBOL	MANUFACTURER'S SYMBOL	STUDBOLTS
53810	104		CI-06-168	2006-2E201-000143-104		P.NIPPLE TBE NPT S-160 1 1/2" L51mm(2") A106B/API 5LB	Normalized at 880°C/920°C / Air Cool	INSPECTION AUTHORITY	QUALITY CONTROL DEPARTMENT	MANUFACTURER'S SYMBOL	MANUFACTURER'S SYMBOL	STUDBOLTS
53810	107		CI-06-168	2006-2E201-000143-107		P.NIPPLE TBE NPT S-160 1 1/2" L100mm(4") A106B/API 5LB	Normalized at 880°C/920°C / Air Cool					
78954	107		CI-06-168	2006-2E201-000143-107		P.NIPPLE TBE NPT S-160 1 1/2" L100mm(4") A106B/API 5LB	Normalized at 880°C/920°C / Air Cool					
53810	108		CI-06-168	2006-2E201-000143-108		P.NIPPLE TBE NPT S-160 1 1/2" L25mm(1") A106B/API 5LB	Normalized at 880°C/920°C / Air Cool					
347932	061		CI-06-847	2006-2E201-0001379-011		P.NIPPLE TBE NPT S-80 3/4" L100mm(4") A106B/API 5LB	Normalized at 880°C/920°C / Air Cool					
55175	012		CI-05-885	2005-2E201-0001379-012		P.NIPPLE TBE NPT S-80 1/2" L86mm(3 1/2") A106B/API 5LB	Normalized at 880°C/920°C / Air Cool					
55175	013		CI-05-886	2005-2E201-0001379-013		P.NIPPLE TBE NPT S-80 1/2" L86mm(3 1/2") A106B/API 5LB	Normalized at 880°C/920°C / Air Cool					
99932	013		CI-05-856	2005-2E201-0001379-013		P.NIPPLE TBE NPT S-80 1/2" L86mm(3 1/2") A106B/API 5LB	Normalized at 880°C/920°C / Air Cool					
53810	104		ASTM A106/B API 5LB	0.140								
53810	107		ASTM A106/B API 5LB	0.140								
78954	107		ASTM A106/B API 5LB	0.150								
53810	108		ASTM A106/B API 5LB	0.140								
347932	061		ASTM A106/B API 5LB	0.130								
55175	012		ASTM A106/B API 5LB	0.130								
55175	013		ASTM A106/B API 5LB	0.130								
99932	013		ASTM A106/B API 5LB	0.015								
53810	104		TEST SPECIMEN	YIELD POINT	REDUCTION OF AREA	HARDNESS	HEAT TREATMENT	INSPECTION AUTHORITY	QUALITY CONTROL DEPARTMENT	MANUFACTURER'S SYMBOL	MANUFACTURER'S SYMBOL	STUDBOLTS
53810	107		TEST SPECIMEN	YIELD POINT	REDUCTION OF AREA	HARDNESS	HEAT TREATMENT	INSPECTION AUTHORITY	QUALITY CONTROL DEPARTMENT	MANUFACTURER'S SYMBOL	MANUFACTURER'S SYMBOL	STUDBOLTS
78954	107		TEST SPECIMEN	YIELD POINT	REDUCTION OF AREA	HARDNESS	HEAT TREATMENT	INSPECTION AUTHORITY	QUALITY CONTROL DEPARTMENT	MANUFACTURER'S SYMBOL	MANUFACTURER'S SYMBOL	STUDBOLTS
53810	108		TEST SPECIMEN	YIELD POINT	REDUCTION OF AREA	HARDNESS	HEAT TREATMENT	INSPECTION AUTHORITY	QUALITY CONTROL DEPARTMENT	MANUFACTURER'S SYMBOL	MANUFACTURER'S SYMBOL	STUDBOLTS
347932	061		TEST SPECIMEN	YIELD POINT	REDUCTION OF AREA	HARDNESS	HEAT TREATMENT	INSPECTION AUTHORITY	QUALITY CONTROL DEPARTMENT	MANUFACTURER'S SYMBOL	MANUFACTURER'S SYMBOL	STUDBOLTS
55175	012		TEST SPECIMEN	YIELD POINT	REDUCTION OF AREA	HARDNESS	HEAT TREATMENT	INSPECTION AUTHORITY	QUALITY CONTROL DEPARTMENT	MANUFACTURER'S SYMBOL	MANUFACTURER'S SYMBOL	STUDBOLTS
55175	013		TEST SPECIMEN	YIELD POINT	REDUCTION OF AREA	HARDNESS	HEAT TREATMENT	INSPECTION AUTHORITY	QUALITY CONTROL DEPARTMENT	MANUFACTURER'S SYMBOL	MANUFACTURER'S SYMBOL	STUDBOLTS
99932	013		TEST SPECIMEN	YIELD POINT	REDUCTION OF AREA	HARDNESS	HEAT TREATMENT	INSPECTION AUTHORITY	QUALITY CONTROL DEPARTMENT	MANUFACTURER'S SYMBOL	MANUFACTURER'S SYMBOL	STUDBOLTS
53810	104		ASTM SA ASTM A106/A160M-04b Gr. B	445.0	38.0	140-148	Normalized at 880°C/920°C / Air Cool					
53810	107		ASTM SA ASTM A106/A160M-04b Gr. B	445.0	38.0	140-148	Normalized at 880°C/920°C / Air Cool					
78954	107		ASTM SA ASTM A106/A160M-04b Gr. B	445.0	38.0	149-154	Normalized at 880°C/920°C / Air Cool					
53810	108		ASTM SA ASTM A106/A160M-04b Gr. B	445.0	38.0	140-148	Normalized at 880°C/920°C / Air Cool					
347932	061		ASTM SA ASTM A106/A160M-04b Gr. B	453.0	48.0	148-150	Normalized at 880°C/920°C / Air Cool					
55175	012		ASTM SA ASTM A106/A160M-04b Gr. B	516.0	44.0	158-160	Normalized at 880°C/920°C / Air Cool					
55175	013		ASTM SA ASTM A106/A160M-04b Gr. B	516.0	44.0	158-160	Normalized at 880°C/920°C / Air Cool					
99932	013		ASTM SA ASTM A106/A160M-04b Gr. B	508.0	40.0	141-149	Normalized at 880°C/920°C / Air Cool					

NOTES: ASME B16.11/05 - ANSI B31.1B31.3 - IMI STD - ANSI B1.1-18.2.2 - NACE MR0175 ISO 15156-1 - MSS SP 83 - SUPPLIED MATERIAL MEETS SPECIFICATIONS AND P.O. REQUIREMENTS



HEAT NUMBER : 88T  
 TRANS AM PIPING PRODUCTS - REV'D BY: AB  
 Shipment/Seq #: S 6 - 1727 8

1 X 2 1/2 XH SMLS STEEL NIPPLES A106  
 TBE



**Phoenix \* Capitol \* Gamco  
 Cap Products**

*Commanding a Higher Standard™*

**Certified Mill Test Report**

12/19/2006

Customer  
 TRANS AM PIPING PRODUCTS LTD AB

P O CI-06 814

Heat No P925859  
 Heat Code 88T  
 Phoenix Order # 445763

7025 44TH ST SE  
 CAL GARY AB, T2C4E8

Material ASTM A106-1999a B / ASME SA106-2001 Edition, No Adden

Part Number  
 15111005

Description  
 1 X 2-1/2" XHSMI BLK NIPL

**Chemical Properties**

C	Mn	P	S	SI	Cu	Cr	Ni	C Eq. Long		
0.200	0.520	0.023	0.025	0.240	0.030	0.020	0.020	0.296		
Mo	V	Co	Al	Ch	N	Pb	Sn	Ta	Ti	
0.010	0.001									

**Additional Chemical Properties**


Cr + Cu + Ni
0.070

**Mechanical Properties**

**Charpy Minimum Impact -**

Tensile (PSI)	Yield (PSI)	Elong. % in 2 in.	R of A	BHN	Test 1	Test 2	Test 3	Average
71,000	44,400	33.0%			N/A	N/A	N/A	N/A

\* Eddy Current test passed

\* Bend test passed

This material meets the requirements of the governing specifications We certify that the above material has been inspected and tested in accordance with the methods prescribed in the governing specification and the results of such inspections and test conform with applicable requirements

Comments:

MEETS HARDNESS REQUIREMENTS OF NACE MRO175 LATEST EDITION CONFORMS TO ASME SA106 GRADE B REQUIREMENTS

**CapProducts. Ltd.**  
 25 Winnipeg St  
 Vanastua, ON NOM1L0



**柏緯鐵工股份有限公司**  
 高雄縣仁武鄉烏林村仁心路 303 號  
**BOTH-WELL STEEL FITTINGS CO., LTD.**  
 NO.303, JEN-HSIN ROAD JEN-WU HSIANG  
 KAOHSIUNG HSIEN, TAIWAN R.O.C (81450)  
 TEL: (07) 371-0497, 371 1536, 372-0260 FAX: (886-7) 371-3864, 371 3882  
 WEB SITE: http://www.bothwell.com.tw E-MAIL: bothwell@www.bothwell.com.tw or box@mail.bothwell.com.tw

An ISO-9001 Registered Manufacturer



**MILL TEST & INSPECTION CERTIFICATE**

ACCORDING TO EN10204/DIN50049/3 I B

ORIGIN: TAIWAN

CUSTOMER: CRANE SUPPLY

INVOICE NO: BW069512040

DATE: 03/24/07

CERT NO: 70528

ORDER NO: 0003-269236

L/C NO:

PAGE: 24

ITEM	RAW MATERIAL HEAT NO	BOTH WELL HI CD	DESCRIPTION	QUANTITY	SPECIFICATION: ASTM / ASME A/SA 105N -05 DIMENSION: ASME B16 11 2001 SURFACE: BY VISUAL GOOD
126	390090	2605	HEX BUSHING 1"x 3/4" NPT	300PC	
127	390684	2628	HEX BUSHING 1"x 1/2" NPT	500PC	
128	388836	2574	HEX BUSHING 1"x 3/8" NPT	50PC	
129	387036	2503	HEX BUSHING 1"x 1/4" NPT	4PC	
129	390090	2605	HEX BUSHING 1"x 1/4" NPT	144PC	
129	358099	853	HEX BUSHING 1"x 1/4" NPT	2PC	
129	358099	853	HEX BUSHING 1"x 1/4" NPT	2PC	
130	364588	968	HEX BUSHING 1"x 1/8" NPT	10PC	

**CHEMICAL COMPOSITION (%)**

ITEM	C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V	Cb(Nb)	N
Min	-	0 100	0 600	-	-	-	-	-	-	-	-	-
Max	0 350	0 350	1 050	0 035	0 040	0 400	0 300	0 400	0 120	0 050	0 020	-
126	0 200	0 210	0 890	0 010	0 010	0 120	0 080	0 040	0 010	0 003	0 003	-
127	0 200	0 210	0 830	0 019	0 011	0 150	0 100	0 050	0 010	0 005	0 002	-
128	0 220	0 210	0 840	0 017	0 006	0 130	0 090	0 070	0 010	0 004	0 001	-
129	0 220	0 220	0 870	0 015	0 016	0 090	0 090	0 040	0 010	0 003	0 000	-
129	0 200	0 210	0 890	0 010	0 010	0 120	0 080	0 040	0 010	0 003	0 003	-
129	0 210	0 200	0 660	0 019	0 019	0 170	0 090	0 060	0 010	0 000	0 001	-
130	0.190	0.210	0.840	0.027	0.010	0.280	0.140	0.080	0.020	0.000	0.001	-

**MECHANICAL TEST**

Remark: NORMALIZED : 850°C

ITEM	Tensile Strength (KSI)	Yield Strength (KSI)	Elongation (%)	R of A (%)	Hardness (HB)
Min	70 0	36 0	22 0	30 0	-
Max	-	-	-	-	187
126	78 3	58 3	27 2	63 9	143
127	78 8	60 0	30 8	63 4	144
128	77 5	53 4	34 0	66 7	141
129	78 4	58 8	30 6	62 8	145
129	78 3	58 3	27 2	63 9	143
129	70 7	48 7	34 8	63 2	143
130	78 3	53 9	33 8	66 4	143

WE CERTIFY THE ABOVE MENTIONED FITTINGS HAVE BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH THE SPECIFICATIONS SHOWN

*S.C. Lee*      *C. Ching*

Q.C. MANAGER  
SHENG CHENG LEE

INSPECTOR  
CHUN CHIEH HUANG



# 柏緯鐵工股份有限公司

高雄縣仁武鄉高林村仁心路 303 號

**BOTH-WELL STEEL FITTINGS CO., LTD.**

NO.303, JEN-HSIANG ROAD JEN-WU HSIANG

KAOHSIUNG HSIEN, TAIWAN R.O.C (814 60)

TEL: (07) 371 0497, 371-1536, 372-0260 FAX: (886-7) 371-3864, 371-3882

WEB SITE: <http://www.bothwell.com.tw> E-MAIL: [bothwell@www.bothwell.com.tw](mailto:bothwell@www.bothwell.com.tw) or [box@mail.bothwell.com.tw](mailto:box@mail.bothwell.com.tw)

An ISO 9001 Registered Manufacturer



## MILL TEST & INSPECTION CERTIFICATE

ACCORDING TO EN10204/DIN50049/3.1.B

ORIGIN: TAIWAN

CUSTOMER: CRANE SUPPLY

INVOICE NO: BW069504059

DATE: 08/17/06

CERT NO: 61657

ORDER NO: 0003-191171

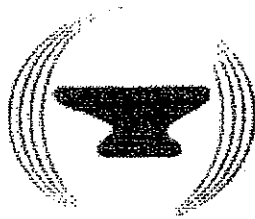
L/C NO:

