	Harsco		Plant Addre 5215 Arkansas I
			Catoosa, OK 740
			Telephone 918.619.8 Fax 918.619.5
_	COLLICUTT ENERGY SERVICES	DATE:	7/27/2005
_	7550 EDGAR INDUSTRIAL DRIVE	CUSTOMER:	TALISMAN ENERGY
_	RED DEER, ALBERTA T4P 3R2	PO #	F35223
_		AXC #	050846X
N: _	DOCUMENT CONTROL	TAG #	MO2966
	Trans	mittal Sheet	
	Attached you will find specific information	on for the job refe	erenced above.
	In order to to complete this manual, ple obtain the vendor information and Air-X-Cha Instructions. If you have any questions, ple	angers Installatio	n, Maintenance & Operating
	Engine Drive Operating, Installation &	Maintenance Ins	structions.
	Maro Shutters, Model EH		
	Garzo Air Motor, 501-12		
	Kimray Temperature Controller		
	Moore Fan, Series 10K (job specific da	ata is included in	n this manual)
	Dodge S2000 Bearings Dodge Fan & Blower Bearings		
	Murphy Vibration Switch (CSA is included)	ded in this manı	ual)
			,
			Very truly yours,
	cc: EADS - HOUSTON		
(	EADO TIODOTON		Debbie DeWitt

г

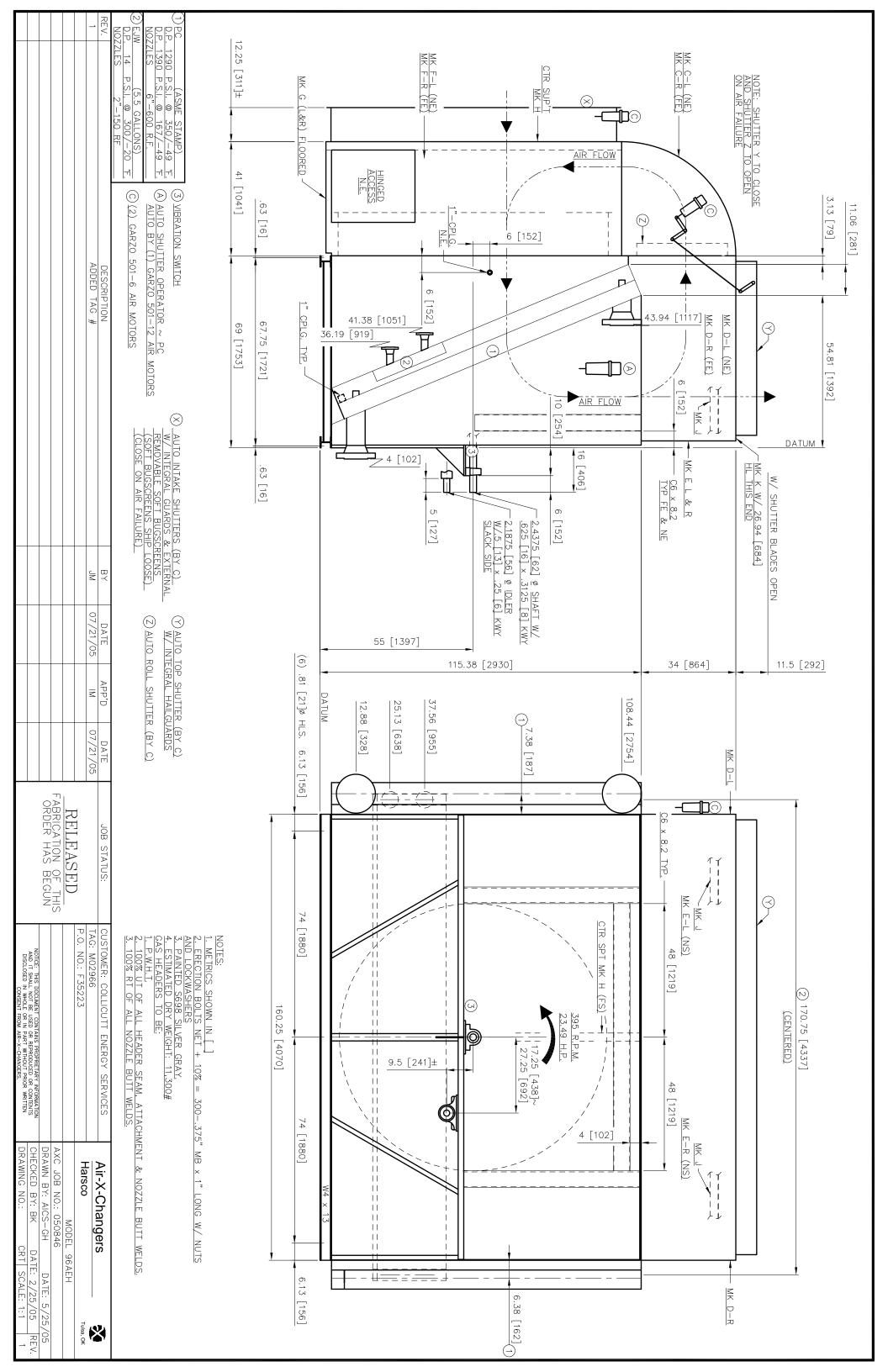


Harsco

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

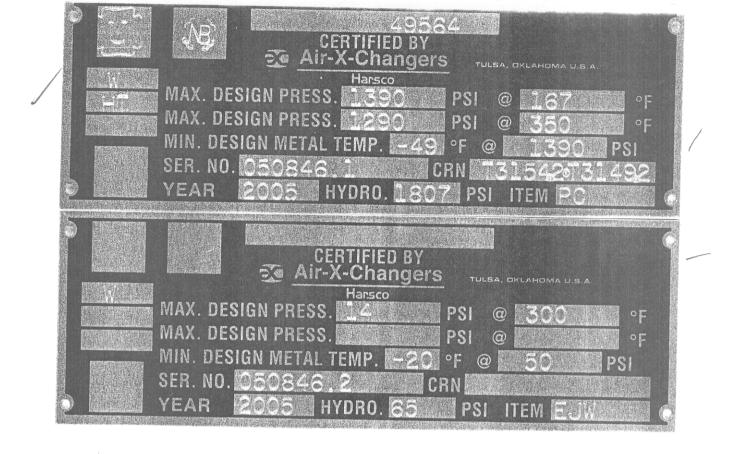
#### JOB NUMBER: 050846 CUSTOMER: COLLICUTT ENERGY SERVICES ULTIMATE USER: TALISMAN ENERGY ORDER COVERS: (1) Model 96AEH

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

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

Alr-X-C	hand	ore	PO I	BOX 1804	Job No.		050840	6
<b>- -</b>		<b>61 8</b>	TUL	SA, OK 74101-1804	Initial Rele	ase Date	06/06/05	05
Hai	rscô			: 918-384-5202	Page		1 of 1	
	JTT ENERG	Y SERVICES		Ultimate User	TALISMAN	ENERGY		
Inquiry/PO#				Destination	FERRIER			
No. Units		Model:		Reference				
Assembly: PAC	KAGED	Draft:	FORCED	Overall Size (WxLxH)	~6.88x1	5.00x9.61	Est. Wt., Ibs.	11,25
			PERFORMAN	CE				
Service		GAS PC	EJW					
Flow Fluid		31100#/HR .685SPGR	37.5GPM 50%GLY					
Temp. In / Out, f		.6655PGR 150.0 / 105.0	178.4 / 166.7					
Pressure, psia		1,057.2	1/0.4/100./					
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 / bt	u	0.0020	0.0005					
Surface, Bare / Extended,	sq.ft.	540 / 8045	29 / 616					
Sections, No./Connected		(1) SINGLY	(1) SINGLY					
Design Temp. (Max / Min)		* 350/-49	300/-20					
Design / Test Press., psig		1290 / 1677	14 / 65					
Pass Arrangement		ROSSFLOW	CROSSFLOW					
No.Tube Rows/Tube Pass	ses	3/4	1/2					
Section Weight, Ibs		4650	522					
Tubes, OD x BWG Material		16(.060MIN) A179 STEEL	1X16 SA214					
No.Per Section / Length, f	-	200 / 14	5A214 8 / 14					
Retarders	ι	200714	0714					
Accelerators								
Fins, Type	L-TENSIC	ON / WHEEL	L-TENSION/WHEEL					
Material		ALUMINUM	ALUMINUM					
Nozzles, Rating/Type		600 RF	150 RF					
Material / Bore	SA350 L	.F2 / SCH-80	SA105					
(No.Inlets) / Size, in		(1) / 6IN	(1) / 2IN					
(No.Outlets) / Size, in		(1) / 6IN	(1) / 2IN					
Headers, Type		X W/PLUGS	BOX W/PLUGS					
Material Corrosion Allow., in		SA516 70(N) 0.1250	SA516 70					
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		((		-	4	h 1
F= 100% R.T of all header s						ong seam &	1 end closure, per	header
U = 100% UT of all header s SB= S PLUS B as each are					us.			
AIR-SIDE PERFORMA				DRIVER DA	ТΔ		REDUCER DATA	
Ambient Air Temp., In, f			ake1 / MOORE-CL10K				REDUCER BY	
Elevation, ft		Blade Materia						
Air Flow, SCFM		HP@RPM	23.49 @ 395					
Air Temp., Out, f		Dia., in / No. I						
Min. Ambient, f		Blade Angle,						
			Adj. 36-HDVT/Manual					
		Fan Hub Busl	-					
* GAS PC Service provided	with 'Dual C	Code Stamp' fo	or: 1390 PSIG @ 167	F				

