



## **Air-X-Changers**

Harsco

Plant Address  
5215 Arkansas Rd.  
Catoosa, OK 74015

Telephone 918.619.8000  
Fax 918.619.5000

TO: COLLICUTT ENERGY SERVICES      DATE: 7/27/2005  
7550 EDGAR INDUSTRIAL DRIVE      CUSTOMER: TALISMAN ENERGY  
RED DEER, ALBERTA T4P 3R2      PO # F35223  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
ATTN: DOCUMENT CONTROL      TAG # MO2966

### **Transmittal Sheet**

Attached you will find specific information for the job referenced above.

In order to to complete this manual, please reference the Air-X-Changers Library CD to obtain the vendor information and Air-X-Changers Installation, Maintenance & Operating Instructions. If you have any questions, please contact Debbie DeWitt at (918) 619-8004

#### **Engine Drive Operating, Installation & Maintenance Instructions.**

**Maro Shutters, Model EH**

**Garzo Air Motor, 501-12**

**Kimray Temperature Controller**

**Moore Fan, Series 10K (job specific data is included in this manual)**

**Dodge S2000 Bearings**

**Dodge Fan & Blower Bearings**

**Murphy Vibration Switch (CSA is included in this manual)**

cc: EADS - HOUSTON

Very truly yours,

*Debbie DeWitt*  
\_\_\_\_\_  
AIR-X-CHANGERS



## **Air-X-Changers**

Harsco

### **MANUAL CONTENTS**

**050846X**

#### **Job Specific Documentation**

Transmittal  
Manual Contents  
Certified Drawing  
Parts List  
Spec Sheet  
Data Report(s)  
Nameplate(s)  
Hydrostatic Test Certification(s)  
Heat Treat Chart(s)  
X-Ray Test Report(s)  
Ultrasonic Test Report(s)  
Mag Particle Test Report(s)  
Material Traceability Records  
Material Test Reports  
Final In-Process Inspection Report(s)  
Paint In-Process  
Moore Fan Data  
Murphy Vibration Switch CSA



# PARTS LIST



Post Office Box 1804  
Tulsa, OK 74015  
Phone: (918) 266-1850  
Fax (918) 266-1322

**JOB NUMBER:** 050846  
**CUSTOMER:** COLLICUTT ENERGY SERVICES  
**ULTIMATE USER:** TALISMAN ENERGY  
**ORDER COVERS:** (1) Model 96AEH

FINISH: *Custom Finish Standard*  
SURFACE PREPARATION: *Commercial Sandblast*  
PRIMER: *H-I-S 9267 Gray Primer; 1.5 TO 2.0 MILS. DFT.*  
FINISH COAT: *H-I-S 698 Silver Gray (Rustoleum 906); 1.5 TO 2.0 MILS. DFT*

P.O.	QTY.	DESCRIPTION OF COMPONENTS
		<b>NOTE: AN ASTERIK (*) IN QUANTITY COLUMN INDICATES A RECOMMENDED SPARE PART</b>
	2	SECTION(S) IN ACCORDANCE WITH SPECIFICATION SHEET.
	1	96AEH STRUCTURE(S), COMPLETE WITH: <i>Fan Shaft Extension: Total Projection = 16"</i> <i>Pipe Supports</i> <i>Customer Requires HIC Plate for GAS PC Section</i> <i>Warm Air Recirc System w/ Bug Screen Frame / Fan Guard on Intake</i>
	1	SET SHUTTERS: TYPE <i>Auto</i> , FOR SERVICE(S) <i>GAS PC</i> , SQ. FT. = <i>127.05</i> , #LINKAGE SETS = <i>1</i> , MOUNTING TYPE: <i>Standard</i> , EXTRA FEATURES: <i>None</i>
	1	SET SHUTTERS: TYPE <i>Auto</i> , FOR SERVICE(S) <i>TOP &amp; ROLL</i> , #LINKAGE SETS = <i>1</i> , MOUNTING TYPE: <i>Standard</i> , EXTRA FEATURES: <i>INTEGRAL HAIL GUARDS</i>
	1	SET SHUTTERS: TYPE <i>Auto</i> , FOR SERVICE(S) <i>INTAKE</i> , #LINKAGE SETS = <i>1</i> , MOUNTING TYPE: <i>Standard</i> , EXTRA FEATURES: <i>DEEP SIDEFAMES; SOFT BUG SCREENS</i>
	1	AIR MOTOR: FOR SERVICE(S) <i>GAS PC</i> , <i>Garzo</i> MAKE, <i>501-12 w/Pivot Mount</i> MODEL, <i>6-30</i> SPRING OPTION, <i>Silicone</i> DIAP MTRL, POSITIONER: <i>None</i>
	1	AIR MOTOR: FOR SERVICE(S) <i>TOP &amp; ROLL</i> , <i>Garzo</i> MAKE, <i>501-6 w/Pivot Mount</i> MODEL, <i>6-30</i> SPRING OPTION, <i>Silicone</i> DIAP MTRL, POSITIONER: <i>None</i>
	1	AIR MOTOR: FOR SERVICE(S) <i>INTAKE</i> , <i>Garzo</i> MAKE, <i>501-6 w/Pivot Mount</i> MODEL, <i>6-30</i> SPRING OPTION, <i>Silicone</i> DIAP MTRL, POSITIONER: <i>None</i>
	2	TEMPERATURE CONTROLLER(S): <i>Kimray</i> MAKE, <i>T12/4000</i> MODEL, LENGTH OF TUBING <i>Probe with separable socket</i> , TEMPERATURE RANGE <i>-30/400° F</i> , REGULATOR <i>Fisher 67CF-224</i>
	* 1	FAN(S): <i>96</i> Inch DIAMETER, <i>6</i> BLADES, <i>LH</i> ROTATION, <i>MOORE-CL10K</i> MAKE, <i>23.8°</i> ANGLE @ <i>Clevis</i> , <i>2-7/16</i> Inch BORE WITH <i>5/8</i> Inch X <i>5/16</i> Inch KEYWAY. MODEL/PITCH: <i>36-HDVT/Manual</i> , HUB: <i>TAPER WELD VORTEX TIPS TO FAN BLADES!</i>
	* 1	FAN SHAFT(S): <i>2-7/16</i> Inch DIA. X <i>94</i> Inch LONG WITH <i>5/8</i> Inch SQ. KEYS <i>each</i> END, KEYWAY LENGTH(DRIVE END): <i>5 Inch</i> , KEYWAY LENGTH(FAN END): <i>6 Inch</i> , KEY LENGTH: <i>5 Inch</i>
	* 2	<i>2-7/16</i> Inch FAN SHAFT BEARINGS, MAKE/MODEL: <i>Dodge-S2000/P2B-S2-207R</i> , AXC P/N <i>BR1111</i>
	* 1	IDLER SHAFT(S): <i>2-3/16</i> inch DIA. X <i>19.5</i> inch LONG WITH <i>1/2</i> inch SQ. KEY <i>4.5</i> inch LONG-ONE END
	1	SET(S): <i>Adj. Block</i> TYPE IDLER FRAME PARTS
	* 1	<i>2-3/16</i> Inch IDLER BEARING(S), MAKE/MODEL: <i>Dodge-FB/CC203</i> , AXC P/N <i>BR1020</i>
	1	VIBRATION SWITCH(ES): <i>Murphy</i> MAKE, <i>VS-2EX, XP</i> MODEL, CSA: <i>YES</i>
	1	SET(S) BUGSCREEN FRAME/FANGUARD WITH SOFT BUGSCREEN PANELS; ONE SET CONSISTS OF: <i>8</i> PANELS <i>37</i> Inches X <i>51.5</i> Inches COMPLETE WITH (1) SOFTBUGSCREEN INSTALLATION KIT.



# Alr-X-Changers

Harsco

PO BOX 1804  
TULSA, OK 74101-1804  
PHONE: 918-619-8000  
FAX: 918-384-5202

Job No. 050846

Initial Release Date 06/06/05

Page 1 of 1

Purchaser COLLICUTT ENERGY SERVICES		Ultimate User TALISMAN ENERGY	
Inquiry/PO#		Destination FERRIER	
No. Units 1	Model: 96AEH	Reference	
Assembly: PACKAGED	Draft: FORCED	Overall Size (WxLxH), -6.88x15.00x9.61	Est. Wt., lbs. 11,250

### PERFORMANCE

Service	GAS PC	EJW
Flow	31100#/HR	37.5GPM
Fluid	.685SPGR	50%GLY
Temp. In / Out, f	150.0 / 105.0	178.4 / 166.7
Pressure, psia	1,057.2	
Pressure Drop, psi	3.5	3.5
Heat Load, btu/hr	1,264,519	200,000
True LMTD, f	25.8	58.8
Overall Rate, U, btu/hr ft <sup>2</sup> f	92.0	120.5
Fouling Factor, ft <sup>2</sup> hr f / btu	0.0020	0.0005
Surface, Bare / Extended, sq.ft.	540 / 8045	29 / 616
Sections, No./Connected	(1) SINGLY	(1) SINGLY
Design Temp. (Max / Min), f	* 350/-49	300/-20
Design / Test Press., psig	* 1290 / 1677	14 / 65
Pass Arrangement	CROSSFLOW	CROSSFLOW
No. Tube Rows/Tube Passes	3 / 4	1 / 2
Section Weight, lbs	4650	522
Tubes, OD x BWG	3/4X16(.060MIN)	1X16
Material	SA179 STEEL	SA214
No. Per Section / Length, ft	200 / 14	8 / 14
Retarders		
Accelerators		
Fins, Type	L-TENSION / WHEEL	L-TENSION/WHEEL
Material	ALUMINUM	ALUMINUM
Nozzles, Rating/Type	600 RF	150 RF
Material / Bore	SA350 LF2 / SCH-80	SA105
(No. Inlets) / Size, in	(1) / 6IN	(1) / 2IN
(No. Outlets) / Size, in	(1) / 6IN	(1) / 2IN
Headers, Type	BOX W/PLUGS	BOX W/PLUGS
Material	SA516 70(N)	SA516 70
Corrosion Allow., in	0.1250	
Grooved Tubesheet	YES	
Plugs, Type	SHOULDER	SHOULDER
Plugs Material	SA350 LF2	SA105
Industry Specifications	AXC-STD	AXC-STD
ASME Code Stamp / N.B.	YES	
Canadian Registration #	YES	
PWHT	YES	
NACE		

**Inspection/NDT** UB

F= 100% R.T of all header seam & nozzle butt welds PLUS 100% U.T. of all attachment welds. S= Spot R.T. of 1 long seam & 1 end closure, per header  
 U = 100% UT of all header seam, attachment & nozzle butt welds. B= 100% R.T. of all nozzle butt welds.  
 SB= S PLUS B as each are described above. UB= U PLUS B as each are described above.

AIR-SIDE PERFORMANCE		FAN DATA		DRIVER DATA		REDUCER DATA	
Ambient Air Temp., In, f	90	No. Fans / Make1 / MOORE-CL10K	Type	ENGINE DRIVE	Type	REDUCER BY OTHERS	
Elevation, ft	2500	Blade Material	ALUMINUM				
Air Flow, SCFM	87,726	HP@RPM	23.49 @ 395				
Air Temp., Out, f	106.3	Dia., in / No. Blades	96 / 6				
Min. Ambient, f	-49	Blade Angle, Deg	23.8 @ Clevis				
		Series/Blade Adj.	36-HDVT/Manual				
		Fan Hub Bushing	TAPER				

\* GAS PC Service provided with 'Dual Code Stamp' for: 1390 PSIG @ 167 F.

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

1. Manufactured and certified by: Air-X-Changers, A Harsco Company 5215 Arkansas Road, Port of Catoosa, OK 74015  
 (Name and address of manufacturer)  
 2. Manufactured for: Collicutt, 7550 Edgar Industrial Drive, Red Deer, Alberta, Canada T4P 3R2  
 (Name and address of purchaser)  
 3. Location of installation: Unknown, Unknown  
 (Name and address)

4. Type: Heat Exchanger 050846.1 SEE BELOW SEE BELOW 49564 2005  
 (Horz/vert tank) (Mfg. Serial No.) (CRN) (Drawing No.) (Nat'l Board No.) Year Built  
 5. The chemical and physical properties of all parts meet the requirements of material specifications of the ASME BOILER AND PRESSURE VESSEL CODE.  
 The design, construction, and workmanship conform to ASME Rules, Section VIII, Division 1 2004  
 to ----- Year Low Temperature  
 Addenda (Date) ----- Code Case No. ----- Special Service per UG-120(d) -----

6. Shell: SA516 70N 1.125" .125" 6.0625" 9' - 7.375"  
 Matl. (Spec No./Grade) Norm. Thk. (in.) Corr. Allow (in.) Diameter ID (Ft/In) Length (Overall) (Ft/In)  
 7. Seams: Corner Joint ----- C=.20 1120 1 Hr ----- -----  
 Long (wld, Dbl, Sgl, Lap, Butt) R. T. (spot/full) Eff (%) H.T. Temp °F Time (hr) Girth (wld, Dbl, Sgl, Lap, Butt) R. T. (spot, part, full) No. of course  
 8. Heads: (a) Matl. SA516 70N 1 Hr @ 1120 °F (b) Matl. SA516 70N 1 Hr @ 1120 °F  
 (Spec No. Grade) (Spec No. Grade)

	Location (Top, bot, ends)	Minimum Thickness	Corrosion Allowance	Crown Radius	Knuckle Radius	Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diam	Side to Pressure Convex or Concave
a	TOP, BTM	1 "	.125"	--	--	--	--	--	5.625"	X 115.375"
b	ENDS	0.875 "	.125"	--	--	--	--	--	5.625"	X 4.0625"

If removable bolts used (describe other fastening) -----  
 Header Volume 1.503 Cu. Ft. (Matl., Spec. No., Gr., Size, No.) -----

9. MAWP \*1290/1390 psi at max. temp. \*350/167 °F  
 Min. design metal temp. -49 Degrees F at \*1290/1390 psi. hydro., pneu., or comb. test pressure 1807 psi.