PAGE: 14

ITEM	RAW MATERIAL HEAT NO.	BOTH WELL HT CD	DESCRIPTION	QUANTITY	SPECIFICATION: ASTM / ASME A/SA 105N -03 DIMENSION: ASME B16 11 - 2001 SURFACE: BY VISUAL GOOD
071	385107	2447	RED CPLG 1-1/2" x 1" 3000# NPT	15 PC	
072	379184	2323	RED CPLG 2" x 1 1/4" 3000# NPT	5 PC	
073	378224	2295	RED CPLG 2" x 1-1/2" 3000# NPT	15 PC	
074	44796	2207	RED CPLG 2" x 3/4" 3000# NPT	5 PC	
075	385105	2456	90D ELBOW 1/4" 3000# NPT	100 PC	
076	375229	2215	90D ELBOW 1/8" 3000# NPT	10 PC	
077	6202060315	AB037	90D ELBOW 1" 3000# NPT	1000 PC	

ITEM	CHEMICAL COMPOSITION (%)											
	C	Si	Mn	P	S	Cu	Cr	Ni	Mg	V	Cb(Nb)	N
Min	-	0.100	0.600	-	-	-	-	-	-	0.050	0.020	-
Max	0.350	0.350	1.050	0.035	0.040	0.400	0.300	0.400	0.120	0.050	0.020	-
071	0.220	0.200	0.860	0.022	0.007	0.130	0.100	0.040	0.010	0.004	0.002	-
072	0.210	0.210	0.860	0.019	0.011	0.170	0.140	0.050	0.010	0.002	0.001	-
073	0.200	0.190	0.860	0.014	0.008	0.130	0.100	0.050	0.020	0.002	0.001	-
074	0.210	0.200	1.090	0.011	0.008	0.080	0.050	0.050	0.005	0.003	0.005	-
075	0.200	0.190	0.840	0.017	0.009	0.070	0.080	0.040	0.010	0.003	0.001	-
076	0.200	0.190	0.830	0.018	0.014	0.230	0.070	0.090	0.020	0.001	0.000	-
077	0.210	0.240	0.870	0.011	0.010	0.100	0.060	0.040	0.020	0.010	0.003	-

ITEM	MECHANICAL TEST					REMARK: NORMALIZED : 850°C
	Tensile Strength (KSI)	Yield Strength (KSI)	Elon-Gation (%)	R of A (%)	Hardness (HB)	
Min	70 0	36 0	22 0	30 0	187	WE CERTIFY THE ABOVE MENTIONED FITTINGS HAVE BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH THE SPECIFICATIONS SHOWN  <i>S. C. Lee</i> <i>C. Ching</i> Q.C. MANAGER      INSPECTOR SHENG CHENG LEE      CHUN CHIH HUANG
Max	-	-	-	-	-	
071	78 2	56 0	29.6	65 2	142	
072	79 8	52 7	29.0	66 0	141	
073	79 5	52 6	29 0	64 9	141	
074	77 4	46 4	32 8	63 9	142	
075	77 7	56 6	28 8	64 9	143	
076	78 2	52 1	32 4	65 6	142	
077	75 2	46 1	33 6	63 2	142	



**ANVIL**  
INTERNATIONAL, INC.



Simcoe, Ontario  
Edmonton, Alberta  
Montreal, Quebec

## Certificate of Test

Part Number: Y3206 Description: 2x6 B XS SML NIP 106B  
 Heat Code: AH73  
 Reference No.:  
 Specification: ASTM A106 GRADE B/ ASME SA106 GRADE B  
 Fitting Trademark: NIKOPOL

### Chemical Analysis %

Heat No	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb/Nb
49762	0.19	0.44	0.009	0.015	0.27	0.07	0.06	0.07	0.01	<0.01	
CE (LONG FORMULA) = 0.29											

### Mechanical Properties

Yield Strength	Tensile Strength	Elongation % 2	Reduction Area	Hardness BHN
psi 46,300	psi 69,000	34.00	0.00	N/R
MPa 000	MPa 000			
Heat Treatment: MEETS NACE MR0175 HARDNESS LESS THAN OR EQUAL 22HRC				
Hydrotest/NDE: NDE			Bend: GOOD	

We certify that this is a true and correct copy of the mill certificate, issued by the manufacturer of the steel employed or the laboratory which has determined it, as retained in the records of the company. We make no representation beyond those of the manufacturer or its agent.



I.M.L.

INDUSTRIA MECCANICA LIGURE SPA

18038 CASAVAZZA Ligure - Genova - Italy - P.zza Marco Caporali, 4 - Tel. 010.43.40761 - Fax 010.43.40530 MATERIAL TEST DEPARTMENT This certificate has been generated by computer and need not to be signed for validity according to DIN EN 10202

INSPECTION CERTIFICATE EN 10202:2004 / 3.1  
COMPANY WITH QUALITY SYSTEM ISO 9001:2000  
CERTIFIED BY RINA

TRANS AM PIPING PRODUCTS LTD.  
7025 - 44th Street SE  
Calgary, Alberta T2C 4E8  
CA  
Certificate No. 16889  
Inspector No. 714  
CML No. No. 119  
Date 23.05.2006  
Date 21.05.2005  
Date 21.05.2005

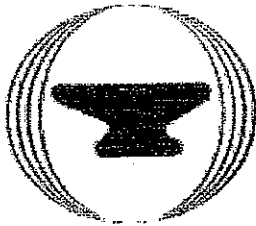
HEAT NUMBER : 55175  
TRANS AM PIPING PRODUCTS - REV'D BY:  
Shipment/Seq #: 3 6 - 1385 31

1/2 X 2 XH SMLS STEEL NIPPLES A106 TBE

Table with columns: HEAT CODE, HEAT, ITEM, VENDOR P.O., QUR REFERENCE, D.T.Y., DESCRIPTION, DIM ACQ. TO, VISUAL & DIMENS., OTHER ELEMENTS, YIELD POINT, TENSILE STRENGTH, ELONGATION, etc. Includes material specifications like ASTM A106B API 5L B and mechanical properties.

NOTES ASME B16.1/05 - ANSI B31.1/83.1.3 - MIL STD - ANSI B1.1-81B.2.2 -  
MACE MRO/T/S ISO 15185/1 - MSS SP 83 - SUPPLIED MATERIAL SPECS  
SPECIFICATIONS AND P.O. REQUIREMENTS

INSPECTION AUTHORITY: BORIS FIZOVIT  
QUALITY CONTROL DEPARTMENT: FITTINGS IML  
MANUFACTURER'S SYMBOL: STUBOILTS



**ANVIL**  
INTERNATIONAL, INC.



Simcoe, Ontario  
Edmonton, Alberta  
Montreal, Quebec

## Certificate of Test

Part Number: Y32055 Description: 2x5-1/2 B XS SML NIP 106B  
 Heat Code: AF44  
 Reference No :  
 Specification: ASTM A106 GRADE B/ ASME SA106 GRADE B  
 Fitting Trademark: DNEPROPETROVSK IUBE

### Chemical Analysis %

Heat No.	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb/Nb
D06&D05	0.21	0.53	0.007	0.026	0.20	0.03	0.03	0.03	0.01	0.01	0.01
CE (LONG FORMULA) = 0.32											

### Mechanical Properties

Yield Strength		Tensile Strength		Elongation % 2	Reduction Area	Hardness BHN
psi	51,500	psi	71,100	30.00	0.00	N/R
MPa	000	MPa	000			
Heat Treatment:						
Hydrotest/NDE: NDE				Bend: GOOD		

We certify that this is a true and correct copy of the mill certificate, issued by the manufacturer of the steel employed or the laboratory which has determined it, as retained in the records of the company. We make no representation beyond those of the manufacturer or its agent.



**Phoenix \* Capitol \* Camco  
Cap Products**

**Certified Mill Test Report**

*Commanding a Higher Standard™*

7/4/2006

**Customer**  
CRANE SUPPLY-WESTERN  
615 DIXON ROAD  
TORONTO, ON M9W 1H9

**P.O.** 0003-220897

**Heat No** 8069269  
**Heat Code** 92J  
**Phoenix Order #** 413040

**Material** ASTM A105/A105M and ASME SA105 Latest Editions

**Part Number**  
15112006

**Description**  
2 X 3" XHSML BK SIL NIPL

**Chemical Properties**

<b>C</b>	<b>Mn</b>	<b>P</b>	<b>S</b>	<b>Si</b>	<b>Cu</b>	<b>Cr</b>	<b>Ni</b>	<b>C Eq. Long</b>	
0.300	0.820	0.011	0.033	0.200	0.180	0.120	0.090	0.485	
<b>Mo</b>	<b>V</b>	<b>Co</b>	<b>Al</b>	<b>Cb</b>	<b>N</b>	<b>Pb</b>	<b>Sa</b>	<b>Ta</b>	<b>Ti</b>
0.030	0.002			0.002					

**Additional Chemical Properties**


<b>Cr + Cu + Ni</b>
0.390

**Mechanical Properties**

**Charpy Minimum Impact-**

<b>Tensile (PSI)</b>	<b>Yield (PSI)</b>	<b>Elong. % in 2 in.</b>	<b>R of A</b>	<b>BHN</b>	<b>Test 1</b>	<b>Test 2</b>	<b>Test 3</b>	<b>Average</b>
78,400	38,200	29.5%	53.0%	149	N/A	N/A	N/A	N/A

This material meets the requirements of the governing specifications We certify that the above material has been inspected and tested in accordance with the methods prescribed in the governing specification and the results of such inspections and test conform with applicable requirements

**CapProducts. Ltd.**  
25 Winnipeg St  
Vancouver, ON N0M1L0



P.O. Box 40, Simcoe, Ontario N3Y 4K9  
 Tel. (519) 426-4551 Fax (519) 426-5509

## Certificate of Test

Part Number: E8467 Description: 2x1/2 FG HX BSH 105  
 Heat Code: ASE  
 Reference No :  
 Specification: ASIM A105/ ASME SA105  
 TO ASIM A105/A 105M - 97  
 Fitting Trademark: MACSTEEL-MONROE

### Chemical Analysis %

Heat No.	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb/Nb
M19544	0.20	0.95	0.016	0.014	0.25	0.19	0.06	0.17	0.03	<0.01	<0.01
CE (LONG FORMULA) = 0.42											

### Mechanical Properties

Yield Strength PSI :41,200	Tensile Strength PSI :74,200
MPa :000	MPa:000
Elongation % 2" : 24.00	Reduction in Area % : 34.00
Hardness BHN : 153	
Heat Treatment:	

We certify that this is a true and correct copy of the mill certificate, issued by the manufacturer of the steel employed or the laboratory which has determined it, as retained in the records of the company CANVIL makes no representation beyond those of the manufacturer or its agent.



Simcoe, Ontario  
 Edmonton, Alberta  
 Montreal, Quebec

A Division of Mueller Canada, LTD





# 拍緯鐵工股份有限公司

高雄縣仁武鄉烏林村仁心路 303 號

## BOTH-WELL STEEL FITTINGS CO., LTD.

NO.303, JEN-HSIN ROAD JEN-WU HSIANG  
 KAOHSIUNG HSIEN, TAIWAN R.O.C (814 60)

TEL: (07) 371-0497, 371-1536, 372-0260 FAX: (886-7) 371-3864, 371-3888

WEB SITE: <http://www.bothwell.com.tw> E-MAIL: [bothwell@www.bothwell.com.tw](mailto:bothwell@www.bothwell.com.tw) or [box@mail.bothwell.com.tw](mailto:box@mail.bothwell.com.tw)

An ISO-9001 Registered Manufacturer



### MILL TEST & INSPECTION CERTIFICATE

ACCORDING TO EN10204/DIN50049/3.1.B

ORIGIN: TAIWAN

CUSTOMER: CRANE SUPPLY

INVOICE NO: BW059411087

DATE: 02/25/06

CBRT NO: 60352



ORDER NO: 0003-124680

L/C NO:

PAGE: 19

ITEM	RAW MATERIAL HEAT NO	BOTH WELL HT. CD	DESCRIPTION	QUANTITY	SPECIFICATION: ASTM / ASME A/SA 105N -03 DIMENSION: ASME B16.11 - 2001 SURFACE: BY VISUAL GOOD
101	381656	2382	HEX BUSHING 2"x 1-1/2" NPT	25 PC	
102	378220	2294	HEX BUSHING 2"x 3/4" NPT	25 PC	
103	379191	2316	HEX BUSHING 2"x 1/2" NPT	25 PC	
104	381655	2385	HEX BUSHING 2-1/2"x 2" NPT	15 PC	
105	383045	2414	HEX BUSHING 3"x 2" NPT	10 PC	
106	374588	2194	HEX BUSHING 3"x 1" NPT	5 PC	
107	379186	2344	90D ELBOW 1/2" 3000# S/W	80 PC	

ITEM	CHEMICAL COMPOSITION (%)											
	C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V	Nb	N
Min	-	0.100	0.600	-	-	-	-	-	-	-	-	-
Max	0.350	0.350	1.050	0.035	0.040	0.400	0.300	0.400	0.120	0.080	-	-
101	0.210	0.210	0.880	0.013	0.007	0.110	0.070	0.050	0.020	0.001	0.002	-
102	0.200	0.180	0.840	0.011	0.011	0.140	0.070	0.050	0.020	0.002	0.001	-
103	0.200	0.230	0.890	0.016	0.011	0.150	0.110	0.060	0.020	0.003	0.001	-
104	0.200	0.210	0.860	0.012	0.006	0.110	0.060	0.040	0.010	0.001	0.002	-
105	0.220	0.210	0.840	0.019	0.014	0.140	0.050	0.050	0.010	0.001	0.003	-
106	0.210	0.220	0.840	0.016	0.011	0.200	0.080	0.070	0.020	0.001	0.002	-
107	0.190	0.210	0.840	0.018	0.010	0.200	0.110	0.070	0.020	0.002	0.001	-

