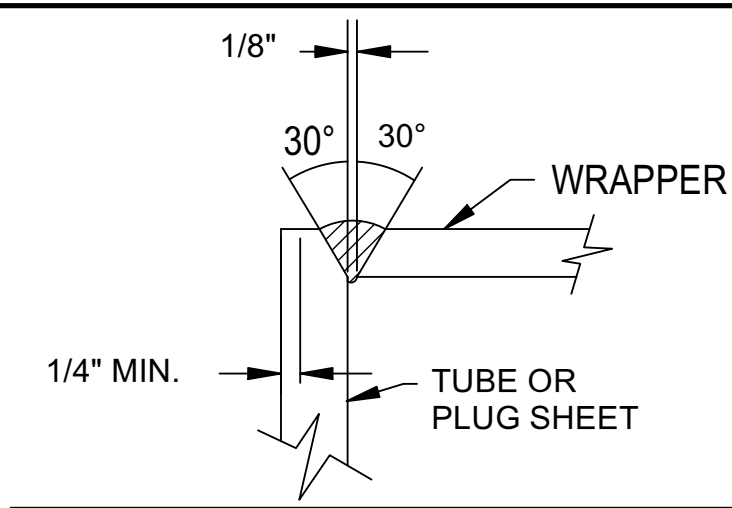
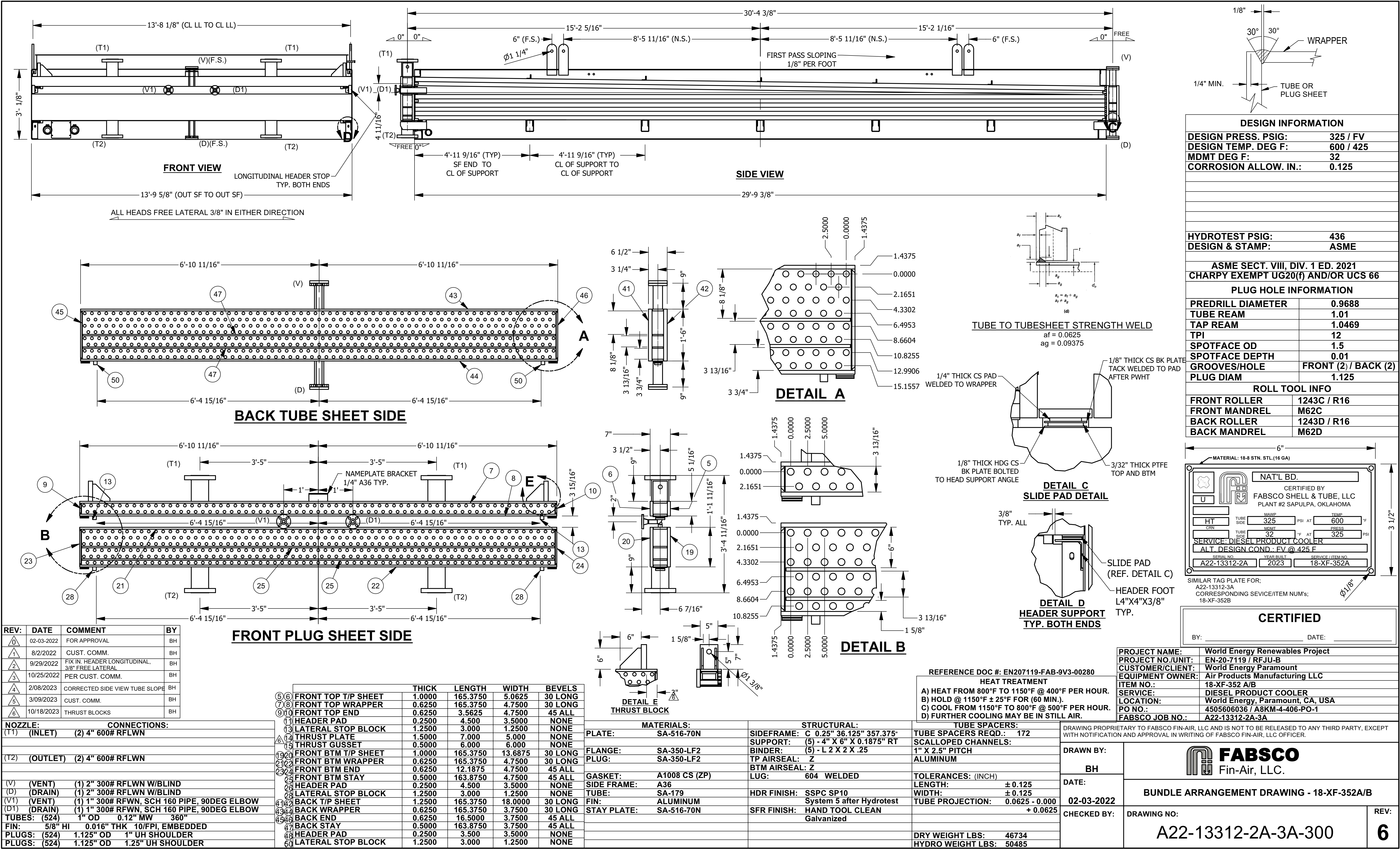




DESIGN INFORMATION	
DESIGN PRESS. PSIG:	325 / FV
DESIGN TEMP. DEG F:	600 / 425
MDMT DEG F:	32
CORROSION ALLOW. IN.:	0.125

HYDROTEST PSIG:	436
DESIGN & STAMP:	ASME

ASME SECT. VIII, DIV. 1 ED. 2021
CHARPY EXEMPT UG20(f) AND/OR UCS 66

PLUG HOLE INFORMATION	
PREDRILL DIAMETER	0.9688
TUBE REAM	1.01
TAP REAM	1.0469
TPI	12
SPOTFACE OD	1.5
SPOTFACE DEPTH	0.01
GROOVES/HOLE	FRONT (2) / BACK (2)
PLUG DIAM	1.125

ROLL TOOL INFO	
FRONT ROLLER	1243C / R16
FRONT MANDREL	M62C
BACK ROLLER	1243D / R16
BACK MANDREL	M62D

MATERIAL: 18-8 STN. STL (16 GA)	
NAT'L BD. CERTIFIED BY FABSCO SHELL & TUBE, LLC PLANT #2 SAPULPA, OKLAHOMA	
HT	MAWP 325 PSI AT 600 °F
CRN	TUBE SIZE 2" MDMT 32 °F AT 325 PSI
SERVICE: DIESEL PRODUCT COOLER	
AL T. DESIGN COND.: FV @ 425 F	
SERIAL NO. A22-13312-2A	YEAR BUILT 2023
SERVICE / ITEM NO. 18-XF-352A	
SIMILAR TAG PLATE FOR: A22-13312-3A CORRESPONDING SERVICE/ITEM NUM'S: 18-XF-352B	

CERTIFIED	
BY: _____	DATE: _____

REV:	DATE	COMMENT	BY
0	02-03-2022	FOR APPROVAL	BH
1	8/2/2022	CUST. COMM.	BH
2	9/29/2022	FIX IN. HEADER LONGITUDINAL, 3/8" FREE LATERAL	BH
3	10/25/2022	PER CUST. COMM.	BH
4	2/08/2023	CORRECTED SIDE VIEW TUBE SLOPE	BH
5	3/09/2023	CUST. COMM.	BH
6	10/18/2023	THRUST BLOCKS	BH

NOZZLE: CONNECTIONS:	
(T1) (INLET)	(2) 4" 600# RFLWN
(T2) (OUTLET)	(2) 4" 600# RFLWN
(V) (VENT)	(1) 2" 300# RFLWN W/BLIND
(D) (DRAIN)	(1) 2" 300# RFLWN W/BLIND
(V1) (VENT)	(1) 1" 300# RFWN, SCH 160 PIPE, 90DEG ELBOW
(D1) (DRAIN)	(1) 1" 300# RFWN, SCH 160 PIPE, 90DEG ELBOW
TUBES: (524)	1" OD 0.12" MW 360"
FIN:	5/8" HI 0.016" THK 10/FPI, EMBEDDED
PLUGS: (524)	1.125" OD 1" UH SHOULDER
PLUGS: (524)	1.125" OD 1.25" UH SHOULDER

	THICK	LENGTH	WIDTH	BEVELS
6 FRONT TOP T/P SHEET	1.0000	165.3750	5.0625	30 LONG
7 FRONT TOP WRAPPER	0.6250	165.3750	4.7500	30 LONG
8 FRONT TOP END	0.6250	3.5625	4.7500	45 ALL
9 HEADER PAD	0.2500	4.5000	3.5000	NONE
10 LATERAL STOP BLOCK	1.2500	3.0000	1.2500	NONE
11 THRUST PLATE	1.5000	7.0000	5.0000	NONE
12 THRUST GUSSET	0.5000	6.0000	6.0000	NONE
13 FRONT BTM T/P SHEET	1.0000	165.3750	13.6875	30 LONG
14 FRONT BTM WRAPPER	0.6250	165.3750	4.7500	30 LONG
15 FRONT BTM END	0.6250	12.1875	4.7500	45 ALL
16 FRONT BTM STAY	0.5000	163.8750	4.7500	45 ALL
17 HEADER PAD	0.2500	4.5000	3.5000	NONE
18 LATERAL STOP BLOCK	1.2500	3.0000	1.2500	NONE
19 BACK T/P SHEET	1.2500	165.3750	18.0000	30 LONG
20 BACK WRAPPER	0.6250	165.3750	3.7500	30 LONG
21 BACK END	0.6250	16.5000	3.7500	45 ALL
22 BACK STAY	0.5000	163.8750	3.7500	45 ALL
23 HEADER PAD	0.2500	3.5000	3.5000	NONE
24 LATERAL STOP BLOCK	1.2500	3.0000	1.2500	NONE

MATERIALS:	
PLATE:	SA-516-70N
FLANGE:	SA-350-LF2
PLUG:	SA-350-LF2
GASKET:	A1008 CS (ZP)
SIDE FRAME:	A36
TUBE:	SA-179
FIN:	ALUMINUM
STAY PLATE:	SA-516-70N
STRUCTURAL:	
SIDEFRAME:	C 0.25" 36.125" 357.375"
SUPPORT:	(5) - 4" X 6" X 0.1875" RT
BINDER:	(5) - L 2 X 2 X .25
TP AIRSEAL:	Z
BTM AIRSEAL:	Z
LUG:	604 WELDED
TUBE SPACERS:	
TUBE SPACERS REQ.:	172
SCALLOPED CHANNELS:	1" X 2.5" PITCH
ALUMINUM	
TOLERANCES: (INCH)	
LENGTH:	± 0.125
WIDTH:	± 0.125
TUBE PROJECTION:	0.0625 - 0.000
	+ 0.0625
DRY WEIGHT LBS:	46734
HYDRO WEIGHT LBS:	50485

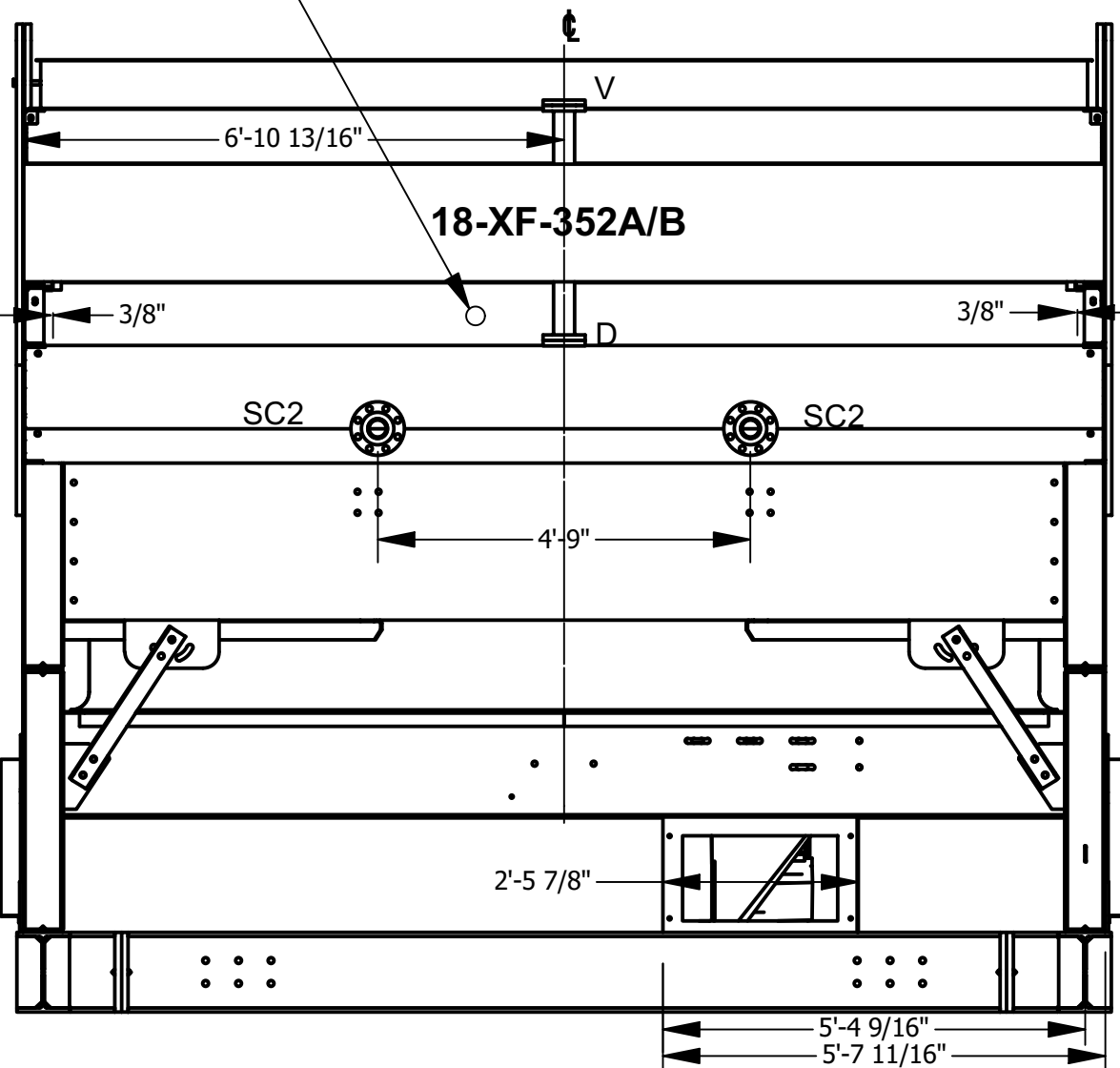
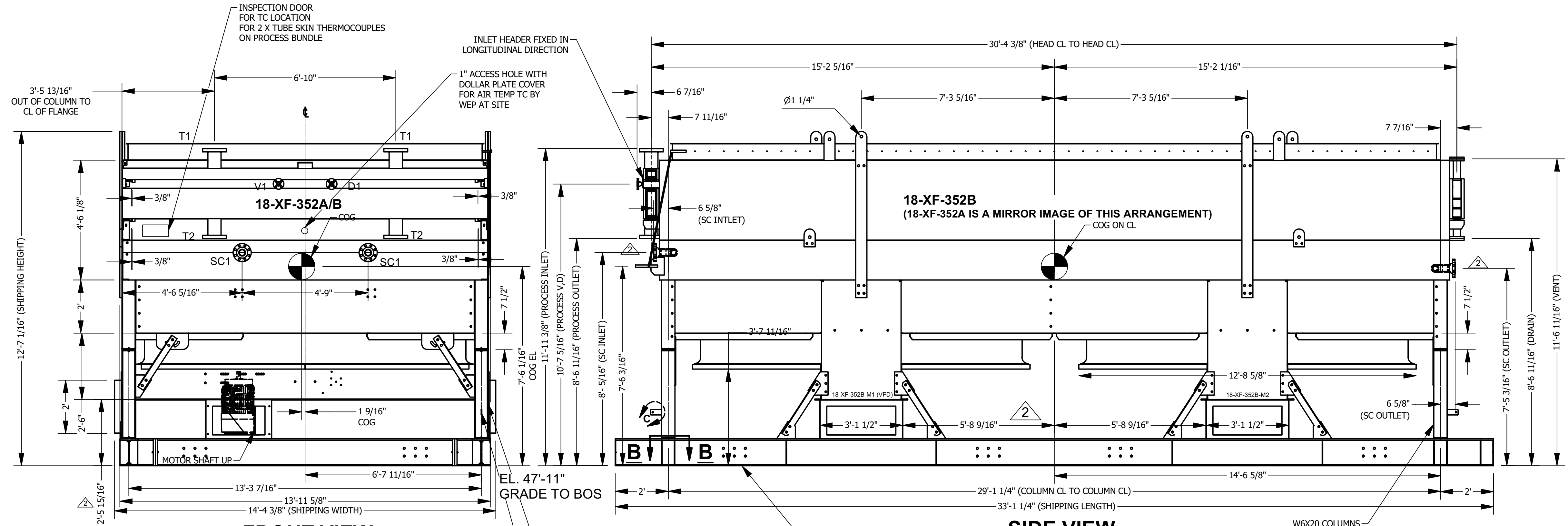
REFERENCE DOC #: EN207119-FAB-9V3-00280
HEAT TREATMENT
A) HEAT FROM 800°F TO 1150°F @ 400°F PER HOUR.
B) HOLD @ 1150°F ± 25°F FOR (60 MIN.).
C) COOL FROM 1150°F TO 800°F @ 500°F PER HOUR.
D) FURTHER COOLING MAY BE IN STILL AIR.

PROJECT NAME:	World Energy Renewables Project
PROJECT NO./UNIT:	EN-20-7119 / RFJU-B
CUSTOMER/CLIENT:	World Energy Paramount
EQUIPMENT OWNER:	Air Products Manufacturing LLC
ITEM NO.:	18-XF-352 A/B
SERVICE:	DIESEL PRODUCT COOLER
LOCATION:	World Energy, Paramount, CA, USA
PO NO.:	4505606036 / A8KM-4-406-PO-1
FABSCO JOB NO.:	A22-13312-2A-3A

DRAWING PROPRIETARY TO FABSCO FIN-AIR, LLC AND IS NOT TO BE RELEASED TO ANY THIRD PARTY, EXCEPT WITH NOTIFICATION AND APPROVAL IN WRITING OF FABSCO FIN-AIR, LLC OFFICER.	
DRAWN BY:	BH
DATE:	02-03-2022
CHECKED BY:	DRAWING NO:
	A22-13312-2A-3A-300
	REV: 6

SECTION / DESCRIPTION	MAWP	TEST PRESS	DESIGN TEMP	MDMT	ALTERNATE DESIGN	BUNDLE VOL	BUNDLE WT	LOUVER	HAILSCREENS	MOTOR HP: 25	FAN MFGR: MOORE	DIAM (FT): 12	SPECIFICATION NOTES:	COOLER WT #: SEE TABLE
UNITS	PSIG	PSIG	DEG F	DEG F	CONDITION	CU FT	LBS			TYPE: TEFC	CLASS: 10000	ACFM/FAN: 114260	VIBE SENSOR:WILCOXON	STRUCTURE FINISH: PER A8KM-PP-000-500540-A
DIESEL PRODUCT COOLER	325	436	600	32	FV @ 425F	60	46734	MANUAL	NONE	RPM: 1800	BLADES: 4	HP@ DES.: 19.65	VIBE SENSOR MODEL NO.;	NON-FIREPROOFED STRUCTURAL STEEL TO BE GALVANIZED
										VAC: 460/3/60	PITCH: 6.12	DRIVE: HTD	786A-D2	HEADER FINISH: PER A8KM-PP-000-500520-A
										FRAME: 284T	RPM: 272	RATIO: 6.62:1	QTY: 2 PER BAY	SYSTEM 5 AFTER HYDROTEST
										SHAFT: 1.875	SERIES: 42	DRIVE WIDTH: 36		
										MOTOR WT: 445 lbs	TYPE: EC	AIR BRAKE: YES		
STEAM COIL	232	301.6	430	32	FV @ 430F	6	7337	NONE	NONE	QTY: 2 PER BAY	TIP: VE			
										QTY: 2 PER BAY				

WEIGHTS PER BAY (LBS)	
ITEM	WEIGHT
COOLER	60932
SPAN BEAMS	6264 [△] ₃
LOUVER	1207
WALKWAY	0
PROCESS H2O	3746
STEAM H2O	375
PROCESS FLUID	2840
TOTAL DRY	68403 [△] ₃
TOTAL FULL H2O	72524 [△] ₃
TOTAL OPERATING	71618 [△] ₃

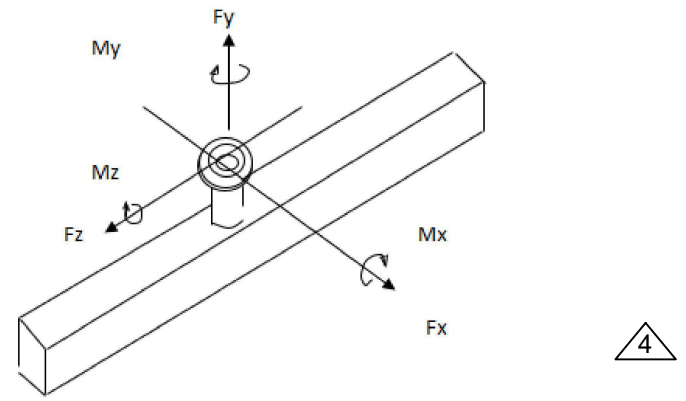


REAR VIEW

APPROVED BY: _____

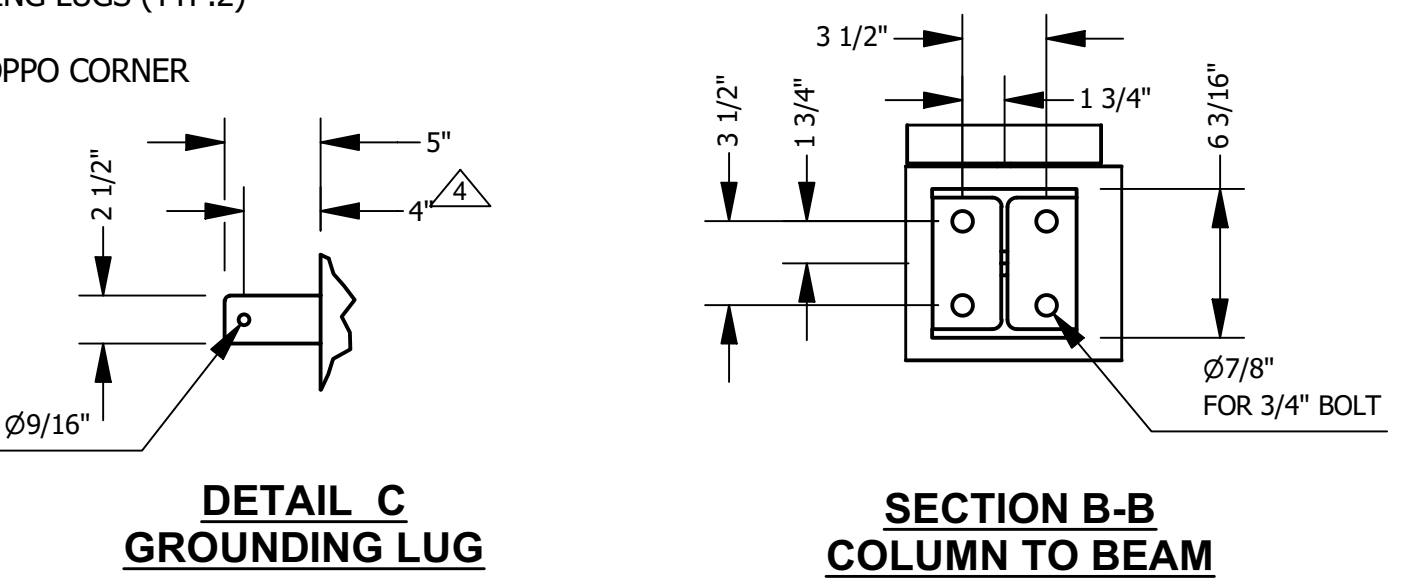
DATE: _____

- NOTE: 1. (2) BAYS REQUIRED
2. SPANNING BEAMS, STUB COLUMNS, TRANSV & LOUVR BRACES, AND MANUAL LOUVER ROD REMOVED FOR SHIPPING.
3. ALL MOTORS ARE VFD COMPATIBLE, NO SPACE HEATER.
4. MOTOR REMOVAL BEAM PROVIDED
5. MOTORS SHALL BE RATED FOR CLASS 1, DIV. 2, GROUPS B,C,D AND A T3C TEMPERATURE CODE
6. "COOLER WEIGHT" LISTED ABOVE INCLUDES BUNDLE, STEAM COIL FAN, MOTOR, STUB COLUMNS AND BRACES PER BAY.