10. Nozzle, inspection and safety valve openings:

Purpose (Inlet, outlet, drain)	No.	Dia. or Size	Type	Material	Nominal Thickness	Reinforce Material	How Attached	Location
IN,OUT	2	6"	600# RFWN	SA350 LF2/SA333 GR6	SCH80	Weld	Welded	HEADER
VENT/DRAIN	3	1"	CPLG.	SA350 LF2	6000#	Weld	Welded	HEADER

11. Supports: Skirt ----- Lugs ----- Legs ----- Other ----- Structure ----- Attached ----- Bolted -----  
 (yes/no) (No.) (No.) (No.) (Description) (Where and How)

12. Remarks: Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report:  
 CRN T31492 DWG HDR-1 R-2,050846 CRN1 R-0 DESIGN PSI 1290 TEST PSI 1907 DESIGN TEMP 350/49 CRN T3154.2DWG HDR-1 R-2,050846 CRN-2R-0, DESIGN PSI 1390 TEST PSI 1907 DESIGN TEMP 167/49  
 (Name of part, item number, Mfg's name and identifying stamp)

Tubes: 200 0.7500" OD, Straight 168" Length 16BWG Gauge / W.Thk SA179 Rolled Tube Sheet  
 Insp: 400 .875" x 14UNF THD'D SA350 LF2 Plug Sheet

VESSEL EXEMPT FROM IMPACT TESTING PER UCS-66(a) CURVE D & UCS 68

**CERTIFICATE OF SHOP COMPLIANCE**

We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship on this vessel conform to the ASME Code for Pressure Vessels, Section VIII, Division 1. "U" Certification of Authorization No. 4241, expires 12/31 2005

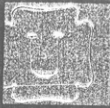
Date 7-26-05 Company Name Air-X-Changers, A Harsco Company (Manufacturer) Signed [Signature] (Representative)

**CERTIFICATE OF SHOP INSPECTION**

Vessel constructed by Air-X-Changers, A Harsco Company at Tulsa, Oklahoma

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and the State or Province of Oklahoma and employed by OneBeacon America Insurance Company have inspected the components described in this Manufacturer's Data Report on 7/21, 20 05 and state that, to the best of my knowledge and belief, the Manufacturer has constructed this 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 loss of any kind arising from or connected with this inspection.

Date: 7/26/05 Signed: [Signature] (Authorized Inspector) Commission: NB # 116 72A / OK # 765 (Nat'l Board (inc. endorsements), State, Prov. and No.)



49564

CERTIFIED BY  
Air-X-Changers

TULSA, OKLAHOMA U.S.A.

Harsco

W  
HT

MAX. DESIGN PRESS. 1390 PSI @ 167 °F

MAX. DESIGN PRESS. 1290 PSI @ 350 °F

MIN. DESIGN METAL TEMP. -49 °F @ 1390 PSI

SER. NO. 050846.1 CRN 731542731492

YEAR 2005 HYDRO. 1807 PSI ITEM PC



49564

CERTIFIED BY  
Air-X-Changers

TULSA, OKLAHOMA U.S.A.

Harsco

W

MAX. DESIGN PRESS. 14 PSI @ 300 °F

MAX. DESIGN PRESS. PSI @ °F

MIN. DESIGN METAL TEMP. -20 °F @ 50 PSI

SER. NO. 050846.2 CRN

YEAR 2005 HYDRO. 65 PSI ITEM EJW



**Air-X-Changers**

Harsco

---

## *CERTIFICATE OF HYDROSTATIC TEST*

---

**CERTIFICATE NUMBER:** 050846C8187

**AXC JOB #** 050846      **DATE:** 7/16/2005      **YEAR BUILT:** 2005

**ITEM DESCRIPTION:** EJW

**AXC SERIAL #:** 0508462

**DESIGN PRESSURE:** 14/50 @ 300/-20 °F      **TEST PRESSURE:** 65

This is to certify that above air cooled heat exchanger section was hydrostatically tested in accordance with ASME section VIII, Division 1, UG-99 and/or the customer requirements, at no less than 1.3 times the working pressure for a time no less than one (1) hour.

HYDROSTATIC TEST CERTIFIED BY: *Sherry Henson*

Witnessed By Client Representative (if applicable) \_\_\_\_\_



# TSI Heat Treating Certification

Order No.: 92652

Date: 07/14/2005

Entry Date: 07/13/2005

Page: 1 of 1

**To:**

AIR - X - CHANGERS  
P O BOX 1804

Purchase Order No.: 1015692

Packing List No.: 14709

TULSA

OK 74101

1

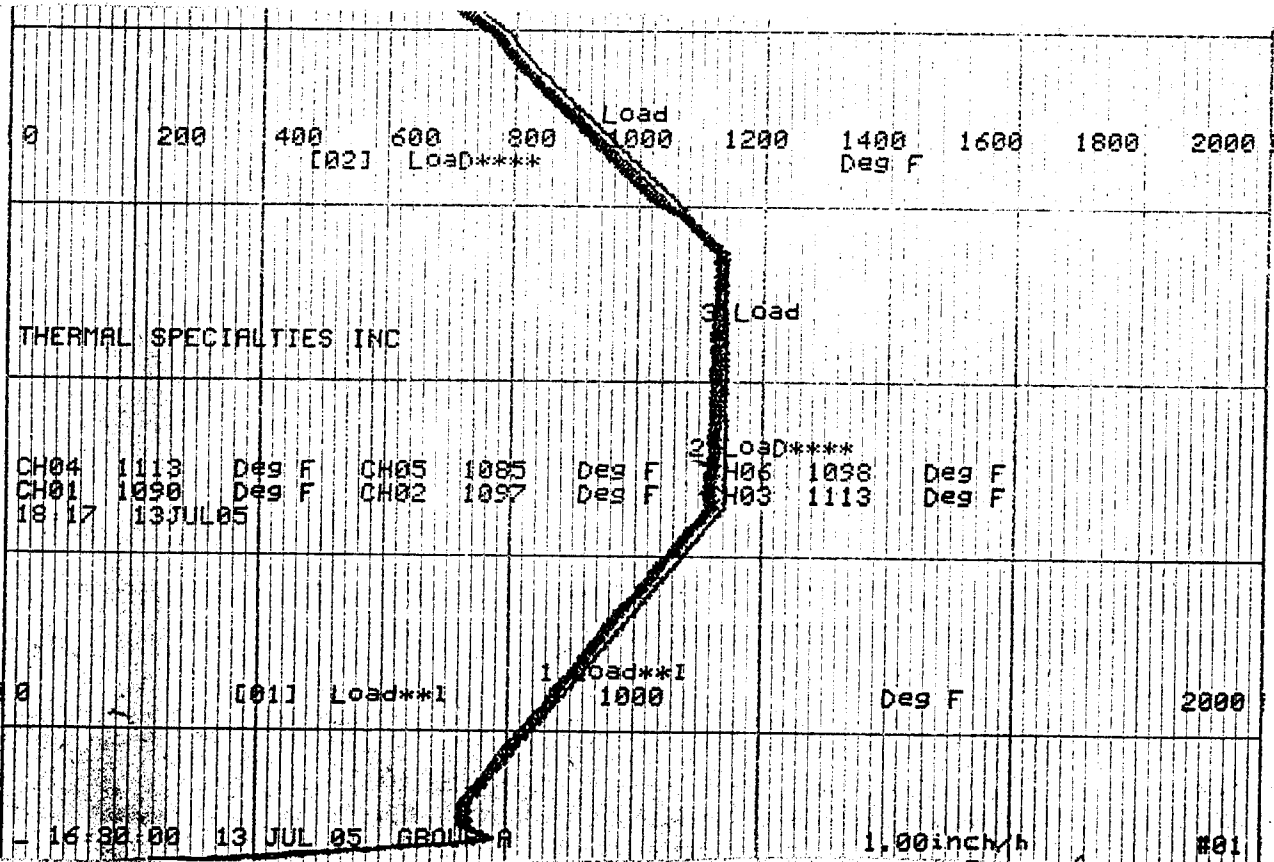
FURNACE NUMBER: 25 RECORDER: HW CALIBRATION DATE: MAY. 01, 2005

CHART DIVISION: 60 minutes

APPROVED BY: [Signature] DATE: 7-14-05

Quantity	Part Number / Part Name / Part Description	Pounds
1	050846.1 FR	970
1	050846.1 BK	822

M.N. 96AEH J.N. 050846.1





# GLOBE X-RAY SERVICES, INC.

8441 SOUTH UNION • TULSA, OKLAHOMA 74132 • (918) 446-1696

N.R.C. #35-15194-01  
TEXAS #5-1892  
FAA #CS2R753K

## RADIOGRAPHIC TECHNIQUE SHEET

PAGE \_\_\_\_\_ OF \_\_\_\_\_

MFG/CUST. <i>Air-X</i>		JOB#/ID <i>050846-1</i>				RT DATE <i>7-7-05</i>										
MAT'L TYPE <i>C.S.</i>	MAT'L THK. <i>1/2</i>	WELD REINF. <i>1/8</i>	TOTAL THK. <i>5/8</i>	RT TECHNIQUE <i>GXS 1B03</i>												
ISOTOPE/ X-RAY VOLTAGE <i>I-192</i>		CI./MA. <i>69c</i>	FOCAL SIZE <i>.141</i>	SOD <i>6 1/2</i>	OFD <i>1/2</i>	EXPOSURE TIME <i>:32</i>										
EXPOSURE SINGLE WALL <input type="checkbox"/> DBL. WALL <input checked="" type="checkbox"/>		VIEWING SINGLE WALL <input checked="" type="checkbox"/> DBL. WALL <input type="checkbox"/>		FILM PROCESS MAN. <input checked="" type="checkbox"/> AUTO <input type="checkbox"/>		Pb FRT. <i>.010</i> BK. <i>.010</i>										
FILM MFG./TYPE <i>Agfa/D-5</i>	RT QUALITY <i>2-2T</i>	APPLICABLE CODE/SPEC. <i>ASME Sec V</i>		ACCEPTANCE STD.												
RT TECH. LEVEL II <i>D Echols</i>				RT PROCEDURE												
PART # SEAM # OR WELD #	LOCATION MARKER INTERVAL	WELDER	# FOLDER	SS SIZE	IQI & SIDE	D ENSITY	A CCEPT	R EJECT	S LAG	P OR	C HECK	P	T	C	A D J U S T M E N T	COMMENTS
<i>NO2 1</i>	<i>T-2</i>		<i>1</i>	<i>A</i>	<i>1B</i>	<i>2.090</i>	<input checked="" type="checkbox"/>									
	<i>2-3</i>						<input checked="" type="checkbox"/>									
	<i>3-T</i>						<input checked="" type="checkbox"/>									
<i>NO2 2</i>	<i>T-2</i>						<input checked="" type="checkbox"/>									
	<i>2-3</i>						<input checked="" type="checkbox"/>									
	<i>3-T</i>						<input checked="" type="checkbox"/>									
FILM INTERPRETATION BY: <i>[Signature]</i>															DATE: <i>7-8-05</i>	
A.I./CUST.															DATE:	

GXS ASSUMES NO RESPONSIBILITY FOR LOSSES OF ANY KIND DUE TO INTERPRETATION.