ITEM	MECHANICAL TEST					Remark: NORMALIZED : 850°C
	Tensile Strength (KSI)	Yield Strength (KSI)	Elongation (%)	R of A (%)	Hardness (HB)	
Min	70.0	36.0	22.0	30.0	-	WE CERTIFY THE ABOVE MENTIONED FITTINGS HAVE BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH THE SPECIFICATIONS SHOWN   Q.C. MANAGER SHENG CHENG LEE
Max	-	-	-	-	187	
101	77.7	57.4	31.0	66.4	142	
102	79.6	53.9	31.4	63.7	142	
103	80.0	55.1	30.0	65.9	143	
104	77.8	59.6	30.2	65.1	142	
105	80.4	53.6	32.4	65.5	142	
106	77.0	52.6	35.2	65.8	141	 INSPECTOR CHUN CHIEH HUANG
107	79.1	52.3	29.6	65.8	144	

HEAT NUMBER : 72479  
 TRANS AM PIPING PRODUCTS - REV'D BY: *[Signature]*  
 Shipment/Seq #: S 6 - 1617 10

4" CL 150 BLIND FLANGE RF  
 A105N



**METALFAR**  
 PRODOTTI INDUSTRIALI S.P.A.  
 23861 CESANA BRIANZA (LC) ITALY  
 Tel. 031 656441 - Fax 031 655749  
 MATERIAL TEST DEPARTMENT  
 SALA PROVA ED ANALISI MATERIALI

COMPANY  
 TRANS AM PIPING PRODUCTS LTD  
 7025 44TH STREET SE Y2C4R8  
 CALGARY, ALBERTA  
 WITH QUALITY MANAGEMENT  
 SYSTEM CERTIFIED BY DNV  
 = ISO 9001 : 2000 =

INSPECTION CERTIFICATE EN 10204/2.1

CERTIFICATO DI COLLAUDO

N. 3889 / 27/10/2006  
 INVOICE / FATURA: 3481 / 26/10/2006  
 S. 47645  
 DEL. NOTE / DOCL: 5544 / 26/10/2006

# 4059

HEAT CODE COL. COLATA	HEAT COLATA	ITEM POS.	YOUR P.O. NO. ORDINE	OUR REFERENCE NO. ORDINE	QUANTITY QUANTITA'	DESCRIPTION DESCRIZIONE	DIM. ACCORDANCE TO DIM. IN ACCORDO A	VISUAL & DIMENSIONAL VISIVO E DIMENSIONALE	ORIGIN ORIGINE												
71545	72479	0010	C106-706	06003388 0101	W/M 150 RP 2" XS S/O 150 RP 4" W/M 300 RP 6" STD W/M 300 RP 6" STD BLIND 150 RP 4" A105	A105	ASME/ANSI B16.5 ASME/ANSI B16.5 ASME/ANSI B16.5 ASME/ANSI B16.5 ASME/ANSI B16.5	SATISFACTORY SATISFACTORY SATISFACTORY SATISFACTORY SATISFACTORY	EUROPE												
36582	72479	0084	C106-514	06002867 0091	0.195	0.170	0.890	0.072	0.012	0.098	0.050	0.010	0.003	0.170	0.002	0.080	0.006	0.014	0.378	EUROPE	
24603	72479	0017	C106-523	06002451 0024	0.190	0.230	1.040	0.019	0.015	0.129	0.050	0.010	0.019	0.150	0.005	0.002	0.000	0.000	0.005	0.403	EUROPE
24603	72479	0017	C106-523	06002451 0024	0.200	0.220	1.070	0.011	0.014	0.110	0.070	0.010	0.002	0.130	0.000	0.001	0.000	0.000	0.029	0.415	EUROPE
72479	72479	0094	C106-706	06003388 0101	0.195	0.190	0.990	0.019	0.017	0.110	0.050	0.010	0.005	0.250	0.001	0.001	0.000	0.000	0.024	0.404	EUROPE
71545	72479	0010	ASTM A 105		0.195	0.190	0.990	0.019	0.017	0.110	0.050	0.010	0.005	0.250	0.001	0.001	0.000	0.000	0.024	0.404	EUROPE
36582	72479	0084	ASTM A 105		0.190	0.230	1.040	0.019	0.015	0.129	0.050	0.010	0.019	0.150	0.005	0.002	0.000	0.000	0.005	0.403	EUROPE
24603	72479	0017	ASTM A 105		0.200	0.220	1.070	0.011	0.014	0.110	0.070	0.010	0.002	0.130	0.000	0.001	0.000	0.000	0.029	0.415	EUROPE
72479	72479	0094	ASTM A 105		0.195	0.190	0.990	0.019	0.017	0.110	0.050	0.010	0.005	0.250	0.001	0.001	0.000	0.000	0.024	0.404	EUROPE
71545	72479	0010	TEST SPECIMEN SECTION	TEST SPECIMEN SECTION	YIELD POINT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	0.0
36582	72479	0084	TEST SPECIMEN SECTION	TEST SPECIMEN SECTION	YIELD POINT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	0.0
24603	72479	0017	TEST SPECIMEN SECTION	TEST SPECIMEN SECTION	YIELD POINT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	0.0
24603	72479	0017	TEST SPECIMEN SECTION	TEST SPECIMEN SECTION	YIELD POINT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	0.0
72479	72479	0094	TEST SPECIMEN SECTION	TEST SPECIMEN SECTION	YIELD POINT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	TEST RESULT (Rm) 5.1%	0.0

NOTE: MATERIAL IN ACCORDANCE WITH NACE MR-0175/2003

QUALITY CONTROL DEPARTMENT  
 UFFICIO CONTROLLO QUALITA'  
 BRACCINI PIAYVO

INSPECTOR AUTHORITY  
 ENTE ESPRESSO E COLLAUDO

MANUFACTURER'S SYMBOL  
 MTF

HEAT TREATMENT  
 TRATTAMENTO TERMICO

ELECTRIC FURNACE  
 ELETTRIC FURNACE  
 ELETTRIC FURNACE  
 ELETTRIC FURNACE  
 ELETTRIC FURNACE  
 ELETTRIC FURNACE

HEAT NUMBER : 21764  
 TRANS AM PIPING PRODUCTS - REV'D BY: *[Signature]*  
 P.O. # /Seq #: L-05 - 6741 1

1/2" 150# SCRD FLANGE RF A105N

三英鋼 鐵 股 份 有 限 公 司  
 SAN ENG STEEL FORGING CO., LTD.  
 NO. 22 LANE 50, MAN 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.  
 3080 YONGE ST, SUITE 2044  
 TORONTO, ONTARIO M4W 3N1  
 FAX 416-481-1790  
 ORDER NO.: 4319-V/L  
 L/C NO.:

CERT NO.: SE044319N  
 DATE 03/08/2004  
 PAGE 3 OF 5

#1059

ITEM NO.	DESCRIPTION	QUANTITY	SPECIFICATION FOR MATERIAL		SPECIFICATION FOR FITTINGS																	
			ASTM A-105-01/ASME SA-105	ASME B16.5-98a	CHEMICAL COMPOSITION (%)																	
ITEM	HEAT	TENSILE STRENGTH (MPA)	YIELD STRENGTH (MPA)	ELONGATION (%)	HARDNESS (HB)	REDUCTION OF AREA (%)	HEAT TREATMENT	MATERIAL SUPPLIER	REMARKS	C	SI	Mn	P	S	Cu	Cr	Ni	Mo	V	Nb	N	C.E.
										MIN	MIN	MIN	MAX	MIN								
21.	4823 3004 HRFP XS	16"	485	250	22.0	187	30.0			0.200	0.180	0.970	0.012	0.008	0.090	0.050	0.060	0.005	0.003	0.005	0.008	0.384
22.	4940 1504 THRF	1/2"	537.40	363.80	33.6	162	65.9	DEBK		0.210	0.230	1.040	0.014	0.013	0.080	0.050	0.010	0.003	0.003	0.005	0.009	0.412
23.	4946 1504 THRF	3/4"	531.50	333.40	38.8	157	67.7	DEBK		0.210	0.210	1.030	0.013	0.010	0.080	0.070	0.040	0.005	0.001	0.005	0.009	0.406
24.	4932 1504 THRF	1"	502.80	313.60	35.0	166	63.0	DEBK		0.230	0.220	0.970	0.011	0.008	0.080	0.060	0.040	0.005	0.003	0.005	0.008	0.404
25.	4972 1504 THRF	2"	495.20	309.60	39.0	171	63.9	DEBK		0.220	0.150	0.950	0.022	0.007	0.010	0.020	0.010	0.003	0.002	0.002	0.007	0.355
26.	5041 6004 THRF	3/4"	502.80	351.80	36.8	147	63.0	CHINA STEEL		0.230	0.230	0.870	0.014	0.008	0.050	0.120	0.030	0.020	0.003	0.003	0.007	0.399
27.	24057 150# HRFP S180	4"	517.80	341.30	35.6	154	72.5	ACORINAS		0.230	0.230	0.910	0.011	0.007	0.050	0.030	0.020	0.004	0.001	0.007	0.438	
28.	24082 1500# HRFP S160	1/2"	511.80	315.80	38.8	171	63.0	DEBK		0.220	0.230	0.940	0.012	0.008	0.100	0.070	0.030	0.009	0.003	0.005	0.011	0.398
29.	24058 300# HRFP S80	10"	502.80	303.80	35.0	162	64.0	CHINA STEEL		0.230	0.210	0.920	0.015	0.007	0.010	0.019	0.013	0.003	0.002	0.002	0.000	0.350

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

Signature: *Sam DeSole*  
 Signature: *Michael DeSole*  
 WAREHOUSE

NORMALIZATION: 280°C X2HRS  
 CONFORMS TO MEET HACE HR-01-75 LATEST  
 EDITION

P1014859-17

Material Test Report

Report Number: 15947

Date: Tue Nov 30th 1999 00:00

Description: 2" SWAGES & BULL PLUGS

Heat Treatment: H R A P

Specification: "A403-WP316/316L/SA403-WP316/316L"

Material: 316/316L

CRN: OA7470 5C

Comment: 580 TBE

2 X 1-1/2

Chemical Analysis

Heat Code: K1289

Heat Number: 0EN1

C	0.025	Cu	0.432	Al	0.000
Mn	1.429	Ni	11.068	Ti	0.000
P	0.000	Cr	17.398	Co	0.339
S	0.000	Mo	2.114		0.000
Si	0.000	V	0.000		0.000
N	0.035	Nb	0.000		0.000

Carbon Equivalency Formula Used:  
C+(Mn/6)+(Cr+Mo+V)/5+(Ni+Cu)/15  
CE= 4.932

Mechanical Tests

Yield PSI: 39000

Tensile PSI: 82000

% Elongation @ 2" 64

Reduction of Area %  
72

Size: 2 3/5" RND

Brinell Hardness: 144

Charpy Impact Test

Individual Values: NA

(V1) 0 (V2) 0 (V3) 0

This Material Test Report meets DIN 50 049/EN 10 204  
3 1, B Standard 1995

We hereby Certify that the material described has been  
tested in accordance with the specifications and the results  
are correct as contained in the records  
of the Company

Ian Shields  
Q.A. Manager and Customer Service



Sarnia  
Toll Free: 1-866-511-1381  
By regular telephone at: 519-336-2960  
By fax at 519-344-3181

Mailing Address:  
PO Box 999  
645 Kedco St  
Sarnia, ON  
N7T 7K6

Edmonton  
Toll Free: 1-800-661-3909  
By regular telephone at: 780-438-4944  
By fax at 780-435-3917

Mailing Address:  
4120 - 78 Av.  
Edmonton AB  
T6B 3M8

EP-61705 2110735N6F



**柏緯鐵工股份有限公司**

高雄縣仁武鄉烏林村仁心路 303 號

**BOTH-WELL STEEL FITTINGS CO., LTD.**

NO.303, JEN-HSIN ROAD JEN-WU HSIANG

KAOSIUNG HSIEN, TAIWAN R.O.C (81460)

TEL: (07) 871-0497, 371 1536, 372-0260 FAX: (886-7) 371-3864, 371 3882

WEB SITE: <http://www.bothwell.com.tw> E-MAIL: [bothwell@www.bothwell.com.tw](mailto:bothwell@www.bothwell.com.tw) or [box@mail.bothwell.com.tw](mailto:box@mail.bothwell.com.tw)

An ISO-9001 Registered Manufacturer



**MILL TEST & INSPECTION CERTIFICATE**

ACCORDING TO EN10204/DIN50049/3 1 B

CUSTOMER: UNIFIED ALLOYS

INVOICE NO: BW079602016

ORIGIN: TAIWAN

CERT NO: 70866

ORDER NO: EP-60010

L/C NO:

DATE: 04/25/07

PAGE: 1

ITEM	RAW MATERIAL HEAT NO	BOTH WELL HT CD	DESCRIPTION	QUANTITY	SPECIFICATION: A182/SA182 -05a F316 / 316I
016	9T035	T693	UNION 1/4" 3000# NPT	50 PC	DIMENSION: MSS-SP-83 - 2001  SURFACE: BY VISUAL GOOD
017	9U111	T847	UNION 3/4" 3000# NPT	50 PC	
018	FS-0515	T829	UNION 1-1/2" 3000# NPT	15 PC	
019	S46128	T739	UNION 2" 3000# NPT	16 PC	
019	FS-0552	T835	UNION 2" 3000# NPT	84 PC	
066	6U506	T848	UNION 3" 3000# S/W	2 PC	