				(Alternative For	MANUFACTUR m For Single Ch the Provisions	amber, Complete of the ASME Code	ly Shop-Fabi e Rules, Sect	icated Ve	ssels Only)				
1. Manufa	ctured and o	certifi	ied by:	Air	-X-Changers,	A Harsco Comp		i Arkansa	as Road, F	Port of Cat	oosa, OK 740	015	
2. Manufa	ctured for:				Collicutt, 75	550 Edgar Industr	iress of manufaction in the second seco	turer) d Deer, Al					
3. Locatio	n of installa	tion:				Unknown, Unkno		aser)					
4. Type:	Heat Exc	:hang	jer	050846.1	S	(Name and ad SEE BELOW		BELOW		49564	•	2005	
5. The che The desig	(Horz/vert ta emical and p jn, construct	hysic	al proper and work	<i>(Mfg. Serial No.)</i> ties of all parts m manship conform	eet the requirer to ASME Rules,	(CRN) nents of material Section VIII, Div	specification	2004	ASME BOIL	(Nat'l Board No. ER AND PRE	.) Essure vesse	Year Ruilt	
to _	Addenda	) Date	 #)		Code	 Case No.		Year -			mperature e per UG-120(d)		
ube & Plug 5. Shell:		SA51	. <u>6</u> 70N		1.125"		.125"		6.0	625"	,	9' - 7.375"	
7. Seams:		• •	<i>No./Grade</i> nt	No	m. Thk. (in.) C=.20	Corr. / 1120	4// <i>ow (in.)</i> 1		Diameter	ID (Ft/In)	Lengt	h (Overall) (Ft/In)	
	Long	(wld, Lap, E	Dbl, R	R. T. (spot/full)	Eff (%)	H.T. Temp °F	Time (			ld, Dbl,	R. T. (spot, part, /full)	No. of course	
8. Heads:	(a) Matl		•	516 70N		@ <u>1120</u> ⁰F	_ (b) Matl.		SA516 7	•	• •	<u>ଡ</u> ି 1120 ୩	
		1		(Spec No. Gra	de)					(Spec	No. Grade)	Side to	
L	ocation (Top, bot,ends)		Minimum Thickness	Corrosion Allowance	Crown Radius	Knuckle Radius	Elliptical Ratio	Conic Ape Angl	x I	Hemispherical Radius	Flat Diam	Pressure Convex or Concave	
	TOP, BTM		1 "	.125"							5.625"	× 115.375"	
<u>b</u>	ENDS	1	0.875 "	.125"					•		5.625"	× 4.0625"	
<i>If remo</i> leader Vol		usea		e other fastening)			(Matl.,Spec. /						
ieader voi . MAWP	ume *1290	/1 704	<u>1.503</u> 0 ps	Cu. Ft. si at max, temp,	*350/1	67 °E	(mau.,spec. I	, Gr., SIZE,	, NO. J				
	lesign metal		F*	•	eqrees F at	1290/1390	nsi. <b>hv</b> r	iro nneu		. test pressi	ura 1	807 psi	
	-			lve openings:		1200/1000	_ pon 113			. coc press		<u>807</u> psi	
[	 	T	Dia.										
	ose (Inlet, t, drain)	No.	or Size	Туре	Material			iominal nickness	Reinfoi Materia		How Attached	Location	
	N,OUT	2	<u>6"</u> 1"	600# RFWN CPLG.		LF2/SA333 GR6		SCH80	Wel		Welded	HEADER	
		-		CPLO.		5A350 LF2		5000#	Wel		Welded	HEADER	
						······································							
	l	l									· · · · · · · · · · · · · · · · · · ·		
1. Support	ts: Skirt	(ves	<u></u> L	ugs (No.	Legs		Oth		Structure	Atta	iched	Bolted	
2. Remark	ks: Manufact	turer':	s Partial [	Data Reports prop		(No.) Id signed by Comi	missioned In		Description) Nav <b>e been f</b>	urnish <b>e</b> d for	(Whei r the following i	re and How) items	
of the re						PSI 1290 TEST PSI 1807 DESIGN T					_		
				(Name of p	art, item numbe	er, Mfg's name an	id identifying	stamp)					
Tubes:			).7500" (	OD, Straight	168" Length	16	BWG Guage	/W.Thk		SA179	Rolled T	ube Sheet	
Insp:	400		· · · · · · · · · · · · · · · · · · ·	4UNF THD'D		SA350 LF2	Plug S	Sheet				· · · · · · · · · · · · · · · · · · ·	
VESSE	L EXEMPT F	ROM	IMPACT	TESTING PER UC									
						ATE OF SHOP (							
				de in this report ar						d workmans	ship on this ve	ssel	
_				ssure Vessels, Sec			ation of Auth	orization I	No. 🚽	4241	expires <u>12/3</u>	2005	
Date /	- del	200	mpany Na	ame <u>Air-X-Char</u>	ngers, A Harsco (Manuf	Company facturer)		Si	gned 📕	(Repre	u of the sentative	Delle	
				Air-X-Chan	CERTIFIC Jers, A Harsco C	ATE OF SHOP I Company	INSPECTIO	N t		Tulsa, O	klahoma		
/essel con	nstructed by												
			) a valid c	commission issued	l by the Nationa	Board of Boiler	and Pressure	e Vessel Ir	ispectors a	na the State	e or Province		
I, the und	ersigned, ho lahoma	olding and	employed		OneBeacon Ar	merica Insurance	Company		have insp	ected the c	omponents de	scribed in this	
I, the und of <u>Ok</u> Manufactu	ersigned, ho lahoma urer's Data R	olding and Repor	employed t on	d by	OneBeacon Ar	merica Insurance d state that, to th	Company e best of my	knowledg	have insp ge and beli	ected the o ef, the Man	omponents de ufacturer has (	constructed	
I, the und of <u>Oki</u> Manufactu his vessel	ersigned, ho lahoma urer's Data R l in accordar	and Repor	employed t on /ith ASME	d by <b>7/2/</b> , 2 Code, Section VI	OneBeacon Ar 20 and II, Division 1. By	merica Insurance d state that, to th y signing this cert	Company le best of my ificate neithe	knowledger the insp	have insp ge and beli pector nor l	ected the c ef, the Man his employe	omponents de ufacturer has ( r makes any w	constructed arranty,	
I, the und of <u>Ok</u> Manufactu his vessel expressed	ersigned, ho lahoma urer's Data R in accordar or implied,	and and Repor ace w conce	employed t on /ith ASME erning the	d by	OneBeacon Ar 20 and II, Division 1. By described in this	merica Insurance d state that, to th γ signing this cert s Manufacturer's I	Company le best of my ificate neithe Data Report.	knowledger the insp Furtherm	have insp ge and beli bector nor l ore, neithe	ected the o ef, the Man his employe r the inspec	omponents de ufacturer has ( r makes any w	constructed arranty,	
I, the und of <u>Ok</u> Manufactu his vessel expressed	ersigned, ho lahoma urer's Data R in accordar or implied,	and and Repor ace w conce	employed t on /ith ASME erning the	d by 7/2/, 7 Code, Section VI e pressure vessel al injury o <del>r pr</del> oper	OneBeacon Ar 20 <u>S</u> and II, Division 1. By described in this by damage or lo	merica Insurance d state that, to th γ signing this cert s Manufacturer's I	Company le best of my ificate neithe Data Report.	knowledger the insp Furtherm	have insp ge and beli bector nor l ore, neithe d with this ions:	ected the c ef, the Man his employe or the inspection. 5 <sup>4</sup> ///	omponents de ufacturer has ( r makes any w	constructed varranty, ployer shall be	





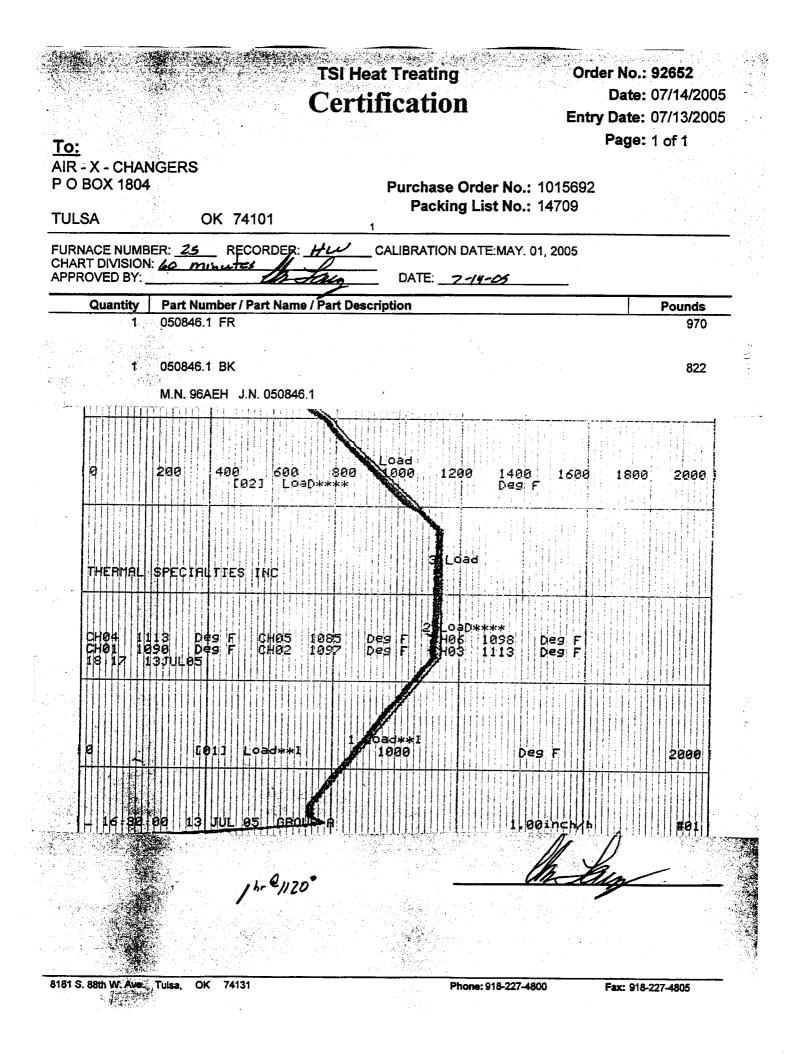
## **CERTIFICATE OF HYDROSTATIC TEST**

	CERTIFICA	TE NUMBER: _	050846C818	87	
AXC JOB #	050846	DATE: 7/16/20	005 Y	EAR BUILT:	2005
ITEM DESCRI	<b>PTION:</b> EJW				
AXC SERIAL \$	#: 0508	3462			
DESIGN PRES	<i>SURE:</i> 14/50	<u>a 300/-20</u>	F TEST PRESSU	/RE:	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 1.3 times the working pressure for a time no less than one (1) hour. no less than

HYDROSTATIC TEST CERTIFIED BY: \_\_\_\_\_ Sherry Henson

Witnessed By Client Representative (if applicable)





# **GLOBE X-RAY SERVICES, INC.** 8441 SOUTH UNION • TULSA, OKLAHOMA 74132 • (918) 446-1696

N.R.C. #35-11 TEXAS #5-18 FAA #CS2R75	92					R TEO		GRA QUE	PHI SHE	C ET						PAGE		(	OF	
MFG/CUST. Air - 7	X						JOB#/IE		54	16-	. 1						RT D	ate ' - 7	.05	· · · · · · · · · · · · · · · · · · ·
MAT'L TYPE		MAT'L T		5			WELD F	REINF				тот	ral T	~		RT TEC	CHNIQL	JE	18	
ISOTOPE/ X-RAY VOLTAGE	Į.	197			CI./MA	690	~?		<u>5</u> DCAL			so 6		<u>o</u>	OFD,	5		SUR	TIME \$2	
	EXPOSL	JRE							VIEW				<u> </u>		<u>FI</u>	LM PRO	CESS		F	b Area
SINGLE WALL		DBL RT QUALII		L		SING				DE	BL. W	ALL							=RT. , ,	010
RT TECH. LEVEL	7.5	2-27				CABLE C AS	ME	-EC.	50.	- <i>l</i>	/				ANCE	STD.				
	chale	·····	<b></b>									RT	PRO		JRE					
PART # SEAM # OR WELD #	LOCATIO MARKER INTERVAI			SS H-NE ME	iQi & D E	DEENS FNS LT MY	ACCEPT	REJECT	SLAG	POR	CRACK	P	F	U C			со	MME	NTS	
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GSX ASSUMES NO RESPONSIBILITY FOR LOSSES OF ANY KIND DUE TO INTERPRETATION.