NOZZLE LOADS	QTY/HEAD	SIZE	CLASS, #	2 X API 661
FRONT HEAD	2	4	600	
SIZE	FX	FY	FZ	MX
	LBS	LBS	LBS	FT LB
4	1500	1200	1500	1200
COMBINED	3000	2400	3000	3600
MAX API	2250	4500	3750	4500
STR DESIGN LOAD	2250	4500	3750	4500

NOZZLE LOADS	QTY/HEAD	SIZE	CLASS, #	2 X API 661
STEAM COIL	2	3	300	
SIZE	FX	FY	FZ	MX
	LBS	LBS	LBS	FT LB
3	900	760	900	600
COMBINED	1800	1520	1800	1200
MAX API	2250	4500	3750	4500
DESIGN LOAD	1800	1520	1800	1200



EQ. TAG #S		
COOLER	EQUIPMENT	TAG #
18-XF-352A	MOTOR	18-XF-352A-M1 (VFD)
18-XF-352A	MOTOR	18-XF-352A-M2
18-XF-352B	MOTOR	18-XF-352B-M1 (VFD)
18-XF-352B	MOTOR	18-XF-352B-M2
18-XF-352A	FAN	18-XF-352A-F01
18-XF-352A	FAN	18-XF-352A-F02
18-XF-352B	FAN	18-XF-352B-F01
18-XF-352B	FAN	18-XF-352B-F02
18-XF-352A	VIB SENSOR	18-VE-XF352AA
18-XF-352A	VIB SENSOR	18-VE-XF352AB
18-XF-352B	VIB SENSOR	18-VE-XF352BA
18-XF-352B	VIB SENSOR	18-VE-XF352BB

REFERENCE DOCUMENTS	
FABSCO DOC. #	APCI DOC. #
A22-13312-2A-3A-300	EN207119-FAB-9V3-00040
A22-13312-2-3-LL	EN207119-FAB-9V3-00139
A22-13312-2-3-NOTES	EN207119-FAB-9V3-00279
A22-13312-2-3-LAYOUT	EN207119-FAB-9V3-00286
A22-13312-DRIVE	EN207119-FAB-9V3-00324
A22-13312-2-3-TUBE SKIN	EN207119-FAB-9V3-00303
A22-13312-2-STR	EN207119-FAB-9V3-00046
A22-13312-3-STR	EN207119-FAB-9V3-00087
A22-13312-2-3-SKID	TBD

GENERAL ARRANGEMENT -18-XF-352A/B

REV.	DATE	DESCRIPTION
1	8/17/22	CUST. COMM.
2	10/12/22	CUST. COMM.
3	12/27/22	CUST. COMM.
4	2/8/2023	CUST. COMM.
5	3/9/2023	CUST. COMM.

PROJECT NAME: World Energy Renewables Project

PROJECT NO./UNIT: EN-20-7119 / RFJU-B

CUSTOMER/CLIENT: World Energy Paramount

EQUIPMENT OWNER: Air Products Manufacturing LLC

ITEM NO.: 18-XF-352A/B

SERVICE: Diesel Product Cooler

LOCATION: World Energy, Paramount, CA, USA

PO NO.: 4505606036 / A8KM-4-406-PO-1

FABSCO JOB NO.: A22-13312-2/3

DRAWN BY: BH

DATE: 3/2/22

CHECKED BY:

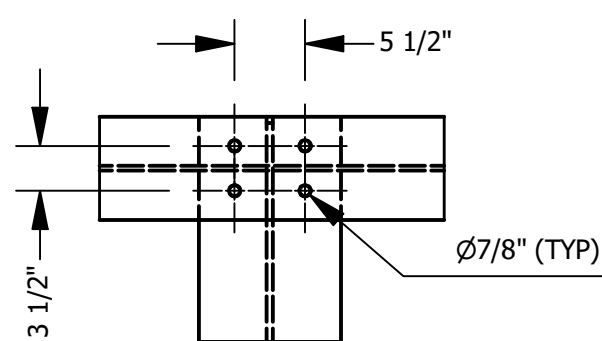
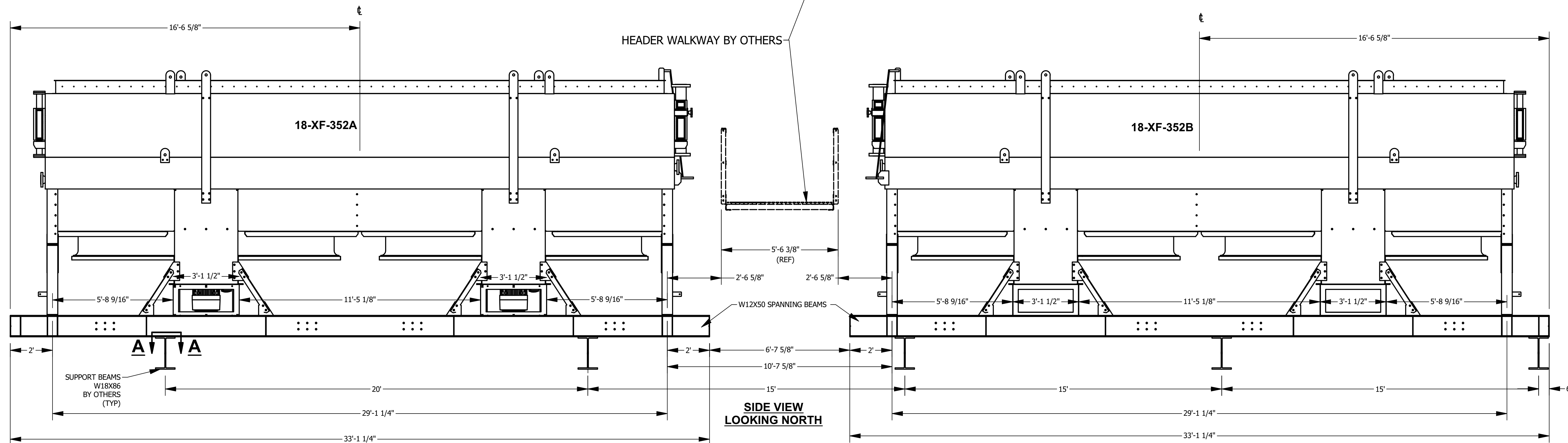
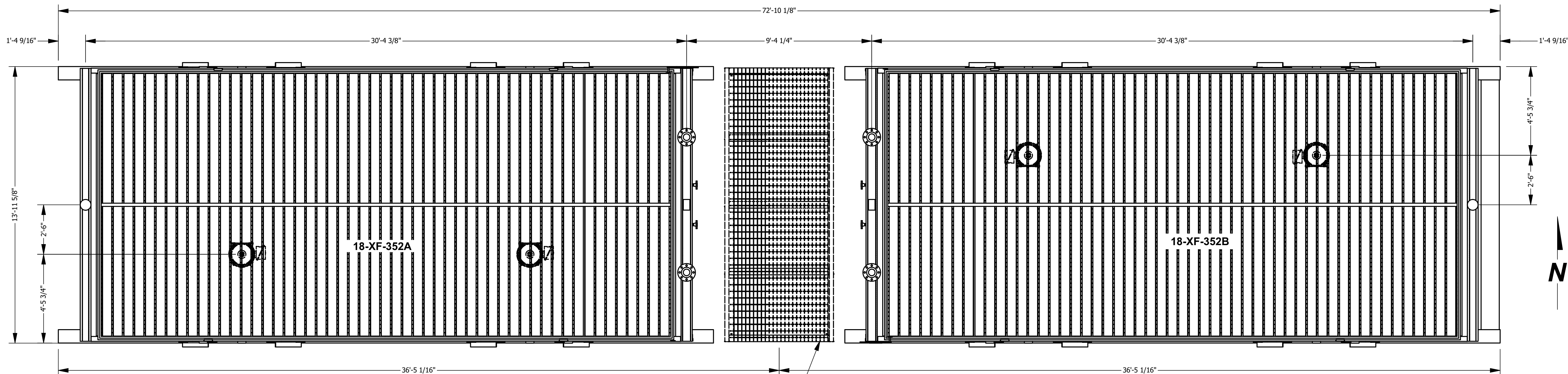
DRAWING NO: A22-13312-2/3-100

REV: 5



Fin-Air, LLC.

DRAWING PROPRIETARY TO FABSCO, LLC AND IS NOT TO BE RELEASED TO ANY THIRD PARTY, EXCEPT WITH NOTIFICATION AND APPROVAL IN WRITING OF FABSCO, LLC OFFICER.



SECTION A-A
CONNECTION TO CUSTOMER BEAM

PROJECT NAME:	World Energy Renewables Project
PROJECT NO./UNIT:	EN-20-7119 / RFJU-B
CUSTOMER/CLIENT:	World Energy Paramount
EQUIPMENT OWNER:	Air Products Manufacturing LLC
ITEM NO.:	18-XF-352A/B
SERVICE:	Diesel Product Cooler
LOCATION:	World Energy, Paramount, CA, USA
PO NO.:	4505606036 / A8KM-4-406-PO-1
FABSCO JOB NO.:	A22-13312-2/3

18-XF-352A/B LAYOUT			DRAWING PROPRIETARY TO FABSCO, LLC AND IS NOT TO BE RELEASED TO ANY THIRD PARTY, EXCEPT WITH NOTIFICATION AND APPROVAL IN WRITING OF FABSCO, LLC OFFICER.		
			DRAWN BY:	FABSCO Fin-Air, LLC.	
REV.	DATE	DESCRIPTION	BH		
0	3/2/22	FOR APPROVAL	DATE:		
1	8/17/22	CUST. COMM.	3/2/22		
2	10/12/22	CUST. COMM.	CHECKED BY:	DRAWING NO:	REV:
3	12/27/22	CUST. COMM.		A22-13312-2/3-LAYOUT	4
4	2/8/2023	CUST. COMM.			



WORLD ENERGY RENEWABLE FUELS CONVERSION PROJECT

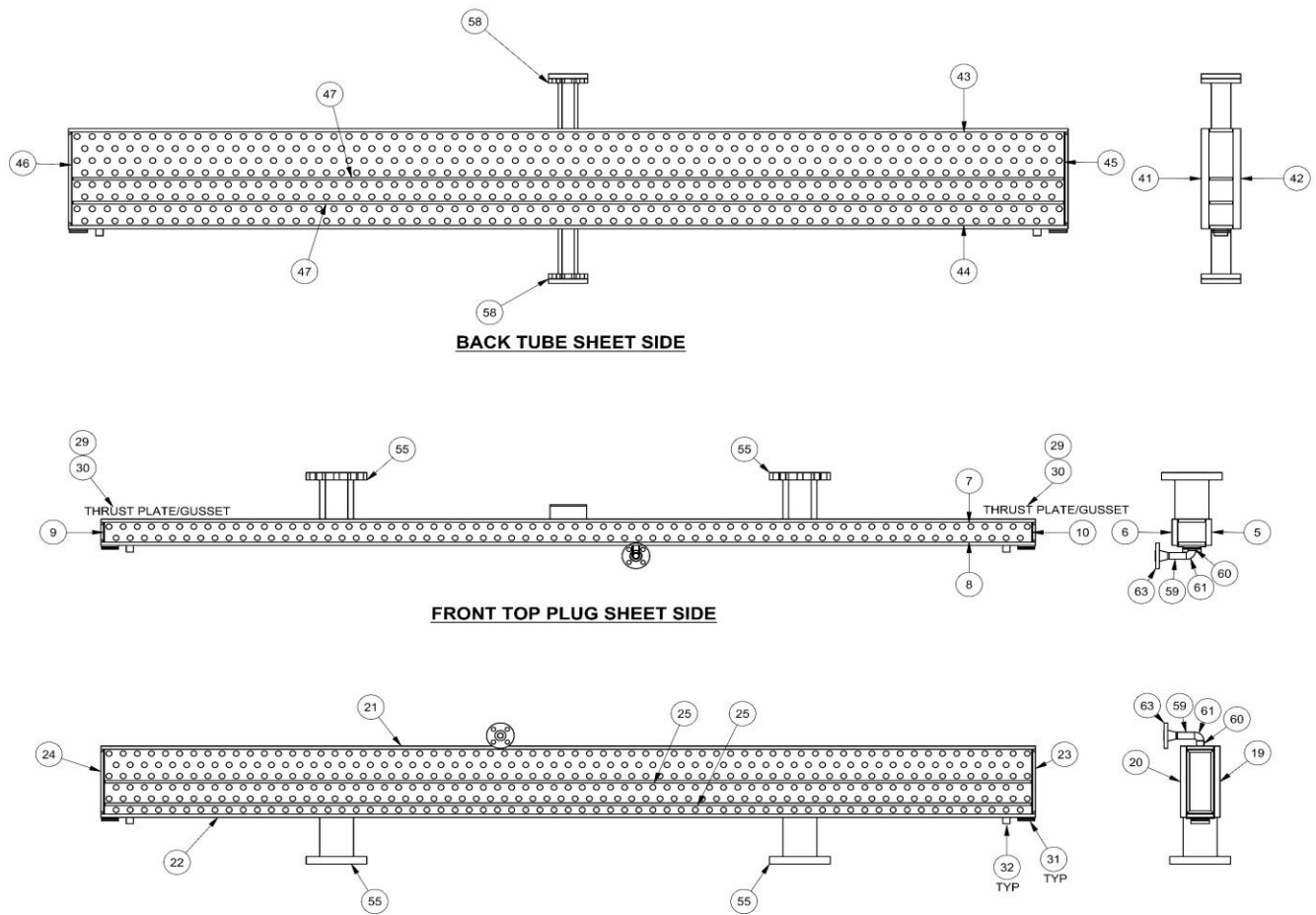
Project No: A8KM

Vendor Input to PCMS

Doc number: A8KM-PCMS-001, Rev. 0

Vendor Doc Number: EN207119-FAB-9V3-00108
PCMS_PO Number: 4505606036
Rev: 0

Identification					
1: Tag No.	18-XF-352A/B				
2: Model No.	A22-13312-2-3				
3: Serial No.	there is a serial no. on				
4: Registration No.	add after Code stamp received				Code Vessels Only
5: Code Stamped	yes				Drop Down
General Design					
15: Build Date	2023				
17: Manufacturer	FABSCO FIN AIR				
19: General Material	CS				
20: Insulation Type	None				Drop Down
21: Support Type	Baseplate				Drop Down
22: External Coating	Epoxy				Drop Down
23: MAWP (psig)	325				
24: MAWT (F)	600				
25: Design Pressure (psig)	325				
26: Full Vacuum	yes				Drop Down
27: Design Temp (F)	600				
28: MDMT (F)	32				
29: Weight Empty (lbs)	68403				
30: Weight Full (lbs)	72524				
31: Equipment Length (inches)	33'-2"				
32: Orientation	Horizontal				Drop Down
33: Equipment Width (inches)	14'-5"				
34: Equipment Height (inches)	12'-8"				
35: Storage Volume (bbls)	NA				Vessels Only
36: Outer Diameter (inches)	NA				
37: PWHT	yes				
38: Fire Proofing	no	yes, by others			
39: Heat Tracing	None				
40: Test Medium	Water				Pressure Testing



Mark No	MATERIAL DESCRIPTION		
	SUPPLIERS	HEAT No.	MATERIAL
5/6	NUCOR	2603538	SA-516-70N
7/8	NUCOR	2603381	SA-516-70N
9/10	NUCOR	2603381	SA-516-70N
19/20	NUCOR	2603538	SA-516-70N
21/22	NUCOR	2603381	SA-516-70N
23/24	NUCOR	2603381	SA-516-70N
25	SSAB	W2F527	SA-516-70N
29	SSAB	E1K179	SA-516-70N
30	NUCOR	3603032	SA-516-70N
31	SSAB	B0J739	SA-516-70N
32	JSW	S31285	SA-516-70N
41/42	SSAB	E2F017	SA-516-70N
43/44	NUCOR	2603381	SA-516-70N
45/46	NUCOR	2603381	SA-516-70N
47	NUCOR	3604954	SA-516-70N
55	AMERIFORGE	BS8-KD	SA-350LF2
58	FCI	11014B	SA-350LF2
59/60	MST	5394350	SA-106B
61	AAAPP	BC8904	SA-234WPB
63	ULMA	K8AV9	SA-350LF2
TUBES	MANNESMANN	323090	SA-179

CUSTOMER: AIR PRODUCT MANUFACTURING LLC.		 FABSCO SHELL & TUBE, LLC	DWG No
PO NO:	4505606036 / A8KM-4-406-PO-1		
ITEM NO:	18-XF-352A		
		AC	A22-13312-2A-HS 0

Mill Test Report

Page 2

1505 River Rd
Cofield, NC 27922
(252) 356-3700

Issuing Date : 08/01/2022 B/L No. : 629578 Load No. : 647645 Our Order No. : 198418/3 Cust. Order No. : 126778
Vehicle No: ALY 91713 Sold To: PORT CITY METALS SERVICES INC A Ship To: PORT CITY METAL SERVICES, INC.
Specification: 1.0000" x 120.000" x 480.000" DIVISION OF METALS USA JUNCTION 12
ASTM A516 70/65/60/485-17/ASME SA516-70/65/60/485 PVQ 2019/2021 3101 CHARLES BLVD HALE,OK 74127
Normalized Plate NACE MR0175 Annex 2.1.2 (2015), MR0103 (2010)
Section 2.1.2 (2015) 13.1.1, 13.1.2)Compliant TULSA,OK 74127 (2)

Marking :

Heat No	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Al(tot)	V	Nb	Ti	N	Ca	B	Sn	Ceq	Pcm
2603538	0.20	1.07	0.008	0.001	0.19	0.19	0.08	0.06	0.01	0.029	0.004	0.003	0.002	0.0041	0.0010	0.0000	0.010	0.41	0.27

Plate Serial No	Pieces	Tons	Tensile Test					Heat Treat			
			Dir.	Yield (psi)	Tensile (psi)	Elong. % in 2"	Elong. % in 8"	Norm ("F)	Time (min)	Temper ("F)	Time (min)
2603538-03	2	16.33	H-T	46,600	72,600	55.7		1650	41		

Manufactured to fully killed fine grain practice by Electric Arc Furnace. Welding or weld repair was not performed on this material. Mercury has not been used in the direct manufacturing of this material. Produced as continuous cast discrete plate, unless otherwise noted in Specification. For Mexico shipments:nhc-SalesMX@nucor.com
Yield by 0.5EUL method unless otherwise specified. Ceq = C+(Mn/6)+((Cr+Mo+V)/5)+((Cu+Ni)/15)
Pcm = C+(Si/30)+(Mn/20)+(Cu/20)+(Ni/60)+(Cr/20)+(Mo/15)+(V/10)+5B
Melted and Manufactured in the USA. ISO 9001:2015 certified. PED 2014/68/EU, 97/23/EC 7/2 Annex 1, Para. 4.3 Compliant. API Q1-1851
DIN 50049 3.1.B/EN 10204 3.1(2004) 3.1B(1993)/ DIN EN 10204 3.1(2005) compliant. ABS QA-3624366

We hereby certify that the contents of this report are accurate and correct. All test results and operations performed by the material manufacturer are in compliance with the applicable specifications, including customer specifications.

T. A. Depretis
T. A. Depretis, Metallurgist

8/1/2022 2:02:22 PM

ANTHONY CARDWELL
12/13/2022

Q.A. APPROVED
By *[Signature]* Date *8/10/2022*



CERTIFICATE OF COMPLIANCE

DATE: NOVEMBER 9, 2022

SUBJECT: NACE

GENTLEMEN:

I HEREBY CERTIFY THAT THE MATERIAL LISTED HEREIN HAS BEEN INSPECTED AND TESTED IN ACCORDANCE WITH PRESCRIBED METHODS IN THE GOVERNING SPECIFICATIONS AND BASED UPON THE RESULTS OF SUCH INSPECTION AND TESTING DOES CONFORM TO THE REQUIREMENTS OF NACE MR 01-75.

PLATE: ASTM A516-70 AND ASME SA516-70 LATEST EDITION.

SIZE: 1" NOMINAL

MILL CERTIFIED: NUCOR

HEAT: 2603538

SLAB: 03

Specification: NACE MR 01-75

Hardness, HRC

Results

Hardness, BHN

Results

162, 162, 163

WE HEREBY CERTIFY THE ABOVE INFORMATION IS CORRECT.