ITEM	CHEMICAL COMPOSITION (%)											
	C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V	Cb(Nb)	N
Min	-	-	-	-	-	-	16.000	10.000	2.000	-	-	-
Max	0.030	1.000	2.000	0.045	0.030	-	18.000	15.000	3.000	-	-	0.100
016	0.023	0.430	1.620	0.027	0.026	-	17.170	10.190	2.050	-	-	0.080
017	0.030	0.390	1.540	0.028	0.026	-	17.290	10.520	2.030	-	-	0.100
018	0.023	0.380	1.440	0.040	0.020	-	16.580	10.090	2.090	-	-	0.046
019	0.028	0.256	1.404	0.033	0.015	-	16.860	10.039	2.040	-	-	0.038
019	0.018	0.350	1.330	0.040	0.020	-	16.620	10.050	2.050	-	-	0.049
066	0.020	0.480	1.420	0.039	0.023	-	16.530	10.110	2.060	-	-	0.040

ITEM	MECHANICAL TEST					Remark: SOLUTION TREATED : 1040 °C, W Q. CONFORMS TO NACE MR0175-2003 STEEL MAKING PROCESS : ELECTRIC FURNACE MERCURY FREE
	Tensile Strength (KSI)	Yield Strength (KSI)	Elongation (%)	R of A (%)	Hardness (HB)	
Min	75.0	30.0	30.0	50.0	-	WE CERTIFY THE ABOVE MENTIONED FITTINGS HAVE BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH THE SPECIFICATIONS SHOWN
Max	-	-	-	-	235	
016	78.5	32.3	62.6	77.4	152	
017	84.5	41.3	60.2	75.3	168	
018	78.5	34.0	68.0	74.6	149	
019	82.8	35.8	62.0	78.3	163	
019	78.5	35.3	67.8	76.1	152	
066	80.5	38.4	65.2	76.1	152	

*S. C. Lee*      *C. C. Huang*  
 Q.C. MANAGER      INSPECTOR  
 SHENG CHENG LEE      CHUN CHIEH HUANG

BW-D0839 REV:0

JTBUBF CP-31773

9014859-24



ENLIN STEEL PHILS. CORPORATION PHILS : TEL 63-46-4371023 FAX 63-46-4371021

MILL TEST REPORT	
PURCHASER: PINACLE STAINLESS STEEL INC	DATE: Jan/13/2007
	PURCHASE ORDER NO: 35962
	ENLIN S/C NO: G544PN

PRODUCT : STAINLESS STEEL FORGED FITTING

HEAT NO	QTY	TYPE	DESIGNATION	SIZE	SPECIFICATION
6IAJF	100	316L/316	3000# COUPLING NPT	2"	ANSI B16 11-05

CHEMICAL ANALYSIS OF MATERIAL

HEAT NO	C	Mn	Si	P	S	Cr	Ni	Mo	N	SPECIFICATION
Maxi	0.030	2.00	1.00	0.045	0.030	16.18	10.15	2.3	0.100	ASME SA182
6IAJF	0.026	1.15	0.38	0.034	0.005	16.50	10.19	2.07	0.033	ASTM A182-04

MECHANICAL CHARACTERISTICS

HEAT NO	TS -PSI	YS -PSI	%-EL	%-RA	HEAT-TREAT	DIMENSION	PMI
Mini	70,000	25,000	30	50	1050~ 1150 °C		
6IAJF	84,600	46,900	53	73	1060 °C	OK	OK

MATERIAL RESISTANT TO INTERCRYSTALLINE CORROSION ACCORDING TO  
 ASTM A262 PRACTICE E. FREE FROM MERCURY CONTAMINATION.  
 MATERIAL IN ACCORDANCE WITH NACE MR0175-2003 & MR0103-2003  
 ISO 9001:2000, PED 97/23/EC CERTIFIED  
 EN10204 3 1B

CRN NUMBERS :

AB - 0A0826 92, BC - 0A0826 91, MB - 0A0826 94, YT - 0A0826 9Y  
 NB - 0A0826 97, NL - 0A0826 90, NT - 0A0826 9T  
 NS - 0A0826 98, NU - 0A0826 9N, ON - 0A0826 95  
 PE - 0A0826 9, QC - 0A0826 96, SK - 0A0826 93

FACTORY INSPECTOR :

*Yi Tsallin*  
 YI TSALLIN

QUALITY ASSURANCE DEPARTMENT

P1014859-31

# M.E.G.A. SINCERT

CERTIFICATO DI COLLAUDO  
TEST CERTIFICATE  
CERTIFICAT DE CONTROLE  
ABNAHMEZEUGNIS



Numero di collaudo /  
Number of tests /  
Zápis č. 209286  
Page 3  
Data /  
Date 19/12/00  
Indirizzo /  
Address 60198

PROVA / Test Number / Prova	Materiali / Mat. used / Materiali	ESAGGI / Test Order / Esami	CW	HW	Mo %	SW	FW	GW	HW	Mo %	SW	FW	GW	HW	Mo %	SW	FW	GW
HE00	A182/90a F316/316L	745398	0.028	0.460	1.570	0.030	0.028	16.43	10.00	1.000	0.000	0.260	0.000	0.000	0.000	0.000	0.000	0.000
HE09	A182/90a F316/316L	230995	0.015	0.580	1.540	0.030	0.035	16.50	10.01	1.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
HE09	A182/90 F316/316L	19580	0.029	0.540	1.760	0.037	0.039	16.20	10.00	1.080	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
HE09	A182/90a F316/316L	739664	0.024	0.470	1.540	0.030	0.027	16.75	10.00	1.120	0.000	0.280	0.000	0.000	0.000	0.000	0.000	0.000
HE19	A182/90a F316/316L	230995	0.021	0.640	1.470	0.030	0.029	16.65	10.23	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

PROVA / Test Number / Prova	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami
HE00	1	60.1	35.0	288.0	546.0	57.8	73.6	160-164										
HE09	1	122.6	50.0	298.0	562.0	54.6	71.9	168-171										
HE09	1	30.6	25.0	296.0	560.0	57.3	74.6	155-160										
HE09	1	68.1	36.5	286.0	554.0	57.3	72.4	163-170										
HE19	1	122.6	50.0	326.0	572.0	56.4	71.8	178-182										

HE10004/3.1B \*\* DEN 50049 3.1B.  
 HE00 ELECT. FURN. - SOLUT. ANNEALED at 1050 C air-WATER QUENCHED /CERT.132.00 KVAST\*117916 NRGCA#\*0,074\*  
 HE09 ELECT. FURN. - SOLUT. ANNEALED at 1050 C air-WATER QUENCHED /CERT.1193/99-C AVFC\*117500 NRGCA#\*0,074\*  
 HE09 ELECT. FURN. - SOLUT. ANNEALED at 1050 C air-WATER QUENCHED /CERT.7-9558-GRAMMORRINTA\*117877 NRGCA#\*0,11\*  
 HE09 ELECT. FURN. - SOLUT. ANNEALED at 1050 C air-WATER QUENCHED /CERT.163.99 KVAST\*117587 NRGCA#\*0,063\*  
 HE19 ELECT. FURN. - SOLUT. ANNEALED at 1050 C air-WATER QUENCHED /CERT.4914.99 AVFC\*117583 NRGCA#\*0,074\*

PROVA / Test Number / Prova	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami	ESAGGI / Test Order / Esami
HE00	029	40	6620-2635	KEY. HEAD PLUG RPT 316L 2														
HE00	037	50	6620-4179	COUPLING S. 3000 SW 316L 1.1/2														OK
HE09	032	25	6620-4075	45 DEG. HEAD S. 3000 SW 316L 1.1/4														OK
HE09	030	25	6620-2479	ORION (MALE+FEMALE+WET) S. 3000 RPT 316L 1.1/2														OK
HE09	021	20	6620-2485	ORION (MALE+FEMALE+WET) S. 3000 RPT 316L 2														OK
HE19	018	25	6620-2420	CAP S. 3000 RPT 316L 1														OK

OGGI QUALORA IL COLLAUDO / THE TESTING TODAY  
 OGGI QUALORA IL COLLAUDO / THE TESTING TODAY  
 OGGI QUALORA IL COLLAUDO / THE TESTING TODAY

Q31679 2T3U6F #0XU9

SAEN SIAH BISHOP, INC. (INCORPORATED)  
 TAIWAN, R.O.C.  
 Tel: 07-371 2923 07-371 2934  
 Fax: 07-371 2923 07-371 2846  
 URL: http://www.saeng.com.tw  
 e-mail: saeng@kts.seed.net.tw

ORDER NO: 5316(1)-CRANE  
 L/C NO.  
 TORONTO, ONTARIO, CANADA  
 TEL: 416-481-9191 FAX: 416-481-1900

DATE: 04/03/2000  
 PAGE 4 OF 4

ITEM NO.	DESCRIPTION	QUANTITY	SPECIFICATION FOR MATERIAL										SPECIFICATION FOR FITTINGS												
			ASTM A-105-Q3/ASME SA-105 (2245, 12 CAT 1 GR. 248 SOHR SERVICE-01)										ASME B16.5-98a												
			CHEMICAL COMPOSITION (%)																						
			C	SI	Mn	P	S	Cu	Cr	NI	Mo	V	Nb	N	C.E.										
31.	150 THRF	2" A105N	10	0.290	0.200	1.140	0.012	0.008	0.100	0.060	0.050	0.005	0.003	0.005	0.009	0.414									
32.	150 THRF	2" A105N	8	0.190	0.170	1.070	0.012	0.015	0.120	0.060	0.010	0.003	0.005	0.009	0.395										
33.	150 THRF	3" A105N	5	0.210	0.260	1.150	0.013	0.006	0.090	0.040	0.050	0.005	0.003	0.005	0.010	0.421									
34.	150 THRF	3" A105N	6	0.190	0.150	1.050	0.012	0.008	0.050	0.050	0.040	0.005	0.003	0.005	0.006	0.385									
ITEM	HEAT	TENSILE STRENGTH (MPa)	YIELD STRENGTH (MPa)	ELONGATION (%)	HARDNESS (HB)	REDUCTION OF AREA (%)	HEAT TREATMENT	MATERIAL SUPPLIER	REMARKS																
									485 MIN	250 MIN	22.0 MIN	187 MAX	30.0 MIN												
31.	37324	515.80	327.50	33.4	150	66.9	NORMALIZED	OEK	NORMALIZATION: 880°C X3HRS CONFORMS TO MEET NACE MR-01-75 LATEST EDITION																
32.	19352	519.80	317.70	34.0	154	66.8	NORMALIZED	OEK																	
33.	47405	511.90	319.70	31.8	154	65.9	NORMALIZED	OEK																	
34.	44787	501.10	319.70	36.2	157	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

*(Handwritten signatures and initials)*



HEAT NUMBER : 36564  
 TRANS AM PIPING PRODUCTS - REV'D BY:   
 Shipment/Seq #: S 7 - 1277 10

6" CL 150 BLIND FLANGE RF  
 A105N



**METALFAR**  
 PRODOTTI INDUSTRIALI S.P.A.  
 23901 GEMANA, BRIANZA (LC) ITALY  
 TEL. 031/55541 - FAX 031/55518  
 MATERIAL TEST DEPARTMENT  
 SALVA PROVE ED ANALISI MATERIALI