GAMMA 1127 SOUTH LEWIS AVENUE	CUSTOMER DATA
TULSA, OKLAHOMA 74104-3900	Address
918 / 585-3228 • FAX 918 / 584-5598 1 - 800 - 625-9288	
	ATTENTION & C
ULTRASONIC INSPECTION REPORT FORM	W #1. WORK ORDER OSO846 PUBCHASE ORDER
3/-1	JOB LOCATION PURCHASE ORDER
1/12/05 DAY CLE	DESCRIPTION US Cro
NSPECTION DESCRIPTION: WELD	TELEVITION
LAMINAR REF	FLECTOR
PIPE	
• OTHER	North Collar attack
APPLICABLE CODE: ASME AUT	Sec VIM Dur 1 annu 17
QUIPMENT MANUFACTURER:	KRT CAPPIC
MODEL NUMBER:	USNSO
RANSDUCERS: LONGITUDINAL MHz 1)	a
SIZE 1)	
SINGLE	
ANGLE	<b>DUAL</b>
	<u>10</u> (2) <del>45</del> 25 (2) <del>22</del> 5
SITEAR. MAZ 1) SIZE 1)	
,	
	·
SIZE 1) ALIBRATION: LONGITUDINAL - REFERENCE 1	
SHEAR - BLOCK TYPE	m2/ ASMC. BLK
REFERENCE I	LEVEL 43/56 (db) SCANNING LEVEL 76
OUPLANT: CELLULOSEGLYCERIN	LEVEL <u>43/56</u> (db) SCANNING LEVEL <u>76</u> OIL WATER OTHER
OUPLANT: CELLULOSEGLYCERIN CANNING: CONTACTIMMERSION _	LEVEL 43 56 (db) SCANNING LEVEL 76
OUPLANT: CELLULOSEGLYCERIN CANNING: CONTACTIMMERSION _ SPEED <u>&lt; 6 produce</u>	LEVEL 43/56 (db) SCANNING LEVEL 76
OUPLANT: CELLULOSE GLYCERIN CANNING: CONTACT IMMERSION _ SPEED <u>&lt; 6 produce</u> 100% OF SURFACE GR	LEVEL 43/56 (db) SCANNING LEVEL 76
OUPLANT: CELLULOSE GLYCERIN CANNING: CONTACT IMMERSION _ SPEED <u>C 6 produce</u> 100% OF SURFACE GR	LEVEL <u>43/56</u> (db) SCANNING LEVEL <u>46</u> OIL WATER OTHER OTHEROT
OUPLANT: CELLULOSE GLYCERIN CANNING: CONTACT IMMERSION SPEED <u>C 6 pro Auc</u> 100% OF SURFACE GR SURFACE - INSIDE OU VERTICLE HO	LEVEL <u>43</u> 56 (db) SCANNING LEVEL <u>76</u> OIL WATER OTHER OTHER MANUAL AUTOMATIC
OUPLANT: CELLULOSE GLYCERIN CANNING: CONTACT IMMERSION SPEED <u>C 6 pro Arc</u> 100% OF SURFACE GR SURFACE - INSIDE OU	LEVEL 43/56 (db) SCANNING LEVEL 6 OIL WATER OTHER MANUAL AUTOMATIC CID OR SPOT (SIZE)
OUPLANT: CELLULOSE GLYCERIN CANNING: CONTACT IMMERSION SPEED <u>C 6 pro Auc</u> 100% OF SURFACE GR SURFACE - INSIDE OU VERTICLE HO	LEVEL 43/56 (db) SCANNING LEVEL 6 OIL WATER OTHER MANUAL AUTOMATIC UTSIDE F OBIZONTAL OPPOSING
OUPLANT: CELLULOSE GLYCERIN CANNING: CONTACT IMMERSION SPEED 6 6 pm Auc 100% OF SURFACE GR SURFACE - INSIDE OU VERTICLE HO DIRECTIONS - PARALLEL - FOR WELD ART IDENTIFICATION - COMMENTS (	LEVEL 43/56 (db) SCANNING LEVEL 6 OIL WATER OTHER MANUAL AUTOMATIC VISIDE 6 OBIZONTAL 0 PERPENDICULAR OPPOSING
OUPLANT: CELLULOSE GLYCERIN CANNING: CONTACT IMMERSION SPEED <u>6 pm Auc</u> 100% OF SURFACE GR SURFACE - INSIDE OU VERTICLE HO DIRECTIONS - PARALLEL - FOR WELD	LEVEL 43/56 (db) SCANNING LEVEL 6 OIL WATER OTHER MANUAL AUTOMATIC UTSIDE FIZENTIAL PERPENDICULAR OPPOSING
OUPLANT: CELLULOSE GLYCERIN CANNING: CONTACT IMMERSION SPEED 6 6 pm Auc 100% OF SURFACE GR SURFACE - INSIDE OU VERTICLE HO DIRECTIONS - PARALLEL - FOR WELD ART IDENTIFICATION - COMMENTS (	LEVEL 43/56 (db) SCANNING LEVEL 6 OIL WATER OTHER MANUAL AUTOMATIC UTSIDE FIZENTIAL PERPENDICULAR OPPOSING
OUPLANT: CELLULOSE GLYCERIN CANNING: CONTACT IMMERSION SPEED <u>6</u> <u>p</u> <u>A</u> <u>c</u> 100% OF SURFACE GR SURFACE - INSIDE OU VERTICLE HO DIRECTIONS - PARALLEL - FOR WELD RT IDENTIFICATION - COMMENTS <u>c</u>	LEVEL 43/56 (db) SCANNING LEVEL 6 OIL WATER OTHER MANUAL AUTOMATIC UTSIDE FIZENTIAL PERPENDICULAR OPPOSING
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OUPLANT: CELLULOSEGLYCERIN CANNING: CONTACTIMMERSION SPEED <u>6</u> <u>p</u> <u>Auc</u> 100% OF SURFACEGR SURFACE - INSIDEOU VERTICLEHO DIRECTIONS - PARALLEL - FOR WELD ART IDENTIFICATION - COMMENTS <u>(UN</u> SULTS: <u>ACCUPUCATULE</u> SULTS: <u>ACCUPUCATULE</u> CHNICIAN HOURS TECHNICIAN	LEVEL 43/56 (db) SCANNING LEVEL 76 OIL WATER OTHER MANUAL AUTOMATIC BID OR SPOT (SIZE) UTSIDE DEIZONTAL PERPENDICULAR OPPOSING B C SURFACE(S) 4, EB 32, Not off attach, Nog Actor Columns 4, EB 32, Not off attach, Nog Actor Columns TRAVEL HOURS MILEAGE PERDIEM LEVEL FORM 1A COLUMNS
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#### Globe X-Ray Services, Inc. 8441 S. Union Ave. Tulsa, OK 74132 918-446-1696

Page \_\_\_\_\_ of \_\_\_\_\_

Certification #\_\_<u>93066</u>-/

Magne	tic Particle E	xamination Re	ecord
Customer: <u>An-X</u>	Da	ate:	5 Time: / DD ALCON
Job/P.O. No.: 05-0846.1	_ Reference C	ode/Specification	Arme Ser THE Owl And
MT Procedure No. <b>GKS_JUZ-C</b> Rev. No	3-04	Acceptance Ay	WE SECTIME. Duy 1, And
Magnetizing Equipment Parcea ( Ass Researce	🖌 Serial No	A-400 44 357	9 Technique: Prods
Current Type:D/C Magnetic	Particle Type:	Wet	DryFluorescent Visible
Amperage (Prod Technique Only) Amp	s/inch of Prod S	pacing	
Part/Item Material Type:	<u> </u>	Material	Thickness
Lighting Equipment: Fluorescent Light M	lodel #	Serial	#
Natural White Light	er Research Y3(	00 or Y400 Probe	light
Other:	·····		
Light Intensity on surface to be examined:	foot ca	undles	μW/cm <sup>2</sup>
Light Intensity Meter: Model #	Ser.# /873		bration Duo Data
Comments: MT- Der May 100		cuii	
Comments: MT- Day MAG 100%	OFAL	c which s	(LSS EBS, Nor INSENTION,
NOZ FLANGE, SOCCET W ALL ITEMS LISTER	ecos, cu	S AND AT	TACUMENT WELDS ) ON
The second close	o seco	V	
	Examination F	Results	
Item # Part Identification	Accept	Reject	Indication Description
AFTER PWHF,			
1. 050040, 1 FH			
Z. OSO846, 1 B4			
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See attachment for additional examination results.

Examiner:

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Qualification Level: Acept 140825

/	MATE	RIAL TRACEAB	ILITY REC	CORD	Job No. <u>D50846</u> <u>15</u> сият. <u>СЕ</u> 5			
PIPE 🗊	PLATE		Y_57_	DATE 7/7/	DECUST. CES			
MTL. P.C SECTIOI	<i></i>		MATERIAL DESCRIPTION					
, / }		1.6"5180 5		s.6	422323			
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NOTE: ALL MATERIAL OF SAME DESCRIPTION IN A SECTION MUST BE OF SAME HEAT NO.