A handwritten signature in black ink, appearing to read 'Marty L. Eubanks', is written over a horizontal line.

MARTY L. EUBANKS
QUALITY ASSURANCE MANAGER
(918) 583-2222



CERTIFICATE OF COMPLIANCE

DATE: NOVEMBER 9, 2022

SUBJECT: NACE

GENTLEMEN:

I HEREBY CERTIFY THAT THE MATERIAL LISTED HEREIN HAS BEEN INSPECTED AND TESTED IN ACCORDANCE WITH PRESCRIBED METHODS IN THE GOVERNING SPECIFICATIONS AND BASED UPON THE RESULTS OF SUCH INSPECTION AND TESTING DOES CONFORM TO THE REQUIREMENTS OF NACE MR 01-75.

PLATE: ASTM A516-70N AND ASME SA516-70N LATEST EDITION.

SIZE: 1" NOMINAL

MILL CERTIFIED: NUCOR

HEAT: 2603538

SLAB: 03

Specification: NACE MR 01-75

Hardness, HRC

Results

Hardness, BHN

Results

160, 162, 165

WE HEREBY CERTIFY THE ABOVE INFORMATION IS CORRECT.

A handwritten signature in black ink, appearing to read 'Marty Eubanks', is written over a horizontal line.

MARTY L. EUBANKS
QUALITY ASSURANCE MANAGER
(918) 583-2222

Mill Test Report

Page 1

1505 River Rd
Cofield, NC 27922
(252) 356-3700

Issuing Date : 08/01/2022 B/L No. : 629578 Load No. : 647645 Our Order No. : 198418/1 Cust. Order No. : 126778
Vehicle No: ALY 91713 Sold To: PORT CITY METALS SERVICES INC A DIVISION OF METALS USA Ship To: PORT CITY METAL SERVICES, INC.
Specification: 0.6250" x 96.000" x 480.000" 3101 CHARLES BLVD JUNCTION 12
ASTM A516 70/65/60/485-17/ASME SA516-70/65/60/485 PVQ 2019/2021 TULSA,OK 74127 (2) HALE,OK 74127
Normalized Plate NACE MR0175 Annex 2.1.2 (2015), MR0103 (2010)
Section 2.1.2 (2015) 13.1.1, 13.1.2)Compliant

Marking :

Heat No	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Al(tot)	V	Nb	Ti	N	Ca	B	Sn	Ceq	Pcm
2603381	0.18	1.02	0.010	0.001	0.18	0.30	0.13	0.10	0.03	0.029	0.004	0.003	0.002	0.0058	0.0010	0.0000	0.011	0.41	0.26

Plate Serial No	Pieces	Tons	Tensile Test					Heat Treat			
			Dir.	Yield (psi)	Tensile (psi)	Elong. % in 2"	Elong. % in 8"	Norm (°F)	Time (min)	Temper (°F)	Time (min)
2603381-02	1	4.08	H-T	49,900	74,400	43.5		1650	27		
2603381-03	1	4.08	H-T	50,400	74,200	45.4		1650	27		

Manufactured to fully killed fine grain practice by Electric Arc Furnace. Welding or weld repair was not performed on this material. Mercury has not been used in the direct manufacturing of this material. Produced as continuous cast discrete plate, unless otherwise noted in Specification. For Mexico shipments:nhc-SalesMX@nucor.com
Yield by 0.5EUL method unless otherwise specified. Ceq = C+(Mn/6)+((Cr+Mo+V)/5)+((Cu+Ni)/15)
Pcm = C+(Si/30)+(Mn/20)+(Cu/20)+(Ni/60)+(Cr/20)+(Mo/15)+(V/10)+5B
Melted and Manufactured in the USA. ISO 9001:2015 certified. PED 2014/68/EU, 97/23/EC 7/2 Annex 1, Para. 4.3 Compliant. API Q1-1851
DIN 50049 3.1.B/EN 10204 3.1(2004) 3.1B(1993)/ DIN EN 10204 3.1(2005) compliant. ABS QA-3624366

We hereby certify that the contents of this report are accurate and correct. All test results and operations performed by the material manufacturer are in compliance with the applicable specifications, including customer specifications.

T. A. Depretis
T. A. Depretis, Metallurgist

8/1/2022 2:02:22 PM

Q.A. APPROVED
By *[Signature]* Date *8/1/2022*

7
8
9
10
21
22
23
24
43
44
45
46

GLOBE X-RAY SERVICES, INC.

8441 South Union Tulsa, OK 74132

Certification 162541

Report of Ultrasonic Examination

Customer: Port City P. O. 128486
Address: _____ Job # _____

Ultrasonic Examination

Test Instrument: Sonatest D-20+ S/N: 1013300
Surface Condition: Smooth Procedure #: GXS-II-D & B Rev: 1-22
Couplant: Sonix Search Unit Cable: RG-174 Co-Axial, 6FT. Long with BNC to BNC Connectors
Beam Angle: 0 Degrees Search Unit 1" x 2.25 MHz S/N: 66159
Scanning Pattern: 100% Reference Level: 35-39 Db
Calibration Reference: Backwall Technique: Contact, Manual Scan
Scanning Surface: One major surface

Reference Standard:

☒ ASTM/ASME A-578/SA-578 LEVEL A(1)
☒ ASTM/ASME A-578/SA-578 LEVEL B(2) ☒ ASTM/ASME A-435/SA-435
☒ ASTM/ASME A-578/SA-578 LEVEL C(3)

Notes: _____

Thickness/Grade	Slab	Area	Heat Number/Code	Accept	Reject
1/2" SA516-70N	A23	96" x 44"	W2F527	✓	
1/2" SA516-70N	D26	120" x 118"	E2B201	✓	
5/8" SA516-70N	02	96" x 480"	2603381	✓	
1" SA 516-70N	05	120" x 480"	1600564	✓	

Unless otherwise noted by an * following the item number, there were no recordable indications observed.

Examination By: Colter Moyer Qualification Level: II
Date: October 28, 2022 Time: NA AM/PM

GLOBE XRAY ASSUMES NO RESPONSIBILITY FOR THE INTEGRITY OF THE STRUCTURE OR ANY LOSSES OF ANY KIND DUE TO ANY KIND OF INTERPRETATION

Q.A. APPROVED
By gu Date 10/31/2022



CERTIFICATE OF COMPLIANCE

DATE: NOVEMBER 9, 2022
SUBJECT: NACE

GENTLEMEN:

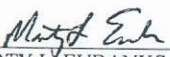
I HEREBY CERTIFY THAT THE MATERIAL LISTED HEREIN HAS BEEN INSPECTED AND TESTED IN ACCORDANCE WITH PRESCRIBED METHODS IN THE GOVERNING SPECIFICATIONS AND BASED UPON THE RESULTS OF SUCH INSPECTION AND TESTING DOES CONFORM TO THE REQUIREMENTS OF NACE MR 01-75.

PLATE: ASTM A516-70N AND ASME SA516-70N LATEST EDITION.
SIZE: 5/8" NOMINAL
MILL CERTIFIED: NUCOR
HEAT: 2603381
SLAB: 02

Specification: NACE MR 01-75

Hardness, HRC	Results	Hardness, BHN	Results
			164, 165, 168

WE HEREBY CERTIFY THE ABOVE INFORMATION IS CORRECT.



MARTY L. EUBANKS
QUALITY ASSURANCE MANAGER
(918) 583-2222

PO/Rel

Certificate of Mill Test Results

TUL-000000-000

Pg 1/1

PART NO.

Attn:

SSAB

12400 Highway 43 North, Axis, Alabama 36505, US

Test Certificate

WARNING: This product can expose you to chemicals including nickel and nickel compounds, which are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

Form TC1: Revision 4: Date 6 Feb 2019

Customer:
CHAPEL STEEL CORPORATION
PO BOX 1000

SPRING HOUSE
PA 19477

Customer P.O.No.: TUL-331

Mill Order No. 41-676504-01

Shipping Manifest: AR359558

Product Description: ASME SA516-70/SA516-65/SA516-60(21)
ASTM A516-70/A516-65/A516-60(17)
VACUUM DEGAS; C.23%, S.015% MAX; ELG 2"
LCVN 20 FT LBS. @ -60F/A673-P

Ship Date: 28 Jun 22

Cert Date: 28 Jun 22
(Page 1 of 1)

Heat Treat Type: NORMALIZED

Size: 0.500 X 96.00 X 480.0 (IN)

Tested Pieces:				Tensiles:					Charpy Impact Tests										BDWTT Tmp %Shr		
Heat Id	Piece Id	Tested Thickness	Tst Loc	YS (KSI)	UTS (KSI)	%RA	Elong % 2in Bin	Tst Dir	Hardness	Abs. Energy(FTLB)				% Shear				Tst Tmp		Tst Dir	Tst Siz
										1	2	3	Avg	1	2	3	Avg				
W2F527	A23	0.502 (DISCRT)	C	55	76		39	T		114	94	108	105					-60F	L	10.	
Chemical Analysis																					
Heat Id	C	Mn	P	S	Si	Tot Al	Sol Al	Cu	Ni	Cr	Mo	Ch	V	Ti	B	IIW	ORGN				
W2F527	.18	1.03	.013	.001	.23	.028	.026	.27	.14	.13	.02	.000	.003	.006	.0001	.41	USA				
KILLED STEEL																					

KILLED STEEL

MERCURY IS NOT A METALLURGICAL COMPONENT OF THE STEEL AND NO MERCURY WAS INTENTIONALLY ADDED DURING THE MANUFACTURE OF THIS PRODUCT.

KILLED STEEL, PRODUCED TO A FINE GRAIN PRACTICE

CEV (IIW) = C + MN/6 + (CR+MO+V)/5 + (NI+CU)/15

NACE MR0175/ISO15156-2:2015 ANNEX A2.1.2 COMPLIANT

NACE MR0103/ISO 17495-1:2015 13.1.1(A) AND 13.1.1(C) COMPLIANT

MTR EN 10204:2004 INSPECTION CERTIFICATE 3.1 COMPLIANT

100% MELTED, POURED, AND ROLLED IN THE USA

NO WELD REPAIR HAS BEEN PERFORMED ON THIS MATERIAL.

NORMALIZED PLATES. HEATED AT 1665F FOR 22 MINUTES.

TEST COUPONS TAKEN FROM HEAT TREATED PLATE.

PRODUCTS SHIPPED:

W2F527 A23	40086955	PCES:	1, LBS:	6534	W2F527 A23	40086957	PCES:	1, LBS:	6534
W2F527 A23	40086956	PCES:	1, LBS:	6534	W2F527 A23	40086954	PCES:	1, LBS:	6534
W2F527 A23	40086950	PCES:	1, LBS:	6534	W2F527 A23	40086958	PCES:	1, LBS:	6534
W2F527 A23	40086959	PCES:	1, LBS:	6534					

Q.A. APPROVED

By Due Date 12/12/2022

(P)

Cust Part #:

WE HEREBY CERTIFY THAT THIS MATERIAL WAS
TESTED IN ACCORDANCE WITH, AND MEETS THE
REQUIREMENTS OF, THE APPROPRIATE SPECIFICATION

Jason Thomas

Director Technical Services

ANTHONY CARDWELL
12/13/2022



CERTIFICATE OF COMPLIANCE

DATE: OCTOBER 26, 2022
SUBJECT: NACE

GENTLEMEN:

I HEREBY CERTIFY THAT THE MATERIAL LISTED HEREIN HAS BEEN INSPECTED AND TESTED IN ACCORDANCE WITH PRESCRIBED METHODS IN THE GOVERNING SPECIFICATIONS AND BASED UPON THE RESULTS OF SUCH INSPECTION AND TESTING DOES CONFORM TO THE REQUIREMENTS OF NACE MR 01-75.

PLATE: ASTM A516-70N AND ASME SA516-70N LATEST EDITION.
SIZE: 1/2" NOMINAL
MILL CERTIFIED: SSAB
HEAT: W2F527
SLAB: A23

Specification: NACE MR 01-75

Hardness, HRC	Results	Hardness, BHN	Results
			165, 172, 161

WE HEREBY CERTIFY THE ABOVE INFORMATION IS CORRECT.


MARTY L. EUBANKS
QUALITY ASSURANCE MANAGER
(918) 583-2222



CERTIFICATE OF COMPLIANCE

DATE: NOVEMBER 9, 2022
SUBJECT: NACE

GENTLEMEN:

I HEREBY CERTIFY THAT THE MATERIAL LISTED HEREIN HAS BEEN INSPECTED AND TESTED IN ACCORDANCE WITH PRESCRIBED METHODS IN THE GOVERNING SPECIFICATIONS AND BASED UPON THE RESULTS OF SUCH INSPECTION AND TESTING DOES CONFORM TO THE REQUIREMENTS OF NACE MR 01-75.

PLATE: ASTM A516-70N AND ASME SA516-70N LATEST EDITION.
SIZE: 1/2" NOMINAL
MILL CERTIFIED: SSAB
HEAT: W2F527
SLAB: A23

Specification: NACE MR 01-75

Hardness, HRC	Results	Hardness, BHN	Results
			162, 162, 163

WE HEREBY CERTIFY THE ABOVE INFORMATION IS CORRECT.



MARTY L. EUBANKS
QUALITY ASSURANCE MANAGER
(918) 583-2222

MTR 6833

SSAB**Test Certificate**

12400 Highway 43 North, Axis, Alabama 36505, US

WARNING: This product can expose you to chemicals including nickel and nickel compounds, which are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov

Form TCT: Revision 4: Date 6 Feb 2019

Customer: LEECO STEEL PRODUCTS, INC. 1011 WARRENVILLE ROAD SUITE 500 LISLE IL 60532	Customer P.O.No.: V25285 Product Description: ASME SA516-70/SA516-85/SA516-80(21) ASTM A516-70/SA516-85/SA516-80(17) LCVN 20/15 FT LBS @ -50F/A573-P CEV 43% MAX Size: 1.500 X 120.0 X 480.0 (IN)	Mill Order No.: 41-657721-01 Shipping Manifest: AR351092 Ship Date: 15 Feb 22 Cert Date: 15 Feb 22 Cert No: 081030419 (Page 1 of 1) Heat Treat Type: NORMALIZED
---	---	---

Tested Pieces:				Tensiles:					Charpy Impact Tests											BDWTT Tmp %Shr
Heat Id	Piece Id	Tested Thickness	Tst Loc	YS (KSI)	UTS (KSI)	%RA	Elong % 2in 8in	Tst Dir	Hardness	Abs. Energy(FTLB)				% Shear			Tst Tmp	Tst Dir	Tst Siz (mm)	
										1	2	3	Avg	1	2	3				
E1K179	A26	1.513 (DISCRT)	C S1	77			56	T		35	32	35	34					-50F		10

Chemical Analysis																	
Heat Id	C	Mn	P	S	Si	Tot Al	Sol Al	Cu	Ni	Cr	Mo	Co	V	Ti	B	IIW	ORG
E1K179	19	1.08	.007	<.001	.33	.042	.041	.26	.13	.12	.02	.005	.004	.001	.0001	.42	USA

KILLED STEEL
MERCURY IS NOT A METALLURGICAL COMPONENT OF THE STEEL AND NO MERCURY WAS INTENTIONALLY ADDED DURING THE MANUFACTURE OF THIS PRODUCT.

KILLED STEEL, PRODUCED TO A FINE GRAIN PRACTICE
CEV (IIW) = C + Mn/6 + (Cr+Mo+V)/5 + (Ni-Cu)/15
NACE MR0175/ISO 15156-2:2015 ANNEX A2.1.2 COMPLIANT
NACE MR0103/ISO 17495-1:2015 19.1.1(A) AND 19.1.1(C) COMPLIANT
MTR EN 10204:2004 INSPECTION CERTIFICATE 3.1 COMPLIANT
100% MELTED, POURED, AND ROLLED IN THE USA
NO WELD REPAIR HAS BEEN PERFORMED ON THIS MATERIAL.
NORMALIZED PLATES. HEATED AT 1685F FOR 63 MINUTES.
TEST COUPONS TAKEN FROM HEAT TREATED PLATE.

PRODUCTS SHIPPED:

E1K179 A26 40075715 PCS: 1, LBS: 24553

E1K179 A26 40075716 PCS: 1, LBS: 24553

CEQ = .42

(2) Cust Part #: 150120480A516-70N

WE HEREBY CERTIFY THAT THIS MATERIAL WAS
TESTED IN ACCORDANCE WITH, AND MEETS THE
REQUIREMENTS OF, THE APPROPRIATE SPECIFICATION

Colt Beck
PRODUCT METALLURGIST

NUCOR
PLATE MILL GROUP

P.O. Box 279
Winton, NC 27986
(252) 356-3700

MTR 9265

Mill Test Report

1585 River Rd
Cottfield, NC 27922
(252) 356-3700

AMERICAN ALLOY
PLATE # 52mm

Issuing Date : 06/03/2023 B/L No. : 669114 Load No. : 066613 Our Order No. : 2060302 Cust. Order No. : 136043-OK
Vehicle No : TTPX 61632 Sold To : AMERICAN ALLOY STEEL INC 6236 N HOUSTON ROSSLYN RD PO BOX 40488 NORTH HOUSTON, TX 77061 Ship To : AMERICAN ALLOY STEEL 6380 N ERIE AVE C/O BKOL TRACK #21 OKWASSO, OK 74055
Specification : 0.5000" x 48.000" x 980.000"
ASTM A516 70/65/50-17/ASME B516-70/65/50 PVQ2019/2021
Normalized Plate NACE MR0175 Annex 2.1.2 (2016), MR0183 (2010)
Section 2.1.2 Compliant (2019) 13.1.1, 13.1.2 Vacuum Degassed
Marking : 136043-OK

Heat No	C	Mn	P	S	Si	Cu	NI	Cr	Mo	Nb	V	Ni	Ti	N	Ca	B	Sn	Ceq	Pcm
9603032	0.20	1.06	0.010	0.001	0.21	0.24	0.11	0.07	0.02	0.030	0.003	0.002	0.001	0.0054	6.9013	0.0002	0.010	0.41	6.28
9603033	0.19	1.04	0.010	0.001	0.18	0.21	0.09	0.05	0.02	0.028	0.002	0.002	0.001	0.0052	6.9013	0.0001	0.011	0.40	6.29

Plate Serial No	Pieces	Tens	Dir.	Tensile Test				Heat Treat			
				Yield (psi)	Tensile (psi)	Elong. % in 2"	Elong. % in 8"	Norm (°F)	Time (min)	Temper (°F)	Time (min)
9603032-07	8	19.80	H-T	51,400	76,900	47.4		1650	23		
9603033-01	4	13.06	H-T	56,900	75,400	45.9		1650	23		

Plate Serial No	Pieces	Tens	Dir.	Absorbed Energy (ft-lb)				Lateral Expansion (in.)				Shear (%)				Min	Temp (°F)	Size
				(ft-lb) 1	(ft-lb) 2	(ft-lb) 3	Ave	(in.) 1	(in.) 2	(in.) 3	Ave	(%) 1	(%) 2	(%) 3	Ave			
9603032-07	8	19.80	H-L	87.7	86.2	105.2	86.4	15								-50	10mm	
9603033-01	4	13.06	H-L	56.8	86.1	33.4	69.4	15								-60	10mm	

MATERIAL CONFORMS TO
NACE MR0175

3HN 153 TO 159
CERTIFIED BY
AMERICAN ALLOY STEEL
BY LMS DATE 10/12/23

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

Reviewed By:

10/11/23

HOT ROLLED CARBON STEEL PLATE
TEST COUPONS TAKEN FROM HEAT TREATED PLATE

Please frequency sharp:

Material selected to fully meet the requirements of Electric Arc Furnace. Welding or other repair work not permitted on this material.
Mercury has not been used in the direct manufacturing of this material. Produced as continuous cast discrete plate, unless otherwise noted in Specification. For Mexico shipments: info@sales@nucor.com
Yield by 0.55UL method unless otherwise specified. $Ceq = C + (Mn/5) + ((Cr + Mo + V)/5) + ((Cu + Ni)/15)$
 $Pcm = C + (B/30) + (Mn/20) + (Cu/20) + (Ni/30) + (Cr/20) + (Mo/15) + (V/10) + 6B$
Melted and Manufactured in the USA. ISO 9001:2015 certified. PED 2014/68/EU, 97/23/EC 7/2 Annex 1, Para. 4.3 Compliant. API Q1-1961
DIN 50446 3.1, EN 10204 3.1(2004) 3.1B(1999) DIN EN 10204 3.1(2006) compliant. ABS QA-982406

We hereby certify that the contents of this report are accurate and correct. All test results and operations performed by the material manufacturer are in compliance with the applicable specifications, including customer specifications.

C.L. Cooper
C. L. Cooper, Metallurgist

6/3/2023 2:06:08 PM

SSAB**Test Certificate**

1770 Bill Sharp Boulevard, Muscatine, IA 52761-9412, US

WARNING: This product can expose you to chemicals including nickel and nickel compounds, which are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

Form TC1: Revision 4: Date 6 Feb 2019

Customer: STEEL & PIPE SUPPLY P.O. BOX 1688 MANHATTAN KS 66502	Customer P.O.No.: 4500353651	Mill Order No. 41-617854-01	Shipping Manifest: MR417701
	Product Description: ASTM A36(19)/A709(18)36/ASME SA36(19) 0.80%-1.20% MN, MAX 0.05% SI, 0.45% CEV		Ship Date: 27 Oct 20 Cert Date: 27 Oct 20
	Size: 0.242(MIN) X 72.00 X COIL (IN)		Cert No: 061863816 (Page 1 of 1)

Tested Pieces:				Tensiles:					Charpy Impact Tests												BDWTT	
Heat Id	Piece Id	Tested Thickness	Tst Loc	YS (KSI)	UTS (KSI)	%RA	Elong % 2in 8in	Tst Dir	Hardness	Abs. Energy(FTLB)				% Shear				Tst Tmp	Tst Dir	Tst Siz (mm)		
B0J739	0673	0.250		54	73		26	T		1	2	3	Avg	1	2	3	Avg					
B0J740	0663	0.250		50	70		34	T														
Chemical Analysis																						
Heat Id	C	Mn	P	S	Si	Tot Al	Cu	Ni	Cr	Mo	Cb	V	Ti	B	N	IIW						
B0J739	.16	.83	.006	.004	.03	.027	.31	.15	.09	.03	.001	.002	.006	.0000	.0081	.35	ORGN					
B0J740	.16	.84	.008	.003	.04	.024	.32	.15	.12	.04	.000	.002	.006	.0000	.0079	.36	USA					

KILLED STEEL

MERCURY IS NOT A METALLURGICAL COMPONENT OF THE STEEL AND NO MERCURY WAS INTENTIONALLY ADDED DURING THE MANUFACTURE OF THIS PRODUCT.