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

233061 ENDRAGON DRIVE S.E.  
 CLARKSVILLE  
 MISSISSIPPI

INSPECTION CERTIFICATE EN 10204/3.1

CERTIFICATO DI COLLAUDO

M. 1625/ 26/04/2007  
 S. 1461/ 26/04/2007  
 S. 49937  
 DEL. NOTE / BOLLA 24801 26/04/2007

HEAT CODE COD. COLLAVA	HEAT COLLAVA	ITEM POS.	YOUR DR. / VS. DOWNE	OUR REFERENCE VS. CRISME	QUANTITY QUANTITA'	DESCRIPTION DESCRIZIONE	DIM. ACCORDANCE TO DIM. IN ACCORDO A	VISUAL & DIMENSIONAL VISOVALE E DIMENSIONALE												
38857, 36564 537709	HEAT COLLAVA	0018 0037 0060	C106-829 C107-268 C107-182	07000046 0018 07000139 0016 07000547 0059		BLIND 600 RP 4" BLIND 150 RP 6" S/O 150 RP 30" TP. CL. 125 A105	LP204 A105	ASME/ANSI B16.5 ASME/ANSI B16.5 FL. CL. 125	SATISFACTORY SATISFACTORY SATISFACTORY											
HEAT CODE COD. COLLAVA	HEAT COLLAVA	ITEM POS.	MATERIAL MATERIALE	C %	SI %	Mn %	S %	P %	Cr %	Ni %	Md %	TI %	Cu %	V %	Nb %	N %	Al %	C.E. %	ORIGIN ORIGINE	
38857, 36564 537709	HEAT COLLAVA	0018 0037 0060	ASTM A350 LP2 CL.1/2 ASTM A 105 ASTM A 105	0.195 0.200 0.190	0.230 0.230 0.190	1.100 1.010 0.310	0.014 0.018 0.003	0.014 0.017 0.309	0.140 0.140 0.190	0.060 0.060 0.080	0.010 0.010 0.020	0.018 0.010 0.000	0.180 0.160 0.150	0.027 0.005 0.002	0.003 0.001 0.001	0.000 0.000 0.000	0.026 0.005 0.044	0.429 0.414 0.392	8880P3 8880P8 8880P8	
HEAT CODE COD. COLLAVA	HEAT COLLAVA	ITEM POS.	TEST SPECIFICATION REQUISITI SPECIFICAZIONE	YIELD POINT New 2 T.S. / New 2 T.S.	TENSILE New 2 / New 2	ELONGATION New 2 % / New 2 %	REDUCTION OF AREA New 2 % / New 2 %	HARDNESS Durezza	HARD TEST Hardness	RAMMING TEST Schiumatura	U.M. UNITA'	IMPACT TEST - TENSILE	Charpy	Charpy	Charpy	Charpy	Charpy	Charpy	Charpy	OUR REF
38857, 36564 537709	HEAT COLLAVA	0018 0037 0060	ASTM/ASME A 350/SA 350 N - 04a ASTM/ASME A 105/SA 105 N - 05 ASTM/ASME A 105/SA 105 N - 05	384.8 348.0 300.0	537 530 503	31.0 31.0 34.0	59.0 59.0 67.0	164-166 163-165 157-156	0.0 0.0 0.0	0.0 0.0 0.0	U.M. UNITA'	-50 20 20	66 88 66	68 81 66	65 87 61	65 87 61	65 87 61	65 87 61	65 87 61	0.0 0.0 0.0
NOTE																				
MATERIAL IN ACCORDANCE WITH NACE MR-0175/2003																				
MATERIAL IN ACCORDANCE TO																				
MATERIALE IN ACCORDO A																				
QUALITY CONTROL DEPARTMENT UFFICIO CONTROLLO QUALITA'										INSPECTION AUTHORITY ENTE OFFICIALE CONTROLLO										
BRACCHI PIAVIO										MANUFACTURER'S SYMBOL MARCHIO IN FABBRICAZIONE										
MATERIALE IN ACCORDO A										MATERIALE IN ACCORDO A										
NORMALIZED AT 930 C - COOLED IN STILL AIR NORMALIZED AT 920 C - COOLED IN STILL AIR NORMALIZED AT 920 C - COOLED IN STILL AIR										ELECTRIC FURNACE ELECTRIC FURNACE ELECTRIC FURNACE										

P1014859-23

WUXI TONGDA STAINLESS STEEL CO., LTD.

MILL TEST CERTIFICATE

ASTM/ASME A/SAS12-04

CONTRACT NO.: TD 06-10-09 EP-57369

DATE: Dec. 15, 2006

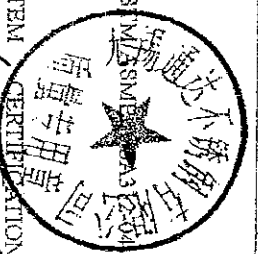
Customer: UNIFIED ALLOYS  
 Article: STAINLESS STEEL PIPE, SEAMLESS  
 Grade/Specification: P316/L  
 SIZE: 2" SCH80S 20FT

BATCH NO.	Dimensions		Length	Total Qty	Total length (ft)	Total Weight Kgs	
	Outside Diameter	Wall Thickness					
0609-128	2"	SCH80S 5.51mm	20' 6096mm	110	2200	5025	
Chemical Composition%							
Normal	C	Mn	P	S	SI	NI	
Min						Cr	
Max	0.035	2.00	0.045	0.030	1.00	10.0	
Test	0.036	0.70	0.032	0.003	0.43	14.0	
Test No.						10.19	
Mechanical Properties							
Test	Tensile Strength		Yield Strength		Elongation %	Reduction of Area %	Hardness (HRB)
	N/mm <sup>2</sup>		N/mm <sup>2</sup>				
	600		320		50		
Test	Edge current Test	Bending Test	Flattening Test	Flaring Test	Hydrostatic Test (Mpa)	Grain Size No.	Decarburized Dept (mm)
	(GOOD)		GOOD				dA
Additional Remarks:							
Mercury free							
No Weld repairs has been made at all							

- We hereby certify that the material describe has been manufactured, sampled, tested and inspected in accordance with ASTM A312/A312M/A312R/A312R-04
  - The material to NACE MR01-75 latest edition and to EN10204 3.1.
  - The material was heated to above 1922°F or 1050°C and water quenched to below 140°F or 60°C.
- Our quality system is certified in accordance with ISO 9001 by CHINA METALLURGICAL INDUSTRY QUALITY SYSTEM CERTIFICATION CENTER

Quality Technology Director

050031015579



*[Signature]*



**ENLIN STEEL PHILS. CORPORATION** PHILS : TEL 63-46-4371023 FAX 63-46-4371021

**MILL TEST REPORT**

DATE: Dec/30/2006  
 PURCHASER: PINACLE STAINLESS STEEL INC PURCHASE ORDER NO: 32932  
 ENLIN S/C NO: G212PN

PRODUCT : STAINLESS STEEL FORGED FITTING

HEAT NO	QTY	TYPE	DESIGNATION	SIZE	SPECIFICATION
617JY	76	316L/316	3000# UNION NPT	2"	MSS SP83

**CHEMICAL ANALYSIS OF MATERIAL**

HEAT NO	C	Mn	Si	P	S	Cr	Ni	Mo	N	SPECIFICATION
Maxi	0.030	2.00	1.00	0.045	0.030	16 - 18	10 - 15	2 - 3	0.100	ASME SA182
617JY	0.012	1.38	0.36	0.028	0.008	16.12	10.03	2.04	0.040	ASTM A182-04

**MECHANICAL CHARACTERISTICS**

HEAT NO	TS - PSI	YS - PSI	%-EL	%-RA	HEAT-TREAT	DIMENSION	PMI
Mini	70,000	25,000	30	50	1050- 1150 °C		
617JY	83,200	44,800	52	67	1060 °C	OK	OK

MATERIAL RESISTANT TO INTERCRYSTALLINE CORROSION ACCORDING TO  
 ASTM A262 PRACTICE E. FREE FROM MERCURY CONTAMINATION.  
 MATERIAL IN ACCORDANCE WITH NACE MR0175-2003 & MR0103-2003  
 ISO 9001:2000, PED 97/23/EC CERTIFIED  
 EN10204 3.1B

CRN NUMBERS :  
 AB - 0A0826.92, BC - 0A0826.91, MB - 0A0826.94, YT - 0A0826.9Y  
 NB - 0A0826.97, NL - 0A0826.90, NT - 0A0826.9T  
 NS - 0A0826.98, NU - 0A0826.9N, ON - 0A0826.9S  
 PE - 0A0826.9, QC - 0A0826.96, SK - 0A0826.93

FACTORY INSPECTOR :

*J. Y. Tsallin*  
 J. Y. TSALLIN

QUALITY ASSURANCE DEPARTMENT

**INSPECTION CERTIFICATION AND MILL TEST REPORT**  
According to EN 10204 3.1.B

Customer:

PinaAcle Stainless Steel Inc,  
455 AMBASSADOR DRIVE,  
MISSISSAUGA, ONTARIO,  
Canada H4S 1A8

Manufacturer' Symbol  
SC-YL

SHANDONG QINGYUN YUNLONG PRECISION CASTING CO., LTD.  
& SC MFG GROUP INC.

QINGYUN SHANDONG Province

Tel : 86-534-7085702 Fax : 86-534-7085700

MTR No.	SC-1525A
Date of issue:	3/2/2006
Grade:	TP316L 80S
Made From:	PIPE
Material Specification:	ASTM A733
Dimensional Specification	ANSI/ASME B1.20.1

P.O. # 31184 SC MFG Order No. SC-1525

**Chemical Analysis**

Item No.	Item Description	Sch.	Heat No.	QTY	%C	%Mn	%P	%S	%Si	Ni	Cr	Mo
43	11/2*3 NIPPLE	80S	F1149	500	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
44	11/2*5/2 NIPPLE	80S	F1149	100	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
45	11/2*6 NIPPLE	80S	F1149	289	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
46	11/2 close	80S	F1149	732	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
47	2*21/2 NIPPLE	80S	F1149	300	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
48	2*3 NIPPLE	80S	F1149	301	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05

**Mechanical Properties**

Heat No.	Item Description	Tensile MPa	Yield MPa	Elong %	Red. %	Bend Test	Flattening Test	Hardness HB	Impact Test	Hydrostat. Test	Xray Test
F1149	11/2*3 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-
F1149	11/2*5/2 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-
F1149	11/2*6 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-
F1149	11/2 close	585	248	49	-	ok	ok	87	ok	ok	-
F1149	2*21/2 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-
F1149	2*3 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-

Misc: Material in accordance with NACE MR0175-2001 Free from Mercury contamination Addition of filler metal?  No  Yes

**WE CERTIFY THIS MATERIAL HAS BEEN MANUFACTURED AND EXAMINED IN ACCORDANCE WITH ALL REQUIREMENTS OF THE SPECIFICATION(S) AND THE RESULTS OF ALL EXAMINATIONS ARE ACCEPTABLE.**

**INSPECTION CERTIFICATION AND MILL TEST REPORT**  
According to EN 10204 3.1.B

Customer:

PinaAcle Stainless Steel Inc.  
455 AMBASSADOR DRIVE,  
MISSISSAUGA, ONTARIO,  
Canada H4S 1A8

Manufacturer' Symbol
SC-YL

**SHANDONG QINGYUN YUNLONG PRECISION CASTING CO., LTD.**  
& SC MFG GROUP INC.

QINGYUN SHANDONGI Province

Tel : 86-534-7085702 Fax : 86-534-7085700

MTR No.	SC-1525A
Date of issue:	3/2/2006
Grade:	TP316L 80S
Made From:	PIPE
Material Specification:	ASTM A733
Dimensional Specification	ANSI/ASME B1.20.1

P.O. # 31184 SC MFG Order No. SC-1525

**Chemical Analysis**

Item No.	Item Description	Sch.	Heat No.	QTY	%C	%Mn	%P	%S	%Si	Ni	Cr	Mo
49	2*3/2 NIPPLE	80S	F1149	248	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
50	2*4 NIPPLE	80S	F1149	298	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
51	2*4 1/2 NIPPLE	80S	F1149	150	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
52	2*5 NIPPLE	80S	F1149	101	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
53	2*5 1/2 NIPPLE	80S	F1149	99	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
54	2*6 NIPPLE	80S	F1149	199	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
55	2 CLOSE	80S	F1149	643	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05

**Mechanical Properties**

Heat No.	Item Description	Tensile MPa	Yield MPa	Elong %	Red. %	Bend Test	Flattening Test	Hardness HB	Impact Test	Hydrostat. Test	Xray Test
F1149	2*3/2 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-
F1149	2*4 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-
F1149	2*4 1/2 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-
F1149	2*5 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-
F1149	2*5 1/2 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-
F1149	2*6 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-
F1149	2 CLOSE	585	248	49	-	ok	ok	87	ok	ok	-

Misc: Material in accordance with NACE MR0175-2001 Free from Mercury contamination Addition of filler metal?  NO  YES

**WE CERTIFY THIS MATERIAL HAS BEEN MANUFACTURED AND EXAMINED IN ACCORDANCE WITH ALL REQUIREMENTS OF THE SPECIFICATION(S) AND THE RESULTS OF ALL EXAMINATIONS ARE ACCEPTABLE.**

**INSPECTION CERTIFICATION AND MILL TEST REPORT**  
According to EN 10204 3.1.B

Customer:

PinaAcle Stainless Steel Inc.  
455 AMBASSADOR DRIVE,  
MISSISSAUGA, ONTARIO,  
Canada H4S 1A8

Manufacturer' Symbol  
SC-YL

**SHANDONG QINGYUN YUNLONG PRECISION CASTING CO., LTD.**  
**& SC MFG GROUP INC.**

QINGYUN SHANDONGI Province

Tel : 86-534-7085702 Fax : 86-534-7085700

MTR No.	SC-1525A
Date of issue:	3/2/2006
Grade:	TP316L 80S
Made From:	PIPE
Material Specification:	ASTM A733
Dimensional Specification:	ANSI/ASME B1.20.1

P.O. # 31184 SC MFG Order No. SC-1525

**Chemical Analysis**

Item No.	Item Description	Sch.	Heat No.	QTY	%C	%Mn	%P	%S	%Si	Ni	Cr	Mo
49	2*3/2 NIPPLE	80S	F1149	248	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
50	2*4 NIPPLE	80S	F1149	298	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
51	2*4 1/2 NIPPLE	80S	F1149	150	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
52	2*5 NIPPLE	80S	F1149	101	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
53	2*5 1/2 NIPPLE	80S	F1149	99	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
54	2*6 NIPPLE	80S	F1149	199	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
55	2 CLOSE	80S	F1149	643	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05

**Mechanical Properties**

Heat No.	Item Description	Tensile Mpa	Yield Mpa	Elong %	Red. %	Bend Test	Flattening Test	Hardness HB	Impact Test	Hydrostat. Test	Xray Test
F1149	2*3/2 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-
F1149	2*4 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-
F1149	2*4 1/2 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-
F1149	2*5 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-
F1149	2*5 1/2 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-
F1149	2*6 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-
F1149	2 CLOSE	585	248	49	-	ok	ok	87	ok	ok	-

Misc: Material in accordance with NACE MR0175-2001 Free from Mercury contamination Addition of filler metal?  No  Yes

**WE CERTIFY THIS MATERIAL HAS BEEN MANUFACTURED AND EXAMINED IN ACCORDANCE WITH ALL REQUIREMENTS OF THE SPECIFICATION(S) AND THE RESULTS OF ALL EXAMINATIONS ARE ACCEPTABLE.**

**INSPECTION CERTIFICATION AND MILL TEST REPORT**  
According to EN 10204 3.1.B

Customer:  
PinaAcle Stainless Steel Inc.  
455 AMBASSADOR DRIVE,  
MISSISSAUGA, ONTARIO,  
Canada H4S 1A8

Manufacturer's Symbol  
SC-YL

SHANDONG QINGYUN YUNLONG PRECISION CASTING CO., LTD.  
& SC MFG GROUP INC.