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TUBULARS

Requirements:

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va

Molting process:

Marking of producer

Zeichen des Lieferwerkes:

	Abnahmeprüfzeugnis B (gem. EN 10204 - Bescheinigung über Werkstolfprüfungen - 3.1)	I	Nr./No. Z25828
	Inspection - Certificate B (according to EN 10204 - 3.1)		Rev. 1
Besteller: Purchaser:	VOEST-ALPINE TUBULAR CORPORATION USA-77042 HOUSTON/TX INDUSTRIAL PIPING TULSA OK 74158-1270	Besteil-Nr.: Your order No.:	IPS PO# TP035361 VATC P.O. # 207512 23.7.2002
Hersteller: Manufacturer:	voestalpine Tubulars GmbH & Co KG	Auftrags-Nr.: Our works order No.:	223400/13
Prüfgegenstand Object of tests:	SEAMLESS STEEL TUBES	Versandanzeige: Dispatch advice No.:	02253/44226 v. 31.10.2002
Anforderungen:	ASTM A 106-99/ASME SA 106 Gr. B + C ASTWASME A/SA 333-99-GR. 1 + 6 (ASME SECTION II. carl A. Edition July 1, 2001)	Erschr	nelzungsart: 🗸

(ASME SECTION II, part A, Edition July 1, 2001) and NACE MR 0175-2002

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

 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 tength, Heat No., PO# TP035361

 Die stamped: MADE IN AUSTRIA
 Tag: PO# TP035361 CIF PORT OF HOUSTON

Ausführung: BEB, both ends beveiled acc. to API/ASTM (30") Condition:

Warmgefertigt/hot finished (845"-945°C) followed by controlled cooling in Wärmebehandlung: Stempel des Sachverstänigen: Air from 845°C to room temperature Heat treatment: Stamp of inspector:

#### Umfang der Lieferung / Volume of delivery:

PosNr.: Item No.: Poste n*	Stückzahl Number Of Numbre	kg	ħ	Abmessung Dimension Dimension	Schmetze Nr. Heet No. N° Coulée	Probe-Nr.: Test-No. N° d' éprouvette
13	45	23883.00	1838.29	168.3 x 10.97 mm	see altachment	1-9
				6 NPS 6.625 in OD 0.432in w.th. SCHED 80		

Kindberg, 5. November 2002

Page 1 of (

voestalpine Tubujars Gmbila Co KG Qualitätsstelle / Qualit 1

Star ALEGGER

Der Wirkssachverständige Works Inspector / L'Expert d' usine

----voestalpine Tubulars GmbH & Co KG, Alpinestralle 17, 8852 Kindberg-Aumühl, Austria

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

Rechtsform: Kommanditgesellschaft, Sitz; Kindberg/Austria, FN 185400k Handelsgericht Leoben DVR 0592684, UID-Nr. ATU 4360406

TUBULARS

<u>ب</u>

Volume of delivery

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

#### **Test Results**

- 1 Visuelle Inspection/ 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:0.B./satisfactory
- 5 Streuflußprüfung/Diverted flux: o.B./satisfactory

Kindberg, 05.11.02

#### Page/of Q

voeslappine Tubu ars GmbH & Co KG, Alpinesiralie 17, 8652 Kindberg-Aumühl, Austria

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

Rechtsform: Kommandilgesellscheit, Sitz: Kindberg/Austria, FN 165400k Handelagericht Leoben UVR 0592684, UID-Mr. ATU 43630406 voestalpine Tubulars ambH & CorRG Qualitistestele / Greity Constraint PIRCHECOER

Der Werkssachverständige Works Inspector / L'Expert d' usine

TUBULARS

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#### Mechanical testing ......

Lot No	Lot No		Specimen	Yield Strength	Tensile Stre	ingth Elongation %			
from: to:						mm Gr. B/Gr. 6 Gr. C	Rt0.50 PSI 35000 40000	PSI 60000 70000	Lo= 2" 30.00
46400 46400	AD AD	01 01	N N	1 2	Streifen Streifen	25.40 10. 25.40 11.	45975 45830	72806 72661	37.00 37.40
46400	AD	01	N	3	Streifen	25.40 10.	46265	73096	37.40

#### Hardness testing /HRC max. 22 o.k.

#### impact test results Charpy-V-45°C specimen 55x10x10 mm 1.04.61

LOTNO					Single			Value
46400	A D	01	N	1	31	15	17	21

#### Hardness testing

Lot No	Reading	Value	Variation /'
from:			voscielpine
to:		200.0	Tubulars Cm1.4 & Co KG A-8652 KINDBERG-AUMÜHA
46400 AD 01 N 1	145.00	148.67	5.34

Kindberg, 05.11.02

Page of Description of the second s

T. +43(0)3865-2215-0, F. +43(0)3885-2215-212, www.valubulars.com

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

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voestalpine Tubulage GmbH & Co KG Qualitătastelle ( Ky De trnent caf PIACHELGÉR

Der Werkssachverständige Works inspector / L'Expert d' usine anista.

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TUBULARS

Chemical test results

Heat analysis Weight % Heat

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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 (pt)

a an addinated of the construction of ur referent in 1. Januar Grinkh & Co KG, Alpinesballe 17, 0652 Kindberg-Aumtin, Austria voestalpine Tubulars Grinkh & Co KG, Alpinesballe 17, 0652 Kindberg-Aumtin, Austria T. +43(0)3065-22 IS-0, F. +43(0)3065-2215-212, www.watabulars.com Rechtsform Kommendigseitschaft, Sitz: KindbergAustra, FN 165400k Handelsgenicht Leoben UVR 0592684. UID-Mr. ATU 436:0406

voestalpine Tubulars GmbH & Co KG

Quality Darpetment

Der Werkssachverständige Worts Inspector / L'Expert d' usine

The state of weathers

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**87629** Item #: 1 P/N #: (5)20'1" & 19'2" RLS P.O.#: 741

CERTIFICAT PURCHASE O PART NUMBE ORDER NUMB HEAT CHARG	E OF TESTS MED MIAST TE OF TESTS MODER: 11690 R : ER: 12-51 E ADDRESS =	*****	**************************************	[NEEF		TS	1000 100. 330-438-5656
CERTIFICAT PURCHASE O PART NUMBE ORDER NUMB HEAT CHARG	E OF TESTS MDER: 11690 R ER: 12-51 E ADDRESS =	*****	**************************************	[NEEF		TS	1000 100. 330-438-5656
PURCHASE O PART NUMBE ORDER NUMB HEAT	RDER: 11690 R : JER: 12-51 . : 89772 E ADDRESS =	*****	**************************************	****			JULY 15, 200 PAGE: 1 DE
•••• Charg	E ADDRESS =	80 			•	CCOUNT	NUMBER NUME BI/09/04
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US ALLO TC 3773 P D BOX						SHIP T	0
HOUSTON	Y INC 3 7/7/04 262405 TX 77207			630	I FPPES		
ASTM A 696- Astme SA 102 And En 10 2 Temp 5 Stra	D LF2 CLASS -90A GRD C A 5-98 4.1:4.2 104 SECTION NIGHT IMPACT	1 4. SME 3.18 TES	TO 4.2; 5A 350-98 (	1 PAI 4.4.2 GRD 1	RA 4.1:4.2 2.3:566: 6 F2 PARA 4	2:5.2.3 S6651	3:5.2.4;6: 7 & 9 ASTM A
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CALLON SHORE -CALLS & BUFALON, NY 14213         CALLY ISANGE         CALLY ISANGE </td							
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CE 84	SURFACE 17	9.7					
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R. A. NEBIOLO DIRECTOR QUAL ASSURANCE

BY D. STOKES

CUSTOMER 649 101 P.O. #\_\_\_\_ CP1150 TOE Coupling ITEM\_\_\_\_ 80U HEAT CODE.

80U

1 6000 SA350 LF2 / 1014649 - 804 - PM

MATE	RIAL TRACEABILI	TY RECORD	Job No. 050846
	TUBES D BY	4 DATE 7-11-0	05 CUST. Collicatt Energy
MTL. P.O. NO. SECTION NO.	MATERIAL DE	SCRIPTION	HEAT OR CERTIFICATION NO.
	1. 5A516-70N 1.125	ISG	7 דוראט
	2. SA516-70N 1	756	71740
.1	3. 5A516-70N ,875	ISG	04461
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NOTE: ALL MATERIAL OF SAME DESCRIPTION IN A SECTION MUST BE OF SAME HEAT NO.

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	·	1-15:05
P.O.	0/2005 From: AMERICAN ALLOY STEEL # :8677-050846 S.O.#	To: AMRON ENTERPRISES :251304 AA PL#:5904117
ltem	:1 (4 PC) 1-1/8" X 6.0625 X 115.375 TUB TAG# 050846-1	E AND PLUG :
	TCC BLATE THE	
	ISG PLATE INC. Ship to:	TEST CERTIFICATE
7 * • .	AMÉRICAN ALLOY STEEL, INC. C/O STORAGE & PROCESSORS, INC. 8500 Clinton DR. /TRACK 23-430 DLV. CARPIER-DR.	PAGE ND: 01 OF 02 File NO: 0284-01-11 Mill Order ND: 2053-002
n na Star	DLV. CARRIER-PT. TERM RR-<150" Houston TX 77240	MELT NO U4717 SLAB NO 11A DATE: 01/05/05
а. Т. т. с.	SOLD TO: AMERICAN ALLOY STEEL THO	SEND TO:
	AMĚŘICAN ALLOY STEEL, INC P. O. BOX 40469 Houston TX 77240-0469	AMERICAN ALLOY STEEL, INC P. O. BOX 40469 ATTN: Homer Gárza Houston, TX 77240-0469
	PLATE DIMENSIONS /	DESCRIPTION
20) 201	QTY GAUGE WIDTH	LENGTH DESCRIPTION WEIGHT
Ĩ.₽ S	20 <b>1 1.125* 96*</b> 30° - 4	480" RECTANGLE 14702#
· · · · · · · · · · · · · · · · · · ·	CUSTOMER INFORMATIO CUSTOMER PD: 60060	AMERICAN ALLOY STEEL
	SPECIFICATION(S)	761/20105
	AN ALLOY-TUF-37 REV 6 YR 04	
	CHEMICAL COMPOSITIO	
	MELT: U4717 C .19 /1.03 /	P S CU SI NI CR MO 006 001 .14 .34 .06 .05 .02
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	CARBON EQUIVALENT FORMULA (CEF) CEF = C + (MN * .1667) + ((CR +	
	MANUFACTURE	
1	FINELINE - VACUUM DEGASSED - MCQUA	ID-EHN GRAIN SIZE PER E112 - 7-8
	HEAT TREAT CONDITIONATL	
	OR HEAT TREAT TEST DE <u>SC</u> RIPTION	NOM HOLD COOL
	PL/TEST NORMALIZE	NON HOLD COOL TEMP MINS MTHD 1650F 51 AIR COOL
· · · · · · · · · · · · · · · · · · ·	TENSILE PROPERTIES	
	SLAB YIELD Strength No. Loc Dir Psi X 100	TENSILE ELONGATION STRENGTH GAGE PSI X 100 LGTH X XR.A.
	11A BOT. TRANS. 504	750 2.00" 31.0 70.0
	WELLEREBY GERTIFY THE ABOVE	
*	INFORMATION IS CORRECT:	Burne Productor
	<sup>d</sup> quality assurance laboratory coatesville, pa 19320	SUPERVISOR - TEST REPORTING ELINORE ZAPLITNY
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	_	20 