HOT-ROLLED COIL INTENDED FOR CONVERSION TO GRADE. CERTIFIED TO CHEMISTRY ONLY.

COIL END PHYSICAL TEST RESULTS, IF REPORTED, ARE FOR INFORMATION ONLY.

CEV (IIW) = $C + \frac{Mn}{6} + \frac{(Cr+Mo+V)}{5} + \frac{(Ni+Cu)}{15}$

MTR EN 10204:2004 INSPECTION CERTIFICATE 3.1 COMPLIANT

100% MELTED, POURED, AND ROLLED IN THE USA

PRODUCTS SHIPPED:

B0J740	0665	PCES:	1, LBS:	49200	B0J739	0670	PCES:	1, LBS:	49200
B0J739	0668	PCES:	1, LBS:	49250	B0J739	0667	PCES:	1, LBS:	49200

Q.A. APPROVED

By  Date 2/3/21

(P) Cust Part # 70872999M3

WE HEREBY CERTIFY THAT THIS MATERIAL WAS
 TESTED IN ACCORDANCE WITH, AND MEETS THE
 REQUIREMENTS OF, THE APPROPRIATE SPECIFICATION

Brian Wales

SENIOR METALLURGIST, PRODUCT



JSW Steel (USA) INC.
5200, East McKinney Road,
BAYTOWN, TX 77523

METALLURGICAL TEST REPORT

MET - 04 Rev. No.: 3 Rev. Date: 02/27/2018

5/28/2022

Bulletin	Order Item	Heat	PO No.	Shipping Mode	Order Dimensions	Slab Origin	TC No.
B114564	JSW19151-06	S31285	25.498	BARGE ITFX54141	1.25x96x240	JSW USA	B114564-1285-1

MELTED AND MANUFACTURED IN THE USA.

Plates Certified for the Following grades
ASTM-A36, ASTM-A709-36, ASME-SA36 AR

Specifications

Marking Instructions

Stencil in 1 location(s); X Loc. 18 Y Loc. 30; CUST; MADEINUSA PN PO;
DIM GRADE; FREIGHT ORDER ITEM PLATE ID SHIPWEEK SLAB ID
TRANSMODE Stamp in 1 location(s); X Loc. 18 Y Loc. 12; Slab ID; Slab ID; Slab ID

Hot Rolled Carbon Steel Plates
Plates Manufactured In the USA

Sold To: SUNBELT GROUP INC. 1990 POST OAK BLVD. SUITE 950 HOUSTON, TX 77056

Complies with ASTM A36 2019

Ship To: SUNBELT GROUP C/O RICHARDSON CO 2333 CLINTON DRIVE GALENA PARK, TX 77547

Test	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn	Al	N	V	B	Ti	Nb	Ca	CE
LADLE	0.14	1.05	0.009	0.003	0.22	0.081	0.034	0.042	0.001	0.004	0.042	0.0086	0.004	0.0003	0.006	0.002	0.0019	0.33

Carbon Equivalent CE = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15

PCM = C + Si/30 + Mn/20 + Cu/20 + Ni/60 + Cr/20 + Mo/15 + V/10 + 5B

AWS = C + (Mn+Si)/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15

Plate Tested	Smpl. Loc.	Slab Identity	Gauge Tested	Test Cond	Test Dir.	Yield Point (KSI)	Ten. Stgth. (KSI)	Elong In 2"	YS/UTS Ratio	Yield Strength Determined At
1236158	A	06A	1.2500	AR	T	46	70	32.0%	0.66	0.2%
1236159	A	06B	1.2500	AR	T	42	69	34.0%	0.61	0.2%

Plates Certified For The Above Tests

Material	Thick(IN)	Width(IN)	Len(IN)	Wgt(LB)	Material	Thick(IN)	Width(IN)	Len(IN)	Wgt(LB)	Material	Thick(IN)	Width(IN)	Len(IN)	Wgt(LB)
1248104A	1.2500	96.000	240.00	8167.680										

DIN: EN 10204 2004 3.1 This is to certify that the product described herein was manufactured, sampled, and tested in accordance with the specifications and requirements in such specifications. Fine Grain, Si-Al Fully Killed Steel. We certify that delivery of this product with the requirement of the specification and purchase order received from customer. DRC Conflict Free. No intentional addition of Pb, Se, S, Hg or B.

Q.A. APPROVED
By *[Signature]* Date *12/12/2022*
April W

April Watkins 8323835325 april.watkins@jswsteel.us



CERTIFICATE OF COMPLIANCE

DATE: OCTOBER 26, 2022
SUBJECT: NACE

GENTLEMEN:

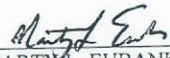
I HEREBY CERTIFY THAT THE MATERIAL LISTED HEREIN HAS BEEN INSPECTED AND TESTED IN ACCORDANCE WITH PRESCRIBED METHODS IN THE GOVERNING SPECIFICATIONS AND BASED UPON THE RESULTS OF SUCH INSPECTION AND TESTING DOES CONFORM TO THE HARDNESS REQUIREMENTS OF NACE MR 01-75.

PLATE: ASTM A-36
SIZE: 1-1/4" NOMINAL
MILL CERTIFIED: JSW STEEL
HEAT: S31285
SLAB: None

Specification: NACE MR 01-75

Hardness, HRC	Results	Hardness, BHN	Results
			160, 154, 165

WE HEREBY CERTIFY THE ABOVE INFORMATION IS CORRECT.



MARTY L. EUBANKS
QUALITY ASSURANCE MANAGER
(918) 583-2222

PO/Rel

Certificate of Mill Test Results

TUL-000000-000

PART NO.

Attn:

Pg 1/1

SSAB

12400 Highway 43 North, Axis, Alabama 36505, US

Test Certificate

WARNING: This product can expose you to chemicals including nickel and nickel compounds, which are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

Form TC1: Revision 4: Date 6 Feb 2019

Customer: CHAPEL STEEL CORPORATION PO BOX 1000 SPRING HOUSE PA 19477				Customer P.O.No.: TUL-331		Mill Order No. 41-876504-02		Shipping Manifest: AR359558								
				Product Description: ASME SA516-70/SA516-65/SA516-60(21) ASTM A516-70/A516-65/A516-60(17) VACUUM DEGAS; C.23%,S.015% MAX;ELG 2" LCVN 20 FT.LBS. @ -50F/A673-P				Ship Date: 28 Jun 22 Cert Date: 28 Jun 22								
						Cert No: 081054055 (Page 1 of 1)										
				Size: 1.250 X 96.00 X 480.0 (IN)				Heat Treat Type: NORMALIZED								
Tested Pieces:				Tensiles:				Charpy Impact Tests								
Heat Id	Piece Id	Tested Thickness	Tst Loc	YS (KSI)	UTS (KSI)	%RA	Elong % 2in 8in	Tst Dir	Hardness	Abs. Energy(FTLB) 1 2 3 Avg	% Shear 1 2 3 Avg	Tst Tmp	Tst Dir	Tst Siz (mm)	BDWTT Tm %Shr	
E2F017	A35	1.257 (DISCRT)	C	50	75		52	T		98 108 116 107		-50F	L	10.		
Chemical Analysis																
Heat Id	C	Mn	P	S	Si	Tot Al	Sol Al	Cu	Ni	Cr	Mo	Ch	V	Ti	B	IW
E2F017	.18	1.00	.010	.001	.24	.028	.028	.29	.15	.13	.02	.080	.002	.008	.0001	.41
ORG																
USA																

KILLED STEEL

MERCURY IS NOT A METALLURGICAL COMPONENT OF THE STEEL AND NO MERCURY WAS INTENTIONALLY ADDED DURING THE MANUFACTURE OF THIS PRODUCT.

KILLED STEEL, PRODUCED TO A FINE GRAIN PRACTICE

CEV (IIT) = C + MN/6 + (CR+MO+V)/5 + (NI+CU)/15

NACE MR0175/ISO15156-2:2015 ANNEX A2.1.2 COMPLIANT

NACE MR0103/ISO 17495-1:2015 13.1.1(A) AND 13.1.1(C) COMPLIANT

MTR EN 10204:2004 INSPECTION CERTIFICATE 3.1 COMPLIANT

100% MELTED, POURED, AND ROLLED IN THE USA

NO WELD REPAIR HAS BEEN PERFORMED ON THIS MATERIAL.

NORMALIZED PLATES. HEATED AT 1665F FOR 53 MINUTES.

TEST COUPONS TAKEN FROM HEAT TREATED PLATE.

PRODUCTS SHIPPED:

E2F017 A35 40086983 PCES: 1, LBS: 16335

E2F017 A35 40086982 PCES: 1, LBS: 16335

E2F017 A35 40086981 PCES: 1, LBS: 16335

Q.A. APPROVED

3y

Date 10/31/2022

(7)

Cust Part #:

WE HEREBY CERTIFY THAT THIS MATERIAL WAS
TESTED IN ACCORDANCE WITH, AND MEETS THE
REQUIREMENTS OF, THE APPROPRIATE SPECIFICATION

Jason Thomas

Director Technical Services

ANTHONY CARDWELL

45110in

12/13/2022



CERTIFICATE OF COMPLIANCE

DATE: NOVEMBER 10, 2022

SUBJECT: NACE

GENTLEMEN:

I HEREBY CERTIFY THAT THE MATERIAL LISTED HEREIN HAS BEEN INSPECTED AND TESTED IN ACCORDANCE WITH PRESCRIBED METHODS IN THE GOVERNING SPECIFICATIONS AND BASED UPON THE RESULTS OF SUCH INSPECTION AND TESTING DOES CONFORM TO THE REQUIREMENTS OF NACE MR 01-75.

PLATE: ASTM A516-70N AND ASME SA516-70N LATEST EDITION.

SIZE: 1-1/4" NOMINAL

MILL CERTIFIED: SSAB

HEAT: E2F017

SLAB: A35

Specification: NACE MR 01-75

Hardness, HRC

Results

Hardness, BHN

Results

165, 166, 162

WE HEREBY CERTIFY THE ABOVE INFORMATION IS CORRECT.


MARTY L. EUBANKS
QUALITY ASSURANCE MANAGER
(918) 583-2222

NUCOR
PLATE MILL GROUP

P.O. Box 279
Winton, NC 27986
(252) 358-3700

Mill Test Report

1505 River Rd
Coffield, NC 27922
(252) 358-3700

AMERICAN ALLOY
PLATE # 5282890

Issuing Date : 09/17/2023 B/L No. : 857581 Load No. : 876694 Our Order No. : 2081972 Cust. Order No. : 136394-OK
Vehicle No: SNC 62593 Sold To: AMERICAN ALLOY STEEL INC 6230 N HOUSTON ROSSLYN RD PO BOX 40469 NORTH HOUSTON, TX 77091 Ship To: AMERICAN ALLOY STEEL 6350 N ERIE AVE C/O SKOL TRACK #21 OWASSO, OK 74055
Specification: 0.5000" x 120.000" x 480.000" ASTM A516 70/65/60-17/ASME SA516-70/65/60 PVQ 2019/2021 Normalized Plate NACE MR0175 Annex 2.1.2 (2015), MR0103 (2010) Section 2.1.2 Compliant (2015) 13.1.1, 13.1.2 Vacuum Degassed
Marking : 136394-OK

Heat No	C	Mn	P	S	Si	Cu	NI	Cr	Mo	Al(tot)	V	Nb	Ti	N	Ca	B	Sn	Ceq	Pcm
3604954	0.20	1.01	0.011	0.001	0.19	0.28	0.10	0.11	0.02	0.031	0.004	0.005	0.002	0.0074	0.0008	0.0002	0.008	0.42	0.28

Plate Serial No	Pieces	Tons	Dir.	Tensile Test			Heat Treat					
				Yield (psi)	Tensile (psi)	Elong. % in 2"	Elong. % in 8"	Norm (°F)	Time (min)	Temper (°F)	Time (min)	
3604954-05	2	8.16	H-T	52,000	75,900	44.5			1650	23		
3604954-06	4	16.33	H-T	49,400	73,300	41.7			1650	23		

Plate Serial No	Places	Tons	Dir.	Absorbed Energy (Ft-lbs)					Charpy Impacts										Mn	Temp (°F)	Size
				1	2	3	Ave	Min	Lateral Expansion (in.)					Shear (%)							
									1	2	3	Ave	Min	1	2	3	Ave				
3604954-05	2	8.16	H-L	81.9	110.7	31.9	74.8	15													
3604954-06	4	16.33	H-L	130.6	167.5	122.8	140.3	15												-50	10mm

CEQ=.42

MATERIAL CONFORMS TO

NACE MR0175

SHN 120 TO 146

CERTIFIED BY

AMERICAN ALLOY STEEL

BY PK DATE 11/9/23

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

Reviewed By:

PCV 1/23

HOT ROLLED CARBON STEEL PLATE
TEST COUPONS TAKEN FROM HEAT TREATED PLATE
Piece frequency charpy:

ANTHONY CARDWELL
02/28/2024

Manufactured to fully killed fine grain practice by Electric Arc Furnace. Welding or weld repair was not performed on this material. Mercury has not been used in the direct manufacturing of this material. Produced as continuous cast discrete plate, unless otherwise noted in Specification. For Mexico shipments: rnc-Sales.MX@nucor.com
Yield by 0.5ELU method unless otherwise specified. $Ceq = C + (Mn/5) + ((Cr+Mo+V)/5) + ((Cu+Ni)/15)$
 $Pcm = C + (Si/30) + (Mn/20) + (Cu/20) + (Ni/60) + (Cr/20) + (Mo/15) + (V/10) + 5B$
Melted and Manufactured in the USA. ISO 9001:2015 certified. PED 2014/68/EU, 97/23/EC 7/2 Annex 1, Para. 4.3 Compliant. API Q1-1851
DIN 50048-3.1/EN 10204-3.1(2004) 3.1B(1993)/DIN EN 10204-3.1(2005) compliant. ABS QA-3824366

We hereby certify that the contents of this report are accurate and correct. All test results and operations performed by the material manufacturer are in compliance with the applicable specifications, including customer specifications.

C. L. Cooper, Metallurgist

9/16/2023 11:27:54 AM

Ameriforge**Material Test Report**

An AFG Holdings Company

Heat Code: BS8-KD**Forged Vessel Connections (FVC)**

13770 Industrial Rd. Houston, TX 77015

ISO 9001:2015 Certified

Sales: (713) 393-4200

Lee Supply, Inc.	LSI0001	PO: 22-3251-DS	Sales Order: 191172S	Line: 16
821 East Independence		Item Code: LWN040600090A002A1	Qty Shipped: 6	
Tulsa, OK 74106		Item Desc: 4 X 600 X 9 LWN RF SA105N		
		Mill Heat: Y7830		

Spec: ASTM A350 (18) / ASME SA350 (21) - LF2 CL1 & ASTM A105/A105M (21) / ASME SA105/SA105M (21)

Element	(%wt)	Ladle	Product	EPCRA	CAS#	Element	(%wt)	Ladle	Product	EPCRA	CAS#
C Carbon	0.18					Ni Nickel	0.10			Y	7440-02-0
Mn Manganese	1.18			Y	7439-96-5	Cr Chromium	0.10			Y	7440-47-3
Mn:C	6.6					Mo Molybdenum	0.02				
P Phosphorous	0.008					V Vanadium	0.02				
S Sulphur	0.008					Cb Columbium	0.015				
Si Silicon	0.28					Al Aluminum	0.012				
Cu Copper	0.16			Y	7440-50-8	C.E.	0.42				

Mechanical Testing

Test Lab	GOOLSBY GT# 22-0488
Test Bar Size	SACRIFICIAL PIECE
HBW	163 - 163
Elg (%)	36.5
RA (%)	63.2
Tensile Specimen Size (in)	.501
Tensile (ksi)	77
Yield (ksi)	55.2
Gauge Length (in)	2
Charpy Temp (F)	-50
Charpy (ft lbs)	69 - 80 - 87
Avg Energy 3 Specimens (ft-lbs)	79
Min Energy 1 Specimens (ft-lbs)	69
% Shear	20 - 30 - 30
Lat. Exp. (in)	.058 - .066 - .063

Heat Treat

Norm. Temp. (F)	1675
Norm. (Hrs)	4.25
Norm. Cooling Type	AIR

Other

Country of Melt	USA
Country of Finish Machining	USA
Country of Forging	USA
Vacuum Degassed	Y
Electric Furnace	Y
Gr.Sz	7

The recording of false, fictitious, or fraudulent statement or entries on this document may be punishable as a felony under federal statute.

EPCRA Supplier Notification: This product may contain one or more toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act (Title III of the Superfund Amendments and Reauthorization Act of 1986) and 40 C.F.R. Part 372. Potentially reportable chemicals are indicated with a checkmark in the "EPCRA" column and a Chemical Abstract Services (CAS) registry number is provided for each such chemical in addition to the percent by weight of the chemical present in this product. It is your responsibility alone to determine whether your facility is required to submit a Toxic Release Inventory Report under EPCRA Section 313.

Certification No.: 1617042-REV01

Certification Date: 12/5/2022

Issued By: Michelle Simien

This report is issued in compliance with the requirements of EN10204 3.1 / ISO 10474 3.1.b

FVC672 / BS8-KD / 4.0RFLWN9#60D / 4" 600# RFLWN X 9" A105N
Material Test Report

Heat Code: BS8-KD

Forged Vessel Connections (FVC)

13770 Industrial Rd. Houston, TX 77015

ISO 9001:2015 Certified

Sales: (713) 393-4200

Lee Supply, Inc. 821 East Independence Tulsa, OK 74106	LSI0001	PO: 22-3251-DS	Sales Order: 191172S	Line: 16
		Item Code: LWN040600090A002A1		Qty Shipped: 6
		Item Desc: 4 X 600 X 9 LWN RF SA105N		
		Mill Heat: Y7830		
Spec: ASTM A350 (18)/ASME SA350 (21)- LF2 CL1 & ASTM A105/A105M (21)/ASME SA105/SA105M (21)				

Material is Fully Killed; Fine Grain Practice

Product compliant with NACE MR0175/ISO 15156-2:2015, Annex A (A.2.1.2, A2.1.3).
 Product compliant with NACE MR0103/ISO 17945:2015, Section 13.1.1 and 13.1.3.

We hereby certify that the material represented by this document has been tested and is in conformance with the Purchase Order and Specification Requirements.

- * No Weld repair performed.
- * Ladle Chemical Analysis results are reported from the raw material suppliers MTR.
- * Tensile taken from a round specimen. Measurement of elongation after fracture.
- * Yield strength was determined using the .2% offset method, unless specified.
- * All material supplied under this order is certified to be free of mercury contamination and no mercury bearing equipment was used in manufacturing, fabrication or testing.
- * When reported on MTR: Tensile Testing Per ASTM E8; Brinell Hardness Per ASTM E10; Charpy Testing Per ASTM E23
- * AF Global manufactures materials according to a certified Quality Management System conforming to ISO 9001:2015 and PED certified to 2014/68/EU, Annex 1, Section 4.3.
- Unless otherwise noted on PO, Dimensions of all standard pipe flanges and flange fittings (NPS 1/2 to NPS 24) per ASME B16.5-2020, large diameter steel flanges (NPS 26 to 60) per ASME B16.47-2020, Orifice flanges per ASME B16.36-2020.
- * AFGlobal uses the latest edition of ASTM E29 (Standard practice for using significant digits in test data to determine conformance with specifications), to claim conformance or nonconformance to a specification. When an accept/reject determination is required AFGlobal uses a test uncertainty ratio (TUR) of 1:1 or higher as acceptable.
- * DNV-GL PED Certificate No 10000425664-PA-ACCREDIA-USA Valid thru December 03, 2023.

The recording of false, fictitious, or fraudulent statement or entries on this document may be punishable as a felony under federal statute.

EPCRA Supplier Notification: This product may contain one or more toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act (Title III of the Superfund Amendments and Reauthorization Act of 1986) and 40 C.F.R. Part 372. Potentially reportable chemicals are indicated with a checkmark in the "EPCRA" column and a Chemical Abstract Services (CAS) registry number is provided for each such chemical in addition to the percent by weight of the chemical present in this product. It is your responsibility alone to determine whether your facility is required to submit a Toxic Release Inventory Report under EPCRA Section 313.

Certification No.: 1617042-REV01
 Certification Date: 12/5/2022
 Issued By: Michelle Simien



Dusty Bannon - Quality Analyst

This report is issued in compliance with the requirements of EN10204 3.1 / ISO 10474 3.1.b

Page 2 of 2

ANTHONY CARDWELL
 12/13/2022



14527 Smith Rd.
Humble, Texas 77396
TEL: (281) 441-4088
FAX: (281) 441-8899

PAGE: 1 of 1
REPORT # 22-036458
DATE: 11/17/2022

FCI ORDER # 117259
IAW ASME 2021 ED.
IAW NACE MR0175 2015Ed

CUSTOMER ORDER # 22-3172-CM
SOLD / SHIPPED TO: LEE SUPPLY

13312-2-3 FL

Item Quantity Description

1 4 2" X 300 X 9" LG RF LWN, TAG# 795089 KC
RACK RW0320

PART HBW: 159

Heat Number: 11014B

Steel Origin (melt): JAPAN

Material Type: SA105N/SA350LF2CL1

CHEMICAL ANALYSIS

PHYSICAL PROPERTIES

C .18
Mn 1.23
P .014
S .006
Si .27
Cr .04
Mo .01
V .00
Cu .01
Ni .03
Cb(Nb) .00
N
Sn
As
Sb
Ti .00
Al .03
B .0005
C E 0.40

Yield PSI 41,600
Tensile PSI 71,900
Elongation % 39
Reduction of Area % 71.6
Hardness 143/143 HBW
CVN -50 °F FT LBS 25/23/18
% Shear 10/10/10
MLE .022/.021/.015

MADE TO FINE GRAIN PRACTICE

Heat Treatment NORMALIZED
Temperature 1706 °F
Time at Temperature 4 HRS
Cooling Media AIR

We hereby certify that all test results and process information contained herein are correct and true as contained in the records of the company.