# TULSA GAMMA RAY, INC.

1127 SOUTH LEWIS AVENUE  
TULSA, OKLAHOMA 74104-3900  
918 / 585-3228 • FAX 918 / 584-5598  
1 - 800 - 625-9288

CUSTOMER DATA	
NAME	<u>Arc West</u>
ADDRESS	
ATTENTION	<u>QC</u>
WORK ORDER	<u>050846</u> PURCHASE ORDER
JOB LOCATION	<u>Arc West</u>
DESCRIPTION	<u>ut Insp</u>

## ULTRASONIC INSPECTION REPORT FORM #1

DATE 7/12/05 DAY Tue

INSPECTION DESCRIPTION: WELD  
LAMINAR REFLECTOR  
PIPE

APPLICABLE CODE: ASME Sect I, Div 1 app 12  
EQUIPMENT MANUFACTURER: KBI  
MODEL NUMBER: USNSO

TRANSDUCERS: LONGITUDINAL

MHz 1)	<u>225</u>	/2)	
SIZE 1)	<u>1"</u>	/2)	
SINGLE	<u>/</u>	DUAL	
ANGLE 1)	<u>70</u>	/2)	<u>45</u>

SHEAR:

MHz 1)	<u>225</u>	/2)	<u>225</u>
SIZE 1)	<u>1/2</u>	/2)	<u>1/2</u>

SURFACE: MHZ 1) \_\_\_\_\_ /2) \_\_\_\_\_  
SIZE 1) \_\_\_\_\_ /2) \_\_\_\_\_

CALIBRATION: LONGITUDINAL - REFERENCE LEVEL 21/32 (db) SCANNING LEVEL 7E (db)  
SHEAR - BLOCK TYPE ITW / ASME C. SR  
REFERENCE LEVEL 43/56 (db) SCANNING LEVEL 7E (db)

COUPLANT: CELLULOSE \_\_\_\_\_ GLYCERIN \_\_\_\_\_ OIL \_\_\_\_\_ WATER \_\_\_\_\_ OTHER \_\_\_\_\_  
SCANNING: CONTACT \_\_\_\_\_ IMMERSION \_\_\_\_\_ MANUAL \_\_\_\_\_ AUTOMATIC \_\_\_\_\_

SPEED 6 in/sec  
100% OF SURFACE \_\_\_\_\_ GRID OR SPOT (SIZE) \_\_\_\_\_  
SURFACE - INSIDE \_\_\_\_\_ OUTSIDE \_\_\_\_\_  
VERTICLE \_\_\_\_\_ HORIZONTAL \_\_\_\_\_  
DIRECTIONS - PARALLEL \_\_\_\_\_ PERPENDICULAR \_\_\_\_\_ OPPOSING \_\_\_\_\_  
- FOR WELD A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_ SURFACE(S) \_\_\_\_\_

PART IDENTIFICATION - COMMENTS ut Insp  
Job # 050846 . 1-FR/AR LS-12,3,4, EB-32, No of cplg attach. No of det. calcd

RESULTS: acceptable

TECHNICIAN HOURS 1 ASST. HOURS \_\_\_\_\_ TRAVEL HOURS \_\_\_\_\_ MILEAGE \_\_\_\_\_ PERDIEM \_\_\_\_\_  
TECHNICIAN: [Signature] LEVEL II FORM 1A ut-2  
SUPERVISED BY: \_\_\_\_\_ LEVEL \_\_\_\_\_ (GRAPHIC DEPICTION)  
CUSTOMER REPRESENTATIVE Brian Weems 7.12.05 TOTAL TIME 1.0



# MATERIAL TRACEABILITY RECORD

Job No. 050846

PIPE

PLATE

TUBES

BY ST

DATE 7/7/05

CUST. CES

MTL. P.O. NO. SECTION NO.	MATERIAL DESCRIPTION	HEAT OR CERTIFICATION NO.
.11	1. 6" S/80 SA 333 GR. 6	422323 ✓
	2. 6" S/80 6000# RFWN SA 350 LF2	102R5 ✓
	3. 1" 6000# CPLG SA 350 LF2	80 U ✓
	1.	
	2.	
	3.	
	1.	
	2.	
	3.	
	1.	
	2.	
	3.	
	1.	
	2.	
	3.	
	1.	
	2.	
	3.	

**NOTE: ALL MATERIAL OF SAME DESCRIPTION IN A SECTION MUST BE OF SAME HEAT NO.**

A

## Abnahmeprüfzeugnis B (gem. EN 10204 - Bescheinigung über Werkstoffprüfungen - 3.1) Inspection - Certificate B (according to EN 10204 - 3.1)

Nr./No. Z25828

Rev. 1

**Besteller:** VOEST-ALPINE TUBULAR CORPORATION  
**Purchaser:** USA-77042 HOUSTON/TX  
**Hersteller:** INDUSTRIAL PIPING TULSA OK 74158-1270  
**Manufacturer:** voestalpine Tubulars GmbH & Co KG

**Bestell-Nr.:** IPS PO# TP035361  
**Your order No.:** VATC P.O. # 207512  
23.7.2002

**Prüfgegenstand:** SEAMLESS STEEL TUBES  
**Object of tests:**

**Auftrags-Nr.:** 223400/13  
**Our works order No.:**

**Anforderungen:** ASTM A 106-99/ASME SA 106 Gr. B + C  
**Requirements:** ASTM/ASME A/SA 333-99-GR. 1 + 6  
(ASME SECTION II, part A, Edition July 1, 2001)  
and NACE MR 0175-2002

**Versandanzeige:** 02253/44226  
**Dispatch advice No.:** v. 31.10.2002

**Werkstoff:** GRADE B/GRADE 1 without marking on tubes  
**Material:** \*) GRADE C/GRADE 1 without marking on tubes

**Erschmelzungsart:** Y  
**Melting process:**

**Kennzeichnung:** PAINT STENCILLING: VA A/SA 106 GRADE B A/SA 333 GRADE 6 6,625" 0,432" 2800 PSI HOT FINISHED  
**Marking:** SEAMLESS-LT—50°F length, Heat No., PO# TP035361  
Die stamped: MADE IN AUSTRIA  
Tag: PO# TP035361 CIF PORT OF HOUSTON

**Zeichen des Lieferwerkes:** va  
**Marking of producer:**

**Ausführung:** BEB, both ends bevelled acc. to API/ASTM (30°)  
**Condition:**

**Wärmebehandlung:** Warmgefertigt/hot finished (845°-945°C) followed by controlled cooling in  
**Heat treatment:** Air from 845°C to room temperature

**Stempel des Sachverständigen:**  
**Stamp of inspector:**

Umfang der Lieferung / Volume of delivery:

Pos.-Nr. Item No. Poste n°	Stückzahl Number Of Nombre	kg	ft	Abmessung Dimension Dimension	Schmelze Nr. Heat No. N° Coulée	Probe-Nr. Test-No. N° d'éprouvette
13	45	23883.00	1838.29	168.3 x 10.97 mm  6 NPS 6.625 in OD 0.432in w.th. SCHED 80	see attachment	1-9

voestalpine Tubulars GmbH & Co KG  
Qualitätsstelle / Quality Department

**PIROEGGER**

Der Werkssachverständige  
Works Inspector / L'Expert d'usine

Kindberg, 5. November 2002

Page 1 of 4

voestalpine Tubulars GmbH & Co KG, Alpinstraße 17, 8032 Kindberg-Aumühl, Austria  
T. +43(0)3865-2215-0, F. +43(0)3865-2215-212, www.vatubulars.com

Rechtsform: Kommanditgesellschaft. Sitz: Kindberg/Austria. FN 165400k Handelsgericht Leoben  
DVR 0592684, UID-Nr. ATU 4360406

# voestalpine

TUBULARS

## Volume of delivery

Bundle No.	Heat	Melting Process	Lot	Heat Treatment - Pipe
1-9	422323		46400 AD	01

## Test Results

- 1 Visuelle Inspektion/ Visual Inspection:  
o.B./satisfactory
- 2 Dimensionskontrolle/ Dimensional  
Inspection: o.B./satisfactory
- 3 Wasserinnendruckversuch/Hydrostatic test:  
o.B./satisfactory 2800 PSI
- 4 Ringfaltversuch/Flattening  
test:o.B./satisfactory
- 5 Streuflußprüfung/Diverted flux:  
o.B./satisfactory

Kindberg, 05.11.02

Page 2 of 4

voestalpine Tubulars GmbH & Co KG, Alpinestraße 17, 8652 Kindberg-Aumöhl, Austria

T. +43(0)3865-2215-0, F. +43(0)3865-2215-212, www.vatubulars.com

Rechtsform: Kommanditgesellschaft, Sitz: Kindberg/Austria, FN 165400k Handelsgericht Leoben  
DVR 0592684, UID-Nr. ATU 43630406

voestalpine Tubulars GmbH & Co KG  
Qualitätsstelle / Quality Department

**PIRCHegger**

Der Werksachverständige  
Works Inspector / L'Expert d'usine

# voestalpine

## TUBULARS

### Mechanical testing

Lot No	Specimen	Yield Strength		Tensile Strength	Elongation %
	mm	Rt0.50	PSI	PSI	Lo= 2"
from:	Gr. B/Gr. 6	35000		60000	30.00
to:	Gr. C	40000		70000	
46400 AD 01 N 1 Streifen	25.40 10.90	45975		72806	37.00
46400 AD 01 N 2 Streifen	25.40 11.10	45830		72661	37.40
46400 AD 01 N 3 Streifen	25.40 10.90	46265		73096	37.00

Hardness testing /HRC max. 22 o.k.

### Impact test results Charpy-V-45°C specimen 55x10x10 mm

Lot No	Single	Value
46400 A 01 N 1 D	31 15 17	21

### Hardness testing

Lot No	Reading	Value	Variation
from:		200.0	
to:			
46400 AD 01 N 1	145.00	148.67	5.34

voestalpine  
Tubulars GmbH & Co KG  
A-8652 KINDBERG-ALMÜHL



Kindberg, 05.11.02

Page 3 of 4

voestalpine Tubulars GmbH & Co KG, Alpinestraße 17, 8652 Kindberg-Almühl, Austria  
T. +43(0)3865-2215-0, F. +43(0)3865-2215-212, www.votubulars.com

Rechtsform: Kommanditgesellschaft, Sitz: Kindberg/Austria, FN 165400k Handelsgericht Leoben  
DVR 0592684, UID-Nr. ATU 43630405

voestalpine Tubulars GmbH & Co KG  
Qualitätsstelle / Quality Department

PIRCHELGER

Der Werkssachverständige  
Works Inspector / L'Expert d'usine



# voestalpine

## TUBULARS

### Chemical test results

Heat analysis Weight %

Heat

	C	Si	Mn	P	S	Cr	Ni	Mo	V	Cu	Ti	Al	Sn	Nb	B
max															
min															
422323	0.1757	0.2550	0.9690	0.0136	0.0089	0.0460	0.0340	0.0090	0.0018	0.0370	0.0018	0.0324	0.0037	0.0387	0.0003

Kindberg, 05.11.02

Page (of)

voestalpine Tubulars GmbH & Co KG, Alpinstraße 17, 8652 Kriberg-Almühl, Austria  
T: +43(0)3665-2215-0, F: +43(0)3665-2215-212, www.vakubulars.com  
Rechtsform: Kommanditgesellschaft, Sitz: Kriberg/Austria, FN 165400k, Handelsgericht: Leoben  
DVR 059289k, UID-Nr. ATU 43630406

voestalpine Tubulars GmbH & Co KG

Quality Assurance Department

Der Werkssachverständige  
Works Inspector / L'Expert d'usine

TP109883



ULMA FORJA, S.COOP.

Bº Zibillaga, 3 - Apdo. 14  
20080 OMAFI (Guzústoa) SPAIN  
Tel.: 94 - 943 78662  
Tel.: 34 - 943 781803  
E-mail: forja@forjg.ulma.es

45371



MARCA DEL FABRICANTE  
Mark of factory  
Marque du fabricant

DEPARTAMENTO QUALITY ASSURANCE  
Section  
Department

**CERTIFICADO DE INSPECCION**  
Works Certificate - Certificat d'Usine

DIN 50049 / 3.1.B  
EN 10204 / 3.1.B

HQJA: Page: 2  
100014

**CUENTE / Customer / Client**  
FORGINGS FLANGES & FITTINGS INC.  
6876 FULTON  
HOUSTON, TEXAS 77022  
USA

FECHA: 29/03/2005  
Date: N.º 29/03/2005 No. 100014

SU PEDIDO N.º  
Your Order No. CONS PO 10040  
Votre Cde. N.º

DE  
of - de 08/12/2004

FLANGES  
ASME B16.5-98

NORMAS APLICABLES  
Requirements - Normes Applicables

MATERIAL CORRESPONDIENTE  
ASTM/ASME

ASME B16.5-98

MATERIAL CORRESPONDIENTE  
ASTM/ASME

NACE MR-01-75/03

MODO DE FUSION (\*)  
Steel Making - Elaboration de l'acier  
E = Elec. Y = Oxygeno Ideico

PARTIDA Item Poste	CANTIDAD Quantity Quantité	DESCRIPCION Description Description	LOTE	OBSERVACIONES Remarks Observations (*)	COLADA N. Heat No N.º Coule	RESISTENCIA T-Strength Tensile Rupt N/mm2	UNIFORMIDAD Yield Point Uniformity N/mm2	ALARGAMIENTO Elongation Elongation L.C. 4 d %	RESILIANCIA Impact Test Resilience Joules	CHARPY V		DUREZA Hardness Dureté HB	
										Media Average Moyenne	°C		
48 2A12330	36	WN 6 600LB S80 RF A350LF2	736	NE	102R5	513	329	34,90	59	68	64	-60	148

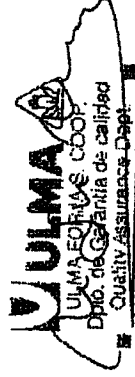
**COMPOSICION QUIMICA - STEEL MARKER'S - ANALYSE CHIMIQUE**

C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %	Nb %	V %	Cu %	CEQ %
0.160	0.240	1.200	0.012	0.001	0.110	0.100	0.049	0.007	0.002	0.280	0.416