P.O.	8677 ¢8677 #	From: AMER -050846 PC) 1-1/8 050846-1	" X 6.062	5	To 5.0.# :251304 5 TUBE AND PLUG	: AMRON ENTERPRISES AA PL#:590 :	)4117
	• •	• ·	· · ·				
	•	]	SG PLATE	INC.	TEST	CERTIFICA PAGE NO	
	1844 - 2010 - 2010 - 20		· · ·			PAGE NO File Nd Hill Order No Melt No Slab No Date	: 20572-002 : U4717 : 11A : 01/05/05
	C E N	ERAL	TNEO	RMATI	0 N		
· · ·					MANUFACTURED IN SSED AND CALCIUN CCORD. WITH PROU N 10204 3.1.8.	THE U.S.A. TREATED	
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NE HEREBY CERTIFY THE ABOVE Information is correct: Quality Assurance Laboratory Coatesville, pa 19320

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SUPERVISOR - TEST REPORTING ELINORE ZAPLITNY

ENGINEERING

### **Consulting Materials Engineers**

Corrosion & Metallurgical Testing Laboratories

e-mail: corrmet @ flash.net web site: www.corrmet.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 MATERIAL IDENTIFICATION

SA 516 GR 60/70 ISG 1-1/8" X 6" X 7" (6"= D.O.R.) 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** 

INITIAL pH2.70FINAL pH3.80TEST TEMPERATURE78°FTEST DURATION96 Hu

PER NACE TM0284-96, SOLUTION "A" (TM0177) 2.70 3.80 78°F 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.

12315 Chimney Rock • Houston, Texas 77035 (713) 721-3274 Fax (713) 721-8021

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

#### TABLE I

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

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

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WE HEREBY CERTIFY THE ABOVE INFORMATION IS CORRECT: QUALITY ASSURANCE LABORATORY COATESVILLE, PA 19320

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Elinone Test REPORTING



Consulting Materials Engineers Corrosion & Metallurgical Testing Laboratories

> e-mail: corrmet @ flash.net web site: www.corrmet.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**

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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 MATERIAL IDENTIFICATION

SA 516 GR 60/70 ISG 1" X 6" X 7" (6"= D.O.R.) 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** 

TEST TEMPERATURE

TEST DURATION

INITIAL DH

FINAL pH

PER NACE TM0284-96, SOLUTION "A" (TM0177) 2.70 3.80 78°F 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.

12315 Chimney Rock • Houston, Texas 77035 (713) 721-3274 Fax (713) 721-8021

#### MR. A. HOMER GARZA

11.

#### 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

R.V

ROBERT H. ZAND, P.E. METALLURGICAL ENGINEER

RZ/KR

06/29/2005 From: AMERICAN ALLOY STEEL	To: AMRON ENTERPRISES
5.0.#	:251304 AA PL#:5904114
Item :2 (4 PC) 1" X 5.3125 X 115.375 WRAPPER	8
:TAG# 050846-1	• •
1140# 00040-T	

### MR. A. HOMER GARZA

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

λŒ 7-15-05 06/30/2005 From: AMERICAN ALLOY STEEL To: AMRON ENTERPRISES P.O.# :8677-050846 S.0. # :251304AA 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: 04461 SLAB NO: 8 DATE: 01/19/05 SOLD TO: American Alloy Steel, inc P. D. Box 40469 Houston TX 77240-0469 SEND TO: 03-C AMERICAN ALLOY STEEL, INC P. O. Box 40469 Attn: Homer Garza Houston, TX 77240-0469 DIMENSIONS PLATE DESCRIPTION n DÇj TOTAL PIECE GAUCE WIDTH LENGTH DESCRIPTION Τ÷ (.875\*) 1 144" RECTANGLE 480\* 17152# ---CUSTONER INFORMATION Cartified a true copy of the original, retained in our file. CUSTOMER PO: 60851 AMERICAN ALLOY STEEL, INC. D6312105 SPECIFICATION (S) THIS MATERIAL HAS BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH PURCHASE ORDER REQUIREMENTS AND SPECIFICATION(S). AN ALLOY-TUF-37 REV 6 YR 04 ASME 8A516 ED 01 03A GRADES 60, 65 & 70 Material produced under a certified quality mgmt system complying with ISD 9001 Abs-ge cert, No. 30130 \* \$3. CHENICAL COMPOSITION ×19 MN P S .99 .007 .001 CU .16 SI S8 CR <sup>17</sup> - MELT:U4461 MD . 08 .07 . Õ2 TI B AL CB SB AS .001 .0010 .0030 CEF SN . 006 NELT: U4461 . **0**01 CARBON EQUIVALENT FORMULA (CEF) CEF = C + (MN \* .1667) + ((CR + MO + V) \* .2000) + ((CU + NI) \* .0667) NANUFACTU'RE FINELINE - VACUUM DEGASSED - MCQUAID-EHN GRAIN SIZE PER E112 - 7-8 13 . HEAT TREAT CONDITION MATL PLATE HEAT TREAT Description OR TEST HOLD NOM COOL MTHD PL/TEST NORMALIZE 1650F 32 AIR COOL TENSILE PROPERTIES TENSILE Strength PSI X 100 YIELD ELONGATION SLAB NO. STRÊÑCTH PSI X 100 GAGE LGTH LOC DIR X XR.A 8 BOT. TRANS. (510) (765) 8.00\* 28.0 66.0 WE HEREBY CERTIFY THE ABOVE Information is correct: the? QUALITY ASSURANCE LABORATORY Coatesville, pa 19320 SUPERVISOR - TEST ELINORE ZAPLIT

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WE HEREBY CERTIFY THE ABOVE Information is correct: Quality Assurance Laboratory Coatesville, pa 19320

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SUPERVISOR - TEST RE ELINORE ZAPLITNY PORTING

ENGINEERING

### **Consulting Materials Engineers**

Corrosion & Metallurgical Testing Laboratories

e-mail: corrmet@flash.net web site: www.corrmet.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 MATERIAL IDENTIFICATION

SA 516 GR 60/70 ISG 7/8" X 6" X 7" (6"= D.O.R.) 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** 

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

12315 Chimney Rock • Houston, Texas 77035 (713) 721-3274 Fax (713) 721-8021

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 CACULATED 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

ROBERT H. ZAND, P.E. METALLURGICAL ENGINEER

RZ/KR

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#### 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 (%)	C8R (%)
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	0.40				
		0.09	1.9579	0.4253	0.0083
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			0.6326	0.1418	0.0028
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\*NOTE= NO VALUE OBTAINED (SUB-SECTION WAS FREE FROM CRACKING) AVERAGE CLR, CTR AND CSR RATIOS = ZERO

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APPENDIX PAGE 16A

TEST REPORT 26087 -01

ORDER NO. NI50110

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..... TENSILE TEST ..... IMPACT TEST (FT\*LBF) ---CAST-TEST NO. YIELD PT. TENSILE STR. ELONGATION TEMP. 1. 2. 3. AVERAGE KSI XSI 4 DEGF RP02 REH 1.1.1 RM λ5 8 IN. \*\*\*\*  $\mathbb{C} \alpha$ ................ 38348 053 50 50 2.0 72 32 26 ·51 120 149 123 131 38362 022 52 54 75 Teen 
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Certified a true copy of the original, retained in our file. AMERICAN ALLOY STEEL, INC. AG Y- H.or