Prepared by:

Name: Cynthia Madrid

Title: QA Representative



400 McMunn St.
South Lyon, MI 48178

TEST REPORT



Date : 07/28/2022

Page : 1

Truck# : MT07694

Heat : 5394350

Job : MJ00007743

Pick# : 62769

Ship# :

Order : MS00011201

Ship To :		Sold To :	
P.O. No : 10P37874	Cust Item :	Shape : Round Round	Wt/ft : 2.844
OD Size : 1.315 IN	ID Size :	Wall Size : 0.250 IN (Average)	
Surface : BLUE UV COATING		Anneal : Per Spec	

Specifications : ASME-SA106-B/C, ASME-SA53-GrB, ASTM-A106-19a-B/C, ASTM-A53-20-Gr. B, DIN-DIN 50049 3.1-1998, EN-EN 10204 3.1-2004, NACE-MR0103-2015, NACE-MR0175-2015

BLUE UV ECT. Cert & stencil to A/SA106B, A/SA106C, A/SA53B, TYPE S. EN10204 3.1, DIN 50 049 3.1, NACE MR0175 & 0103. Melt & Mfg in USA. HtTime & Temp, trace elements. Ship +/-10%. Email ship docs to Carri Bethel when ready

Heat		Furnace				Melted Source										Feet		Weight (lbs)							
5394350		EAF				USA,REPUBLIC STEEL CANTON, OH										3843		10929							
Chemical Analysis																									
	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Al	V	Sn	Nb	SB	As	Ti	Zr	N	Ca	CO	W	B	H2	CE	
L	0.26	0.72	0.018	0.021	0.310	0.130	0.10	00.15	0.02	0.021	0.003	0.005	0.000	0.001	0.003	0.001		0.006		0.010				0.42	
P1	0.24	0.72	0.012	0.013	0.282	0.114	0.09	00.13	0.02	0.016	0.004														
P2	0.25	0.72	0.013	0.014	0.278	0.116	0.09	00.13	0.02	0.016	0.004														
Tensile																							Hardness		
Tensile		Yield															%Elong				HRbw Mid				
76349		0.2%															2"								
		51497															49.3				79.0 82.0				
Tensile: Full Size Longitudinal																									
Hydrostatic Test Results																									
Hydro(Tested 100% Length)								Ultrasonic %		Eddy Current		Flatten		Flare		Bend		Expansion							
										PASS						PASS									
Heat Treatment																									
Normalized				Temper				Final Anneal				Stress Relieved													
Temperature		Time		Temperature		Time		Temperature		Time		Temperature		Time											
1650 F		20.00 Min																							
Lot Details																									
Bundle		Footage		Pcs		Length																			
ms0001120101001		1281		61		Cut 21' 0.000" -																			
ms0001120101002		1281		61		Cut 21' 0.000" -																			
ms0001120101003		1281		61		Cut 21' 0.000" -																			



400 McMunn St.
South Lyon, MI 48178

TEST REPORT



Date : 07/28/2022

Page : 2

Job : MJ00007743

Order : MS00011201

Truck# : MT07694

Heat : 5394350

Pick# : 62769

Ship# :

- Material has not been exposed to metallic mercury, lead or asbestos so as to cause contamination. Material is free from radioactive contamination. Cold Drawn Seamless. No weld repair. 100% Manufactured, USA.
- Michigan Seamless Tube LLC, South Lyon MI is a division of Specialty Steel Works, Inc.
- Certificate of Conformance Statement: This certificate asserts that the tubing listed above has been manufactured, inspected and approved in accordance with all specifications, requirements and the customer's purchase order.

Jacob Gorkowski
Quality Assurance Manager

P2827 / BC8904 / 1.0LR90160D / 1" S160 LR 90 ELBOW SA234 WPB
ALLOY PIPING PRODUCTS LLC

Mill Test Report

Date: 07/20/22
 Time: 10:37:16
 Page: 1/2

INSPECTION CERTIFICATE
 EN 10204:2004 Type 3.1



From:

Alloy Piping Products, LLC
 740 North Market Street
 Shreveport, LA 71107

To:

Customer Order#:

APP Invoice#:

Heat Number	Item Number	Item Description	Quantity
BC8904	263257	1" 160 WPB SMLS B/W LR 90 ELBOW	

Starting Material:
 Pipe Seamless

Order Spec:

Item Spec:	ASTM A234	2019	ASME SA-234	2021		
------------	-----------	------	-------------	------	--	--

Chemical Composition (wt%)					
Element	Content	Element	Content	Element	Content
C	0.11000	CR	0.12000	SUM OF CU+NI+CR+MO	0.16
MN	1.26000	MO	0.01000	SUM OF CR+MO	0.13
P	0.01200	CU	0.01000	SUM OF NB+V	0.00
S	0.00100	V	0.00200	CREQ: CR+(0.19*MO)+(0.40*CU)	0.13
SI	0.29000	NE	0.00100	MN/C RATIO	11.45
NI	0.02000	CARBON EQUIVALENT	0.35		

Test Results

Work Order#: 1001090	Load Designation:	Test Set: 0
----------------------	-------------------	-------------

Tensile Test		
Test ID: 1	Specimen Type: Longitudinal Rectangular	Gauge Length: 2.0000 in
Tensile Strength: 65,300 psi	Elongation: 52 %	Yield Strength: 46,500 psi
		Reduction:

Hardness Test	
Test ID: 1	Notes
Hardness	147 HBW(79 HRB)
	HARDNESS IS ACCEPTABLE IN ACCORDANCE WITH NACE MR0175/ISO 15156:2015 AND MR0103/ISO 17945:2015

ANTHONY CARDWELL
12/13/2022

P2827 / BC8904 / 1.0LR90160D / 1" S160 LR 90 ELBOW SA234 WPB
ALLOY PIPING PRODUCTS LLC



Mill Test Report

Date: 07/20/22
Time: 10:37:16
Page: 2/2

INSPECTION CERTIFICATE
EN 10204:2004 Type 3.1

To:

From:
Alloy Piping Products, LLC
740 North Market Street
Shreveport, LA 71107

Customer Order#: APP Invoice#:

Heat Number	Item Number	Item Description	Quantity
BC8904	263257	1" 160 WPB SMLS B/W LR 90 ELBOW	

Test ID: 1	Heat Treatment Statement
NORMALIZED AT 1670°F	

Material supplied in accordance with a Quality Management System certified to ISO 9001:2015. Certificate Number: Q1674

Dimensions and Tolerances in accordance with ASME B16.9 or B16.5, as applicable. Bevels in accordance with ASME B16.25, unless noted otherwise.

Material, when shipped, is free from contamination by mercury, radium, alpha source and low melting elements. Where applicable, welds are 100% radiographed and acceptable to ASME Section VIII - Para UW-51. We hereby certify that the materials listed above have been manufactured, sampled, tested and inspected in accordance with the specifications and grade listed, and have been found to meet the requirements.

Stacey Freeman

QA Supervisor

07/20/22

Date

CLIENTE / Customer / Client

CERTIFICADO DE INSPECCION

UNE EN 10204:06 / 3.1

Inspection Certificate - Certificat de Réception

ISO 10474:15 / 3.1

FECHA:
Date:

25/10/2021

N.º
No.

216291

HOJA:
Page:

SGI 1922164



SGI 6000236



SGI 6009987



Advanced Forged Solutions

ULMA FORJA, S.COOP.

Management Systems certified by LRQAE

Certified acc. PED 97/23/EC+AD2000-W0

PED 14/68/UE

by TÜV Rheinland

N.º 01 202 E/Q 02 7443

MARCA DEL FABRICANTE

Mark of factory

Marque du fabricant

DEPARTAMENTO

Section

Département

QUALITY ASSURANCE

Bº Zubillaga, 3 - Apdo. 14
20560 ONATI (Gipuzkoa) SPAIN
Tel.: 34 - 943 780552
Fax: 34 - 943 781808
E-mail: ulma@ulmaforge.com

Packing List: 164645
Expedition: 382897

PRODUCTO
Article - Produit

FLANGES

SU PEDIDO N.º

Your Order No.

LA0507 HOUSTON

Votre Cde. N.º

DE

of. - de 13/10/2021

NORMAS APLICABLES
Requirements - Normes Applicables

ASME B16.5-17

MATERIAL CORRESPONDIENTE ASME SA350LF2CL1-2-19, ASTM A350LF2CL1-2-18

Material Correspondent - Qualité

MODO DE FUSION (*)

Steel Making - Elaboration de l'acier

E = Elec. Y = Oxígeno básico

NACE MR0175/ISO15156-02/03-15 & NACE MR0103/ISO17945-15

PARTIDA Item Poste	CANTIDAD Quantity Quantité	DESCRIPCION Description Description	LOTE	OBSERVACIONES Remarks Observations (*)	COLADA N.º Heat No N.º Coulée	RESISTENCIA T. Strength Resist Rupt N/mm²	LIMITE ELAST Y. Strength 0.2 % N/mm²	ALARGAM. Elongation Allongement L0:50mm/4d %	ESTRICCION Red. Area Striction %	RESILIENCIA Impact test Résilience Joules	CHARPY V 10x10mm MEDIA Average Moyenne °C	DUREZA Hardness Dureté HBW
31 F1LT8W00D	50	WN 1/2 150LB XS/80 RF A350LF2	09D17A	NE	D6AV7	510	308	34,20	62,00	68 76 76	73	-50 149 152
32 F1LT8W00E	50	WN 3/4 150LB XS/80 RF A350LF2	17D821	NE	C03A8	515	334	36,70	73,60	115 91 77	94	-50 146 149
56 F3LT16W010	50	WN 1 300LB S160 RF A350LF2	13E011	NE	K8AV9	520	330	39,08	73,68	122 129 137	129	-50 140 143
67 F3LTS010	24	SO 1 300LB RF A350LF2	13N17C	NE	A0AV7	508	307	30,50	61,60	64 74 68	69	-50 146 156
67 F3LTS010	6	SO 1 300LB RF A350LF2	26F18M	NE	E1AV7	518	309	29,20	63,80	59 63 58	60	-50 147 148

COMPOSICION QUIMICA - STEEL MAKER'S LADLE ANALYSIS - ANALYSE CHIMIQUE																
COLADA N.º Heat No Ladle: L Product: P	C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %	Nb %	V %	Cu %	Al %	Ti %	B %	CEq %	Origin of Steel
D6AV7 L	0,170	0,260	1,010	0,012	0,001	0,160	0,080	0,020	0,005	0,003	0,150	0,026	0,003	0,0001	0,39	Italy
C03A8 L	0,190	0,250	1,060	0,010	0,003	0,050	0,060	0,011	0,004	0,001	0,210	0,025	0,001	0,0004	0,40	France
K8AV9 L	0,180	0,190	1,070	0,012	0,002	0,070	0,150	0,030	0,001	0,002	0,200	0,025	0,001	0,0002	0,40	Italy
A0AV7 L	0,182	0,240	1,000	0,015	0,003	0,180	0,110	0,020	0,004	0,002	0,200	0,022	0,000	0,0000	0,41	Italy
E1AV7 L	0,177	0,240	1,020	0,011	0,002	0,120	0,100	0,020	0,005	0,005	0,180	0,032	0,003	0,0001	0,39	Italy

- Las dimensiones y la condición superficial se hallaron satisfactorias.
- Dimension and surface condition were found acceptable.
- Les dimensions et états 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



ULMA FORJA S. COOP.
Dpto. de Garantía de calidad
Quality Assurance Dept.

(*) OBSERVACIONES:
Remarks
Observations

N_ NORMALIZED ABOVE 900°C AND COOLED UNIFORMLY IN STILL AIR

Inspection Certificate

Page 1 of: 2 Pages

acc to EN 10204/3.1

Certificate no.: 9220 348

Purchaser: Webco Industries, Inc
74063 Sand Springs OK
Your order no.: 10075464
Manufacturer: Mannesmann Precision Tubes Netherlands B.V.
NL-Helmond
Our order no.: 3400033
Product: Seamless cold drawn low-carbon steel heat exchanger and condenser tubes
Specification: (S)A 179 / (S)A 450 / NACE MR0103-05 / NACE MR0175
Steelgrade: A 179
SA 179 acc. to norm: A179
Edition: 2021
Marking: On tubes / On tags SA179 Edition: 2021

Process: Basic oxygen steel

Manufacturer's mark: MPT-HE

Steelmarks: (S)A 179 + N

Stamp of the mill's inspector: (Q-MPT-NL)

Extent of the delivery:

Shipping no.: 4400587

Our shipping date: 01-06-2022

Item	Numbers	Dimension	Heat no.	Sample no.
20	1079	1,000" OD x 0,120" MW x 30'0"	9866,39 m 17621 kg 323090	1-1

Shipping marks:

PO : 10075464
Item : 00002 Line 1
Mat. : A32010001200B
Quantity : 1079pcs.
Tag Nr. : PO# A22-13312 T-2,3
ASTM/ASME A5SA 179 SMLS
Grade 1010
OD: 1,0000" inches
Wall: 0.1200 inches MW Wall
Melting Western Europe
Hot finished tube fabrication in Germany
Cold drawn in The Netherlands
Max. 1 heat per bundle - Max 1 heat per box

	C	Mn	P	S	Cr	Heat no.
Requirements:	0,06-0,18	0,27-0,63	≤0,035	≤0,035		
Heat analysis (%)	0,15	0,51	0,011	0,001	0,04	323090

	Mo	V	Cu	Ni	Sn	Heat no.
Requirements:						
Heat analysis (%)	0,01	0,001	0,02	0,03	0,001	323090

Heat treatment: Normalized at 920 °C

Remarks: It is certified that the products have been tested in accordance to purchase specifications and found satisfactory

Helmond(NL.) : 01-06-2022

Mannesmann Precision Tubes - NL
Inspector
B. van Lier



1. Visual inspection and control of dimensions: OK
2. Eddy current test acc. to: E309: OK
3. Flattening test: OK
Flaring test: OK
4. Hardness test: OK

Mechanical data	Dimensions of the test tube mm	Hardness HRB
Requirements:		Max 72
1	25,40 x 3,26	68
2		72
3		68
4		67
5		66
6		70

Helmond: 01-06-2022

Mannesmann Precision Tubes - NL
Inspector
B. van Lier



Inspection Certificate

Page 1 of:

2 Pages

acc to EN 10204/3.1

Certificate no.:

92203419

Purchaser: Webco Industries, Inc
74063 Sand Springs OK
Your order no.: 10075464
Manufacturer: Mannesmann Precision Tubes Netherlands B.V.
NL-Helmond
Our order no.: 3400033

Product: Seamless cold drawn low-carbon steel heat exchanger and condenser tubes
Specification: (S)A 179 / (S)A 450 / NACE MR0103-05 / NACE MR0175

Steelgrade: A 179
SA 179
acc. to norm: A179
Edition: 2021
2021

Marking: On tubes / On tags

Manufacturer's mark: MPT-H-E

Process: Basic oxygen steel

Stamp of the mill's inspector: (Q-MPT-H-L)

Steelmarks: (S)A 179 + N

Extent of the delivery:

Shipping no.: 4400587

Our shipping date: 01-06-2022

Item	Numbers	Dimension	Heat no.	Sample no.
21	113	1,000" OD x 0,120" MW x 28'6"	981,63 m 1756 kg 323090	1-2

Shipping marks:

PO : 10075464
Item : 00002 Line 2
Mat. : A32010001200B
Quantity : 113pcs
Tag Nr. : PC# A22-13312 T-2,3 SC
ASTM/ASME A/SA 179 SMLS
Grade 1010
OD: 1,0000" inches
Wall: 0,1200 inches MW Wall
Melting Western Europe
Hot finished tube fabrication in Germany
Cold drawn in The Netherlands
Max. 1 heat per bundle - Max 1 heat per box

	C	Mn	P	S	Cr	Heat no.
Requirements:	0,06-0,18	0,27-0,63	≤0,035	≤0,035		
Heat analysis (%)	0,15	0,51	0,011	0,001	0,04	323090

	Mo	V	Cu	Ni	Sn	Heat no.
Requirements:						
Heat analysis (%)	0,01	0,001	0,02	0,03	0,001	323090

Heat treatment: Normalized at 920 °C

Remarks: It is certified that the products have been tested in accordance to purchase specifications and found satisfactory

Helmond(NL.): 01-06-2022

Mannesmann Precision Tubes - N.L.
Inspector
B. van Lier



Test results

Page 2 of:

2 Pages

Certificate no.:

9220349

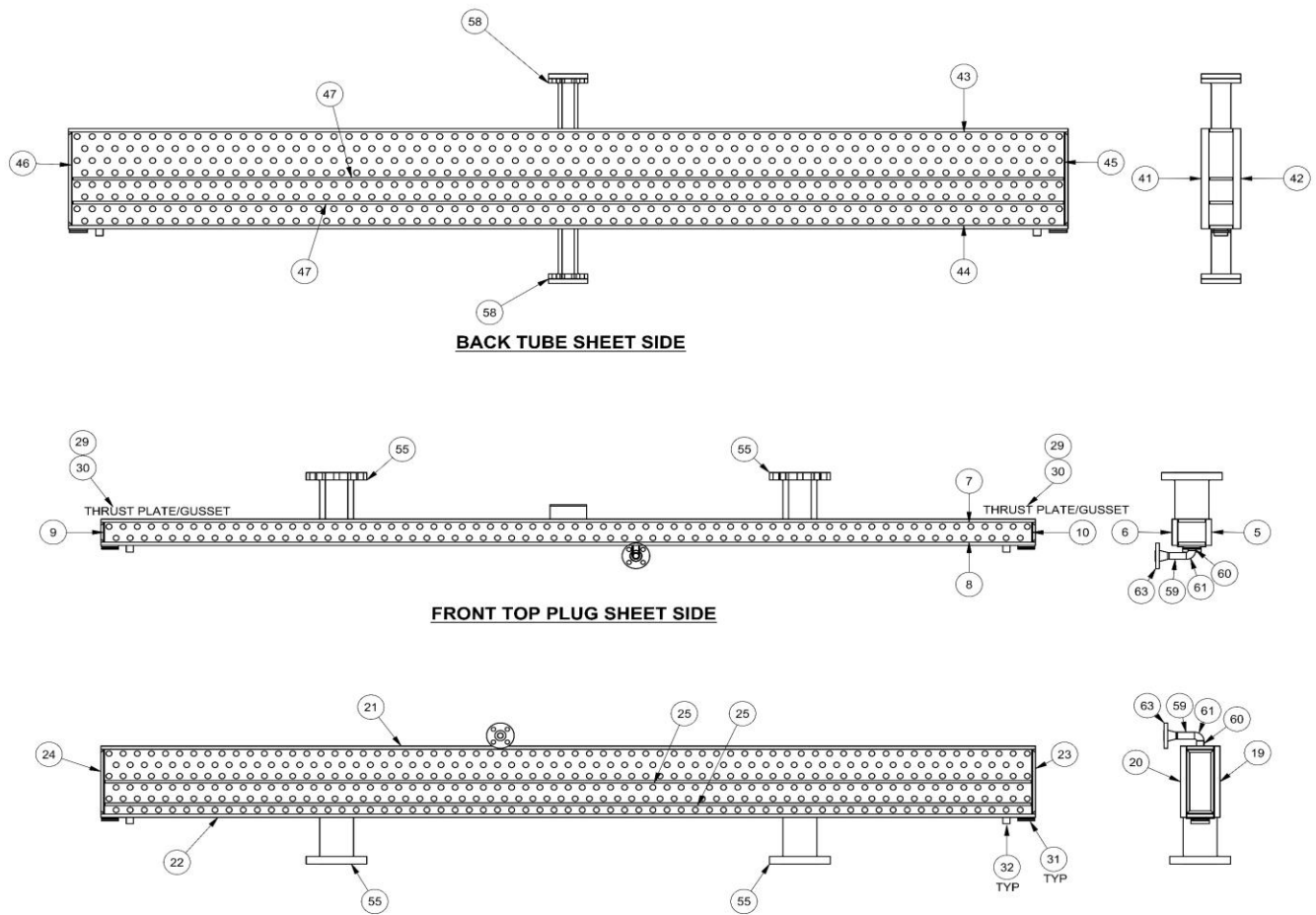
1. Visual inspection and control of dimensions: OK
2. Eddy current test acc. to: E309; OK
3. Flattening test: OK
Flaring test: OK
4. Hardness test: OK

Mechanical data	Dimensions of the test tube mm	Hardness HRB
Requirements:		Max 72
1	25,40 x 3,26	68
2		66

Helmond: 01-06-2022

Mannesmann Precision Tubes - NL
Inspector
B. van Lier





Mark No	MATERIAL DESCRIPTION		
	SUPPLIERS	HEAT No.	MATERIAL
5/6	NUCOR	2603538	SA-516-70N
7/8	NUCOR	2603381	SA-516-70N
9/10	NUCOR	2603381	SA-516-70N
19/20	NUCOR	2603538	SA-516-70N
21/22	NUCOR	2603381	SA-516-70N
23/24	NUCOR	2603381	SA-516-70N
25	SSAB	W2F527	SA-516-70N
29	SSAB	E1K179	SA-516-70N
30	NUCOR	3603032	SA-516-70N
31	SSAB	B0J739	SA-516-70N
32	JSW	S31285	SA-516-70N
41/42	SSAB	E2F017	SA-516-70N
43/44	NUCOR	2603381	SA-516-70N
45/46	NUCOR	2603381	SA-516-70N
47	NUCOR	3604954	SA-516-70N
55	AMERIFORGE	BS8-KD	SA-350LF2
58	FCI	11014B	SA-350LF2
59/60	MST	5394350	SA-106B
61	AAAPP	BC8904	SA-234WPB
63	ULMA	K8AV9	SA-350LF2
TUBES	MANNESMANN	323090	SA-179

CUSTOMER: AIR PRODUCT MANUFACTURING LLC.