(\*) OBSERVACIONES:  
Remarks  
Observations

- Las dimensiones y la condición superficial se hallaron satisfactorias
- Dimension and surface condition were found acceptable
- Les dimensions et l'état de surface sont satisfaisants
- Los materiales citados cumplen las normas aplicables
- Manufacturing requirements are satisfied
- Les normes applicables sont respectées

EL INSPECTOR  
Works Inspector - L'inspecteur



804



3049 LAKESHORE-GATE 6 BUFFALO, NY 14219  
 PHONE: 330-438-5658 FAX: 330-438-5656

CERTIFICATE OF TESTS REPUBLIC ENGINEERED PRODUCTS

JULY 15, 2004  
 PAGE: 1 OF 2

PURCHASE ORDER: 11690  
 PART NUMBER  
 ORDER NUMBER: 12-51146-01 213  
 HEAT: 8977200  
 CHARGE ADDRESS

PURCHASE ORDER DATE: 01/09/04  
 ACCOUNT NUMBER: 76607001  
 SCHEDULE: 08868-67

SHIP TO

US ALLOY INC  
 TC 37733 7/7/04  
 P O BOX 262405  
 HOUSTON TX 77207

US ALLOYS INC  
 CHUCK REDMAN  
 6301 EPPES  
 HOUSTON TX 77087

MATERIAL DESCRIPTION  
 HOT ROLLED STEEL BARS CARBON CAMERON SPEC MR-005 REV C1 PG 1 ONLY US ALLOYS  
 SPEC USA-2 REV 02/26/02 ASTM A 105-01 PARA 4.1; 4.2; 5.2.3; 5.2.4; 6; 7 & 9 ASTM A  
 350-02A GRD LF2 CLASS 1 4.1 TO 4.2; 4.4.2.3; 5.2.3; 5.2.4; 6; 7 & 9 ASTM A  
 ASTM A 696-90A GRD C ASME SA 350-98 GRD LF2 PARA 4.1 TO 4.2; 4.4.2.3; 5 & 6  
 ASME SA 105-98 4.1; 4.2; 5.2.3; 5.2.4; 6; 7 & 9 NACE MR0175-92 DIN 50 049  
 AND EN 10 204 SECTION 3.18 AISI-1522 FINE GRAIN VACUUM DEGASSED MRRQ QUENCH &  
 TEMP S STRAIGHT IMPACT TEST REST CHEM 3 T MAX LIFT

SIZE: RDS 2-1/4 X 18/20 FT

LADLE CHEMISTRY %										
C	MN	P	S	SI	CU	NI	CR	MO	AL	
0.21 /	0.12 /	0.010 /	0.030 /	0.23 /	0.14 /	00.05 /	00.06 /	0.02 /	00.021	
V	N	CB	SN							
0.001 /	0.0045	0.001 /	0.006							

AUSTENITIC GRAIN SIZE SEMI-FINISH RESULTS  
 AUST GRAIN SZ 7.

CAR EQUIV (A707) EQUALS ASTM A707

PCE LADLE 0.42 /

CU+NI+CR+MO+V EQUALS

PCE LADLE 0.271

BHN HT TRTD (LAB) FINISH SIZE RESULTS  
 SURFACE 179. / ASTM E10

SCHEDULE: 0886867  
 ASTM A370

PCE 02 SURFACE 170. /  
 PCE 03 SURFACE 179. /  
 PCE 04 SURFACE 170. /

LONG HT TRT IMPACT  
 INDIVIDUAL #1 ASTM E23 INDIVIDUAL #2 ASTM A370 INDIVIDUAL #3 AVERAGE IMPACT  
 FT-LBS FT-LBS FT-LBS FT-LBS  
 PCE 01 200. / 220. / 258. / 231. /

% SHEAR PERCENT #1 LAT EXPANS #1 % SHEAR PERCENT #2 LAT EXPANS #2  
 99. 73. 99. 84.

% SHEAR PERCENT #3 LAT EXPANS #3 TESTTEMP MINUS  
 99. 70. DEG F -50 /

R. A. NEBIOLD  
 DIRECTOR QUAL ASSURANCE

BY D. STOKES

CUSTOMER AIR-X-CHANGERS  
 P.O. # 1015247 & 1014649  
 ITEM CP1150 TOE COUPLING  
 HEAT CODE 804

R.A. Nebiold

1" 6000 SA350 LF2 / 1014649-804-PM

# MATERIAL TRACEABILITY RECORD

Job No. 050846

PIPE  PLATE  TUBES  BY 4 DATE 7-1-05 CUST. Callcott Energy

MTL. P.O. NO. SECTION NO.	MATERIAL DESCRIPTION	HEAT OR CERTIFICATION NO.
.1	1. SA516-70N 1.125 ISG	U4717 ✓
	2. SA516-70N 1 ISG	U4717 ✓
	3. SA516-70N .875 ISG	U4461 ✓
	1.	
	2.	
	3.	
	1.	
	2.	
	3.	
	1.	
	2.	
	3.	
	1.	
	2.	
	3.	

**NOTE: ALL MATERIAL OF SAME DESCRIPTION IN A SECTION MUST BE OF SAME HEAT NO.**

06/30/2005 From: AMERICAN ALLOY STEEL

To: AMRON ENTERPRISES

P.O.# : 8677-050846

S.O.# : 251304

AA PL#: 5904117

Item : 1 (4 PC) 1-1/8" X 6.0625 X 115.375 TUBE AND PLUG

: TAG# 050846-1

ISG PLATE INC.

TEST CERTIFICATE

SHIP TO:

AMERICAN ALLOY STEEL, INC.  
C/O STORAGE & PROCESSORS, INC.  
8500 CLINTON DR./TRACK 23-430  
DLV. CARRIER-PT. TERM RR-<150"  
HOUSTON TX 77240

PAGE NO: 01 OF 02  
FILE NO: 0284-01-11  
MILL ORDER NO: 20572-002  
MELT NO: U4717  
SLAB NO: 11A  
DATE: 01/05/05

SOLD TO:

AMERICAN ALLOY STEEL, INC  
P. O. BOX 40469  
HOUSTON TX 77240-0469

SEND TO:

AMERICAN ALLOY STEEL, INC  
P. O. BOX 40469  
ATTN: HOMER GARZA  
HOUSTON, TX 77240-0469

03-C

PLATE DIMENSIONS / DESCRIPTION

TOTAL QTY	GAUGE	WIDTH	LENGTH	DESCRIPTION	PIECE WEIGHT
1	1.125"	96"	480"	RECTANGLE	14702#

CUSTOMER INFORMATION

CUSTOMER PO: 60060

Certified a true copy of the original, retained in our file.  
AMERICAN ALLOY STEEL

SPECIFICATION(S)

THIS MATERIAL HAS BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH PURCHASE ORDER REQUIREMENTS AND SPECIFICATION(S).

AM ALLOY-TUF-37 REV 6 YR 04  
ASME SA516 ED 01 03A GRADES 60, 65 & 70  
MATERIAL PRODUCED UNDER A CERTIFIED QUALITY MGMT SYSTEM COMPLYING WITH ISO 9001 ABS-QE CERT. NO. 30130

CHEMICAL COMPOSITION

MELT:U4717	C	MN	P	S	CU	SI	NI	CR	MO
	.19	1.03	.006	.001	.14	.34	.06	.05	.02
MELT:U4717	V	TI	B	AL	CB	SB	AS	SN	CEF
	.001	.002	.0005	.026	.001	.0010	.0030	.006	.39

CARBON EQUIVALENT FORMULA (CEF)

CEF = C + (MN \* .1667) + ((CR + MO + V) \* .2000) + ((CU + NI) \* .0667)

MANUFACTURE

FINELINE - VACUUM DEGASSED - MCQUAID-EHN GRAIN SIZE PER E112 - 7-8

HEAT TREAT CONDITION

MATL OR TEST	HEAT TREAT DESCRIPTION	NOM TEMP	HOLD MINS	COOL MTHD
PL/TEST	NORMALIZE	1650F	51	AIR COOL

TENSILE PROPERTIES

SLAB NO.	LOC	DIR	YIELD STRENGTH PSI X 100	TENSILE STRENGTH PSI X 100	ELONGATION GAGE LGTH	X	XR.A.
11A	BOT.	TRANS.	504	750	2.00"	31.0	70.0

AMERICAN ALLOY  
PLATE # 11A

WE HEREBY CERTIFY THE ABOVE INFORMATION IS CORRECT:

QUALITY ASSURANCE LABORATORY  
COATESVILLE, PA 19320

ELINORE ZAPLITNY  
SUPERVISOR - TEST REPORTING

06/30/2005 From: AMERICAN ALLOY STEEL

To: AMRON ENTERPRISES

P.O.# : 8677-050846

S.O.# : 251304

AA PL#: 5904117

Item : 1 (4 PC) 1-1/8" X 6.0625 X 115.375 TUBE AND PLUG

: TAG# 050846-1

ISG PLATE INC.

TEST CERTIFICATE

PAGE NO: 02 OF 02  
FILE NO: 0284-01-11  
MILL ORDER NO: 20572-002  
MELT NO: U4717  
SLAB NO: 11A  
DATE: 01/05/05

GENERAL INFORMATION

ALL STEEL HAS BEEN MELTED AND MANUFACTURED IN THE U.S.A.  
MATERIAL HAS BEEN VACUUM DEGASSED AND CALCIUM TREATED  
FOR SULFIDE SHAPE CONTROL.  
FINELINE MOD FOR SULPHUR  
TEST CERTS. ARE PREPARED IN ACCORD. WITH PROCEDURES  
OUTLINED IN DIN 50049 3.1.B/EN 10204 3.1.B.

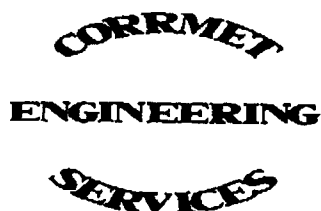
B/L #64517 BVRV 62065

Certified a true copy of the  
original, retained in our file.  
AMERICAN ALLOY STEEL, INC.

WE HEREBY CERTIFY THE ABOVE  
INFORMATION IS CORRECT:

QUALITY ASSURANCE LABORATORY  
COATESVILLE, PA 19320

*Elinore Zaplitny*  
SUPERVISOR - TEST REPORTING  
ELINORE ZAPLITNY



**Consulting Materials Engineers**  
Corrosion & Metallurgical Testing Laboratories

---

*e-mail: corrmnet@flash.net*  
*web site: www.corrmnet.com*

MR. A. HOMER GARZA  
AMERICAN ALLOY STEEL  
P.O. BOX 40469  
HOUSTON, TX 77240-0469

February 1, 2005  
REPORT. NO.: C05-144  
P.O. NO.: 62177

REF: HIC TEST

DEAR MR. GARZA:

CORRMET ENGINEERING SERVICES HAS COMPLETED THE HYDROGEN INDUCED CRACKING (HIC) TEST PROGRAM ON THREE (3) CARBON STEEL SPECIMENS MEASURING 100 mm X 20.40 mm X 28.47 mm.

TEST COUPON	SA 516 GR 60/ 70	ISG
MATERIAL	1-1/8" X 6" X 7" (6"= D.O.R.)	
IDENTIFICATION	PLATE # 5904118	HEAT # U4717 SLAB # 11C

THE TEST WAS PERFORMED IN ACCORDANCE WITH THE TEST PROCEDURES OUTLINED IN NACE STANDARDS TM0284-96 USING SOLUTION "A" AND AASI PROCEDURE NO. HIC-L1 Rev. 2.

THE TESTING CONDITIONS WERE AS FOLLOWS:

TEST SOLUTION	PER NACE TM0284-96, SOLUTION "A" (TM0177)
INITIAL pH	2.70
FINAL pH	3.80
TEST TEMPERATURE	78°F
TEST DURATION	96 HOURS

AFTER COMPLETION OF THE TEST, ALL THREE (3) SPECIMENS WERE CLEANED AND THEN EXAMINED BOTH VISUALLY AND WITH THE AID OF A STEREOSCOPIC MICROSCOPE.

VISUAL EXAMINATION REVEALED THAT ALL SPECIMENS CONTAINED A FEW HYDROGEN INDUCED BLISTERS ON BOTH SURFACES. THE BLISTERS VARIED IN SIZE FROM 1/64 OF AN INCH TO 1/32 OF AN INCH IN DIAMETER AS SHOWN IN FIGURE 1.

EACH SPECIMEN TESTED WAS FURTHER SECTIONED INTO EQUAL SMALLER SECTIONS FOR DETAILED METALLOGRAPHIC EXAMINATION OF THEIR POLISHED SURFACES AS WELL AS MEASUREMENT OF THEIR STEPWISE CRACKS.

MICROSCOPIC EXAMINATION REVEALED THAT ALL SUB-SECTIONS WERE FREE FROM ANY HYDROGEN INDUCED CRACKING (HIC). THE CLR, CTR AND CSR RATIOS FOR THESE SPECIMENS WERE REPORTED AS ZERO. SEE TABLE 1.