QINGYUN SHANDONG Province

Tel : 86-534-7085702 Fax : 86-534-7085700

MTR No.	SC-1525A
Date of Issue:	3/2/2006
Grade:	TP316L 80S
Made From:	PIPE
Material Specification:	ASTM A733
Dimensional Specification	ANSI/ASME B1.20.1

P.O. # 31184 SC MFG Order No. SC-1525

**Chemical Analysis**

Item No.	Item Description	Sch.	Heat No.	QTY	%C	%Mn	%P	%S	%Si	Ni	Cr	Mo
49	2*31/2 NIPPLE	80S	F1149	248	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
50	2*4 NIPPLE	80S	F1149	298	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
51	2*4 1/2 NIPPLE	80S	F1149	150	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
52	2*5 NIPPLE	80S	F1149	101	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
53	2*5 1/2 NIPPLE	80S	F1149	99	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
54	2*6 NIPPLE	80S	F1149	199	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05
55	2 CLOSE	80S	F1149	643	0.026	1.18	0.036	0.004	0.64	10.85	16.2	2.05

**Mechanical Properties**

Heat No.	Item Description	Tensile MPa	Yield MPa	Elong %	Red. %	Bend Test	Flattening Test	Hardness HB	Impact Test	Hydrostat Test	Xray Test
F1149	2*31/2 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-
F1149	2*4 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-
F1149	2*4 1/2 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-
F1149	2*5 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-
F1149	2*5 1/2 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-
F1149	2*6 NIPPLE	585	248	49	-	ok	ok	87	ok	ok	-
F1149	2 CLOSE	585	248	49	-	ok	ok	87	ok	ok	-

Misc: Material in accordance with NACE MR0175-2001 Free from Mercury contamination Addition of filler metal?  No  Yes

**WE CERTIFY THIS MATERIAL HAS BEEN MANUFACTURED AND EXAMINED IN ACCORDANCE WITH ALL REQUIREMENTS OF THE SPECIFICATION(S) AND THE RESULTS OF ALL EXAMINATIONS ARE ACCEPTABLE.**

**INSPECTION CERTIFICATION AND MILL TEST REPORT**  
According to EN 10204 3.1.B

**Customer:**  
PinaAcle Stainless Steel Inc.  
455 AMBASSADOR DRIVE,  
MISSISSAUGA, ONTARIO,  
Canada H4S 1A8

Manufacturer's Symbol  
**SC-HF**

**P.O. # 24863 SC MFG Order No. SC092**

**CANGZHOU HONGFENF PRECISION CASTING CO., LTD.**  
**DBA SC MFG GROUP INC.**

Niangliang Miao Industry Area, Yunhe District, Cangzhou City, Hebei Province  
Tel: 86-317-2120955 Fax: 86-317-2120700

MTR No.	GWKH-0411-108
Date of issue:	1/12/2005
Grade:	TP316 / TP316L
Made From:	PIPE
Material Specification:	ASTM A312
Dimensional Specification	ANSI/ASME B1.20.1

**Chemical Analysis**

Item No.	Item Description	Sch.	Heat No.	QTY	%C	%Mn	%P	%S	%Si	Ni	Cr	Mo
31	2*6 NIPPLE	80S	0821-3	30	0.022	1.12	0.033	0.009	0.48	10.23	16.18	2.12
32	2*8 NIPPLE	80S	0821-3	10	0.022	1.12	0.033	0.009	0.48	10.23	16.18	2.12

**Mechanical Properties**

Heat No.	Item Description	Tensile MPa	Yield MPa	Elong %	Red. Area %	Bend Test	Flattening Test	Hardness HB	Impact Test	Hydrostat. Test	Xray Test	Visual & Dimension
0821-3	2*6 NIPPLE	550	218	48	-	ok	ok	181	ok	ok	-	ok
0821-3	2*8 NIPPLE	550	218	48	-	ok	ok	181	ok	ok	-	ok

Misc: Material in accordance with NACE MR0175-2001 Free from Mercury contamination Addition of filler metal?  No  Yes  
**WE CERTIFY THIS MATERIAL HAS BEEN MANUFACTURED AND EXAMINED IN ACCORDANCE WITH ALL REQUIREMENTS OF THE SPECIFICATION(S) AND THE RESULTS OF ALL EXAMINATIONS ARE ACCEPTABLE.**

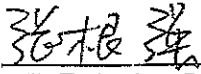



**HUZHOU XINYAOHUA STAINLESS STEEL PIPES & TUBES CO., LTD.**

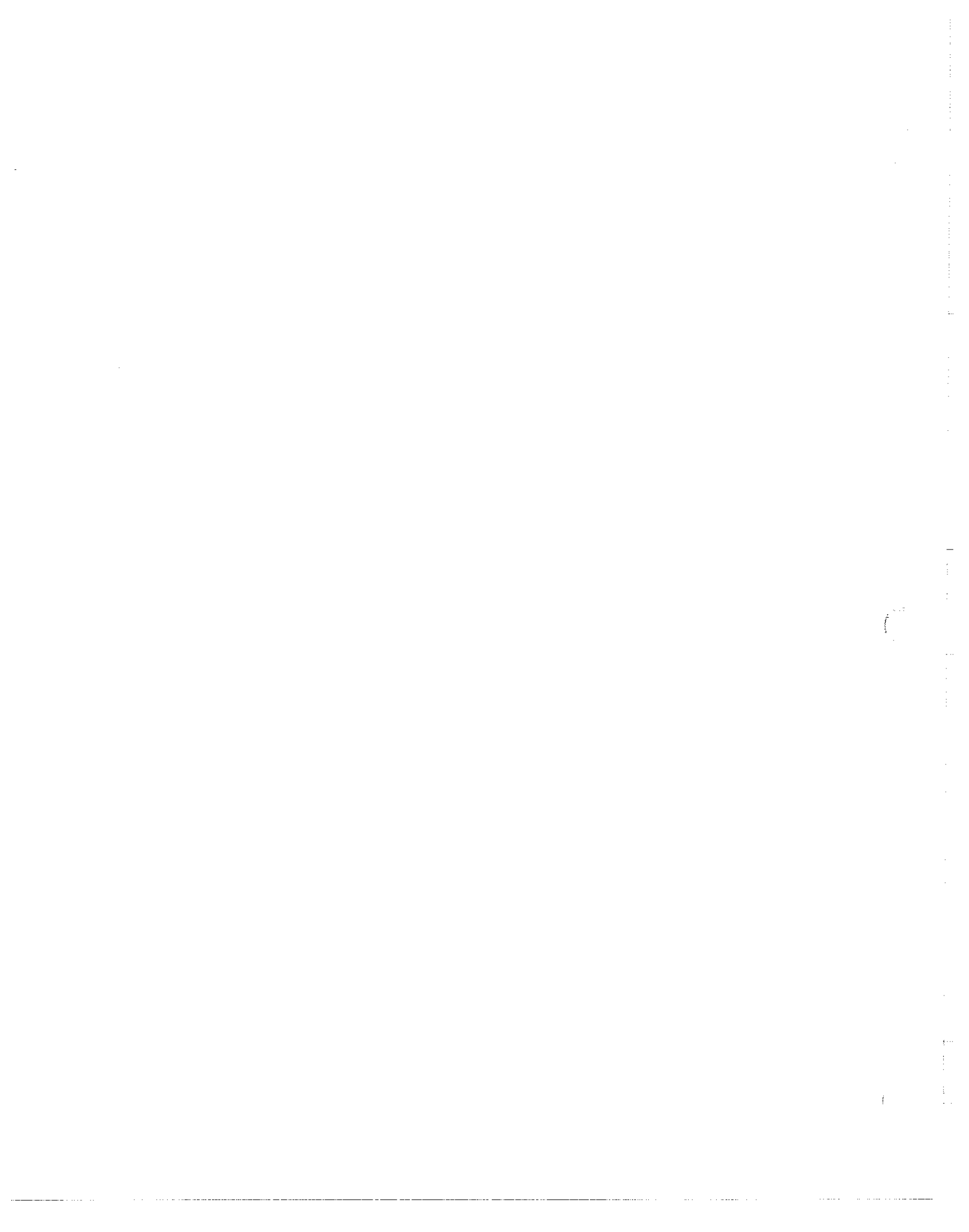
CHANGCHAO IND ZONE, HEFU TOWN, HUZHOU CITY, ZHEJIANG PROVINCE, P.R. OF CHINA

**MILL CERTIFICATE to EN 10204/3.1**

Customer : PINACLE STAINLESS STEEL INC	Cert No : XYH-07-01-60
Specification : ASTM A312-05; ASME SA312-04	Delivery Condition : Annealed & Pickled
Steel Grade : TP316/316L	Invoice No :06MGS/LL13-2
Goods : Stainless Steel Seamless Pipe	L/C NO :I1045214T07512

Heat No	Chemical Composition (%)							
	C	Mn	P	S	Si	Ni	Cr	Mo
0610-61	0.014	0.73	0.038	0.008	0.51	11.05	16.23	2.02
Lot No.	Size			Quantity				
1A-36	2"SCH10S			40 FT				
1A-37	2"SCH40S			120 FT				
1A-38	2"SCH80S			1020 FT				
Lot No.	Mechanical Properties (Under Room Temperature)						Size & Surface	
	Yield Strength Mpa	Tensile Strength Mpa	Elongation (%)	Hardness Test HRB	Flaring Test HRB	Flattening Test	Size Check	Surface Quality
1A-36	270/275	605/615	48/47	76/78		Acceptable	Acceptable	Acceptable
1A-37	265/275	610/615	49/46	78/78		Acceptable	Acceptable	Acceptable
1A-38	260/270	610/615	47/46	74/75	5	Acceptable	Acceptable	Acceptable
Nondestructive Examination						Intergranular Corrosion	Grain Size	
Eddy Current Test Acc to ASTM E426	Ultrasonic Test		Hydrostatic Test			Acc to ASTM A262 E	Acc to ASTM E112	
Acceptable								
<b>Additional Remarks: The pipes are acc. to ASTM A999/A999M-03 and conform to NACE MR0175.</b>								
Annealing temperature 1100°C								
We hereby certify that the material described above has been tested and sampled and complies with the terms of the Contract & the specification								
2007/1/24			 _____ Quality Technology Director					
Date								

湖州新亚华不锈钢有限公司  






**CHAMCO**

Your Challenges  
Our Solutions

PUMPING AND COMPRESSION EQUIPMENT



ISO 9001:2000 Certified

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HAS BEEN  
LEFT BLANK  
INTENTIONALLY***



30146 to A6's #41059. P70302E1002

Bill To: Ship To: 1  
WILKINSON STEEL & METALS-CALC WILKINSON COMPANY LTD. - CALC  
DIV FERMETALCO, INC. Mill Order No: P70302E1002  
6125 51ST STREET S.E. Load No: 3276280  
CALCARY AB Manifest No: 1816873  
T2C-3V2 CA

Order Date: 03/09/2007  
CHAPARRAL STEEL  
CERTIFIED MATERIAL TEST REPORT  
CHAPARRAL STEEL  
300 Ward Rd.  
Midlothian, TX  
76065-9651  
(972) 775-8241

SIZE 6 X 8.20 CHANNELS / C 150 X 12.2  
GRADE A36/A57250  
LENGTH 40 FT / 12.192 M  
PRODUCT CHANNELS

SPECIFICATION  
ASTM A6-05, A36-05, A572-06, A992-06

HEAT NO: 22396370

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn	V	Al	Mb	CE
.08	.91	.006	.023	.22	.34	.12	.16	.028	.009	.001	.005	.018	.3

PHYSICAL PROPERTIES

Yield Strength	Tensile Strength	Specimen Area	Elongation	Bend Test	ROA
KSI	MPa	Sq In	%	Dia. Result	%
57.5	396.4	0.310	24.1	200 mm	
55.3	381.3	0.320	24.0	200 mm	

REMARKS

MATERIAL MEETS REQUIREMENTS OF CSA G40.21 GRADES 44W / 50W; MEETS REQUIREMENTS OF AISC TECH BULLETIN #3 - MARCH, 1997

All manufacturing processes of this product, including electric arc melting and continuous casting, occurred in the U.S.A. CMTR complies with DIN EN 10204 3.1.B

"I hereby certify that the contents of this report are correct and accurate. All tests and operations performed by this material manufacturer or its sub-contractors, when applicable, are in compliance with the requirements of the material specifications and applicable purchaser designated requirements."