PO NO: 4505606036 / A8KM-4-406-PO-1

ITEM NO: 18-XF-352A

DATE

AC



FABSCO
SHELL & TUBE, LLC

DWG No

A22-13312-2A-HS

0

Mill Test Report

Page 2

1505 River Rd
Cofield, NC 27922
(252) 356-3700

Issuing Date : 08/01/2022 B/L No. : 629578 Load No. : 647645 Our Order No. : 198418/3 Cust. Order No. : 126778
Vehicle No: ALY 91713 Sold To: PORT CITY METALS SERVICES INC A DIVISION OF METALS USA Ship To: PORT CITY METAL SERVICES, INC.
Specification: 1.0000" x 120.000" x 480.000" 3101 CHARLES BLVD JUNCTION 12
ASTM A516 70/65/60/485-17/ASME SA516-70/65/60/485 PVQ 2019/2021 TULSA,OK 74127 (2) HALE,OK 74127
Normalized Plate NACE MR0175 Annex 2.1.2 (2015), MR0103 (2010)
Section 2.1.2 (2015) 13.1.1, 13.1.2)Compliant

Marking :

Heat No	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Al(tot)	V	Nb	Ti	N	Ca	B	Sn	Ceq	Pcm
2603538	0.20	1.07	0.008	0.001	0.19	0.19	0.08	0.06	0.01	0.029	0.004	0.003	0.002	0.0041	0.0010	0.0000	0.010	0.41	0.27
Plate Serial No	Pieces	Tons	Tensile Test					Heat Treat											
			Dir.	Yield (psi)	Tensile (psi)	Elong. % in 2"	Elong. % in 8"	Norm (°F)	Time (min)	Temper (°F)	Time (min)								
2603538-03	2	16.33	H-T	46,600	72,600	55.7				1650	41								

Manufactured to fully killed fine grain practice by Electric Arc Furnace. Welding or weld repair was not performed on this material. Mercury has not been used in the direct manufacturing of this material. Produced as continuous cast discrete plate, unless otherwise noted in Specification. For Mexico shipments:nhc-SalesMX@nucor.com
Yield by 0.5EUL method unless otherwise specified. Ceq = C+(Mn/6)+((Cr+Mo+V)/5)+((Cu+Ni)/15)
Pcm = C+(Si/30)+(Mn/20)+(Cu/20)+(Ni/60)+(Cr/20)+(Mo/15)+(V/10)+5B
Melted and Manufactured in the USA. ISO 9001:2015 certified. PED 2014/68/EU, 97/23/EC 7/2 Annex 1, Para. 4.3 Compliant. API Q1-1851
DIN 50049 3.1.B/EN 10204 3.1(2004) 3.1B(1993)/ DIN EN 10204 3.1(2005) compliant. ABS QA-3624366

We hereby certify that the contents of this report are accurate and correct. All test results and operations performed by the material manufacturer are in compliance with the applicable specifications, including customer specifications.

T. A. Depretis
T. A. Depretis, Metallurgist

8/1/2022 2:02:22 PM

ANTHONY CARDWELL
12/13/2022

Q.A. APPROVED
By *[Signature]* Date *8/10/2022*



CERTIFICATE OF COMPLIANCE

DATE: NOVEMBER 9, 2022
SUBJECT: NACE

GENTLEMEN:

I HEREBY CERTIFY THAT THE MATERIAL LISTED HEREIN HAS BEEN INSPECTED AND TESTED IN ACCORDANCE WITH PRESCRIBED METHODS IN THE GOVERNING SPECIFICATIONS AND BASED UPON THE RESULTS OF SUCH INSPECTION AND TESTING DOES CONFORM TO THE REQUIREMENTS OF NACE MR 01-75.

PLATE: ASTM A516-70 AND ASME SA516-70 LATEST EDITION.
SIZE: 1" NOMINAL
MILL CERTIFIED: NUCOR
HEAT: 2603538
SLAB: 03

Specification: NACE MR 01-75

Hardness, HRC	Results	Hardness, BHN	Results
			162, 162, 163

WE HEREBY CERTIFY THE ABOVE INFORMATION IS CORRECT.


MARTY L. EUBANKS
QUALITY ASSURANCE MANAGER
(918) 583-2222



CERTIFICATE OF COMPLIANCE

DATE: NOVEMBER 9, 2022

SUBJECT: NACE

GENTLEMEN:

I HEREBY CERTIFY THAT THE MATERIAL LISTED HEREIN HAS BEEN INSPECTED AND TESTED IN ACCORDANCE WITH PRESCRIBED METHODS IN THE GOVERNING SPECIFICATIONS AND BASED UPON THE RESULTS OF SUCH INSPECTION AND TESTING DOES CONFORM TO THE REQUIREMENTS OF NACE MR 01-75.

PLATE: ASTM A516-70N AND ASME SA516-70N LATEST EDITION.

SIZE: 1" NOMINAL

MILL CERTIFIED: NUCOR

HEAT: 2603538

SLAB: 03

Specification: NACE MR 01-75

Hardness, HRC

Results

Hardness, BHN

Results

160, 162, 165

WE HEREBY CERTIFY THE ABOVE INFORMATION IS CORRECT.

A handwritten signature in black ink, appearing to read 'Marty Eubanks', is written over a horizontal line.

MARTY L. EUBANKS
QUALITY ASSURANCE MANAGER
(918) 583-2222

Mill Test Report

Page 1

1505 River Rd
Cofield, NC 27922
(252) 356-3700

Issuing Date : 08/01/2022 B/L No. : 629578 Load No. : 647645 Our Order No. : 198418/1 Cust. Order No. : 126778
Vehicle No: ALY 91713 Sold To: PORT CITY METALS SERVICES INC A DIVISION OF METALS USA Ship To: PORT CITY METAL SERVICES, INC.
Specification: 0.6250" x 96.000" x 480.000" 3101 CHARLES BLVD JUNCTION 12
ASTM A516 70/65/60/485-17/ASME SA516-70/65/60/485 PVQ 2019/2021 TULSA,OK 74127 (2) HALE,OK 74127
Normalized Plate NACE MR0175 Annex 2.1.2 (2015), MR0103 (2010)
Section 2.1.2 (2015) 13.1.1, 13.1.2)Compliant

Marking :

Heat No	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Al(tot)	V	Nb	Ti	N	Ca	B	Sn	Ceq	Pcm
2603381	0.18	1.02	0.010	0.001	0.18	0.30	0.13	0.10	0.03	0.029	0.004	0.003	0.002	0.0058	0.0010	0.0000	0.011	0.41	0.26

Plate Serial No	Pieces	Tons	Tensile Test					Heat Treat			
			Dir.	Yield (psi)	Tensile (psi)	Elong. % in 2"	Elong. % in 8"	Norm (°F)	Time (min)	Temper (°F)	Time (min)
2603381-02	1	4.08	H-T	49,900	74,400	43.5		1650	27		
2603381-03	1	4.08	H-T	50,400	74,200	45.4		1650	27		

Manufactured to fully killed fine grain practice by Electric Arc Furnace. Welding or weld repair was not performed on this material. Mercury has not been used in the direct manufacturing of this material. Produced as continuous cast discrete plate, unless otherwise noted in Specification. For Mexico shipments:nhc-SalesMX@nucor.com
Yield by 0.5EUL method unless otherwise specified. Ceq = C+(Mn/6)+((Cr+Mo+V)/5)+((Cu+Ni)/15)
Pcm = C+(Si/30)+(Mn/20)+(Cu/20)+(Ni/60)+(Cr/20)+(Mo/15)+(V/10)+5B
Melted and Manufactured in the USA. ISO 9001:2015 certified. PED 2014/68/EU, 97/23/EC 7/2 Annex 1, Para. 4.3 Compliant. API Q1-1851
DIN 50049 3.1.B/EN 10204 3.1(2004) 3.1B(1993)/ DIN EN 10204 3.1(2005) compliant. ABS QA-3624366

We hereby certify that the contents of this report are accurate and correct. All test results and operations performed by the material manufacturer are in compliance with the applicable specifications, including customer specifications.

T. A. Depretis
T. A. Depretis, Metallurgist

8/1/2022 2:02:22 PM

Q.A. APPROVED
By *[Signature]* Date *8/1/2022*

7
8
9
10
21
22
23
24
43
44
45
46

GLOBE X-RAY SERVICES, INC.

8441 South Union Tulsa, OK 74132

Certification 162541

Report of Ultrasonic Examination

Customer: Port City P. O. 128486
Address: _____ Job # _____

Ultrasonic Examination

Test Instrument: Sonatest D-20+ S/N: 1013300
Surface Condition: Smooth Procedure #: GXS-II-D & B Rev: 1-22
Couplant: Sonix Search Unit Cable: RG-174 Co-Axial, 6FT. Long with BNC to BNC Connectors
Beam Angle: 0 Degrees Search Unit 1" x 2.25 MHz S/N: 66159
Scanning Pattern: 100% Reference Level: 35-39 Db
Calibration Reference: Backwall Technique: Contact, Manual Scan
Scanning Surface: One major surface

Reference Standard:

☒ ASTM/ASME A-578/SA-578 LEVEL A(1)
☒ ASTM/ASME A-578/SA-578 LEVEL B(2) ☒ ASTM/ASME A-435/SA-435
☒ ASTM/ASME A-578/SA-578 LEVEL C(3)

Notes: _____

Thickness/Grade	Slab	Area	Heat Number/Code	Accept	Reject
1/2" SA516-70N	A23	96" x 44"	W2F527	✓	
1/2" SA516-70N	D26	120" x 118"	E2B201	✓	
5/8" SA516-70N	02	96" x 480"	2603381	✓	
1" SA 516-70N	05	120" x 480"	1600564	✓	

Unless otherwise noted by an * following the item number, there were no recordable indications observed.

Examination By: Colter Moyer Qualification Level: II
Date: October 28, 2022 Time: NA AM/PM

GLOBE XRAY ASSUMES NO RESPONSIBILITY FOR THE INTEGRITY OF THE STRUCTURE OR ANY LOSSES OF ANY KIND DUE TO ANY KIND OF INTERPRETATION

Q.A. APPROVED
By gu Date 10/31/2022



CERTIFICATE OF COMPLIANCE

DATE: NOVEMBER 9, 2022
SUBJECT: NACE

GENTLEMEN:

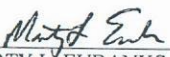
I HEREBY CERTIFY THAT THE MATERIAL LISTED HEREIN HAS BEEN INSPECTED AND TESTED IN ACCORDANCE WITH PRESCRIBED METHODS IN THE GOVERNING SPECIFICATIONS AND BASED UPON THE RESULTS OF SUCH INSPECTION AND TESTING DOES CONFORM TO THE REQUIREMENTS OF NACE MR 01-75.

PLATE: ASTM A516-70N AND ASME SA516-70N LATEST EDITION.
SIZE: 5/8" NOMINAL
MILL CERTIFIED: NUCOR
HEAT: 2603381
SLAB: 02

Specification: NACE MR 01-75

Hardness, HRC	Results	Hardness, BHN	Results
			164, 165, 168

WE HEREBY CERTIFY THE ABOVE INFORMATION IS CORRECT.



MARTY L. EUBANKS
QUALITY ASSURANCE MANAGER
(918) 583-2222

SSAB

12400 Highway 43 North, Axis, Alabama 36505, US

MTR 9661 Test Certificate

WARNING: This product can expose you to chemicals including nickel and nickel compounds, which are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov

Form TC1: Revision 5: Date 22 Aug 2022

Customer: LEECO STEEL PRODUCTS, INC. 1011 WARRENVILLE ROAD SUITE 500 LISLE IL 60532	Customer P.O.No.: V33048 Product Description: ASME SA516-70/SA516-65/SA516-60(23) ASTM A516-70/A516-65/A516-60(17) LCVN 20/15 FT.LBS @ -50F/A673-P CEV .43% MAX Size: 0.500 X 96.00 X 480.0 (IN)	Mill Order No.: 41-723601-01 Shipping Manifest: AR390287 Ship Date: 04 Nov 23 Cert Date: 04 Nov 23 Cert No: 081142845 (Page 1 of 1) Heat Treat Type: NORMALIZED
---	--	---

Tested Pieces:				Tensiles:					Charpy Impact Tests										BDWTT Tnp %Shr	
Heat Id	Piece Id	Tested Thickness	Tst Loc	YS (KSI)	UTS (KSI)	%RA	Elong % 2in 8in	Tst Dir	Hardness	Abs. Energy(FTLB)				% Shear				Tst Tnp		Tst Dir
W3J537	C41	0.503 (DISCRT)	C	55	78		40	T		65	97	117	93					-60F	L	10

Chemical Analysis																		ORGN
Heat Id	C	Mn	P	S	Si	Tot Al	Sol Al	Cu	Ni	Cr	Mo	Cb	V	Ti	B	IIW		
W3J537	.19	1.05	.012	.002	.24	.027	.025	.25	.13	.14	.03	.000	.002	.007	.0001	.42		USA

KILLED STEEL
MERCURY IS NOT A METALLURGICAL COMPONENT OF THE STEEL AND NO MERCURY WAS INTENTIONALLY ADDED DURING THE MANUFACTURE OF THIS PRODUCT.

KILLED STEEL, PRODUCED TO A FINE GRAIN PRACTICE
CEV (IIW) = C + MN/6 + (CR+MO+V)/5 + (NI+CU)/15
NACE MRO175/ISO15156-2:2015 ANNEX A2.1.2 COMPLIANT
NACE MRO103/ISO 17495-1:2015 13.1.1(A) AND 13.1.1(C) COMPLIANT
MTR EN 10204:2004 INSPECTION CERTIFICATE 3.1 COMPLIANT
100% MELTED, FOUNDED, AND ROLLED IN THE USA
NO WELD REPAIR HAS BEEN PERFORMED ON THIS MATERIAL.
NORMALIZED PLATES. HEATED AT 1665F FOR 22 MINUTES.
TEST COUPONS TAKEN FROM HEAT TREATED PLATE.

PRODUCTS SHIPPED:

W3J537 C41	40117174	PCES:	1, LBS:	6534	W3J537 C41	40117172	PCES:	1, LBS:	6534
W3J537 C41	40117168	PCES:	1, LBS:	6534	W3J537 C41	40117167	PCES:	1, LBS:	6534
W3J537 C41	40117166	PCES:	1, LBS:	6534	W3J537 C41	40117165	PCES:	1, LBS:	6534
W3J537 C41	40117164	PCES:	1, LBS:	6534					

CEQ#042

© Cust Part #: 050096480A516-70N

WE HEREBY CERTIFY THAT THIS MATERIAL WAS
TESTED IN ACCORDANCE WITH AND MEETS THE
REQUIREMENTS OF THE APPROPRIATE SPECIFICATION

Jason Thomas

Director Technical Services

MTR 6833

SSAB**Test Certificate**

12400 Highway 43 North, Axis, Alabama 36505, US

WARNING: This product can expose you to chemicals including nickel and nickel compounds, which are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov

Form TCT: Revision 4: Date 6 Feb 2019

Customer: LEECO STEEL PRODUCTS, INC. 1011 WARRENVILLE ROAD SUITE 500 LISLE IL 60532	Customer P.O.No.: V25285 Product Description: ASME SA516-70/SA516-85/SA516-80(21) ASTM A516-70/SA516-85/SA516-80(17) LCVN 20/15 FT LBS @ -50F/A573-P CEV 43% MAX Size: 1.500 X 120.0 X 480.0 (IN)	Mill Order No.: 41-657721-01 Shipping Manifest: AR351092 Ship Date: 15 Feb 22 Cert Date: 15 Feb 22 Cert No: 081030419 (Page 1 of 1) Heat Treat Type: NORMALIZED
---	---	---

Tested Pieces:				Tensiles:					Charpy Impact Tests											BDWTT Tmp %Shr	
Heat Id	Piece Id	Tested Thickness	Tst Loc	YS (KSI)	UTS (KSI)	%RA	Elong %		Tst Dir	Hardness	Abs. Energy(FTLB)				% Shear			Tst Tmp	Tst Dir		Tst Siz (mm)
							2in	8in			1	2	3	Avg	1	2	3				
E1K179	A26	1.513 (DISCRT)	C S1	77			56		T			35	32	35	34				-50F		10

Chemical Analysis																	
Heat Id	C	Mn	P	S	Si	Tot Al	Sol Al	Cu	Ni	Cr	Mo	Co	V	Ti	B	IIV	ORG
E1K179	19	1.08	.007	<.001	.33	.042	.041	.26	.13	.12	.02	.005	.004	.001	.0001	.42	USA

KILLED STEEL
MERCURY IS NOT A METALLURGICAL COMPONENT OF THE STEEL AND NO MERCURY WAS INTENTIONALLY ADDED DURING THE MANUFACTURE OF THIS PRODUCT.

KILLED STEEL, PRODUCED TO A FINE GRAIN PRACTICE
CEV (IIV) = C + Mn/6 + (Cr+Mo+V)/5 + (Ni+Cu)/15
NACE MR0175/ISO 15156-2:2015 ANNEX A2.1.2 COMPLIANT
NACE MR0103/ISO 17495-1:2015 19.1.1(A) AND 19.1.1(C) COMPLIANT
MTR EN 10204:2004 INSPECTION CERTIFICATE 3.1 COMPLIANT
100% MELTED, POURED, AND ROLLED IN THE USA
NO WELD REPAIR HAS BEEN PERFORMED ON THIS MATERIAL.
NORMALIZED PLATES. HEATED AT 1685F FOR 63 MINUTES.
TEST COUPONS TAKEN FROM HEAT TREATED PLATES.
PRODUCTS SHIPPED:

E1K179 A26 40075715 PCS: 1, LBS: 24503

E1K179 A26 40075716 PCS: 1, LBS: 24503

CEQ = .42

(2) Cust Part #: 150120480A516-70N

WE HEREBY CERTIFY THAT THIS MATERIAL WAS
TESTED IN ACCORDANCE WITH, AND MEETS THE
REQUIREMENTS OF, THE APPROPRIATE SPECIFICATION

Colt Beck
PRODUCT METALLURGIST

NUCOR
PLATE MILL GROUP

P.O. Box 279
Winton, NC 27986
(252) 356-3700

MTR 9265

Mill Test Report

1585 River Rd
Cottfield, NC 27922
(252) 356-3700

AMERICAN ALLOY
PLATE # 52mm

Issuing Date : 06/03/2023 B/L No. : 669114 Load No. : 066613 Our Order No. : 2060302 Cust. Order No. : 136043-OK
Vehicle No : TTPX 61632 Sold To : AMERICAN ALLOY STEEL INC 6236 N HOUSTON ROSSLYN RD PO BOX 40488 NORTH HOUSTON, TX 77061 Ship To : AMERICAN ALLOY STEEL 6380 N ERIE AVE C/O BKOL TRACK #21 OKWASSO, OK 74055
Specification : 0.5000" x 48.000" x 980.000"
ASTM A516 70/65/50-17/ASME B516-70/65/50 PVQ2019/2021
Normalized Plate NACE MR0175 Annex 2.1.2 (2016), MR0183 (2010)
Section 2.1.2 Compliant (2019) 13.1.1, 13.1.2 Vacuum Degassed
Marking : 136043-OK

Heat No	C	Mn	P	S	Si	Cu	NI	Cr	Mo	Nb	V	Ni	Ti	N	Ca	B	Sn	Ceq	Pcm
3603032	0.20	1.06	0.010	0.001	0.21	0.24	0.11	0.07	0.02	0.030	0.003	0.002	0.001	0.0054	6.9013	0.0002	0.010	0.41	6.28
3603033	0.19	1.04	0.010	0.001	0.18	0.21	0.09	0.06	0.02	0.028	0.002	0.002	0.001	0.0052	6.9013	0.0001	0.011	0.40	6.29

Plate Serial No	Pieces	Tens	Dir.	Tensile Test				Heat Treat			
				Yield (psi)	Tensile (psi)	Elong. % in 2"	Elong. % in 8"	Norm (°F)	Time (min)	Temper (°F)	Time (min)
3603032-07	8	19.80	H-T	51,400	76,900	47.4		1650	23		
3603033-01	4	13.06	H-T	56,900	75,400	45.9		1650	23		

Plate Serial No	Pieces	Tens	Dir.	Absorbed Energy (ft-lb)				Lateral Expansion (in.)				Shear (%)				Min	Temp (°F)	Size
				(ft-lb) 1	(ft-lb) 2	(ft-lb) 3	Ave	(in.) 1	(in.) 2	(in.) 3	Ave	(%) 1	(%) 2	(%) 3	Ave			
3603032-07	8	19.80	H-L	87.7	86.2	105.2	86.4	15								-50	10mm	
3603033-01	4	13.06	H-L	56.8	86.1	33.4	69.4	15								-60	10mm	

MATERIAL CONFORMS TO
NACE MR0175

3HN 153 TO 159
CERTIFIED BY
AMERICAN ALLOY STEEL
BY LMS DATE 10/12/23

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

Reviewed By:

10/11/23

HOT ROLLED CARBON STEEL PLATE
TEST COUPONS TAKEN FROM HEAT TREATED PLATE

Please frequency sharp:

Material selected to fully meet the requirements of Electric Arc Furnace. Welding or other repair work not permitted on this material.
Mercury has not been used in the direct manufacturing of this material. Produced as continuous cast discrete plate, unless otherwise noted in Specification. For Mexico shipments: mto-sales@nucor.com
Yield by 0.55UL method unless otherwise specified. Ceq = C + (Mn/6) + ((Cr + Mo + V)/5) + ((Cu + Ni)/15)
Pcm = C + (B/30) + (Mn/20) + (Cu/20) + (Ni/30) + (Cr/20) + (Mo/15) + (V/10) + 6B
Melted and Manufactured in the USA. ISO 9001:2015 certified. PED 2014/68/EU, 97/23/EC 7/2 Annex 1, Para. 4.3 Compliant. API Q1-1961
DIN 50446 3.1, EN 10204 3.1(2004) 3.1B(1999) DIN EN 10204 3.1(2006) compliant. ABS QA-982406

We hereby certify that the contents of this report are accurate and correct. All test results and operations performed by the material manufacturer are in compliance with the applicable specifications, including customer specifications.