MICROSCOPIC EXAMINATION IN THE UNETCHED CONDITION REVEALED THESE SPECIMENS CONTAINED A LOW CONCENTRATION OF NON-METALLIC INCLUSIONS. ETCHED MICROSCOPIC EXAMINATION INDICATED THAT ALL SPECIMENS MICROSTRUCTURES CONSISTED OF FERRITE AND PEARLITE. SEE FIGURES 2 & 3.

RESULTS ARE AS FOLLOW:

CRACK LENGTH RATIO (CLR)	0.0000 %
CRACK THICKNESS RATIO (CTR)	0.0000 %
CRACK SENSITIVITY RATIO (CSR)	0.0000 %

INDIVIDUAL SPECIMEN RESULTS ARE SUMMARIZED ON THE FOLLOWING PAGE.

RESPECTFULLY SUBMITTED  
CORRMET ENGINEERING SERVICES

  
\_\_\_\_\_  
ROBERT H. ZAND, P.E.  
METALLURGICAL ENGINEER

RZ/KR



**TABLE I**

SECTION WIDTH (W) 20.40 mm  
 SECTION THICKNESS (T): 28.47 mm

CRACK LENGTH RATIO (CLR), CRACK THICKNESS RATIO (CTR) AND CRACK SENSITIVITY RATIO (CSR) IS TABULATED AS THE FOLLOWING:

SUB-SECTIONS	CRACK LENGTH (A) MM	CRACK THICKNESS (B) MM	CLR (%)	CTR (%)	CSR (%)
1-1	.	.	.	.	.
1-2	.	.	.	.	.
1-3	.	.	.	.	.
1-4	.	.	.	.	.
2-1	.	.	.	.	.
2-2	.	.	.	.	.
2-3	.	.	.	.	.
2-4	.	.	.	.	.
3-1	.	.	.	.	.
3-2	.	.	.	.	.
3-3	.	.	.	.	.
3-4	.	.	.	.	.

**\*NOTE= NO VALUE OBTAINED (SUB-SECTION WAS FREE FROM CRACKING) AVERAGE CLR, CTR AND CSR RATIOS = ZERO**

06/29/2005 From: AMERICAN ALLOY STEEL

To: AMRON ENTERPRISES

P.O.# :8677-050846

S.O.# :251304

AA PL#:5904114

Item :2 (4 PC) 1" X 5.3125 X 115.375 WRAPPERS

:TAG# 050846-1

ISG PLATE INC.

TEST CERTIFICATE

SHIP TO:

AMERICAN ALLOY STEEL, INC.  
C/O STORAGE & PROCESSORS, INC.  
8500 CLINTON DR./TRACK 23-430  
DLV. CARRIER-PT. TERM RR-<150"  
HOUSTON TX 77240

PAGE NO: 01 OF 02  
FILE NO: 0284-01-11  
MILL ORDER NO: 28572-001  
MELT NO: U4717  
SLAB NO: 6  
DATE: 12/21/04

SOLD TO:

AMERICAN ALLOY STEEL, INC  
P. O. BOX 40469  
HOUSTON TX 77240-0469

SEND TO:

AMERICAN ALLOY STEEL, INC  
P. O. BOX 40469  
ATTN: HOMER GARZA  
HOUSTON, TX 77240-0469

03-C

PLATE DIMENSIONS / DESCRIPTION

TOTAL QTY	GAUGE	WIDTH	LENGTH	DESCRIPTION	PIECE WEIGHT
1	1"	120"	480"	RECTANGLE	16335#

CUSTOMER INFORMATION

CUSTOMER PO: 60060

Certified a true copy of the original, retained in our file.  
AMERICAN ALLOY STEEL, INC.  
D6211505

SPECIFICATION(S)

THIS MATERIAL HAS BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH PURCHASE ORDER REQUIREMENTS AND SPECIFICATION(S).

AM ALLOY-TUF-37 REV 6 YR 04  
ASME SA516 ED 01 03A GRADES 60, 65 & 70  
MATERIAL PRODUCED UNDER A CERTIFIED QUALITY MGMT SYSTEM COMPLYING WITH ISO 9001 ABS-QE CERT. NO. 30130

CHEMICAL COMPOSITION

MELT:U4717	C	MN	P	S	CU	SI	NI	CR	MO
	.19	1.03	.006	.001	.14	.34	.06	.05	.02
MELT:U4717	V	TI	B	AL	CB	SB	AS	SN	CEF
	.001	.002	.0005	.026	.001	.0010	.0030	.006	.39

CARBON EQUIVALENT FORMULA (CEF)

CEF = C + (MN \* .1667) + ((CR + MO + V) \* .2000) + ((CU + NI) \* .0667)

MANUFACTURE

FINELINE - VACUUM DEGASSED - MCQUAID-EHN GRAIN SIZE PER E112 - 7-8

HEAT TREAT CONDITION

MATL OR TEST	HEAT TREAT DESCRIPTION	NOM TEMP	HOLD MINS	COOL MTHD
PL/TEST	NORMALIZE	1650F	34	AIR COOL

TENSILE PROPERTIES

SLAB NO.	LOC	DIR	YIELD STRENGTH PSI X 100	TENSILE STRENGTH PSI X 100	ELONGATION GAGE LGTH	XR.A.
6	BOT.	TRANS.	521	748	8.00" 28.0	67.0

WE HEREBY CERTIFY THE ABOVE INFORMATION IS CORRECT:

QUALITY ASSURANCE LABORATORY  
COATESVILLE, PA 19320

ELINORE ZAPLITNY  
SUPERVISOR - TEST REPORTING

AMERICAN ALLOY  
PLATE # 570114

06/29/2005 From: AMERICAN ALLOY STEEL

To: AMRON ENTERPRISES

P.O.# : 8677-050846

S.O.# : 251304

AA PL#: 5904114

Item : 2 (4 PC) 1" X 5.3125 X 115.375 WRAPPERS

TAG# 050846-1

ISG PLATE INC.

TEST CERTIFICATE

PAGE NO: 02 OF 02  
FILE NO: 0284-01-11  
MILL ORDER NO: 20572-001  
MELT NO: U4717  
SLAB NO: 6  
DATE: 12/21/04

GENERAL INFORMATION

ALL STEEL HAS BEEN MELTED AND MANUFACTURED IN THE U.S.A.  
MATERIAL HAS BEEN VACUUM DEGASSED AND CALCIUM TREATED  
FOR SULFIDE SHAPE CONTROL.  
FINELINE MOD FOR SULPHUR  
TEST CERTS. ARE PREPARED IN ACCORD. WITH PROCEDURES  
OUTLINED IN DIN 50049 3.1.B/EN 10204 3.1.B.

B/L #63246 TTPX 80121

Certified a true copy of the  
original, retained in our file.  
AMERICAN ALLOY STEEL, INC.

WE HEREBY CERTIFY THE ABOVE  
INFORMATION IS CORRECT:

QUALITY ASSURANCE LABORATORY  
COATESVILLE, PA 19320

*Elinore Zaplity*  
SUPERVISOR - TEST REPORTING  
ELINORE ZAPLITY

06/29/2005 From: AMERICAN ALLOY STEEL

To: AMRON ENTERPRISES

P.O.# :8677-050846

S.O.# :251304

AA PL#:5904114

Item :2 (4 PC) 1" X 5.3125 X 115.375 WRAPPERS

:TAG# 050846-1



**Consulting Materials Engineers**  
**Corrosion & Metallurgical Testing Laboratories**

e-mail: [corrmec@flash.net](mailto:corrmec@flash.net)

web site: [www.corrmec.com](http://www.corrmec.com)

MR. A. HOMER GARZA  
AMERICAN ALLOY STEEL  
P.O. BOX 40469  
HOUSTON, TX 77240-0469

April 20, 2005  
REPORT NO.: C05-248.1  
P.O. NO.: 62981

REF: HIC TEST

DEAR MR. GARZA:

CORRMET ENGINEERING SERVICES HAS COMPLETED THE HYDROGEN INDUCED CRACKING (HIC) TEST PROGRAM ON THREE (3) CARBON STEEL SPECIMENS MEASURING 100 mm X 20.88 mm X 25.39 mm.

TEST COUPON	SA 516 GR 60/70	ISG
MATERIAL	1" X 6" X 7" (6"= D.O.R.)	
IDENTIFICATION	PLATE # 5904114	HEAT # U4717
		SLAB # 6

THE TEST WAS PERFORMED IN ACCORDANCE WITH THE TEST PROCEDURES OUTLINED IN NACE STANDARDS TM0284-96 USING SOLUTION "A" AND AASI PROCEDURE NO. HIC-L1 Rev. 2.

THE TESTING CONDITIONS WERE AS FOLLOWS:

TEST SOLUTION	PER NACE TM0284-96, SOLUTION "A" (TM0177)
INITIAL pH	2.70
FINAL pH	3.80
TEST TEMPERATURE	78°F
TEST DURATION	96 HOURS

AFTER COMPLETION OF THE TEST, ALL THREE (3) SPECIMENS WERE CLEANED AND THEN EXAMINED BOTH VISUALLY AND WITH THE AID OF A STEREOSCOPIC MICROSCOPE.

06/29/2005 From: AMERICAN ALLOY STEEL

To: AMRON ENTERPRISES

P.O.# :8677-050846

S.O.# :251304

AA PL#:5904114

Item :2 (4 PC) 1" X 5.3125 X 115.375 WRAPPERS

:TAG# 050846-1

**MR. A. HOMER GARZA**

**REPORT C05-248.1  
PAGE 2**

VISUAL EXAMINATION REVEALED THAT ALL SPECIMENS CONTAINED A FEW HYDROGEN INDUCED BLISTERS ON BOTH SURFACES. THE BLISTERS VARIED IN SIZE FROM 1/64 OF AN INCH TO 1/32 OF AN INCH IN DIAMETER AS SHOWN IN FIGURE 1.

EACH SPECIMEN TESTED WAS FURTHER SECTIONED INTO EQUAL SMALLER SECTIONS FOR DETAILED METALLOGRAPHIC EXAMINATION OF THEIR POLISHED SURFACES AS WELL AS MEASUREMENT OF THEIR STEPWISE CRACKS.

MICROSCOPIC EXAMINATION REVEALED THAT ALL SUB-SECTIONS WERE FREE FROM ANY HYDROGEN INDUCED CRACKING (HIC). THE CLR, CTR AND CSR RATIOS FOR THESE SPECIMENS WERE REPORTED AS ZERO. SEE TABLE 1.


MICROSCOPIC EXAMINATION IN THE UNETCHED CONDITION REVEALED THESE SPECIMENS CONTAINED A LOW CONCENTRATION OF NON-METALLIC INCLUSIONS. ETCHED MICROSCOPIC EXAMINATION INDICATED THAT ALL SPECIMEN'S MICROSTRUCTURES CONSISTED OF FERRITE AND PEARLITE. SEE FIGURES 2 & 3.

RESULTS ARE AS FOLLOW:

CRACK LENGTH RATIO (CLR)	0.0000 %
CRACK THICKNESS RATIO (CTR)	0.0000 %
CRACK SENSITIVITY RATIO (CSR)	0.0000 %

INDIVIDUAL SPECIMEN RESULTS ARE SUMMARIZED ON THE FOLLOWING PAGE.

RESPECTFULLY SUBMITTED  
CORRMET ENGINEERING SERVICES



ROBERT H. ZAND, P.E.  
METALLURGICAL ENGINEER

RZ/KR

MR. A. HOMER GARZA

REPORT C05-248.1  
PAGE 3

**TABLE I**

SECTION WIDTH (W) 20.88 mm  
SECTION THICKNESS (T): 25.39 mm

CRACK LENGTH RATIO (CLR), CRACK THICKNESS RATIO (CTR) AND CRACK SENSITIVITY RATIO (CSR) IS TABULATED AS THE FOLLOWING:

SUB-SECTIONS	CRACK LENGTH (A) MM	CRACK THICKNESS (B) MM	CLR (%)	CTR (%)	CSR (%)
1	.	.	.	.	.
	.	.	.	.	.
	.	.	.	.	.
2	.	.	.	.	.
	.	.	.	.	.
	.	.	.	.	.
3	.	.	.	.	.
	.	.	.	.	.
	.	.	.	.	.
4	.	.	.	.	.
	.	.	.	.	.
	.	.	.	.	.
5	.	.	.	.	.
	.	.	.	.	.
	.	.	.	.	.
6	.	.	.	.	.
	.	.	.	.	.
	.	.	.	.	.

\*NOTE= NO VALUE OBTAINED (SUB-SECTION WAS FREE FROM CRACKING) AVERAGE CLR, CTR AND CSR RATIOS = ZERO

06/30/2005 From: AMERICAN ALLOY STEEL

To: AMRON ENTERPRISES

P.O.# :8677-050846

S.O.# :251304

AA PL#:5904325

Item :3 (4 PC) 7/8" X 5.3125 X 3.75 END PLATES

:TAG# 050846-1

ISG PLATE INC.