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TOTAL QTY       GAUGE       WIDTH       LENGTH       DESCRIPTION       PIECE WEIGHT         6       .25"       96"       360"       RECTANGLE       24500         CU S T O M E R I N F O R M A T I O N CUSTOMER PO: S8958-OK       SMP E C I F I C A T I O N (S)       NCUSTOMER PO: S8958-OK         SMP E C I F I C A T I O N (S)       THIS MATERIAL HAS BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH PURCHASE ORDER REQUIREMENTS AND SPECIFICATION(S).       ASKE SA516 REV ED YR 01 GR 75 02 AD PSHE SA516 REV ED YR 01 GR 75 02 AD PSHE SA516 REV ED YR 01 GR 75 02 AD PSHE SA516 REV ED YR 01 GR 75 02 AD PSHE SA516 REV ED YR 01 GR 75 02 AD PSHE SA516 REV ED YR 01 GR 65 02 AD PSHE SA516 REV ED YR 01 GR 65 02 AD PSHE SA516 REV ED YR 01 GR 65 02 AD MATERIAL PRODUCED UNDER A CERTIFIED QUALITY MGMT SYSTEM COMPLYING WITH ISO 9001 ABS-QE CERT. MO. 5012 ~014       CU S SI MI S CR MO .08 .06 .02         C H E M I C A L       C O M P O S I T I O N       MI S CR MO .001 .003 .012 ~014       CU S SI MI S CR MO .001         MELT: T5761       .001 .003 .012 ~014       .03       CB .001       .001         MALT: T5761       .001 .003 .014       .001       CB .001       .001       .001         MALT: T5761       .001 .003 .014       .001       .001       .001       .001       .002         MELT: T5761       .001 .003 .014       .001       .001       .001       .001       .002       .001         H A N U F A C T U R E MCQUAID-EHN GRAI		ATE D	IMENS	IONS,	NU NU	USION, TX 77	240-0469	
6       .25"       96"       360"       RECTANGLE       24500         CUSTOMER PO: 58958-OK       SMP E C I F I C A T I O N (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 70 02 AD         PRODUCT OF COILED YR 01 GR 60 02 AD         MATERIAL PRODUCED UNDER A CERTIFIED QUALITY MEMT SYSTEM COMPLYING WITH         ISO 9001 ABS-QE CERT. NO. 30130         MELT:T5761       .15 1.5 1.0 N         MELT:T5761       .001 .003         CH E N U F A C T U R E       .001         MCQUAID-EHN GRAIN SIZE PER E112 - 7-8       CHING UNCER OFFICE         SLAB       SILAB       STRENGTH       STRENGTH         NU.       LOC       DIR       STRENGTH       STRENGTH         SLAB       LOC       DIR       STRENGTH       STRENGTH         SLAB       LOC       DIR       STRENGTH       STRENGTH         SLAB       <	n de la composition de La composition de la c		-	E WIDTH			PIECE	
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SMP E C I F I C A T I O N (S) THIS MATERIAL HAS BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH PURCHASE ORDER REQUIREMENTS AND SPECIFICATION(S). ASME SABIG REV ED YR 01 GR 70 02 AD ASME SABIG REV ED YR 01 GR 60 02 AD MATERIAL PRODUCED UNDER A CERTIFIED QUALITY MGMT SYSTEM COMPLYING WITH ISO 9001 ABS-QE CERT. NO. 30130 C H E M I C A L C O M P O S I T I O N MELT:T5761 MELT:T5761 MA N U F A C T U R E MCQUAID-EHN GRAIN SIZE PER E112 - 7-8 T'E N S I L E P R O P E R T I E S SLAB ND. LOC DIR STIELD SLAB ND. LOC DIR STIELD MANUFACTURE MCQUAID-ENN GRAIN SIZE PER E112 - 748 SLAB ND. LOC DIR STRENGTH SB2 745 28 BQI- TRANS. SALE SLAB ND. LOC DIR STRENGTH SB2 745 20 20 20 20 20 20 20 20 20 20		STOME			I O N	·		
THIS MATERIAL HAS BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH PURCHASE ORDER REQUIREMENTS AND SPECIFICATION(S).         ASME SASIG REV ED YR 01 GR 70 02 AD ASME SASIG REV ED YR 01 GR 60 02 AD PRODUCT OF COIL MATERIAL PRODUCED UNDER A CERTIFIED QUALITY MGHT SYSTEM COMPLYING WITH         C H E M I C A L       C O M P O S I T I O N         -MELT:T5761       V.15 /1.00         MATERIAL       You i GR 60 02         MELT:T5761       V.15 /1.00         MELT:T5761       V.01 JI GR 60 02         MELT:T5761       V.01 JI GR 60         MELT:T5761       V.15 /1.00         MAY       OOI JOI GR 60 02         MELT:T5761       V.15 /1.00         MELT:T5761       V.01 JI GR 60         MELT:T5761       J.001 JI GR 60         J.001 JI GR 60       J.001	SMP	·						
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PRODUCT OF KEY ED YN OI GR 60 02 AD MATERIAL PRODUCED UNDER A CERTIFIED QUALITY MGHT SYSTEM COMPLYING WITH ISO 9001 ABS-QE CERT. NO. 30130         CH E M I C A L       C O M P O S I T I O N         MELT:T5761       V15 /100 /012 /014 /13 /20 /08 /06 /02         MELT:T5761       V15 /100 /012 /014 /13 /20 /08 /06 /02         MELT:T5761       V01 .003 /049 .001         MARCHARD       MARCHARD         MELT:T5761       V01 .003 /049 .001         MARCHARD       MARCHARD         MELT:T5761       V01 .003 /049 .001         MARCHARD       MARCHARD					CATION(S).		SOURCE MILL	FURCHASE
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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.	G E	PRODUCT OF         MATERIAL PI         ISO 9001 AI         E M I C A I         MELT:T5761         MELT:T5761         MELT:T5761         N U F A C T         MCQUAID-EHN         N S I L E         SLAB         NG.         2B         2B </td <td>COILCED U RODUCED U BS-QE CER C O M C U R E GRAIN S P R O P LOC BOT. MID. TOP I N F O</td> <td>R DI GR 60 0 NDER A CERTI T. NO. 30130 P O S I T I V.15 1.00 V .15 1.00 V .15 .1.00 IZE PER E112 E R T I E S DIR P TRANS. TRANS. TRANS. TRANS. TRANS.</td> <td>2 AD 2 AD</td> <td>TY MGHT SYSTER L4 CU SI L4 .13 21 B1 COPULA OFICIAL AMIERICA TENSILE STRENGTH PSI X 100 765 796 774</td> <td>NI COMPLYING NI COMPLYING 0.08 .0 00 0.00 (Composite 0.00 (Composi</td> <td>WITH R MO D6 .02 He. ., INC</td>	COILCED U RODUCED U BS-QE CER C O M C U R E GRAIN S P R O P LOC BOT. MID. TOP I N F O	R DI GR 60 0 NDER A CERTI T. NO. 30130 P O S I T I V.15 1.00 V .15 1.00 V .15 .1.00 IZE PER E112 E R T I E S DIR P TRANS. TRANS. TRANS. TRANS. TRANS.	2 AD 2 AD	TY MGHT SYSTER L4 CU SI L4 .13 21 B1 COPULA OFICIAL AMIERICA TENSILE STRENGTH PSI X 100 765 796 774	NI COMPLYING NI COMPLYING 0.08 .0 00 0.00 (Composite 0.00 (Composi	WITH R MO D6 .02 He. ., INC
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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 7-15-05 ł. 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: 28C DATE: 05/18/05 1 1 \$. \$ SOLD TO: American Alloy Steel, Inc P. O. Box 40469 Houston TX 77240-0469 SEND TO: 03. AMERICAN ALLOY STEEL, INC P. O. Box 40469 Attn: Homer Garza Houston, TX 77240-0469 . PLATE DIMENSIONS DESCRIPTION . . TOTAL PIECE WEIGHT р. GAUGE WIDTH LENGTH DESCRIPTION Ι.c. 1 .25\* 96" 480" RECTANGLE 3267# CUSTOMER INFORMATION . . Cortified a true copy of the 1.4 ariginal, retained in our file. CUSTOMER PD: 61050 AMERICAN ALLOY STEEL, INC. į, D66/9/03 SPECIFICATION(S) 1 THIS MATERIAL HAS BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH PURCHASI 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 CHENICAL COMPOSITION MN P S .94 .007 .006 8.22 CU .12 SI. CR NI .06 MO \_\_MELT:U5497 1.1 . 08 TI.003 . 0 0 1 CB .001 ,026) MELT: U5497 MANUFACTURE MCQUAID-EHN GRAIN SIZE PER E112 - 7-8 - 5 HEAT TREAT CONDITION MATL TEST HEAT TREAT DESCRIPTION PLATE # \_ NOM AMAGRICAN HOLD C001 NTHD NORMALIZE PL/TEST 1660F 14 AIR COOL TENSILE PROPERTIES YIELD Strength PSI X 100 TENSILE ELONGATION SLAB STRENGTH GAGE ŇŌ. LOC DIR PSI X 100 2 2BC BOT. TRANS. 604 850 8.00\* (22.0 WE HEREBY CERTIFY THE ABOVE Information is correct;

> QUALITY ASSURANCE LABORATORY Coatesville, pa 19320

Elinore Japlitny REPORTING SUPERVISOR - T ELINDRE ZA 3

PΛ	0,2000	From: AMERIC	AN ALLO	y steel		Te	: AMRON	ENTERPRISES	
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			TN TITN I	68888 <del>2</del>			INGGEDUI		
	•	ALL STEEL TEST CERTS OUTLINED		34847 3.	1.B/EN 10	204 3.1.	B.		
. jenje .	· ····	OUTLINED B/L# 7795			1.8/EN 10	204 3.1.	B		
4. (Annuar					1.8/EN 10	204 3.1.	B		
					1. <b>B</b> /EN 10	204 3.1.	B	·	
					1. <b>B</b> /EN 10	204 3.1.	B	· <b></b>	·
					1. <b>B</b> /EN 10	204 3.1.	B	· • •	
2					1. <b>B</b> /EN 10	204 3.1.	Β	· • •	
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2					1. <b>B</b> /EN 10	204 <b>3.1.</b>	Β		
2					1. <b>B</b> /EN 10	204 3.1.	Β.		

Certified a true capy of the eniginal, related in our file. AMERICAN ALLOT STEER, INC.

WE HEREBY CERTIFY THE ABOVE Information is correct; Quality Assurance Laboratory Coatesville, pa 19320

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Elinore Japlitny SUPERVISOR - TEST REPORTING ELINORE ZAPLITNY

MATERIAL TRACEABILITY RECORD

Job No. 050846×

	PLATE	□ TUBES ☞ BY_ <u></u> DATE <u>07/</u>	12/05 CUST. COLLICUTT
MTL. P.O SECTION		MATERIAL DESCRIPTION	HEAT OR CERTIFICATION NO.
10149	35	1. 14'- 3/4×-060 SA-179	32759
		2.	
./		З.	WEBW.
10148	48	1. 14'- 1" x 060 SA-214	WE-SOY94
7		2.	
2		З.	WEB W.
		1.	
		2.	
		З.	
		1.	
		2.	
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		1.	
		2.	
		3.	
		1.	
		2.	
		3.	