C.L. Cooper

C. L. Cooper, Metallurgist

6/3/2023 2:06:08 PM

SSAB**Test Certificate**

1770 Bill Sharp Boulevard, Muscatine, IA 52761-9412, US

WARNING: This product can expose you to chemicals including nickel and nickel compounds, which are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

Form TC1: Revision 4: Date 6 Feb 2019

Customer: STEEL & PIPE SUPPLY P.O. BOX 1688 MANHATTAN KS 66502				Customer P.O.No.: 4500353651				Mill Order No. 41-617854-01				Shipping Manifest: MR417701									
				Product Description: ASTM A36(19)/A709(18)36/ASME SA36(19) 0.80%-1.20% MN, MAX 0.05% SI, 0.45% CEV				Ship Date: 27 Oct 20 Cert Date: 27 Oct 20				Cert No: 061863816 (Page 1 of 1)									
				Size: 0.242(MIN) X 72.00 X COIL (IN)																	
Tested Pieces:				Tensiles:				Charpy Impact Tests													
Heat Id	Piece Id	Tested Thickness	Tst Loc	YS (KSI)	UTS (KSI)	%RA	Elong % 2in 8in	Tst Dir	Hardness	Abs. Energy(FTLB) 1 2 3 Avg				% Shear 1 2 3 Avg				Tst Tmp	Tst Dir	Tst Siz (mm)	BDWTT Tmp %Shr
B0J739	0673	0.250		54	73		26	T													
B0J740	0663	0.250		50	70		34	T													
Chemical Analysis:																					
Heat Id	C	Mn	P	S	Si	Tot Al	Cu	Ni	Cr	Mo	Cb	V	Ti	B	N	IIW	ORGN				
B0J739	.16	.83	.006	.004	.03	.027	.31	.15	.09	.03	.001	.002	.006	.0000	.0081	.35	USA				
B0J740	.16	.84	.008	.003	.04	.024	.32	.15	.12	.04	.000	.002	.006	.0000	.0079	.36	USA				

KILLED STEEL

MERCURY IS NOT A METALLURGICAL COMPONENT OF THE STEEL AND NO MERCURY WAS INTENTIONALLY ADDED DURING THE MANUFACTURE OF THIS PRODUCT.

HOT-ROLLED COIL INTENDED FOR CONVERSION TO GRADE. CERTIFIED TO CHEMISTRY ONLY.

COIL END PHYSICAL TEST RESULTS, IF REPORTED, ARE FOR INFORMATION ONLY.

CEV (IIW) = $C + \frac{Mn}{6} + \frac{(Cr+Mo+V)}{5} + \frac{(Ni+Cu)}{15}$

MTR EN 10204:2004 INSPECTION CERTIFICATE 3.1 COMPLIANT

100% MELTED, POURED, AND ROLLED IN THE USA

PRODUCTS SHIPPED:

B0J740	0665	PCES:	1, LBS:	49200	B0J739	0670	PCES:	1, LBS:	49200
B0J739	0668	PCES:	1, LBS:	49250	B0J739	0667	PCES:	1, LBS:	49200

Q.A. APPROVED

By  Date 2/3/21

(P) Cust Part # 70872999M3

WE HEREBY CERTIFY THAT THIS MATERIAL WAS
TESTED IN ACCORDANCE WITH, AND MEETS THE
REQUIREMENTS OF, THE APPROPRIATE SPECIFICATION

Brian Wales

SENIOR METALLURGIST, PRODUCT



JSW Steel (USA) INC.
5200, East McKinney Road,
BAYTOWN, TX 77523

METALLURGICAL TEST REPORT

MET - 04 Rev. No.: 3 Rev. Date: 02/27/2018

5/28/2022

Bulletin	Order Item	Heat	PO No.	Shipping Mode	Order Dimensions	Slab Origin	TC No.
B114564	JSW19151-06	S31285	25.498	BARGE ITFX54141	1.25x96x240	JSW USA	B114564-1285-1

MELTED AND MANUFACTURED IN THE USA.

Plates Certified for the Following grades
ASTM-A36, ASTM-A709-36, ASME-SA36 AR

Specifications

Marking Instructions

Stencil in 1 location(s); X Loc. 18 Y Loc. 30; CUST; MADEINUSA PN PO;
DIM GRADE; FREIGHT ORDER ITEM PLATE ID SHIPWEEK SLAB ID
TRANSMODE Stamp in 1 location(s); X Loc. 18 Y Loc. 12; Slab ID; Slab ID

Hot Rolled Carbon Steel Plates
Plates Manufactured In the USA

Sold To: SUNBELT GROUP INC. 1990 POST OAK BLVD. SUITE 950 HOUSTON, TX 77056

Complies with ASTM A36 2019

Ship To: SUNBELT GROUP C/O RICHARDSON CO 2333 CLINTON DRIVE GALENA PARK, TX 77547

Test	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn	Al	N	V	B	Ti	Nb	Ca	CE
LADLE	0.14	1.05	0.009	0.003	0.22	0.081	0.034	0.042	0.001	0.004	0.042	0.0086	0.004	0.0003	0.006	0.002	0.0019	0.33

Carbon Equivalent CE = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15

PCM = C + Si/30 + Mn/20 + Cu/20 + Ni/60 + Cr/20 + Mo/15 + V/10 + 5B

AWS = C + (Mn+Si)/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15

Plate Tested	Smpl. Loc.	Slab Identity	Gauge Tested	Test Cond	Test Dir.	Yield Point (KSI)	Ten. Stgth. (KSI)	Elong In 2"	YS/UTS Ratio	Yield Strength Determined At
1236158	A	06A	1.2500	AR	T	46	70	32.0%	0.66	0.2%
1236159	A	06B	1.2500	AR	T	42	69	34.0%	0.61	0.2%

Plates Certified For The Above Tests

Material	Thick(IN)	Width(IN)	Len(IN)	Wgt(LB)	Material	Thick(IN)	Width(IN)	Len(IN)	Wgt(LB)	Material	Thick(IN)	Width(IN)	Len(IN)	Wgt(LB)
1248104A	1.2500	96.000	240.00	8167.680										

DIN: EN 10204 2004 3.1 This is to certify that the product described herein was manufactured, sampled, and tested in accordance with the specifications and requirements in such specifications. Fine Grain, Si-Al Fully Killed Steel. We certify that delivery of this product with the requirement of the specification and purchase order received from customer. DRC Conflict Free. No intentional addition of Pb, Se, S, Hg or B.

Q.A. APPROVED
By *[Signature]* Date *12/12/2022*
April W

April Watkins 8323835325 april.watkins@jswsteel.us



CERTIFICATE OF COMPLIANCE

DATE: OCTOBER 26, 2022
SUBJECT: NACE

GENTLEMEN:

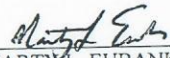
I HEREBY CERTIFY THAT THE MATERIAL LISTED HEREIN HAS BEEN INSPECTED AND TESTED IN ACCORDANCE WITH PRESCRIBED METHODS IN THE GOVERNING SPECIFICATIONS AND BASED UPON THE RESULTS OF SUCH INSPECTION AND TESTING DOES CONFORM TO THE HARDNESS REQUIREMENTS OF NACE MR 01-75.

PLATE: ASTM A-36
SIZE: 1-1/4" NOMINAL
MILL CERTIFIED: JSW STEEL
HEAT: S31285
SLAB: None

Specification: NACE MR 01-75

Hardness, HRC	Results	Hardness, BHN	Results
			160, 154, 165

WE HEREBY CERTIFY THE ABOVE INFORMATION IS CORRECT.



MARTY L. EUBANKS
QUALITY ASSURANCE MANAGER
(918) 583-2222

PO/Rel

Certificate of Mill Test Results

TUL-000000-000

PART NO.

Attn:

Pg 1/1

SSAB

12400 Highway 43 North, Axis, Alabama 36505, US

Test Certificate

WARNING: This product can expose you to chemicals including nickel and nickel compounds, which are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

Form TC1: Revision 4: Date 6 Feb 2019

Customer: CHAPEL STEEL CORPORATION PO BOX 1000 SPRING HOUSE PA 19477				Customer P.O.No.: TUL-331		Mill Order No. 41-876504-02		Shipping Manifest: AR359558								
				Product Description: ASME SA516-70/SA516-65/SA516-60(21) ASTM A516-70/A516-65/A516-60(17) VACUUM DEGAS; C.23%,S.015% MAX;ELG 2" LCVN 20 FT.LBS. @ -50F/A673-P				Ship Date: 28 Jun 22 Cert Date: 28 Jun 22 Cert No: 081054055 (Page 1 of 1)								
				Size: 1.250 X 96.00 X 480.0 (IN)				Heat Treat Type: NORMALIZED								
Tested Pieces:				Tensiles:				Charpy Impact Tests								
Heat Id	Piece Id	Tested Thickness	Tst Loc	YS (KSI)	UTS (KSI)	%RA	Elong % 2in 8in	Tst Dir	Hardness	Abs. Energy(FTLB) 1 2 3 Avg	% Shear 1 2 3 Avg	Tst Tmp	Tst Dir	Tst Siz (mm)	BDWTT Tm %Shr	
E2F017	A35	1.257 (DISCRT)	C	50	75		52	T		98 108 116 107		-50F	L	10.		
Chemical Analysis																
Heat Id	C	Mn	P	S	Si	Tot Al	Sol Al	Cu	Ni	Cr	Mo	Ch	V	Ti	B	IW
E2F017	.18	1.00	.010	.001	.24	.028	.028	.29	.15	.13	.02	.080	.002	.008	.0001	.41
ORG																
USA																

KILLED STEEL

MERCURY IS NOT A METALLURGICAL COMPONENT OF THE STEEL AND NO MERCURY WAS INTENTIONALLY ADDED DURING THE MANUFACTURE OF THIS PRODUCT.

KILLED STEEL, PRODUCED TO A FINE GRAIN PRACTICE

CEV (IIT) = C + MN/6 + (CR+MO+V)/5 + (NI+CU)/15

NACE MR0175/ISO15156-2:2015 ANNEX A2.1.2 COMPLIANT

NACE MR0103/ISO 17495-1:2015 13.1.1(A) AND 13.1.1(C) COMPLIANT

MTR EN 10204:2004 INSPECTION CERTIFICATE 3.1 COMPLIANT

100% MELTED, POURED, AND ROLLED IN THE USA

NO WELD REPAIR HAS BEEN PERFORMED ON THIS MATERIAL.

NORMALIZED PLATES. HEATED AT 1665F FOR 53 MINUTES.

TEST COUPONS TAKEN FROM HEAT TREATED PLATE.

PRODUCTS SHIPPED:

E2F017 A35 40086983 PCES: 1, LBS: 16335

E2F017 A35 40086982 PCES: 1, LBS: 16335

E2F017 A35 40086981 PCES: 1, LBS: 16335

Q.A. APPROVED

3y

Date 10/31/2022

(7)

Cust Part #:

WE HEREBY CERTIFY THAT THIS MATERIAL WAS
TESTED IN ACCORDANCE WITH, AND MEETS THE
REQUIREMENTS OF, THE APPROPRIATE SPECIFICATION

Jason Thomas

Director Technical Services

ANTHONY CARDWELL

45110in

12/13/2022



CERTIFICATE OF COMPLIANCE

DATE: NOVEMBER 10, 2022

SUBJECT: NACE

GENTLEMEN:

I HEREBY CERTIFY THAT THE MATERIAL LISTED HEREIN HAS BEEN INSPECTED AND TESTED IN ACCORDANCE WITH PRESCRIBED METHODS IN THE GOVERNING SPECIFICATIONS AND BASED UPON THE RESULTS OF SUCH INSPECTION AND TESTING DOES CONFORM TO THE REQUIREMENTS OF NACE MR 01-75.

PLATE: ASTM A516-70N AND ASME SA516-70N LATEST EDITION.

SIZE: 1-1/4" NOMINAL

MILL CERTIFIED: SSAB

HEAT: E2F017

SLAB: A35

Specification: NACE MR 01-75

Hardness, HRC

Results

Hardness, BHN

Results

165, 166, 162

WE HEREBY CERTIFY THE ABOVE INFORMATION IS CORRECT.


MARTY L. EUBANKS
QUALITY ASSURANCE MANAGER
(918) 583-2222



14527 Smith Rd.
Humble, Texas 77396
TEL: (281) 441-4088
FAX: (281) 441-8899

PAGE: 1 of 1
REPORT # 22-036557
DATE: 11/18/2022

FCI ORDER # 117284
IAW ASME 2021 ED.
IAW NACE MR0175 2015Ed

CUSTOMER ORDER # 22-3187-CM
SOLD / SHIPPED TO: LEE SUPPLY

Item Quantity Description

1 4 4" X 600 X 9" LG RF LWN, TAG# 794744 KC PART HBW: 156

Heat Number: 30808A

Steel Origin (melt): JAPAN

Material Type: SA105N/SA350LF2CL1

CHEMICAL ANALYSIS

PHYSICAL PROPERTIES

C .19
Mn 1.22
P .016
S .002
Si .28
Cr .04
Mo .00
V .00
Cu .01
Ni .01
Cb(Nb) .00

Sn
As
Sb
Ti .00
Al .04
B .0005
C E 0.40

Yield PSI 50,600
Tensile PSI 78,400
Elongation % 33.7
Reduction of Area % 76.7
Hardness 152/152 HBW
CVN -50 °F FT LBS 112/135/86
% Shear 100/100/100
MLE .082/.098/.070

MADE TO FINE GRAIN PRACTICE

Heat Treatment **NORMALIZED**
Temperature 1706 °F
Time at Temperature 4 HRS
Cooling Media AIR

We hereby certify that all test results and process information contained herein are correct and true as contained in the records of the company.

Prepared by:

Name: Cynthia Madrid

Title: QA Representative



14527 Smith Rd.
Humble, Texas 77396
TEL: (281) 441-4088
FAX: (281) 441-8899

PAGE: 1 of 1
REPORT # 22-036458
DATE: 11/17/2022

FCI ORDER # 117259
IAW ASME 2021 ED.
IAW NACE MR0175 2015Ed

CUSTOMER ORDER # 22-3172-CM
SOLD / SHIPPED TO: LEE SUPPLY

13312-2-3 FL

Item Quantity Description

1 4 2" X 300 X 9" LG RF LWN, TAG# 795089 KC
RACK RW0320

PART HBW: 159

Heat Number: 11014B

Steel Origin (melt): JAPAN

Material Type: SA105N/SA350LF2CL1

CHEMICAL ANALYSIS

PHYSICAL PROPERTIES

C .18
Mn 1.23
P .014
S .006
Si .27
Cr .04
Mo .01
V .00
Cu .01
Ni .03
Cb(Nb) .00
N
Sn
As
Sb
Ti .00
Al .03
B .0005
C E 0.40

Yield PSI 41,600
Tensile PSI 71,900
Elongation % 39
Reduction of Area % 71.6
Hardness 143/143 HBW
CVN -50 °F FT LBS 25/23/18
% Shear 10/10/10
MLE .022/.021/.015

MADE TO FINE GRAIN PRACTICE

Heat Treatment NORMALIZED
Temperature 1706 °F
Time at Temperature 4 HRS
Cooling Media AIR

We hereby certify that all test results and process information contained herein are correct and true as contained in the records of the company.

Prepared by:

Name: Cynthia Madrid

Title: QA Representative



400 McMunn St.
South Lyon, MI 48178

TEST REPORT



Date : 07/28/2022

Page : 1

Truck# : MT07694

Heat : 5394350

Job : MJ00007743

Pick# : 62769

Ship# :

Order : MS00011201

Ship To :		Sold To :	
P.O. No : 10P37874	Cust Item :	Shape : Round Round	Wt/ft : 2.844
OD Size : 1.315 IN	ID Size :	Wall Size : 0.250 IN (Average)	
Surface : BLUE UV COATING		Anneal : Per Spec	

Specifications : ASME-SA106-B/C, ASME-SA53-GrB, ASTM-A106-19a-B/C, ASTM-A53-20-Gr. B, DIN-DIN 50049 3.1-1998, EN-EN 10204 3.1-2004, NACE-MR0103-2015, NACE-MR0175-2015

BLUE UV ECT. Cert & stencil to A/SA106B, A/SA106C, A/SA53B, TYPE S. EN10204 3.1, DIN 50 049 3.1, NACE MR0175 & 0103. Melt & Mfg in USA. HtTime & Temp, trace elements. Ship +/-10%. Email ship docs to Carri Bethel when ready

Heat		Furnace				Melted Source										Feet		Weight (lbs)						
5394350		EAF				USA,REPUBLIC STEEL CANTON, OH										3843		10929						
Chemical Analysis (wt %)																								
	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Al	V	Sn	Nb	SB	As	Ti	Zr	N	Ca	CO	W	B	H2	CE
L	0.26	0.72	0.018	0.021	0.310	0.130	0.10	00.15	0.02	0.021	0.003	0.005	0.000	0.001	0.003	0.001		0.006		0.010				0.42
P1	0.24	0.72	0.012	0.013	0.282	0.114	0.09	00.13	0.02	0.016	0.004													
P2	0.25	0.72	0.013	0.014	0.278	0.116	0.09	00.13	0.02	0.016	0.004													
Mechanical Properties																						Hardness		
Tensile		Yield		%Elong																HRbw Mid				
76349		51497		2"																79.0 82.0				
49.3																								
Tensile: Full Size Longitudinal																								
Hydrostatic Test Results																								
Hydro(Tested 100% Length)								Ultrasonic %		Eddy Current		Flatten		Flare		Bend		Expansion						
								PASS						PASS										
Normalized				Temper				Final Anneal				Stress Relieved												
Temperature		Time		Temperature		Time		Temperature		Time		Temperature		Time										
1650 F		20.00 Min																						
Lot Details																								
Bundle		Footage		Pcs		Length																		
ms0001120101001		1281		61		Cut 21' 0.000" -																		
ms0001120101002		1281		61		Cut 21' 0.000" -																		
ms0001120101003		1281		61		Cut 21' 0.000" -																		



400 McMunn St.
South Lyon, MI 48178

TEST REPORT



Date : 07/28/2022

Page : 2

Job : MJ00007743

Order : MS00011201

Truck# : MT07694

Heat : 5394350

Pick# : 62769

Ship# :

- Material has not been exposed to metallic mercury, lead or asbestos so as to cause contamination. Material is free from radioactive contamination. Cold Drawn Seamless. No weld repair. 100% Manufactured, USA.
- Michigan Seamless Tube LLC, South Lyon MI is a division of Specialty Steel Works, Inc.
- Certificate of Conformance Statement: This certificate asserts that the tubing listed above has been manufactured, inspected and approved in accordance with all specifications, requirements and the customer's purchase order.

Jacob Gorkowski
Quality Assurance Manager

2827 / BC8904 / 1.0LR90160D / 1" S160 LR 90 ELBOW SA234 WPB
ALLOY PIPING PRODUCTS LLC

Mill Test Report

Date: 07/20/22
 Time: 10:37:16
 Page: 1/2

INSPECTION CERTIFICATE
 EN 10204:2004 Type 3.1



From:

Alloy Piping Products, LLC
 740 North Market Street
 Shreveport, LA 71107

To:

Customer Order#:

APP Invoice#:

Heat Number	Item Number	Item Description	Quantity
BC8904	263257	1" 160 WPB SMLS B/W LR 90 ELBOW	

Starting Material:
 Pipe Seamless

Order Spec:

Item Spec:	ASTM A234	2019	ASME SA-234	2021		
------------	-----------	------	-------------	------	--	--

Chemical Composition (wt%)					
Element	Content	Element	Content	Element	Content
C	0.11000	CR	0.12000	SUM OF CU+NI+CR+MO	0.16
MN	1.26000	MO	0.01000	SUM OF CR+MO	0.13
P	0.01200	CU	0.01000	SUM OF NB+V	0.00
S	0.00100	V	0.00200	CREQ: CR+(0.19*MO)+(0.40*CU)	0.13
SI	0.29000	NE	0.00100	MN/C RATIO	11.45
NI	0.02000	CARBON EQUIVALENT	0.35		

Test Results

Work Order#: 1001090	Load Designation:	Test Set: 0
----------------------	-------------------	-------------

Tensile Test		
Test ID: 1	Specimen Type: Longitudinal Rectangular	Gauge Length: 2.0000 in
Tensile Strength: 65,300 psi		Yield Strength: 46,500 psi
Elongation: 52 %		Reduction:

Hardness Test	
Test ID: 1	
Hardness	Notes
147 HBW(79 HRB)	HARDNESS IS ACCEPTABLE IN ACCORDANCE WITH NACE MR0175/ISO 15156:2015 AND MR0103/ISO 17945:2015

ANTHONY CARDWELL
12/13/2022

P2827 / BC8904 / 1.0LR90160D / 1" S160 LR 90 ELBOW SA234 WPB
ALLOY PIPING PRODUCTS LLC



Mill Test Report

Date: 07/20/22
Time: 10:37:16
Page: 2/2

INSPECTION CERTIFICATE
EN 10204:2004 Type 3.1

To:

From:
Alloy Piping Products, LLC
740 North Market Street
Shreveport, LA 71107

Customer Order#: APP Invoice#:

Heat Number	Item Number	Item Description	Quantity
BC8904	263257	1" 160 WPB SMLS B/W LR 90 ELBOW	

Test ID: 1	Heat Treatment Statement
NORMALIZED AT 1670°F	

Material supplied in accordance with a Quality Management System certified to ISO 9001:2015. Certificate Number: Q1674

Dimensions and Tolerances in accordance with ASME B16.9 or B16.5, as applicable. Bevels in accordance with ASME B16.25, unless noted otherwise.

Material, when shipped, is free from contamination by mercury, radium, alpha source and low melting elements. Where applicable, welds are 100% radiographed and acceptable to ASME Section VIII - Para UW-51. We hereby certify that the materials listed above have been manufactured, sampled, tested and inspected in accordance with the specifications and grade listed, and have been found to meet the requirements.

Stacey Freeman

QA Supervisor

07/20/22

Date

CLIENTE / Customer / Client

CERTIFICADO DE INSPECCION

UNE EN 10204:06 / 3.1

Inspection Certificate - Certificat de Réception

ISO 10474:15 / 3.1

FECHA:
Date:

25/10/2021

N.º
No.

216291

HOJA:
Page:

SGI 1922164



SGI 6000236



SGI 6009987



Advanced Forged Solutions

ULMA FORJA, S.COOP.

Management Systems certified by LRQAE

Certified acc. PED 97/23/EC+AD2000-W0

PED 14/68/UE

by TÜV Rheinland

N.º 01 202 E/Q 02 7443

MARCA DEL FABRICANTE

Mark of factory

Marque du fabricant

DEPARTAMENTO

Section

Département

QUALITY ASSURANCE

Bº Zubillaga, 3 - Apdo. 14
20560 ONATI (Gipuzkoa) SPAIN
Tel.: 34 - 943 780552
Fax: 34 - 943 781808
E-mail: ulma@ulmaforge.com

Packing List: 164645
Expedition: 382897

PRODUCTO
Article - Produit

FLANGES

SU PEDIDO N.º

Your Order No.