TEST CERTIFICATE

SHIP TO:

AMERICAN ALLOY STEEL, INC.  
C/O STORAGE & PROCESSORS, INC.  
8500 CLINTON DR./TRACK 23-430  
DLV. CARRIER-PT. TERM RR-<150"  
HOUSTON TX 77240

PAGE NO: 01 OF 02  
FILE NO: 0284-01-11  
MILL ORDER NO: 23409-001  
MELT NO: U4461  
SLAB NO: 8  
DATE: 01/19/05

SOLD TO:

AMERICAN ALLOY STEEL, INC  
P. O. BOX 40469  
HOUSTON TX 77240-0469

SEND TO:

AMERICAN ALLOY STEEL, INC  
P. O. BOX 40469  
ATTN: HOMER GARZA  
HOUSTON, TX 77240-0469

03-C

PLATE DIMENSIONS / DESCRIPTION

TOTAL QTY	GAUGE	WIDTH	LENGTH	DESCRIPTION	PIECE WEIGHT
1	.875"	144"	480"	RECTANGLE	17152#

CUSTOMER INFORMATION

CUSTOMER PO: 60851

Certified a true copy of the original, retained in our file.  
AMERICAN ALLOY STEEL, INC.

D6312105

SPECIFICATION(S)

THIS MATERIAL HAS BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH PURCHASE ORDER REQUIREMENTS AND SPECIFICATION(S).

AM ALLOY-TUF-37 REV 6 YR 04  
ASME SA516 ED 01 03A GRADES 60, 65 & 70  
MATERIAL PRODUCED UNDER A CERTIFIED QUALITY MGMT SYSTEM COMPLYING WITH ISO 9001 ABS-QE CERT. NO. 30130

CHEMICAL COMPOSITION

MELT:U4461	C	MN	P	S	CU	SI	NI	CR	MO
	.19	.99	.007	.001	.16	.38	.08	.07	.02
MELT:U4461	V	TI	B	AL	CB	SB	AS	SN	CEF
	.001	.003	.0006	.043	.001	.0010	.0030	.006	.39

CARBON EQUIVALENT FORMULA (CEF)  
CEF = C + (MN \* .1667) + ((CR + MO + V) \* .2000) + ((CU + NI) \* .0667)

MANUFACTURE

FINELINE - VACUUM DEGASSED - MCQUAID-EHN GRAIN SIZE PER E112 - 7-8

HEAT TREAT CONDITION

MATL OR TEST	HEAT TREAT DESCRIPTION	NOM TEMP	HOLD MINS	COOL MTHD
PL/TEST	NORMALIZE	1650F	32	AIR COOL

TENSILE PROPERTIES

SLAB NO.	LOC	DIR	YIELD STRENGTH PSI X 100	TENSILE STRENGTH PSI X 100	ELONGATION GAGE LGTH	X	XR.A.
8	BOT.	TRANS.	510	765	8.00"	28.0	66.0

AMERICAN ALLOY  
PLATE # 5904325

WE HEREBY CERTIFY THE ABOVE INFORMATION IS CORRECT:

QUALITY ASSURANCE LABORATORY  
COATESVILLE, PA 19320

Elinore Zaplitzny  
SUPERVISOR - TEST REPORTING  
ELINORE ZAPLITNY

06/30/2005 From: AMERICAN ALLOY STEEL

To: AMRON ENTERPRISES

P.O.# :8677-050846

S.O.# :251304

AA PL#:5904325

Item :3 (4 PC) 7/8" X 5.3125 X 3.75 END PLATES

:TAG# 050846-1

ISG PLATE INC.

TEST CERTIFICATE

PAGE NO: 02 OF 02  
FILE NO: 0284-01-11  
HILL ORDER NO: 23609-001  
MELT NO: U4461  
SLAB NO: 8  
DATE: 01/19/05

GENERAL INFORMATION

ALL STEEL HAS BEEN MELTED AND MANUFACTURED IN THE U.S.A.  
MATERIAL HAS BEEN VACUUM DEGASSED AND CALCIUM TREATED  
FOR SULFIDE SHAPE CONTROL.  
FINELINE MOD FOR SULPHUR  
TEST CERTS. ARE PREPARED IN ACCORD. WITH PROCEDURES  
OUTLINED IN DIN 50049 3.1.B/EN 10204 3.1.B.

B/L #66010 TTPX 80985

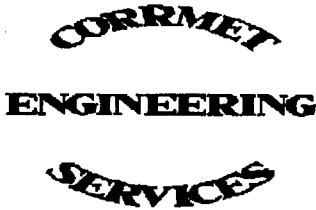
Certified a true copy of the  
original, retained in our file.  
AMERICAN ALLOY STEEL, INC.

WE HEREBY CERTIFY THE ABOVE  
INFORMATION IS CORRECT:

QUALITY ASSURANCE LABORATORY  
COATESVILLE, PA 19320

*Elinore Zapitny*  
SUPERVISOR - TEST REPORTING  
ELINORE ZAPITNY





**Consulting Materials Engineers**  
Corrosion & Metallurgical Testing Laboratories

*e-mail: corrmnet@flash.net*  
*web site: www.corrmnet.com*

MR. A HOMER GARZA  
AMERICAN ALLOY STEEL  
P.O. BOX 40469  
HOUSTON, TX 77240-0469

March 9, 2005  
REPORT. NO.: C05-186.1  
P.O. NO.: 62509

REF: HIC TEST

DEAR MR. GARZA:

CORRMET ENGINEERING SERVICES HAS COMPLETED THE HYDROGEN INDUCED CRACKING (HIC) TEST PROGRAM ON THREE (3) CARBON STEEL SPECIMENS MEASURING 100 mm X 20.43 mm X 21.16 mm.

TEST COUPON	SA 516 GR 60/ 70	ISG
MATERIAL	7/8" X 6" X 7" (6"= D.O.R.)	
IDENTIFICATION	PLATE # 5904324	HEAT # U4461 SLAB # 7

THE TEST WAS PERFORMED IN ACCORDANCE WITH THE TEST PROCEDURES OUTLINED IN NACE STANDARDS TM0284-96 USING SOLUTION "A" AND AASI PROCEDURE NO. HIC-L1 Rev. 2.

THE TESTING CONDITIONS WERE AS FOLLOWS:

TEST SOLUTION	PER NACE TM0284-96, SOLUTION "A" (TM0177)
INITIAL pH	2.75
FINAL pH	3.79
TEST TEMPERATURE	75°F
TEST DURATION	96 HOURS
H2S CONCENTRATION	2769 ppm

AFTER COMPLETION OF THE TEST, ALL THREE (3) SPECIMENS WERE CLEANED AND THEN EXAMINED BOTH VISUALLY AND WITH THE AID OF A STEREOSCOPIC MICROSCOPE.

*W. Wheeler*  
*9/10/05*

VISUAL EXAMINATION REVEALED THAT ALL SPECIMENS CONTAINED A FEW HYDROGEN INDUCED BLISTERS ON BOTH SURFACES. THE BLISTERS VARIED IN SIZE FROM 1/64 OF AN INCH TO 1/32 OF AN INCH IN DIAMETER AS SHOWN IN FIGURE 1.

EACH SPECIMEN TESTED WAS FURTHER SECTIONED INTO EQUAL SMALLER SECTIONS FOR DETAILED METALLOGRAPHIC EXAMINATION OF THEIR POLISHED SURFACES AS WELL AS MEASUREMENT OF THEIR STEPWISE CRACKS.

MICROSCOPIC EXAMINATION REVEALED THAT ONE (1) SUB-SECTION EXPERIENCED HYDROGEN INDUCED CRACKING (HIC). TYPICAL HIC CRACKING IS SHOWN IN FIGURE 2. THE CLR, CTR AND CSR RATIOS FOR THESE SPECIMENS WERE CALCULATED AND WERE REPORTED. SEE TABLE 1.

MICROSCOPIC EXAMINATION IN THE UNETCHED CONDITION REVEALED THESE SPECIMENS CONTAINED A LOW CONCENTRATION OF NON-METALLIC INCLUSIONS. ETCHED MICROSCOPIC EXAMINATION INDICATED THAT ALL SPECIMEN'S MICROSTRUCTURES CONSISTED OF FERRITE AND PEARLITE. SEE FIGURES 3 & 4.

RESULTS ARE AS FOLLOW:

CRACK LENGTH RATIO (CLR)	0.2125 %
CRACK THICKNESS RATIO (CTR)	0.0473 %
CRACK SENSITIVITY RATIO (CSR)	0.0009 %

INDIVIDUAL SPECIMEN RESULTS ARE SUMMARIZED ON THE FOLLOWING PAGE.

RESPECTFULLY SUBMITTED  
CORRMET ENGINEERING SERVICES

*Witness Jonathan*  
*Wheeler*  
*9/10/05*

*R H Z*  
\_\_\_\_\_  
ROBERT H. ZAND, P.E.  
METALLURGICAL ENGINEER

RZ/KR

**TABLE I**

SECTION WIDTH (W) 20.43 mm  
SECTION THICKNESS (T): 21.16 mm

CRACK LENGTH RATIO (CLR), CRACK THICKNESS RATIO (CTR) AND CRACK SENSITIVITY RATIO (CSR) IS TABULATED AS THE FOLLOWING:

SUB-SECTIONS	CRACK LENGTH (A) MM	CRACK THICKNESS (B) MM	CLR (%)	CTR (%)	CSR (%)
16	.	.	.	.	.
17	0.40	0.09	1.9579	0.4253	0.0083
18	.	.	.	.	.
19	.	.	0.6326	0.1418	0.0028
20	.	.	.	.	.
21	.	.	.	.	.
22	.	.	.	.	.
23	.	.	.	.	.
24	.	.	.	.	.
25	.	.	.	.	.
26	.	.	.	.	.
27	.	.	.	.	.
28	.	.	.	.	.
29	.	.	.	.	.
30	.	.	.	.	.

\*NOTE= NO VALUE OBTAINED (SUB-SECTION WAS FREE FROM CRACKING) AVERAGE CLR, CTR AND CSR RATIOS = ZERO

*Whitney/Janitor*  
*Wh*  
*9/03/05*



06/30/2005 From: AMERICAN ALLOY STEEL

To: AMRON ENTERPRISES

P.O.#: 8677-050846

S.O.#: 251304

AA PL#: 5055372

Item #4 (3 PC) 3/8" X 5.625 X 4.5 PASS PLATES

:TAG# 050846-1

RAUTARUUKKI AINESTODISTUS TEST REPORT WERKSZEUGNIS RELEVÉ DE CONTROLE EN 10 204-3.1.B

A 16/31 26087 -01

Title of Purchaser / Destinataire: STEPCOR USA INC.
Address: EMPIRE STATE BUILDING
Order No. / Commande No.: NIS0110
Lith. mark / Shipping mark: 57633-H
Date: 13.03.2004
Mark of the Manufacturer: Rautaruukki logo
ASME SA-20 ED. 2002
PRESS VESSEL STEEL ED. 2001 OF ASME CODE SEC II ADD-02 SA20

Table with columns: Pile No., Thickness, Subst. No., C, SI, MN, P, S, AL, NB, V, TI, CU, CR, NI, MO. Contains chemical composition data for three samples.

N 920C, T=1.1 (MIN) X THICKN (MM)
CEKV=C+MN/6+(CR+MO+V)/5+(NI+CU)/15

Table with columns: Pile No., Subst. No., T-Dir, Yield, Tensile, Elong, Charpy, etc. Contains mechanical test results for multiple samples.

K2: 71=TOP, TRANSV. K3: 115=CH-V/ISO-V(J), 7.5X10, TOP, LONGIT.

RAUTARUUKKI STEEL

This test report, with testpiece, is the property of the customer. We hereby certify that the material described therein has been tested and was found to conform with the terms of the order.

Certified a true copy of the original, retained in our file. AMERICAN ALLOY STEEL, INC.

15.03.2004 TPE

Address: 8677-050846, Tel: 308 5 0411

AR: normalizing + rolling, N: normalizing, NR: normalizing + rolling, CR: normalizing + rolling, TM: treatment, MT: normalizing + rolling, G: heat treatment.