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

<b>Ju</b> 7-27-05 14	:25			P 01
		MATERIAL	TEST REPORT	Page 1 of 1
Sold To: 4422 AIR-X-CHANGE 990 KEYSTON CATOOSA OK	RS E AVE.		Ship To: 44220027 AIR-X-CHANGERS 990 KEYSTONE AVE. CATOOSA OK 74015	US
	1014935 68833 TA32007500650 80100049	A/SA179 0.750" (	DD x .065" MW	
Description: A	STM/ASME A/SA 1	79-90A(01) SMLS		
Test: NDT ELECT FLANGE TEST PA	RIC TESTED TO AS SSED. FLARE TEST	TM A450 OR A10 PASSED. FLATTE	16 & APPLICABLE TEST ME NING TEST PASSED.	THOD E309 OR E42
Heat Number:	32759	· · · · · · · · · · · · · · · · · · ·		
CARBONIdlMANGANESEIdlPHOSPHORUSIdlSULFURIdlSILICONIdlNICKELIdlCHROMIUMIdlMOLYBDENUMIdlALUMINUMIdlVANADIUMIdl	0.570 0.014 0.002 0.200 0.033 0.040 0.020			
Ultimate (PSI ) Yield (PSI ) Elongation (%) Hardness (RB )	66 / 67		<u> </u>	$\sim$
	certifies that the materia in accordance with the spect. X 15 (			Date: 06(27/200 Releasing Analyst
		! 		

	)		MATEDIAL	TEOT P	EDODT	
			MATERIAL		EPORI	Page 1 of
Sold To: 44 AIR-X-CHAN 990 KEYSTO CATOOSA C	GERS			AIR-X-CH 990 KEY	44220027 IANGERS STONE AVE. A OK 74015 US	
Purchase Order Sales Order: Material: Delivery:	68775	0000600 A	/SA 214/178-A EF	 RW 10000D	060M	
Description:	ASTM/AS	ME A/SA 2	14-96A(01) ERW			
Test: NDT ELE FLANGE TEST	CTRIC TES PASSED. I	TED TO AS	TM A450 OR A10 TEST PASSED. F	16 & APPLIC	CABLE TEST METHO	DD E309 OR SED.
Heat Number:		WE50494	· · · · · · · · · · · · · · · · · · ·	- -		
CARBON	Idl	0.090		•		
MANGANESE	Idl	0.360				
PHOSPHORUS	ldl	0.008		:		
SULFUR	ldi	0.006				
SILICON NICKEL	ldi Idi	0.024 0.021	:			
CHROMIUM	ldi	0.021				
MOLYBDENUM		0.014				
COPPER	ldi	0.057		i		
ALUMINUM	ldl	0.047				
TIN	ldi	0.008				
VANADIUM	ldl	0.002		;		
Ultimate (PSI	)					
Yield (PSI	)			1		
Elongation (%)	,		2 3 - 1	-		
Hardness (RB		55 / 56				
			al described was manual specification and fulfill			Date: 06/19/2
requirements in suc				- '	 	11. (and
Made with Pride in	the U.S.A.					eleasing Anal
				•		-
				1) Million - 1000 - 1		
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				4		

AIA Not Ambianhla					die volandane.	BScogoin				
					uit - y-changers				-7	
		FINAL		ROCES	<b>ESS INSPECTION CHECKLIST</b>	IST				••••••
Custorker: Collicut	Collicutt Energy Services	Service		Job/Section No.:	050846		Date:	07/18/05	5	
MODEL:	<b>96EH</b>		TAG	TAG NUMBER:						
FINAL ASSEMBLY	Prod.		Hold	Hold Points	FINAL ASSEMBLY	Prod.		Hold Points	ß	***
	Check	Lead	ບ ອ	Cust.		Check	Lead	U C	Cust.	
Dimensional Insp.		7			Manual and/or	710 71/2	FA	121		
Dimensional Insp.	40	とと	171		Final Paint of Unit	L.M. M.H.		1/10		
Of Base Holes	2/16	7/18	12/2		¢	7/19/05	719105	15/2,		•
Fan Blade	72	C R	<u> </u> /h/		All shutter rods pinned		-			
Clearance	2//2	81/1	7/81		With #14 x <sup>3</sup> ⁄4" tapping screw					
Fan Blade Pitch	310	47	No.		Clean Galvanizing			- Hor		
Fan Shaft	E F	山 子 山	10		All Bearings and/or	25	L D	101		•••• •
Clearance	8/12	81/4	761	] .	Universals Greased	7/19	5/20	7/21	-	4
Idler Alignment	AL	1-1%-VC	14		Vibration Switches	61/2		121		
Electric Motor			L/M		Unit Name Plate	1020	484 1/20	KO XO XO		24
Gear Box			nep -		Lifting Lug Attachment	2000	1/2	1/2		्रिय
Bearing set screws	۲ ۲	2010	10/0		All Loose Parts Tagged	46-7H		18/2		1
Prevention of Rust		2 4 2	140,				2	Hold Points	S	
	2/19	2120	2/21			وز	Lead		A.I.	
Flange Arrangement and Facing	15/22	石石	1/2/2		Name Plate Attachment	400	11 12	X	×	
Hail, Core,FanGuards,	4	2			Run Test and			/~		
Bug Screens	216	8	Lott		Vibration Check				-	<u>b</u>
Shutters Operate Correctly	2112	N F	12) 1/2)		Megger Test on Motors					
Q. C. Review: Jill	Cosner	-								Ø
For St	nent: 7/a/	los tui	Level à							
Coinments:										
										-
Initialing on this form indicates ackno Initialing on this form without first ins	wledgment that you	u have visually i ill be construed	nspected the ite as falsification	m listed and, to of this documen	R Initialing on this form indicates acknowledgment that you have visually inspected the item listed and, to the best of your knowledge, the item meets the required specification issued to this job. FORM NO.:FNLINPROCHKR4 Initialing on this form without first inspecting the item will be construed as falsification of this document.	uired specification iss	ued to this job.	FORM NO.:FNLINPRC	REV 4 OCHKR4	4
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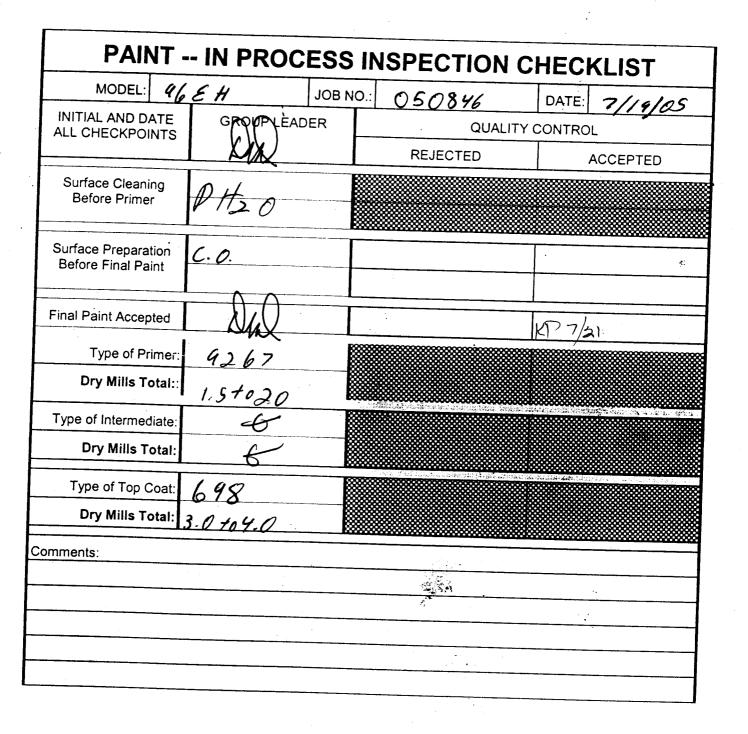
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## **Air-X-Changers**

Harsco



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## MOORE FANS LLC

800 S. MISSOURI AVENUE MARCELINE, MO 64658 USA TELEPHONE: (660) 376-3575 FACSIMILE: (660) 376-2909

#### INSTALLATION MANUAL

SOLD TO AIR-X-CHANGERS ATTN: ACCOUNTS PAYABLE PO BOX 1804 TULSA OK 74101-1804

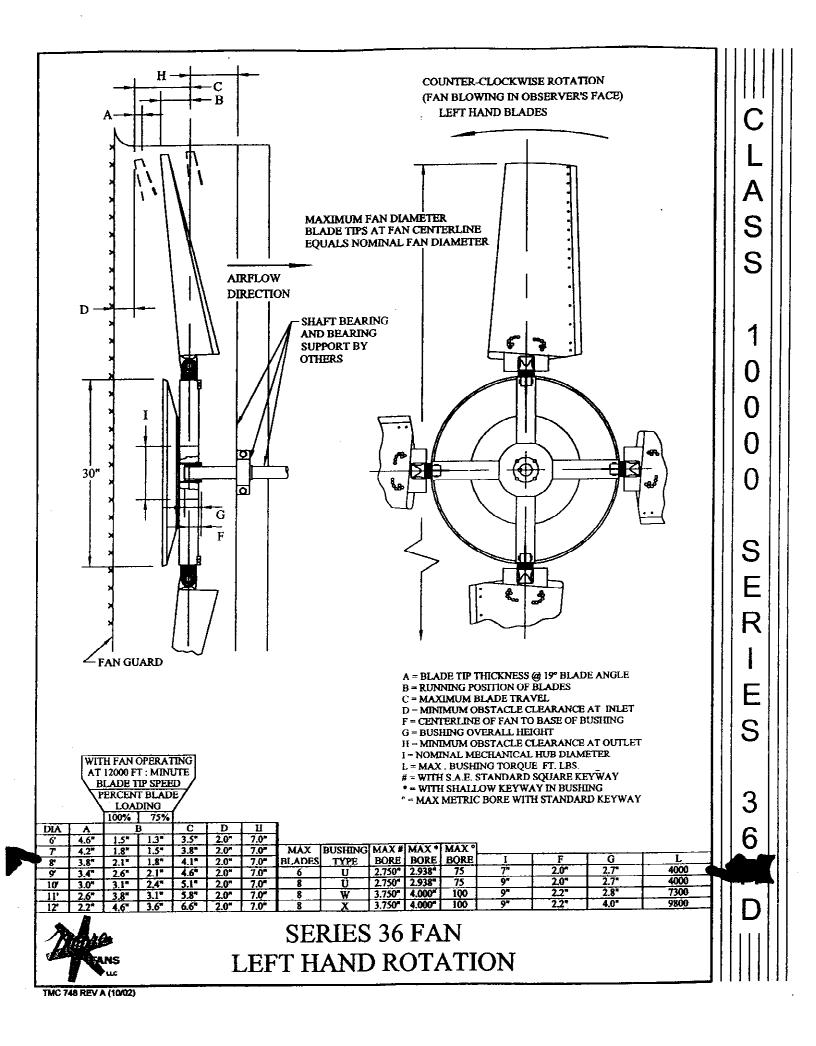
SHIP TO AIR-X-CHANGERS 5555 BIRD CREEK ROAD CATOOSA, OK 74015 JOB NO.:84131

INVOICE DATE: MODEL NO.:CLASS 10000 HD PURCHASE ORDER NO:1014921 CUSTOMER JOB NO:050846,054081A/B SHIP REQUIRED:06/22/2005
PAYMENT TERMS:NET JU DAIS
ROUTING: MOORE TULSA F.O.B. POINT: MARCELINE, MO.
FREIGHT: PREPAID CRATING: STANDARD DOMESTIC