Signed: Tom L. Harrington Date: Apr. 05, 2007 Signed: Notary Public (if applicable)

Date: \_\_\_\_\_  
Page: 1 of 8

64A007401

**ALGOMA STEEL INC.**  
 CUSTOMER PURCHASE ORDER NUMBER: IM 64020862  
 ENTRY DATE: 2006/07/20  
 SHIP DATE: 2006/10/02  
 105 West Street, Sault Ste. Marie, Ontario Canada P6A 7B4  
 FULLY NUMBERED SHIPPER'S NUMBER: 347323 03  
 CARRIER: CN  
 ALL ORDER: 12326

CHARGE TO CUSTOMER NAME AND ADDRESS: RUSSEL METALS INC  
 5724 - 40TH STREET SE  
 CALGARY ALBERTA T2C 2A1  
 SHIP TO CUSTOMER NAME AND ADDRESS: RUSSEL METALS INC  
 5724 - 40TH STREET SE  
 CALGARY ALBERTA

CUSTOMER SPECIFICATION: HR FLOOR PLATE - CARBON - ALGOMA 50  
 SUPPLEMENTARY INSTRUCTIONS: J. Johnston  
 MANAGING METALLURGIST

FAX SM & TR TO CAROLYN SPEERS (403-279-3269) AT TIME OF SHIPMENT  
 THIS MILL TEST REPORT MAY NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF ALGOMA STEEL INC. IF YOU RECEIVE THIS DOCUMENT AND ARE NOT THE INTENDED RECEIVER, PLEASE CALL (705) 846-2624 COLLECT FOR INSTRUCTIONS ON METHOD OF DISPOSAL OF DOCUMENT.

SHIP TO: CHEMICAL ANALYSIS REPORT REQUIRED  
 RESALE  
 MEETS EN 10204 3.1.B AND DIN 50049 3.1.B  
 MEETS ISO 9001:2000 REGISTERED  
 ALL HEATS FULLY KILLED  
 HEATS INDICATED WITH (\*) FINE GRAINED  
 PRODUCED FROM COIL  
 CUSTOMER ITEM 002 OUR ITEM 002 DIMENSIONS .188 X 60 X 240 #

TAG NUMBER	NO. PIECES	WEIGHT	HEAT(S)	TAG NUMBER	NO. PIECES	WEIGHT	HEAT(S)
J26559	11	8775	2032X	J26560	11	8775	2032X
J26561	11	8775	2032X	J26562	11	8775	2032X

HEAT	CI	MM	PN	AS	SR	CR	NT	CU	MO	AL	CB	V	B
2032X*	.002	.38	.003	.010	.01	.02	.01	.02	.00	.026	.002	.002	.002

4832793269 ALGOMA STEEL INC. Page 881  
 18/02/06 19:53:16  
 # 6108

\*\*\*WARNING\*\*\* THE TEST RESULTS AND VALUES REPORTED HEREIN INDICATE ONLY THAT (1) THE PARTICULAR STEEL FOR WHICH THIS CERTIFICATE IS ISSUED MEETS THE MINIMUM SPECIFIED YIELD STRENGTH AND (2) THE CHEMICAL ANALYSIS AND PHYSICAL PROPERTIES OF SUCH STEEL ARE IN CONFORMANCE WITH THE REQUIREMENTS OF THE SPECIFICATION INDICATED. THE RESULTS OR VALUES REPORTED HEREIN CAN NOT BE USED TO QUALIFY THE STEEL FOR ANY SPECIFICATION OTHER THAN THE ONE INDICATED AND CAN NOT BE RELIED UPON FOR ANY PURPOSE (INCLUDING DESIGN OR CALCULATIONS) AS REPRESENTING THE ACTUAL STRENGTH OF SUCH STEEL.

10/10/06

*[Signature]*  
 11/17

64A005999

**ALGOMA STEEL INC.**

CUSTOMER PURCHASE ORDER NUMBER  
MG 4020132

CHARGE TO CUSTOMER NAME AND ADDRESS  
RUSSEL METALS INC.  
5724 40TH STREET SE,  
CALGARY ALBERTA  
T2C 2A1

ENTRY DATE  
2006/04/19

SHIP DATE  
2006/06/12

DAILY NUMBER SHIPPERS NUMBER  
308892 03 -

CARRIER  
CN

105 West Street, Sault Ste. Marie, Ontario Canada P6A 7B4

SHIP TO CUSTOMER NAME AND ADDRESS  
RUSSEL METALS INC  
5724 - 40TH STREET SE  
CALGARY ALBERTA

MILL ORDER  
79385

-622365

**MILL TEST REPORTS**

ALGOMA STEEL INC. HERBY CERTIFIES THAT THE MATERIAL HEREIN DESCRIBED WAS MADE AND TESTED IN ACCORDANCE WITH THE RULES OF THE SPECIFICATION SHOWN HEREIN AS CONTAINED IN THE COMPANY RECORDS AND WITHIN THE SCOPE OF ACCREDITATION OF ISO/IEC GUIDE 28:1990 AS CONTAINED IN THE COMPANY RECORDS.

J. Johnston  
MANAGING METALLURGIST

THIS MILL TEST REPORT MAY NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF ALGOMA STEEL INC. IF YOU RECEIVE THIS DOCUMENT AND ARE NOT THE INTENDED RECIPIENT, PLEASE CALL (705) 845-2624 COLLECT FOR INSTRUCTIONS ON METHOD OF DISPOSAL OF DOCUMENT.

ALGOMA SPECIFICATION PLATE - CARBON - ALGOMA 50

FAX SM & TR TO CAROLYN SPEERS (403-279-3269) AT TIME OF SHIPMENT

CHEMICAL ANALYSIS REPORT REQUIRED

INSTR USE  
RESALE P/N 61038

2006/06/12 05:50

MEETS EN 10204 3.1.B AND DIN 50049 3.1.B  
MEETS ISO 9001:2000 REGISTERED  
ALL HEATS FULLY KILLED  
HEATS INDICATED WITH (X) FINE GRAINED  
PRODUCED FROM COIL

\*\*\*\*\* S H I P P E D \*\*\*\*\*

CUSTOMER ITEM 001 OUR ITEM 001 DIMENSIONS .188 X 72 X 240

TAG NUMBER	NO. PIECES	WEIGHT	HEAT(S)	TAG NUMBER	NO. PIECES	WEIGHT	HEAT(S)
J22819	9	8616	3176E-57				
HEAT 3176EX				CU	MD	AL	B
				SI	ZR	AS	
				MN	SN		
				NI	SO		
				CR	PH		
				CB	V		
						.000	.002

\*\*WARNING\*\* THE TEST RESULTS AND VALUES REPORTED HEREIN INDICATE ONLY THAT (1) THE PARTICULAR STEEL FOR WHICH THIS CERTIFICATE IS ISSUED MEETS THE MINIMUM SPECIFIED YIELD STRENGTH AND (2) THE CHEMICAL ANALYSIS AND PHYSICAL PROPERTIES OF SUCH STEEL ARE IN CONFORMANCE WITH THE REQUIREMENTS OF THE SPECIFICATION INDICATED. THE RESULTS OR VALUES REPORTED HEREIN CAN NOT BE USED TO QUALIFY THE STEEL FOR ANY SPECIFICATION OTHER THAN THE ONE INDICATED AND CAN NOT BE RELIED UPON FOR ANY PURPOSE (INCLUDING DESIGN OR CALCULATIONS) AS REPRESENTING THE ACTUAL STRENGTH OF SUCH STEEL.

21st June 2006

PAGE 2 OF 5



#61038

64A006887

105 West Street, Samit Ste. Marie, Ontario Canada P6A 7E4

MILL ORDER 12327

-622221

SHIP DATE 2006/07/20

ENTRY DATE 2006/08/23

ALGOMA STEEL INC.

CUSTOMER PURCHASE ORDER NUMBER M64020817

SHIP TO CUSTOMER NAME AND ADDRESS RUSSEL METALS INC 5724 - 40TH STREET SE CALGARY ALBERTA T2C 2A1

SHIP TO CUSTOMER NAME AND ADDRESS RUSSEL METALS INC 5724 - 40TH STREET SE CALGARY ALBERTA T2C 2A1

CUSTOMER SPECIFICATION HR FLOOR PLATE - CARBON - ALGOMA 50

FAX SM & TR TO CAROLYN SPEERS (403-279-3269) AT TIME OF SHIPMENT

J. Johnston MANAGING METALLURGIST

SUPPLEMENTARY INSTRUCTIONS

THIS MILL TEST REPORT MAY NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF ALGOMA STEEL INC. IF YOU RECEIVE THIS DOCUMENT AND ARE NOT THE INTENDED RECEIVER, PLEASE CALL (105) 845-2824 COLLECT FOR INSTRUCTIONS ON METHOD OF DISPOSAL OF DOCUMENT.

NUMP/YR CHEMICAL ANALYSIS REPORT REQUIRED 2006/08/23 11:35

CURT USE RESALE

MEETS EN 10204 3.1.B AND DYN 50069 3.1.B MEETS F50 9001-2000 REGISTERED MEETS F50 9001-2000 KILLED ALL HEATS FULLY KILLED HEATS INDICATED WITH (3E) FINE GRAINED PRODUCED FROM COIL

CUSTOMER ITEM 001 OUR ITEM 001 DIMENSIONS .189 X 72 X 240 "

TAG NUMBER	NO. PIECES	WEIGHT	HEAT(S)
J25499	9	8660	1878X
J25496	9	8660	1878X
J25498	9	8660	1878X

PROPERTY	VALUE	PROPERTY	VALUE
CU	.02	MO	.00
NI	.01	AL	.047
CR	.02	CB	.002
SR	.01	V	.002
AS	.010	B	.002
P	.005		
MN	.36		
SN	.02		
TI	.002		

PROPERTY CHEMICAL

PROPERTY CHEMICAL

PROPERTY CHEMICAL

PROPERTY CHEMICAL

PROPERTY CHEMICAL

PROPERTY CHEMICAL

PROPERTY CHEMICAL

PROPERTY CHEMICAL

PROPERTY CHEMICAL

THE TEST RESULTS AND VALUES REPORTED HEREIN INDICATE ONLY THAT (1) THE PARTICULAR STEEL FOR WHICH THIS CERTIFICATE IS ISSUED MEETS THE MINIMUM SPECIFIED YIELD STRENGTH AND (2) THE CHEMICAL ANALYSIS AND PHYSICAL PROPERTIES OF SUCH STEEL ARE IN CONFORMANCE WITH THE REQUIREMENTS OF THE SPECIFICATION INDICATED. THE RESULTS OR VALUES REPORTED HEREIN CAN NOT BE USED TO QUALIFY THE STEEL FOR ANY SPECIFICATION OTHER THAN THE ONE INDICATED AND CAN NOT BE RELIED UPON FOR ANY PURPOSE INCLUDING DESIGN OR CALCULATIONS AS REPRESENTING THE ACTUAL STRENGTH OF SUCH STEEL.

\*\*\*WARNINGS\*\*\*

an August 7006

July 2007



# NUCOR

**SOLD TO:**  
 RUSSEL - CALGARY  
 5724 40TH ST SE  
 CALGARY AB T2C 2A1  
 Canada

**SHIP TO:**  
 RUSSEL METALS INC  
 5724 40TH ST SE  
 CALGARY AB T2C 2A1  
 Canada

# CERTIFIED MILL TEST REPORT

**NUCOR STEEL SEATTLE, INC.** Ship from:  
 Nucor Steel Seattle, Inc.  
 2424 SW Andover  
 SEATTLE, WA 98106-1100  
 206-933-2222

64A009532

Date: 10-Apr-2007  
 B.L. Number: 336615  
 Load Number: 183161

Material Safety Data Sheets are available at www.nucorbar.com or by contacting your inside sales representative.

HEAT NUM.	DESCRIPTION	PHYSICAL TESTS				CHEMICAL TESTS											
		YIELD PSI	TENSILE PSI	ELONG. % IN 2"	BEND	WT%	WT%	C	Mn	P	S	Si	Al	Cr	Cu	Sn	Pb
7007N1040	Nucor Steel Seattle, inc. 1/4x2" FL 20' A36/44W	53,860 371MPa	77,840 537MPa	25.0%				.16	.68	.009	.026	.21	.25	.34			
	CSA G40.21-98 44W/ASTM A36/A36M- ASTM A709/A709M-07 GR 36	53,340	75,240	28.1%													
	CSA G40.21-98 GR 44W ASME SA36-EDITION 2002	368MPa	519MPa														
	ASTM A36/A36M-05																
PO# => 7007N1053	M64022240 Nucor Steel Seattle, inc. 3/8x1-1/2" FL 20' A36/44W	52,355 361MPa	74,062 511MPa	26.6%			.16 .10	.68 .12	.011 .020	.030 .005	.22 .003	.30 .003					
	CSA G40.21-98 44W/ASTM A36/A36M- ASTM A709/A709M-07 GR 36	52,266	74,631	27.3%													
	CSA G40.21-98 GR 44W ASME SA36-EDITION 2002	360MPa	515MPa														
	ASTM A36/A36M-05																
PO# => 7007N1190	M64023563 Nucor Steel Seattle, inc. 3x2x1/4" Angle 20' A36/44W	47,850 330MPa	71,610 494MPa	32.8%			.14 .13	.69 .14	.014 .020	.040 .005	.20 .002	.39 .002					
	CSA G40.21-98 44W/ASTM A36/A36M- ASTM A709/A709M-07 GR 36	48,010	71,650	31.3%													
	CSA G40.21-98 GR 44W ASME SA36-EDITION 2002	331MPa	494MPa														
	ASTM A36/A36M-05																

All steel products produced at Nucor Steel Seattle are manufactured with over 98% recycled materials.

I HEREBY CERTIFY THAT THE ABOVE FIGURES ARE CORRECT AS CONTAINED IN THE RECORDS OF THE CORPORATION.

ALL MANUFACTURING PROCESSES OF THE STEEL MATERIALS IN THIS PRODUCT, INCLUDING MELTING, HAVE OCCURRED WITHIN THE UNITED STATES. ALL PRODUCTS PRODUCED ARE WELD FREE. MERCURY, IN ANY FORM, HAS NOT BEEN USED IN THE PRODUCTION OR TESTING OF THIS MATERIAL.