06/30/2005 From: AMERICAN ALLOY STEEL

To: AMRON ENTERPRISES

P.O.#: 8677-050846

S.O.#: 251304

AA PL#: 5055372

Item : 4 (3 PC) 3/8" X 5.625 X 4.5 PASS PLATES

TAG# 050846-1



APPENDIX PAGE 16A

TEST REPORT 26087 -01

ORDER NO. NI50110

CAST-TEST NO.	YIELD PT.		TENSILE TEST			IMPACT TEST (FT*LPF)				
	RP02	REH	TENSILE STR. KSI	ELONGATION %		TEMP. DEG F	1.	2.	3.	AVERAGE
38348 053	50	50	72	32	26	-51	120	149	123	131
38362 022	52	54	75	30	24	-51	082	086	075	081
38362 023	53	54	76	31	24	-51	063	071	084	073
38362 024	53	55	76	30	24	-51	060	064	075	066
38362 025	53	55	77	31	24	-51	056	076	040	058
38362 031	53	54	75	30	24	-51	077	092	091	087
38362 032	53	55	76	31	24	-51	072	082	080	078
38362 033	53	55	77	31	24	-51	070	066	054	063
38362 034	53	54	76	30	23	-51	088	091	062	080
38362 035	53	54	77	29	23	-51	069	087	074	077
38362 036	53	54	76	31	25	-51	089	105	086	093
38362 041	52	53	75	31	24	-51	082	097	091	090
38362 042	53	54	76	30	24	-51	077	074	091	080
38362 043	53	55	77	31	25	-51	071	074	058	068
38362 044	54	55	77	31	24	-51	084	074	060	072
38362 045	53	55	77	30	24	-51	074	066	084	075
38362 046	52	53	74	32	25	-51	097	089	109	098
38362 051	52	54	76	30	23	-51	057	055	061	058
38362 052	52	53	75	32	26	-51	119	091	113	108
38362 053	52	54	76	29	23	-51	069	085	071	075
38362 055	53	54	77	29	23	-51	079	058	060	066
38371 022	53	55	75	30	24	-51	079	070	080	077

RAUTARUUKKI STEEL TESTING AND INSPECTION

15.03.2004

M. Valkama  
MINNA VALKAMA

Certified a true copy of the original, retained in our file.  
AMERICAN ALLOY STEEL, INC.  
AC 9-11-04

06/30/2005 From: AMERICAN ALLOY STEEL

To: AMRON ENTERPRISES

P.O.# :8677-050846

S.O.# :251304

AA PL#:5059643

Item :8 (1 PC) 1/4" X 2.5 X 7.25 NAME PLATE

:TAG# 050846-1

ISG PLATE INC.

TEST CERTIFICATE

SHIP TO:

AMERICAN ALLOY STEEL, INC.  
C/O SAND SPRINGS RAILWAY CO  
TRANS LOAD FACILITY  
SAND SPRINGS OK XXXXX

PAGE NO: 01 OF 01  
FILE NO: 0284-01-14  
MILL ORDER NO: 13254-001  
MELT NO: T5761  
SLAB NO: 2B  
DATE: 07/02/04

SOLD TO:

AMERICAN ALLOY STEEL, INC  
P. O. BOX 40469  
HOUSTON TX 77240-0469

SEND TO:

AMERICAN ALLOY STEEL, INC  
P. O. BOX 40469  
ATTN: HOMER GARZA  
HOUSTON, TX 77240-0469

03-C

PLATE DIMENSIONS / DESCRIPTION

TOTAL QTY	GAUGE	WIDTH	LENGTH	DESCRIPTION	PIECE WEIGHT
6	.25"	96"	360"	RECTANGLE	2450#

CUSTOMER INFORMATION

CUSTOMER PO: 58958-OK

SPECIFICATION(S)

THIS MATERIAL HAS BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH PURCHASE ORDER REQUIREMENTS AND SPECIFICATION(S).

ASME SA516 REV ED YR 01 GR 70 02 AD  
ASME SA516 REV ED YR 01 GR 65 02 AD  
ASME SA516 REV ED YR 01 GR 60 02 AD

PRODUCT OF COIL  
MATERIAL PRODUCED UNDER A CERTIFIED QUALITY MGMT SYSTEM COMPLYING WITH ISO 9001 ABS-QE CERT. NO. 30130

CHEMICAL COMPOSITION

MELT: T5761	C	MN	P	S	CU	SI	NI	CR	MO
	✓.15	✓1.00	✓.012	✓.014	.13	.20	.08	.06	.02
MELT: T5761	V	TI	AL	CB					
	.001	.003	○.049	.001					

MANUFACTURE

MCQUAID-EHN GRAIN SIZE PER E112 - 7-8

*See 8-10-04*  
Certified true copy of the original, retained in our file.  
AMERICAN ALLOY STEEL, INC

TENSILE PROPERTIES

SLAB NO.	LOC	DIR	YIELD STRENGTH PSI X 100	TENSILE STRENGTH PSI X 100	ELONGATION GAGE LGTH	%
2B	BOT.	TRANS.	582	765	2.00"	41.0
2B	MID.	TRANS.	611	796	2.00"	27.0
2B	TOP	TRANS.	591	774	2.00"	29.0

GENERAL INFORMATION

ALL STEEL HAS BEEN MELTED AND MANUFACTURED IN THE U.S.A.  
TEST CERTS. ARE PREPARED IN ACCORD. WITH PROCEDURES OUTLINED IN DIN 50049 3.1.B/EN 10204 3.1.B.

B/L# 45457 MTTX 97581

WE HEREBY CERTIFY THE ABOVE INFORMATION IS CORRECT:

QUALITY ASSURANCE LABORATORY  
COATESVILLE, PA 19320

*[Signature]*  
SUPERVISOR - TEST REPORTING  
ELINORE ZAPLITNY

5059643

06/30/2005 From: AMERICAN ALLOY STEEL  
 P.O.# : 8677-050846  
 Item : 5 (2 PC) 1/4" X 4 X 11.1875 FL BAR  
 :TAG# 050846-1

To: AMRON ENTERPRISES  
 AA PL#: 5063051

*JH* 7-15-05

ISG PLATE INC.

TEST CERTIFICATE

SHIP TO:  
 AMERICAN ALLOY STEEL, INC.  
 C/O STORAGE & PROCESSORS, INC.  
 8500 CLINTON DR./TRACK 23-430  
 DLV. CARRIER-PT. TERM RR-<150"  
 HOUSTON TX 77240

PAGE NO: 01 OF 02  
 FILE NO: 0284-01-  
 MILL ORDER NO: 26690-00;  
 MELT NO: U5497  
 SLAB NO: 2BC  
 DATE: 05/18/05

SOLD TO:  
 AMERICAN ALLOY STEEL, INC  
 P. O. BOX 40469  
 HOUSTON TX 77240-0469

SEND TO:  
 AMERICAN ALLOY STEEL, INC  
 P. O. BOX 40469  
 ATTN: HOMER GARZA  
 HOUSTON, TX 77240-0469

03

PLATE DIMENSIONS / DESCRIPTION

TOTAL QTY	GAUGE	WIDTH	LENGTH	DESCRIPTION	PIECE WEIGHT
1	.25"	96"	480"	RECTANGLE	3267#

CUSTOMER INFORMATION

CUSTOMER PO: 61050

Certified a true copy of the original, retained in our file.  
 AMERICAN ALLOY STEEL, INC.

*DBU/9/05*

SPECIFICATION(S)

THIS MATERIAL HAS BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH PURCHASE ORDER REQUIREMENTS AND SPECIFICATION(S).

ASME SA516 REV ED YR 01 GR 70 03 AD  
 ASME SA516 REV ED YR 01 GR 65 03 AD  
 MATERIAL PRODUCED UNDER A CERTIFIED QUALITY MGMT SYSTEM COMPLYING WITH ISO 9001 ABS-QE CERT. NO. 30130

CHEMICAL COMPOSITION

MELT:U5497	C	MN	P	S	CU	SI	NI	CR	MO
	✓.22	✓.94	✓.007	✓.006	.12	✓.19	.06	.07	.08
MELT:U5497	V	TI	AL	CB					
	.001	.003	026	.001					

MANUFACTURE

MCQUAID-EHN GRAIN SIZE PER E112 - 7-8

HEAT TREAT CONDITION

MATL OR TEST	HEAT TREAT DESCRIPTION	NOM TEMP	HOLD MINS	COOL MTHD
PL/TEST	NORMALIZE	1660F	14	AIR COOL

TENSILE PROPERTIES

SLAB NO.	LOC	DIR	YIELD STRENGTH PSI X 100	TENSILE STRENGTH PSI X 100	ELONGATION GAGE LGTH %
2BC	BOT.	TRANS.	604	850	8.00" 22.0

AMERICAN ALLOY  
 PLATE # 5063051

WE HEREBY CERTIFY THE ABOVE INFORMATION IS CORRECT;

QUALITY ASSURANCE LABORATORY  
 COATESVILLE, PA 19320

*Elinore Zaplitny*

SUPERVISOR - TEST REPORTING  
 ELINORE ZAPLITNY



06/30/2005 From: AMERICAN ALLOY STEEL

To: AMRON ENTERPRISES

P.O.# :8677-050846

S.O.# :251304

AA PL#:5063051

Item :5 (2 PC) 1/4" X 4 X 11.1875 FL BAR

:TAG# 050846-1

ISG PLATE INC.

TEST CERTIFICATE

PAGE NO: 02 OF 02  
FILE NO: 0284-01-  
MILL ORDER NO: 26690-00  
MELT NO: U5497  
SLAB NO: 2BC  
DATE: 05/18/05

CHARPY V-NOTCH IMPACT RESULTS

SLAB	LOC	DIR	TEMP	SIZE	FT.	LBS.
2BC	BOT.	LONG.	-50F	1/2	21	23 24

GENERAL INFORMATION

ALL STEEL HAS BEEN MELTED AND MANUFACTURED IN THE U.S.A.  
TEST CERTS. ARE PREPARED IN ACCORD. WITH PROCEDURES  
OUTLINED IN DIN 50049 3.1.B/EN 10204 3.1.B.

B/L# 77956 NS 101585

Certified a true copy of the  
original, retained in our file.  
AMERICAN ALLOY STEEL, INC.

WE HEREBY CERTIFY THE ABOVE  
INFORMATION IS CORRECT:

QUALITY ASSURANCE LABORATORY  
COATESVILLE, PA 19320

*Elinore Zaplitny*

SUPERVISOR - TEST REPORTING  
ELINORE ZAPLITNY

# MATERIAL TRACEABILITY RECORD

Job No. 050846X

PIPE  PLATE  TUBES  BY Ly DATE 07/12/05 CUST. COLLICUTT

MTL. P.O. NO. SECTION NO.	MATERIAL DESCRIPTION	HEAT OR CERTIFICATION NO.
1014935  .1	1. 14' - 3/4" x .060 SA-179	32759
	2.	
	3.	WEB CO.
1014848  2	1. 14' - 1" x .060 SA-214	WE-50494
	2.	
	3.	WEB CO.
	1.	
	2.	
	3.	
	1.	
	2.	
	3.	
	1.	
	2.	
	3.	

**NOTE: ALL MATERIAL OF SAME DESCRIPTION IN A SECTION MUST BE OF SAME HEAT NO.**



# MATERIAL TEST REPORT

Sold To: 44220027  
 AIR-X-CHANGERS  
 990 KEYSTONE AVE.  
 CATOOSA OK 74015 US

Ship To: 44220027  
 AIR-X-CHANGERS  
 990 KEYSTONE AVE.  
 CATOOSA OK 74015 US

Purchase Order: 1014935  
 Sales Order: 68833  
 Material: TA32007500650 A/SA179 0.750" OD x .065" MW  
 Delivery: 80100049

Description: ASTM/ASME A/SA 179-90A(01) SMLS

Test: NDT ELECTRIC TESTED TO ASTM A450 OR A1016 & APPLICABLE TEST METHOD E309 OR E42  
 FLANGE TEST PASSED. FLARE TEST PASSED. FLATTENING TEST PASSED.

Heat Number: 32759

CARBON	Idl	0.150
MANGANESE	Idl	0.570
PHOSPHORUS	Idl	0.014
SULFUR	Idl	0.002
SILICON	Idl	0.200
NICKEL	Idl	0.033
CHROMIUM	Idl	0.040
MOLYBDENUM	Idl	0.020
COPPER	Idl	0.058
ALUMINUM	Idl	0.034
VANADIUM	Idl	0.002

Ultimate (PSI )  
 Yield (PSI )  
 Elongation (%)  
 Hardness (RB ) 66 / 67

Webco Industries, Inc. certifies that the material described was manufactured and tested and/or inspected in accordance with the specification and fulfills requirements in such respect.

Country of Origin: Mexico  
 Mill Name:

Date: 06/27/200

Releasing Analyst



# MATERIAL TEST REPORT

**Sold To: 44220027**  
**AIR-X-CHANGERS**  
**990 KEYSTONE AVE.**  
**CATOOSA OK 74015 US**

**Ship To: 44220027**  
**AIR-X-CHANGERS**  
**990 KEYSTONE AVE.**  
**CATOOSA OK 74015 US**

**Purchase Order:** 1014848  
**Sales Order:** 68775  
**Material:** A13010000600 A/SA 214/178-A ERW 1000D 060M  
**Delivery:** 80099583

**Description:** ASTM/ASME A/SA 214-96A(01) ERW

**Test:** NDT ELECTRIC TESTED TO ASTM A450 OR A1016 & APPLICABLE TEST METHOD E309 OR E4  
 FLANGE TEST PASSED. FLATTENING TEST PASSED. REVERSE FLATTENING TEST PASSED.

**Heat Number:** WE50494

<b>CARBON</b>	Idl	0.090
<b>MANGANESE</b>	Idl	0.360
<b>PHOSPHORUS</b>	Idl	0.008
<b>SULFUR</b>	Idl	0.006
<b>SILICON</b>	Idl	0.024
<b>NICKEL</b>	Idl	0.021
<b>CHROMIUM</b>	Idl	0.030
<b>MOLYBDENUM</b>	Idl	0.014
<b>COPPER</b>	Idl	0.057
<b>ALUMINUM</b>	Idl	0.047
<b>TIN</b>	Idl	0.008
<b>VANADIUM</b>	Idl	0.002

**Ultimate (PSI )**  
**Yield (PSI )**  
**Elongation (%)**  
**Hardness (RB )** 55 / 56

Webco Industries, Inc. certifies that the material described was manufactured and tested and/or inspected in accordance with the specification and fulfills requirements in such respect.  
 Made with Pride in the U.S.A.