SERIES:       36       DIA.:       8.00       BUSHING:       U       H DIM.:       2.73         BLADES:       6       TYPE:       MANUAL HD       KEYWAY:0.625" X 0.313" BORE:       2.43         ARRANGEMENT:       0.0°       WEIGHT:       Left Hand       STD. BORE TOL.: +.001"000"      000"         Left Hand       STOP DROOP:       4.10       CUT DROOP         JYNAMIC BALANCE HUB:       YES       STOP DROOP:       4.10       CUT DROOP         4 INCH HOLE IN AIR SEAL:       NO       BALANCE WT.:       COLOR CODE:         AIR PERFORMANCE DATA       AIR PERFORMANCE DATA       DENSITY RATIO:         ELEVATION:       Ft.       AIR TEMPERATURE:       °       DENSITY RATIO:         STATIC PRESSURE:       "WG VELOCITY PRESSURE:       "WG TOTAL PRESSURE:       EFFICIENCY:	FREIGHT: PREPAID CRATING: STANDARD DOMESTIC	
3 U BUSHING 2.438" BORE .625X.313 K/         1 PACK ALONE 3-FAN OR MORE ALL SERIE         2 Seriel Nos.: F136850-136852         2 ASSEMBLY DATA         ASSEMBLY DATA         ASSEMBLY DATA         MATERIAL: ALUMINUM         SERIES: 36 DIA.: 8.00 BUSHING: U ANTON         STOP DROS: 4.10 CLEVIS ANGLE: 0.0° WEIGHT: Left Hand         HUB LENGTH C/L TO BASE: 1.50 DYNAMIC BALANCE HUB: YES         DYNAMIC BALANCE HUB: YES         4 INCH HOLE IN AIR SEAL: NO         AIR PERFORMANCE DATA         ELEVATION: Ft. AIR TEMPERATURE: PHUD: INLET CORRECTION: STATIC PRESSURE: "WG VELOCITY PRESSURE: "G TOTAL PRESSURE: YELOCITY THROUCH FAN: REM         STATIC PRESSURE: WG VELOCITY PRESSURE: "WG TOTAL PRESSURE: PHP REQUIRED: TORQUE: FT.1         THEORETICAL NO. OF BLADES:       MAIMIMM APPLIED TORQUE: STATIC PROVE: FT.1	PTION	QTY DESCRIPTION
Serial Nos.: F136850-136852         ASSEMBLY DATA       MATERIAL: ALUMINUR         SERIES: 36 DIA.: 8.00 BLADES: 6 TYPE: MANUAL HD BLADES: 6 TYPE: MANUAL HD ARRANGEMENT: 07 MOUNTS: Standard CLEVIS ANGLE: 0.0° WEIGHT: Left Hand HUB LENGTH C/L TO BASE: 1.50 DYNAMIC BALANCE HUB: YES 4 INCH HOLE IN AIR SEAL: NO       STOP DROOP: 4.10 CLT TO TIP: 31.45 BALANCE WT.: COLOR CODE: AIR PERFORMANCE DATA         ELEVATION: Ft. AIR TEMPERATURE: ° ACFM/FAN: RPM: PHUD: INLET CORRECTION: STATIC PRESSURE: "WG VELOCITY PRESSURE: "WG TOTAL PRESSURE: THEORETICAL NO. OF BLADES: **MOTOR HP: **MAXIMUM APPLIED TORQUE: FT.J BHP REQUIRED: *MOTOR HP: **MAXIMUM APPLIED TORQUE: FT.J BLADE LOAD FACTOR:         * MAXIMUM APPLIED TORQUE USING FACTOR OF NOMINAL TIMES CAUTION: (FACTORY SHOULD BE NOTIFIED IF MAX. APPLIED TORQUE OR MOTOR HP : GREATER THAN THE VALUE SHOWN.)         ADDITIONAL NOTES:	BORE .625X.313 K/	3 U BUSHING 2.438" BORE .625X.313 H-2.719
BLADES:       6       TYPE: MANUAL HD ARRANGEMENT:       KEYWAY:0.625" X 0.313" BORE:       2.4:         ARRANGEMENT:       0.0°       WEIGHT:       STD. BORE TOL.: +.001"000"       2.4:         CLEVIS ANGLE: 0.0°       WEIGHT:       STD. BORE TOL.: +.001"000"       2.4:         HUB LENGTH C/L TO BASE: 1.50       STOP DROOP: 4.10       CUT DROOP         DYNAMIC BALANCE HUB: YES       STOP DROOP: 4.10       CUT DROOP         4 INCH HOLE IN AIR SEAL: NO       STOP DROOP: 4.10       CUT DROOP         AIR PERFORMANCE DATA       BALANCE WT.:       COLOR CODE:         AIR PERFORMANCE DATA       INLET CORRECTION:       INLET CORRECTION:         STATIC PRESSURE:       "WG VELOCITY PRESSURE:       "WG TOTAL PRESSURE:         STATIC PRESSURE:       "WG VELOCITY PRESSURE:       "WG TOTAL PRESSURE:         BHP REQUIRED:       *MOTOR HP:       *MAXIMUM APPLIED TORQUE:       FT.1         BLADE LOAD FACTOR:       BLADE LOAD FACTOR:       EFFICIENCY:         * MAXIMUM APPLIED TORQUE USING FACTOR OF NOMINAL TIMES       BLADE LOAD FACTOR:       TIP:         CAUTION:       (FACTORY SHOULD BE NOTIFIED IF MAX. APPLIED TORQUE OR MOTOR HP :       GREATER THAN THE VALUE SHOWN.)         ADDITIONAL NOTES:       MARKS:       P.0. NO. 1014921		Serial Nos.: F136850-136852
DYNAMIC BALANCE HUB: YES 4 INCH HOLE IN AIR SEAL: NOCH TO TIP: 31.45 BALANCE WT.:COLOR CODE:AIR PERFORMANCE DATAELEVATION: ACFM/FAN: STATIC PRESSURE: VELOCITY THROUGH FAN: BHP REQUIRED: THEORETICAL NO. OF BLADES:AIR TEMPERATURE: PHUD: PHUD: THEORETICAL NO. OF BLADES:OLOR CODE:* MAXIMUM APPLIED TORQUE USING FACTOR OF NOMINAL TIMES GREATER THAN THE VALUE SHOWN.)SIATS COLOR CODE:ADDITIONAL NOTES:MARKS: P.O. NO. 1014921	TYPE: MANUAL HD KEYWAY:0.625" X 0.313" BORE: 2.438" OUNTS: Standard STD. BORE TOL.: +.001"000" EIGHT: nd	BLADES: 6 TYPE: MANUAL ARRANGEMENT: 07 MOUNTS: Standar CLEVIS ANGLE: 0.0° WEIGHT: Left Hand
ELEVATION:       Ft. AIR TEMPERATURE: <sup>o</sup> DENSITY RATIO: ACFM/FAN: STATIC PRESSURE:          RPM: RPM: STATIC PRESSURE: STATIC PRESSURE: STATIC PRESSURE: STATIC PRESSURE: WG VELOCITY PRESSURE: WG TOTAL PRESSURE: VELOCITY THROUGH FAN: BLADE LOAD FACTOR: STATICAL NO. OF BLADES: STATICAL NO. OF BLADES: CAUTION: (FACTORY SHOULD BE NOTIFIED IF MAX. APPLIED TORQUE OR MOTOR HP : GREATER THAN THE VALUE SHOWN.)         ADDITIONAL NOTES: ADDITIONAL NOTES: STATIC PRESSURE: STATIC PRESSURE: STATICAL	ES CH TO TIP: 31.45	DYNAMIC BALANCE HUB: YES
ACFM/FAN: RPM: PHUD: STATIC PRESSURE: WG VELOCITY PRESSURE: VELOCITY THROUGH FAN: HPM TIP CLEARANCE: WG TOTAL PRESSURE: WG TOTAL PRESSURE: WG TOTAL PRESSURE: WG TOTAL PRESSURE: EFFICIENCY: * MAXIMUM APPLIED TOR HP: * MAXIMUM APPLIED TOR UE USING FACTOR OF NOMINAL TIMES CAUTION: (FACTORY SHOULD BE NOTIFIED IF MAX. APPLIED TOR OF MOTOR HP: GREATER THAN THE VALUE SHOWN.) ADDITIONAL NOTES: MARKS: P.O. NO. 1014921	AIR PERFORMANCE DATA	AIR PE
CAUTION: (FACTORY SHOULD BE NOTIFIED IF MAX. APPLIED TORQUE OR MOTOR HP . GREATER THAN THE VALUE SHOWN.) ADDITIONAL NOTES: MARKS: P.O. NO. 1014921	RPM: PHUD: INLET CORRECTION: "WG VELOCITY PRESSURE: "WG TOTAL PRESSURE: "WG FPM TIP CLEARANCE: "EFFICIENCY: *MOTOR HP: *MAXIMUM APPLIED_TORQUE: FT.LBS.	ACFM/FAN: RPM: STATIC PRESSURE: "WG VELOCITY VELOCITY THROUGH FAN: FPM BHP REOUIRED: *MOTOR HP:
P.O. NO. 1014921	OULD BE NOTIFIED IF MAX. APPLIED TORQUE OR MOTOR HP IS	CAUTION: (FACTORY SHOULD BE NOTIFI
	P.O. NO. 1014921	ADDITIONAL NOTES:

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### 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**

	Murphy Industries Inc.
4500982	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.



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File No: 046306 0 000

Class No: 3211 07 INDUSTRIAL CONTROL EQUIPMENT Miscellaneous Apparatus

#### SUBMITTOR

 Murphy Industries Inc.
 4500982 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.