4/17/07

QUALITY ASSURANCE: G. Giraldo



64A009031



WHITBY STEEL MILL  
HOPKINS STREET SOUTH  
WHITBY ON L1N 5T1 CAN  
(905) 668-8811

Chemical and Physical Test Report

MADE IN CANADA

W-061711

PRODUCED IN: WHITBY

SHIP TO  
RUSSEL METALS - CALGARY  
C/O CALGARY DISTRIBUTION  
5724 - 40TH STREET SE  
CALGARY, AB T2C 2A1

INVOICE TO  
RUSSEL METALS INC CALGARY  
5724 - 40TH STREET SE  
CALGARY, AB T2C 2A1

SHIP DATE  
02/26/07

CUST. ACCOUNT NO  
60142676

SHAPE + SIZE	GRADE	SPECIFICATION	SALES ORDER	CUST.F.O.NUMBER
CG X 11.8#	44W	C.S.A. G40.21-86 44W(50W); ASTM: A38 - 97a ASTM A709- 97b ASME: SA38 (A)	6069595-01	64021676-01
HEAT ID.	C	S Si Cu Ni Cr Mo V Nb B N Sn Al Ti Zr Ca C Eqv		
B40649	.18 .69 .010 .037 .26 .24 .11 .07 .028 .000 .000 .0137 .010 .000 .000000 .342			

Mechanical Test: Yield 51201 PSI, 353.23 MPA Tensile: 74894 PSI, 517 MPA %EL: 25.0/8in, 25.0/200MM

Customer Requirements SOURCE: WHITBY BILLETS CASTING: STRAND CAST

Mechanical Test: Yield 51843 PSI, 357.44 MPA Tensile: 76497 PSI, 541.22 MPA %EL: 25.0/8in, 25.0/200MM

Customer Requirements SOURCE: WHITBY BILLETS CASTING: STRAND CAST

CUST ITEM NUMBER: 12746

SHAPE + SIZE	GRADE	SPECIFICATION	SALES ORDER	CUST.F.O.NUMBER
CG X 11.8#	44W	C.S.A. G40.21-86 44W(50W); ASTM: A38 - 97a ASTM A709- 97b ASME: SA38 (A)	6069595-02	64021676-02
HEAT ID.	C	S Si Cu Ni Cr Mo V Nb B N Sn Al Ti Zr Ca C Eqv		
B40877	.16 .69 .010 .028 .20 .24 .10 .07 .025 .000 .011 .0004 .0165 .014 .000 .000000 .332			

Mechanical Test: Yield 57803 PSI, 399.23 MPA Tensile: 78462 PSI, 540.91 MPA %EL: 23.1/8in, 23.1/200MM

Customer Requirements SOURCE: WHITBY BILLETS CASTING: STRAND CAST

Mechanical Test: Yield 66830 PSI, 465.82 MPA Tensile: 78279 PSI, 539.71 MPA %EL: 22.5/8in, 22.5/200MM

Customer Requirements SOURCE: WHITBY BILLETS CASTING: STRAND CAST

CUST ITEM NUMBER: 12746

This material, including the billets, was produced and manufactured in Canada

Shankar Yalernar chll

Quality Director

GERDAU AMERISTEEL

*B. R. B...*

Mgr. Metallurg. Svcs.

WHITBY STEEL MILL

*[Signature]*  
July 4/07

THE ABOVE FIGURES ARE CERTIFIED EXTRACTS FROM THE ORIGINAL CHEMICAL AND PHYSICAL TEST RECORDS AS CONTAINED IN THE PERMANENT RECORDS OF COMPANY.

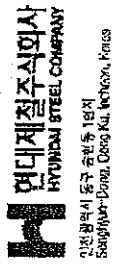
3/12/07

64A009578  
 WIRTH  
 PO NO.: 8034-V  
 46200611B003  
 WIDE FLANGE BEAMS

# 檢 查 證 明 書

## INSPECTION CERTIFICATE

ISSUED ONLY BY HYUNDAI STEEL COMPANY  
MILL TEST CERTIFICATE



證明書 番號  
 Certificate No. JH20061200145 -- 10  
 鋼板證明書 番號  
 Class Cert. No.  
 發行日期  
 Date of Issue 2007-01-15

Specification CSA G40.21 50W/ASTM A572 GRADE 50 AND ASTM A992-03 (TRIPLE CERTIFIED)

值 Dimensions & Length	製鋼番號 Heat No.	數量 (PCS) 重量 (KGS)	化學成分 (%)										引張試驗 Tensile Test				屈曲 試驗 Bend Test (. .)	衝擊試驗 Impact Test			備 考 Remarks <sup>(1)</sup>																											
			C		Mn		P		S		Cu		Mo		Ni			Cr		V		Nb		Al		N, CE <sup>(1)</sup> x10000 X 100	引張強度 T.S. N/mm <sup>2</sup>	屈服點 Y.P. %	延伸率 EL <sup>(2)</sup> %	AVG	1	2	3	V-Notch														
			X 100	X 1000	X 100	X 1000	X 1000	X 1000	X 1000	X 1000	X 100	X 100	X 100	X 100	X 100	X 100		X 100	X 100	X 100		X 100	X 100	X 100	X 100										X 100	X 100	X 100	X 100	X 100	X 100	X 100	X 100						
10X5-3/4X22	D 067848	64	27	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	643.3	400.1	25.0																						
50.00 FT		31,936	19	26	62	27	28	7	8															544.3	397.2	25.5																						
10X5-3/4X22	D 067849	48	28,752	14	24	65	28	18	8	6														530.5	382.5	26.0																						
60.00 FT		28,752																						527.6	381.6	26.5																						
10X5-3/4X22	D 067850	104	62,296	15	23	62	30	22	8	9														634.5	392.3	25.5																						
60.00 FT		62,296																						631.5	389.3	26.0																						
10X5-3/4X26	D 067863	32	15,104	18	25	74	33	36	9	9														545.2	398.1	24.5																						
60.00 FT		32																						543.3	401.1	24.0																						
10X5-3/4X26	D 067863	23	13,570	18	25	74	33	36	9	9														545.2	388.1	24.5																						
50.00 FT		23																						543.3	401.1	24.0																						
10X5-3/4X26	D 067863	32	22,658	18	25	74	33	36	9	9														545.2	398.6	24.5																						
60.00 FT		32																						543.3	401.1	24.0																						
10X5-3/4X30	D 067844	24	13,056	16	23	66	30	27	7	7														539.4	382.5	24.5																						
40.00 FT		24																						539.4	382.5	24.5																						
10X5-3/4X30	D 067847	24	16,320	18	23	64	26	13	7	6														536.4	381.5	25.0																						
50.00 FT		24																						536.4	381.5	25.0																						
10X5-3/4X30	D 067846	8	6,528	17	26	69	27	30	8	7														641.3	400.1	25.5																						
60.00 FT		8																						539.4	402.1	25.0																						
SUB TOTAL		359	210,218																																													

(3) Impact Specimen Size

(2) Gauge length : 200 mm

(注) (1) Req: \*SHOWING THE GRADE(S), WIRTH STEEL, APPLICANT'S ORDER NUMBER 8034-V MATERIAL'S HEAT NUMBER AND ALL CHEMICAL COMPOSITION AND TENSILE TEST REQUIRED BY THE GRADE(S) ORDERED  
CSA G40.21 50W/ASTM A572 GRADE 50 AND ASTM A992-03 (TRIPLE CERTIFIED) TOLERANCES TO A6

監 督 官  
 Witnessed by  
 品質保證 Team 長  
 MGR of Q.A Team

416/07  
 監 督 官  
 Witnessed by

416/07  
 品質保證 Team 長  
 MGR of Q.A Team  
 A4(210x297)

10-MAR-2007 04:30

FILIFAX 1-800-645-4155

Page 8/11

CHAPARRAL STEEL  
 CERTIFIED MATERIAL TEST REPORT  
 CHAPARRAL STEEL  
 300 Ward Rd.  
 Midlothian, TX  
 76065-9651  
 (972) 775-8241

Order Date: 11/04/2006  
 PO No: W64022223  
 Mill Order No: 3217493  
 Load No: 1095372  
 Manifest No: 1810906

SHIP To: 12  
 RUSSEL METALS - CALGARY  
 5724 40TH STREET S.E.  
 CALGARY AB  
 T2P-2M7 CA

Bill To:  
 RUSSEL METALS - CALGARY  
 RUSSEL METALS, INC.  
 5724 40TH STREET SE  
 CALGARY AB  
 T2C-2A1 CA

PRODUCT  
 WF BEAMS

LENGTH  
 40 FT / 12.192 M

GRADE  
 992/572-50

SIZE  
 W 10 X 26# / W250 X 38.5

SPECIFICATION  
 ASTM A6-05a, A992-06a, A572-06

HEAT NO: 22391060

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sb	V	Al	MB	CE
.09	.91	.006	.039	.27	.30	.12	.12	.030	.010	.001	.006	.015	.3

PHYSICAL PROPERTIES

Yield Strength	Tensile Strength	Specimen Area	Elongation	Bend Test	ROA
KSI	KSI	Sq In	%	Dia. Result	%
57.5	75.2	0.398	24.3	8In	
57.9	74.8	0.400	24.1	8In	
	518.5	2.57	24.3	200 mm	
	515.7	2.58	24.1	200 mm	

Remarks

MATERIAL MEETS REQUIREMENTS OF CSA G40.21-50M

All manufacturing processes of this product, including electric arc melting and continuous casting, occurred in the U.S.A. CMTR complies with DIN EN 10204 3.1.2

"I hereby certify that the contents of this report are correct and accurate. All tests and operations performed by this material manufacturer or its sub-contractors, when applicable, are in compliance with the requirements of the material specifications and applicable purchaser designated requirements."

Signed: Tom L. Harrington Date: Mar. 10, 2007 Signed: Notary Public (if applicable) Date: \_\_\_\_\_  
 Tom L. Harrington: Quality Assurance Manager Page: 8 of 11

*[Handwritten Signature]*  
 4/15/07



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Our Solutions

PUMPING AND COMPRESSION EQUIPMENT



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# IRISNDT

## MAGNETIC PARTICLE INSPECTION REPORT

155802  
Page 2 of 2

Procedures: IRIS Proc. S.0  
Code: CSA-W59 (STATIC)  
Job / PO #: C1014859 IRISNDT #: 226787 Date: JUNE 11/07  
Client: CHAMCO  
Location: CALGARY  
Item Inspected: LIFTING LUGS: BAY #2

SURFACE CONDITION: Painted  Sandblasted  Machined  As Cast  As Forged  Weldment  Other   
MATERIAL: C.S. Thickness: 1.00" Heat Treatment: NO  
MAGNETIZING EQUIPMENT: Yoke  Coil  Prod  Bench: Headshot  Central Conductor  Coil   
IRISNDT #: 40096 Mfg: PARKER Calibration Date: APR. 23/07  
BLACKLIGHT:  IRISNDT #: \_\_\_\_\_ Mfg: \_\_\_\_\_ Calibration Date: \_\_\_\_\_  
 Verification per ASME V Art 7 T 777.2  
WHITELIGHT: Battery Powered Min 3V  Held within 30 cm (12in) of the inspection surface provides minimum 1000 Lx (100fc)  
110V Power Min 100W Bulb   
METHOD OF MAGNETIZATION: AC  DC  Continuous  Residual   
MAGNETIC PARTICLES: Dry  Wet  Red  Grey  Black  Fluorescent   
Batch #: 556 Mfg: MAGNAFLUX Type: 7C  
BACKGROUND:  Batch #: 824 Mfg: ARDROX Type: 8901 W

Inspection Results:  
WET BLACK AT WAS DONE ON 4- LIFTING LUGS.  
  
RESULTS: NO INDICATIONS WERE FOUND - ACCEPTABLE TO CODE.

Unit #: 274 Kilometres: \_\_\_\_\_  
In 13:45 Out 14:30 Hrs .75  
Consumables: MT  
Interpretation by: Y. ARSENEAU SNT-TC-1A II  
(Print) CGSB II  
Y. Arsenau CGSB # 3761  
(Signature)  
Personnel: YA  
I am in full agreement with report contents:  
Client Representative: [Signature]

Edmonton (780) 437-4747	Fort McMurray (780) 743-1536	Barrhead (780) 674-3018	Mailing Address
Calgary (403) 279-6121	Lloydminster (780) 875-6455	Tulsa, OK (918) 446-8773	5311 - 86 Street
Nisku (780) 955-7616	Cold Lake (780) 594-1114	Deer Park, TX (281) 476-4444	Edmonton, Alberta
Red Deer (403) 347-1742	High Level (780) 956-4094	Houston TX (713) 461-6363	T6E 5T8







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*Our Solutions*

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**PAINT RECORDS**

**PROJECTS GROUP**

2907-18 St NE, Calgary, AB, T2E 7K5 Phone (403) 777-1200, Fax (403) 777-1207  
www.chamco.com

CLIENT	HUSKY OIL OPERATIONS Air Compressor Pkg	W/O #	G1014859
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APPLICATORS NAME	CHRIS ROSS
DATE	JUNE 18/ 2007

MATERIAL PREP	SSP7
AREA COATED	SKID/ RECEIVER
PRIMER PRODUCT #	4160
PRIMER BATCH #	HU6J91161
HUMIDITY PRIMER COAT	22.00%
AMBIENT TEMPERATURE PRIMER	78F
RECOMMENDED DRY FILM THICKNESS	2- 10 MILS
PAINT PRODUCT #	4318
PAINT BATCH #	TO6B75A
HUMIDITY TOP COAT	22.00%
AMBIENT TEMPERATURE TOP COAT	78F
RECOMMENDED DRY FILM THICKNESS	5- 10 MILS
TYPE OF CURE	AIR