Date: 06/19/2005

*M. Crocker*  
 Releasing Analyst

N/A Not Applicable *air-x-changers* BScoggin

# FINAL -- IN PROCESS INSPECTION CHECKLIST

Customer: **Collicutt Energy Services** Job/Section No.: **050846** Date: **07/18/05**

FINAL ASSEMBLY	Prod. Check	Lead	TAG NUMBER:		FINAL ASSEMBLY	Prod. Check	Lead	Hold Points	
			Q. C.	Cust.				Q. C.	Cust.
Dimensional Insp. Of Sub Columns	✓	✓	N/A		Manual and/or <del>3 AIR MOTORS</del>	TD 7/18	EA 5/20	14/7/01	
Dimensional Insp. Of Base Holes	TD 7/18	EA 7/18	14/7/21		Final Paint of Unit	L.M. M.H. 7/19/05	EA 7/19/05	14/7/21	
Fan Blade Clearance	SL 7/18	EA 7/18	14/7/21		All shutter rods pinned With #14 x 3/4" tapping screw		EA 7/18	14/7/21	
Fan Blade Pitch	SL 7/18	EA 7/18	14/7/21		Clean Galvanizing		EA 7/18	14/7/21	
Fan Shaft Clearance	SL 7/18	EA 7/18	14/7/21		All Bearings and/or Universals Greased	SL 7/19	EA 7/20	14/7/21	
Idle Alignment	AL 7-18-05	nc 7-18-05	14/7/21		Vibration Switches	TD 7/19	EA 7/20	14/7/21	
Electric Motor	✓	✓	N/A		Unit Name Plate	<del>SL</del> 7-19-05	EA 7/20	14/7/21	
Gear Box	✓	✓	N/A		Lifting Lug Attachment	<del>SL</del> 7-19-05	EA 7/20	14/7/21	
Bearing set screws Torque	AL 7-18-05	nc 7-18-05	14/7/21		All Loose Parts Tagged	AG-TH 7-30-05	EA 7/20	14/7/21	
Prevention of Rust	SL 7/19	EA 7/20	14/7/21				EA 7/20	14/7/21	
Flange Arrangement and Facing	TD/SL 7/18	EA 7/18	14/7/21		Name Plate Attachment	400 7-21-05	EA 7/21	14/7/21	X
Hail, Core, Fan Guards, Bug Screens	TP 7/18	EA 7/20	14/7/21		Run Test and Vibration Check	✓	EA 7/21	14/7/21	
Shutters Operate Correctly	TD 7/18	EA 7/20	14/7/21		Megger Test on Motors	✓	EA 7/21	14/7/21	

Q. C. Review: **Jill Cosner**  
 Q. C. Release For Shipment: *James Kirk Pp. 1-2*  
 Comments:

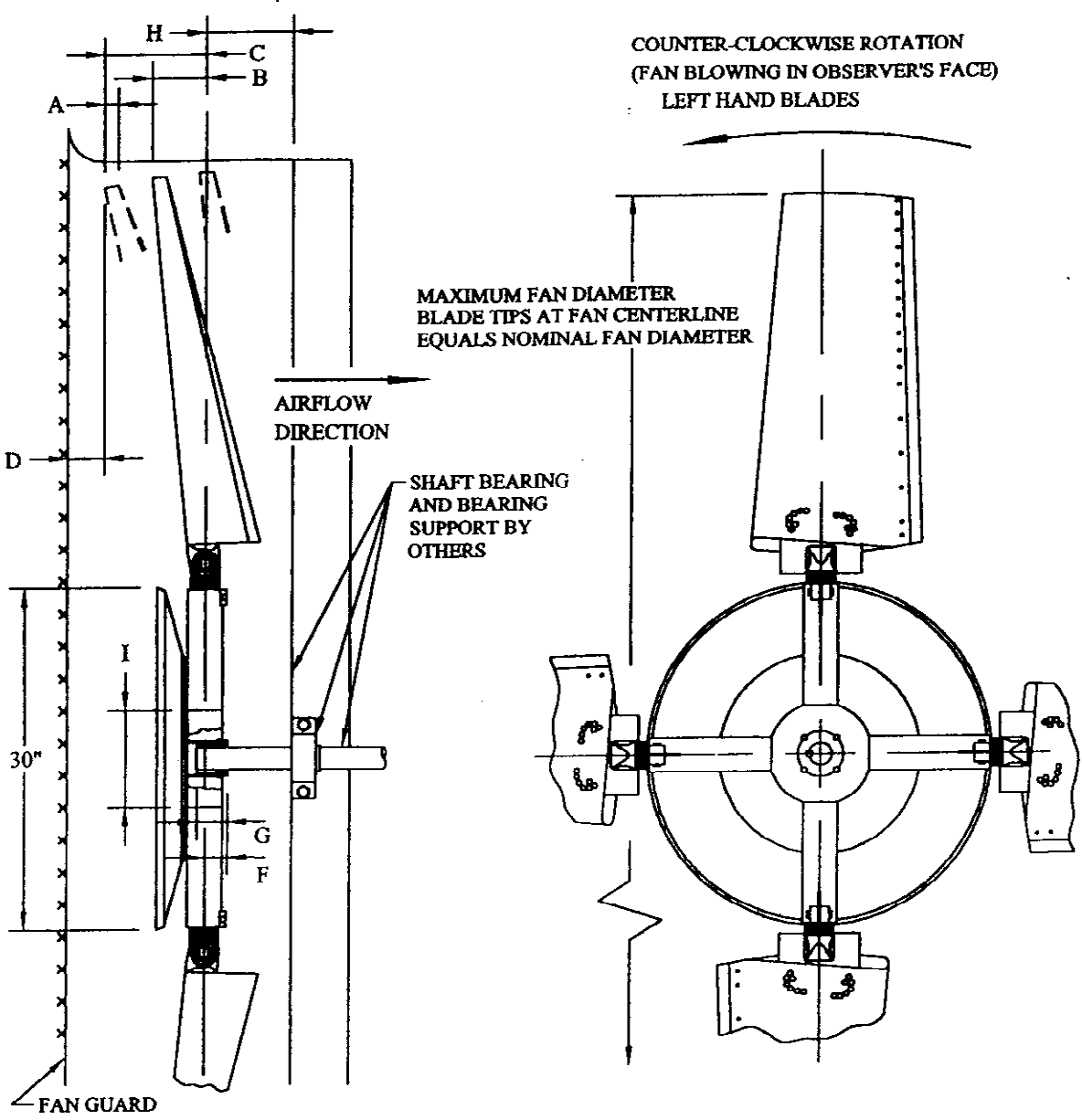


## PAINT -- IN PROCESS INSPECTION CHECKLIST

MODEL:	46EH	JOB NO.:	050846	DATE:	7/19/05
INITIAL AND DATE ALL CHECKPOINTS	GROUP LEADER <i>[Signature]</i>	QUALITY CONTROL			
		REJECTED		ACCEPTED	
Surface Cleaning Before Primer	<i>D H<sub>2</sub>O</i>				
Surface Preparation Before Final Paint	<i>C.O.</i>				
Final Paint Accepted	<i>[Signature]</i>	<i>KP 7/21</i>			
Type of Primer:	<i>9267</i>				
Dry Mills Total:	<i>1.5 + 0.20</i>				
Type of Intermediate:	<i>8</i>				
Dry Mills Total:	<i>8</i>				
Type of Top Coat:	<i>698</i>				
Dry Mills Total:	<i>3.0 + 0.40</i>				
Comments:					



CLASS 10000 SERIES 36 D



- A = BLADE TIP THICKNESS @ 19° BLADE ANGLE
- B = RUNNING POSITION OF BLADES
- C = MAXIMUM BLADE TRAVEL
- D = MINIMUM OBSTACLE CLEARANCE AT INLET
- F = CENTERLINE OF FAN TO BASE OF BUSHING
- G = BUSHING OVERALL HEIGHT
- H = MINIMUM OBSTACLE CLEARANCE AT OUTLET
- I = NOMINAL MECHANICAL HUB DIAMETER
- L = MAX. BUSHING TORQUE FT. LBS.
- # = WITH S.A.E. STANDARD SQUARE KEYWAY
- \* = WITH SHALLOW KEYWAY IN BUSHING
- ° = MAX METRIC BORE WITH STANDARD KEYWAY

WITH FAN OPERATING  
 AT 12000 FT : MINUTE  
 BLADE TIP SPEED  
 PERCENT BLADE  
 LOADING

DIA	100%		75%		C	D	H	MAX BLADES	BUSHING TYPE	MAX # BORE	MAX * BORE	MAX ° BORE	I	F	G	L
	A	B	A	B												
6'	4.6"	1.5"	1.3"	3.5"	2.0"	7.0"							7"	2.0"	2.7"	4000
7'	4.2"	1.8"	1.5"	3.8"	2.0"	7.0"							9"	2.0"	2.7"	4000
8'	3.8"	2.1"	1.8"	4.1"	2.0"	7.0"	6	U	2.750"	2.938"	75		9"	2.2"	2.8"	7300
9'	3.4"	2.6"	2.1"	4.6"	2.0"	7.0"	8	U	2.750"	2.938"	75		9"	2.2"	2.8"	7300
10'	3.0"	3.1"	2.4"	5.1"	2.0"	7.0"	8	W	3.750"	4.000"	100		9"	2.2"	4.0"	9800
11'	2.6"	3.8"	3.1"	5.8"	2.0"	7.0"	8	X	3.750"	4.000"	100		9"	2.2"	4.0"	9800
12'	2.2"	4.6"	3.6"	6.6"	2.0"	7.0"	8	X	3.750"	4.000"	100		9"	2.2"	4.0"	9800

**SERIES 36 FAN**  
**LEFT HAND ROTATION**







# CERTIFICATION RECORD

The company named below has been authorized by CSA to represent the products listed in this record as "CSA Certified" and to affix the CSA Mark to these products according to the terms and conditions of the CSA Service Agreement and applicable CSA program requirements (including additional Markings).

File No: 046306 0 000

Class No: 3218 06 INDUSTRIAL CONTROL EQUIPMENT Miscellaneous Apparatus - For Hazardous Locations

## SUBMITTOR

4500982 Murphy Industries Inc.  
P.O. Box 470248,  
Tulsa, OK 74147  
USA

## FACTORY

4500983 FW Murphy  
5311 South 122<sup>nd</sup> East Ave  
Tulsa, OK 74146  
USA

April 18, 1995 (Replaces: October 5, 1983)

## Class I, Groups C and D:

- Indicating relays for intermittent use only, coil 120V ac; Models 100\*, contacts 300V ac, 10A, 440V ac, 5A, 110\*, 198 contacts 120V ac, 10A; 196 contacts, 48V ac/dc, 1A; coil 2-48V ac: Model 169, contacts 48V ac/dc, 10A; Coil 2-48V dc: Models 201, 210, 221, 223, 246, 247, 248, 274, 297, contacts 48V ac/dc, 10A; 109, 117, contacts 48V dc, 10A; coil 2-24V ac; Models 101, 102, 103, contacts 48V ac/dc, 3A; 141, 197, 202, 203, 303, 307, 404, 606, contacts 48V ac/dc, 10A.

\*These relays are Certified only for use in equipment where the short circuit capacity of the circuits in which they are connected are limited by fuses having ratings not exceeding the ratings of the relay.

Note: Model numbers are followed by four or more suffix letters including PH-EX denoting explosion proof relays, and a digit denoting number of identical relays in enclosure.

- Indicating relay, Model 551 PH-EX-1 through -4, coil 12V dc, 6W, contacts 48V dc, 10A, continuous use.
- Vibration-shock detector switch, Model VS-2-EX, 480V ac max, 5A or VS-2-EX, with options, designated by Suffix "R", rated 24V dc, nominal, 120V ac nominal.



CSA INTERNATIONAL

# CERTIFICATION RECORD

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The company named below has been authorized by CSA to represent the products listed in this record as "CSA Certified" and to affix the CSA Mark to these products according to the terms and conditions of the CSA Service Agreement and applicable CSA program requirements (including additional Markings).

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File No: 046306 0 000

Class No: 3211 07 INDUSTRIAL CONTROL EQUIPMENT Miscellaneous Apparatus

## SUBMITTOR

4500982 Murphy Industries Inc.  
P.O. Box 470248,  
Tulsa, OK 74147  
USA

## FACTORY

4500983 FW Murphy  
5311 South 122<sup>nd</sup> East Ave  
Tulsa, OK 74146  
USA

April 18, 1995 (Replaces: November 15, 1994)

- Annunciator type relays, Cat Nos 100PH and 100PH-AS; contact ratings 10A, 120V ac, coil 120V ac; auxiliary contacts (Suffix -AS) rated 5A, 120V ac.

Note: These relays are open types for use as components as other equipment where the suitability is determined by Canadian Standards Association.