LA0507 HOUSTON

Votre Cde. N.º

DE

of. - de 13/10/2021

NORMAS APLICABLES
Requirements - Normes Applicables

ASME B16.5-17

MATERIAL CORRESPONDIENTE ASME SA350LF2CL1-2-19, ASTM A350LF2CL1-2-18

Material Correspondent - Qualité

MODO DE FUSION (*)

Steel Making - Elaboration de l'acier

E = Elec. Y = Oxígeno básico

NACE MR0175/ISO15156-02/03-15 & NACE MR0103/ISO17945-15

PARTIDA Item Poste	CANTIDAD Quantity Quantité	DESCRIPCION Description Description	LOTE	OBSERVACIONES Remarks Observations (*)	COLADA N.º Heat No N.º Coulée	RESISTENCIA T. Strength Resist Rupt N/mm²	LIMITE ELAST Y. Strength 0.2 % N/mm²	ALARGAM. Elongation Allongement L0:50mm/4d %	ESTRICCION Red. Area Striction %	RESILIENCIA Impact test Résilience Joules	CHARPY V 10x10mm MEDIA Average Moyenne °C	DUREZA Hardness Dureté HBW
31 F1LT8W00D	50	WN 1/2 150LB XS/80 RF A350LF2	09D17A	NE	D6AV7	510	308	34,20	62,00	68 76 76	73	-50 149 152
32 F1LT8W00E	50	WN 3/4 150LB XS/80 RF A350LF2	17D821	NE	C03A8	515	334	36,70	73,60	115 91 77	94	-50 146 149
56 F3LT16W010	50	WN 1 300LB S160 RF A350LF2	13E011	NE	K8AV9	520	330	39,08	73,68	122 129 137	129	-50 140 143
67 F3LTS010	24	SO 1 300LB RF A350LF2	13N17C	NE	A0AV7	508	307	30,50	61,60	64 74 68	69	-50 146 156
67 F3LTS010	6	SO 1 300LB RF A350LF2	26F18M	NE	E1AV7	518	309	29,20	63,80	59 63 58	60	-50 147 148

COMPOSICION QUIMICA - STEEL MAKER'S LADLE ANALYSIS - ANALYSE CHIMIQUE																
COLADA N.º Heat No Ladle: L Product: P	C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %	Nb %	V %	Cu %	Al %	Ti %	B %	CEq %	Origin of Steel
D6AV7 L	0,170	0,260	1,010	0,012	0,001	0,160	0,080	0,020	0,005	0,003	0,150	0,026	0,003	0,0001	0,39	Italy
C03A8 L	0,190	0,250	1,060	0,010	0,003	0,050	0,060	0,011	0,004	0,001	0,210	0,025	0,001	0,0004	0,40	France
K8AV9 L	0,180	0,190	1,070	0,012	0,002	0,070	0,150	0,030	0,001	0,002	0,200	0,025	0,001	0,0002	0,40	Italy
A0AV7 L	0,182	0,240	1,000	0,015	0,003	0,180	0,110	0,020	0,004	0,002	0,200	0,022	0,000	0,0000	0,41	Italy
E1AV7 L	0,177	0,240	1,020	0,011	0,002	0,120	0,100	0,020	0,005	0,005	0,180	0,032	0,003	0,0001	0,39	Italy

- Las dimensiones y la condición superficial se hallaron satisfactorias.
- Dimension and surface condition were found acceptable.
- Les dimensions et états 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



ULMA FORJA S. COOP.
Dpto. de Garantía de calidad
Quality Assurance Dept.

(*) OBSERVACIONES:
Remarks
Observations

N_ NORMALIZED ABOVE 900°C AND COOLED UNIFORMLY IN STILL AIR

Inspection Certificate

Page 1 of: 2 Pages

acc to EN 10204/3.1

Certificate no.: 9220 348

Purchaser: Webco Industries, Inc
74063 Sand Springs OK
Your order no.: 10075464
Manufacturer: Mannesmann Precision Tubes Netherlands B.V.
NL-Helmond
Our order no.: 3400033
Product: Seamless cold drawn low-carbon steel heat exchanger and condenser tubes
Specification: (S)A 179 / (S)A 450 / NACE MR0103-05 / NACE MR0175
Steelgrade: A 179
SA 179 acc. to norm: A179
Edition: 2021
Marking: On tubes / On tags SA179 Edition: 2021

Process: Basic oxygen steel

Manufacturer's mark: MPT-HE

Steelmarks: (S)A 179 + N

Stamp of the mill's inspector: (Q-MPT-NL)

Extent of the delivery:

Shipping no.: 4400587

Our shipping date: 01-06-2022

Item	Numbers	Dimension	Heat no.	Sample no.
20	1079	1,000" OD x 0,120" MW x 30'0"	9866,39 m 17621 kg 323090	1-1

Shipping marks:

PO : 10075464
Item : 00002 Line 1
Mat. : A32010001200B
Quantity : 1079pcs.
Tag Nr. : PO# A22-13312 T-2,3
ASTM/ASME A5SA 179 SMLS
Grade 1010
OD: 1,0000" inches
Wall: 0.1200 inches MW Wall
Melting Western Europe
Hot finished tube fabrication in Germany
Cold drawn in The Netherlands
Max. 1 heat per bundle - Max 1 heat per box

	C	Mn	P	S	Cr	Heat no.
Requirements:	0,06-0,18	0,27-0,63	≤0,035	≤0,035		
Heat analysis (%)	0,15	0,51	0,011	0,001	0,04	323090

	Mo	V	Cu	Ni	Sn	Heat no.
Requirements:						
Heat analysis (%)	0,01	0,001	0,02	0,03	0,001	323090

Heat treatment: Normalized at 920 °C

Remarks: It is certified that the products have been tested in accordance to purchase specifications and found satisfactory

Helmond(NL.) : 01-06-2022

Mannesmann Precision Tubes - NL
Inspector
B. van Lier



Test results

Page 2 of:

2 Pages

Certificate no.:

9220348

1. Visual inspection and control of dimensions: OK
2. Eddy current test acc. to: E309: OK
3. Flattening test: OK
Flaring test: OK
4. Hardness test: OK

Mechanical data	Dimensions of the test tube mm	Hardness HRB
Requirements:		Max 72
1	25,40 x 3,26	68
2		72
3		68
4		67
5		66
6		70

Helmond: 01-06-2022

Mannesmann Precision Tubes - NL
Inspector
B. van Lier



Inspection Certificate

Page 1 of:

2 Pages

acc to EN 10204/3.1

Certificate no.:

92203419

Purchaser: Webco Industries, Inc
74063 Sand Springs OK
Your order no.: 10075464
Manufacturer: Mannesmann Precision Tubes Netherlands B.V.
NL-Helmond
Our order no.: 3400033
Product: Seamless cold drawn low-carbon steel heat exchanger and condenser tubes
Specification: (S)A 179 / (S)A 450 / NACE MR0103-05 / NACE MR0175

Steelgrade: A 179
SA 179
acc. to norm: A179
Edition: 2021
Marking: On tubes / On tags
SA179
Edition: 2021

Process: Basic oxygen steel
Manufacturer's mark: MPT-H-E
Steelmarks: (S)A 179 + N
Stamp of the mill's inspector: (Q-MPT-H-L)

Extent of the delivery:

Shipping no.: 4400587
Our shipping date: 01-06-2022

Item	Numbers	Dimension	Heat no.	Sample no.
21	113	1,000" OD x 0,120" MW x 28'6"	981,63 m 1756 kg 323090	1-2

Shipping marks:

PO : 10075464
Item : 00002 Line 2
Mat. : A32010001200B
Quantity : 113pcs
Tag Nr. : PC# A22-13312 T-2,3 SC
ASTM/ASME A/SA 179 SMLS
Grade 1010
OD: 1,0000" inches
Wall: 0,1200 inches MW Wall
Melting Western Europe
Hot finished tube fabrication in Germany
Cold drawn in The Netherlands
Max. 1 heat per bundle - Max 1 heat per box

	C	Mn	P	S	Cr	Heat no.
Requirements:	0,06-0,18	0,27-0,63	≤0,035	≤0,035		
Heat analysis (%)	0,15	0,51	0,011	0,001	0,04	323090

	Mo	V	Cu	Ni	Sn	Heat no.
Requirements:						
Heat analysis (%)	0,01	0,001	0,02	0,03	0,001	323090

Heat treatment: Normalized at 920 °C

Remarks: It is certified that the products have been tested in accordance to purchase specifications and found satisfactory

Helmond(NL.) : 01-06-2022

Mannesmann Precision Tubes - NL
Inspector
B. van Lier



Test results

Page 2 of:

2 Pages

Certificate no.:

9220349

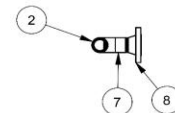
1. Visual inspection and control of dimensions: OK
2. Eddy current test acc. to: E309; OK
3. Flattening test: OK
Flaring test: OK
4. Hardness test: OK

Mechanical data	Dimensions of the test tube mm	Hardness HRB
Requirements:		Max 72
1	25,40 x 3,26	68
2		66

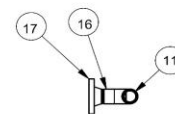
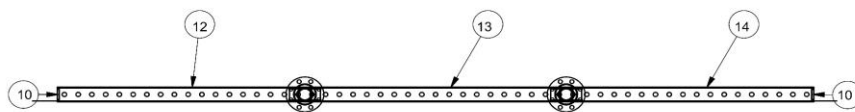
Helmond: 01-06-2022

Mannesmann Precision Tubes - NL
Inspector
B. van Lier





FRONT PLUG SHEET SIDE

[illegible]

PO/Rel

Certificate of Mill Test Results

TUL-000000-000

PART NO.

Attn:

Pg 1/1

SSAB

12400 Highway 43 North, Axis, Alabama 36505, US

Test Certificate

WARNING: This product can expose you to chemicals including nickel and nickel compounds, which are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

Form TC1: Revision 4: Date 6 Feb 2019

Customer:
CHAPEL STEEL CORPORATION
PO BOX 1000

SPRING HOUSE
PA 19477

Customer P.O.No.: TUL-331

Mill Order No. 41-676504-01

Shipping Manifest: AR359558

Product Description: ASME SA516-70/SA516-65/SA516-60(21)
ASTM A516-70/A516-65/A516-60(17)
VACUUM DEGAS; C.23%, S.015% MAX; ELG 2"
LCVN 20 FT LBS. @ -60F/A673-P

Ship Date: 28 Jun 22

Cert No: 081054059
(Page 1 of 1)

Heat Treat Type: NORMALIZED

Size: 0.500 X 96.00 X 480.0 (IN)

Tested Pieces:				Tensiles:					Charpy Impact Tests												
Heat Id	Piece Id	Tested Thickness	Tst Loc	YS (KSI)	UTS (KSI)	%RA	Elong % 2in Bin	Tst Dir	Hardness	Abs. Energy(FTLB)				% Shear				Tst Tmp	Tst Dir	Tst Siz (mm)	BDWTT Tmp %Shr
W2F527	A23	0.502 (DISCRT)	C	55	76		39	T		114	94	108	105					-60F	L	10.	
Chemical Analysis																					
Heat Id	C	Mn	P	S	Si	Tot Al	Sol Al	Cu	Ni	Cr	Mo	Ch	V	Ti	B	IIW	ORG				
W2F527	.18	1.03	.013	.001	.23	.028	.026	.27	.14	.13	.02	.000	.003	.006	.0001	.41	USA				
KILLED STEEL																					

KILLED STEEL

MERCURY IS NOT A METALLURGICAL COMPONENT OF THE STEEL AND NO MERCURY WAS INTENTIONALLY ADDED DURING THE MANUFACTURE OF THIS PRODUCT.

KILLED STEEL, PRODUCED TO A FINE GRAIN PRACTICE

CEV (IIW) = C + MN/6 + (CR+MO+V)/5 + (NI+CU)/15

NACE MR0175/ISO15156-2:2015 ANNEX A2.1.2 COMPLIANT

NACE MR0103/ISO 17495-1:2015 13.1.1(A) AND 13.1.1(C) COMPLIANT

MTR EN 10204:2004 INSPECTION CERTIFICATE 3.1 COMPLIANT

100% MELTED, POURED, AND ROLLED IN THE USA

NO WELD REPAIR HAS BEEN PERFORMED ON THIS MATERIAL.

NORMALIZED PLATES. HEATED AT 1665F FOR 22 MINUTES.

TEST COUPONS TAKEN FROM HEAT TREATED PLATE.

PRODUCTS SHIPPED:

W2F527 A23 40086955 PCES: 1, LBS: 6534
W2F527 A23 40086956 PCES: 1, LBS: 6534
W2F527 A23 40086950 PCES: 1, LBS: 6534
W2F527 A23 40086959 PCES: 1, LBS: 6534

W2F527 A23 40086957 PCES: 1, LBS: 6534
W2F527 A23 40086954 PCES: 1, LBS: 6534
W2F527 A23 40086958 PCES: 1, LBS: 6534

Q.A. APPROVED

By Due Date 12/12/2022

(P)

Cust Part #:

WE HEREBY CERTIFY THAT THIS MATERIAL WAS TESTED IN ACCORDANCE WITH, AND MEETS THE REQUIREMENTS OF, THE APPROPRIATE SPECIFICATION

Jason Thomas

Director Technical Services

ANTHONY CARDWELL
12/13/2022



INSPECTION CERTIFICATE

EN 10204 3.1 : 2004

Head Office : 4-2, KAMIGAMO, SUMOTO CITY, HYOGO, 656-0015, JAPAN
Tel : (81) 799-22-1731 : FAX (81) 799-22-1730

ISO 9001 :2008 Manufacturing Company
Certified by BV. Certificate No. TH008428

Material manufacturer QMS acc.
PED 97/23/EC. Annex I. Par4.3/AD2000W0
Certified by Lloyd's Register
Certificate No. 50207/1

Factory : 81, MOO 4, PRAKASA ROAD, TAMBOL BANGMUANG, AMPHUR MUANG
SAMUTPRAKARN, THAILAND 10270, Tel : (662) 701-5226

Date : JANUARY 31, 2018

Purchaser :

Certificate No. : T18-13092/2

Order No.		Job No.		Product		MADE FROM SEAMLESS STEEL PIPE	
42117AW		—		CARBON STEEL BUTT WELDING FITTINGS			
Inspection Standard		Material Standard					
ASME B16.9-12, ASME B16.25-12 ASTM A960-16 NACE MR-0175/ISO 15156-2-15, SS Region3 MR-0103-15		ASTM A420-16, WPL6 ASME SA420-17, WPL6 except nuclear usage		Visual	Dimension	*5 UT Inspection	Magnetic Particle Test
				GOOD	GOOD	—	GOOD
Manufacturing No. (Heat code.)	Product Code	Material	Article & Size			Quantity	Note.
7Z5M20	PTY3-AW	WPL6	XXS TEE 3"			50 Pcs.	

Specification		*1 Chemical Composition (%)																	*2 Mechanical Test			Hardness	Impact Test		
		C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V	Nb	Ti	B	Ca	N	Al	C.E.		Y.S.	T.S.			E	
		Min.	X100	X100	X100	X1000	X10000	X100	X100	X100	X100	X100	X1000	X100	X10000	X10000	x1000	X1000	X100		MPa		%	HB	J
		Max.	-	15	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	240	415	30	-	-50°C
Heat No.		30	40	135	35	400	40	40	30	12	8	20	-	-	-	-	-	-	-	-	655	-	197	*3 F	
877151	L	14	30	105	12	20	7	3	5	2	3	10	0	5	13	9	40	35	345	480	46	140	*4 E 155.64 E 171.43 E 180.87 A 169.31		
	P	15	27	109	8	10	6	3	5	5	4	0	0	4	8	4	36	37				143			

$$C.E. = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Ni+Cu}{15}$$

*5 UT = Ultrasonic thickness inspection

Impact Test : Longitudinal

*1 Equivalent for A420 WPL6

*2 Y.S. = Yield Strength (0.2% offset), T.S. = Tensile Strength, E = Elongation (in 50mm) : Longitudinal

L = Ladle Analysis, P = Product Analysis

Weld repair is not applied to our products.

Steel Making by Vacuum degassed, fully silicon aluminium killed & fine grain.

All material supplied is certified to be free of mercury contamination² no mercury bearing equipment was used during manufacturing.

*3 Size of Specimen

*3 Size of Specimen	A	E	*4
F. 10.0 by 10.0	17.6	13.6	E = Each Test
7. 10.0 by 7.5	13.6	10.8	A = Average Value
5. 10.0 by 5.0	9.5	7.0	
2. 10.0 by 2.5	5.4	4.1	

ELBOW, TEE, REDUCER & CAP / Normalizing : 910°C (Holding Time : (Nominal Wall Thickness/1mm) x 1.5 min.))

AT-24(2)27

"We certify that the fitting was manufactured, sampled, tested and inspected
in accordance with the specification and was found to meet the requirements.

Material complies with ASTM A/SA234 WPB (15)

Surveyor to

QA. GM. /Work Inspector S. MAEKAWA

Maekawa@awaji.co.th

BENTELER 309901 / 3.0A106XXHD / 3 XXH A106B SMLS PIPE

BENTELER Steel/Tube
 1 Benteler Drive|Shreveport|LA 71115|USA
 Tel. +1 318-216-4149
 qms.shreveport@benteler.com

INSPECTION CERTIFICATE EN 10204-3.1 EN 10204 2005-01	Document No.: 465-1270937/001/P	Inspection No.:	Page: 1 / 3
	Purchase Order No.: 10965	Manufacturer: BSTMC Shreveport USA	
	Benteler Order No.: 48002112	Manufacturer's brand: 	
	Dispatch Note No.:	Stamp of the inspection representative: MI	
	Product: SEAMLESS STEEL TUBES	Steelmaking process: ELECTRIC FURNACE	

Terms of delivery:	ASTM-A 53-2018, ASME SA-53, ASME BPVC.II.A-2019, ASTM-A 106-19a, ASME SA-106, ASME BPVC.II.A-2019, API Specification 5L Forty-Sixth Edition April 2018 incl. Errata 1, May 2018, PSL 2, ANSI/NACE MR0175/ISO 15156-1 2015, ANSI/NACE MR0175/ISO 15156-2 2015, ANSI/NACE MR0103/ISO 17945 2015
Dimensions-tolerances:	ASTM-A 106-19a, ASME SA-106, ASME BPVC.II.A-2019, ASTM-A 53-2018, ASME SA-53, ASME BPVC.II.A-2019, API Specification 5L Forty-Sixth Edition April 2018 incl. Errata 1, May 2018
Steel grade:	GRADE B, GRADE C, GRADE BN, GRADE X42N
Delivery condition:	N
Product marking:	FS: BENTELER BENTELER-Sign API 5L-1072 API-Sign Month/Year Conditions Dimension: O.D. * t inch Steel Grade PSL2 SMLS Inspector's sign Heat No. Tube length feet Test Pressure PSI Production No. Customer's material no.

AEZ = Etching ink marking FK = color marking FS = paint stenciling FSD = Color jet printer FSI = Color jet printer inside LK = Laser marking PKE = tag marking PS = die stamp TS = Ink jet spray marking

Item	Number	Dimensions	Length total feet	Weight lbs	Heat No.	Test pressure PSI sec	
0007	52	3 NPS - XXS 35 FT - 45 FT	2134.62	40082	309901	2970	5

Country of melt and pour
 Melted & Manufactured in USA
 Nucor, Jewett, TX, US

Heat analysis [%]

Item	Heat No.	C	SI	MN	P	S	CR	MO	NI	CU	V	NB	TI	B
0007	309901	0.160	0.262	0.98	0.007	0.007	0.10	0.02	0.06	0.17	0.005	0.0000	0.002	0.0002

- Formula: $CE_{IIW} = C + (Mn/6) + ((Cr+Mo+V)/5) + ((Cu+Ni)/15) \leq 0.43 \%$
- Formula: $Cr+Cu+Mo+Ni+V \leq 1.00 \%$
- Formula: $Nb+V \leq 0.06 \%$
- Formula: $Nb+Ti+V \leq 0.15 \%$

BENTELER Steel/Tube
1 Benteler Drive|Shreveport|LA 71115|USA
Tel. +1 318-216-4149
qms.shreveport@benteler.com

INSPECTION CERTIFICATE EN 10204-3.1

Document No.:

465-1270937/001/P

Inspection No.:

Page: 2 / 3

Formula results

Item	Heat No.	1. Formula	2. Formula	3. Formula	4. Formula
0007	309901	0.364	0.333	0.009	0.007

Product analysis [%]

Item	Heat No.	C	SI	MN	P	S	CR	MO	NI	CU	V	NB	TI	B
0007	309901	0.170	0.280	0.96	0.009	0.007	0.10	0.02	0.06	0.16	0.004	0.001	0.002	0.0001
0007	309901	0.170	0.280	0.96	0.009	0.008	0.10	0.02	0.06	0.16	0.004	0.001	0.002	0.0001

1. Formula: $CE_{IIW} = C + (Mn/6) + ((Cr+Mo+V)/5) + ((Cu+Ni)/15) \leq 0.43 \%$
2. Formula: $Cr+Cu+Mo+Ni+V \leq 1.00 \%$
3. Formula: $Nb+V \leq 0.06 \%$
4. Formula: $Nb+Ti+V \leq 0.15 \%$

Formula results

Item	Heat No.	1. Formula	2. Formula	3. Formula	4. Formula
0007	309901	0.369	0.344	0.005	0.007
0007	309901	0.369	0.344	0.005	0.007

Test results

The tubes have been submitted to a leak tightness test by:		Hydrostatic test: acc. to API 5L, Test pressure/Time-record, the test records/charts shall be available for examination by the inspector	PASSED
The tubes are non destructive tested:		ET - Test standard: acc. to API 5L; ET - Test method: acc. to ASTM-E 309, ET - Test drilled hole 0.125 IN.; ET - Notch shape/hole: drilled hole	PASSED
Visual inspection:	PASSED	Dimensions examination:	PASSED

Results of mechanical testing

Tensile test longitudinal at RT, Strip test specimen

Item	Specimen No.	Heat No.	Specimen dimensions	Yield strength	Tensile strength	Elongation	1. Formula	Rt 0.5/Rm
Requirements			IN	RT 0.5 % PSI 42100-71800	Rm PSI 70000-95000	A2+ %		MAX 0.93
0007	000011	309901	0.749 X 0.615	48733	75565	41.00	23.00	0.64

Elongation formula

1. Formula: $AF = 625000 \cdot AXC^{0.2} / U^{0.9}$

BEN188 / 309901 / 3.0A106XXHD / 3 XXH A106B SMLS PIPE

BENTELER Steel/Tube
1 Benteler Drive|Shreveport|LA 71115|USA
Tel.: +1 318-216-4149
qms.shreveport@benteler.com

INSPECTION CERTIFICATE EN 10204-3.1 Document No.: 465-1270937/001/P Inspection No.: Page: 3 / 3

Protection

outside surface varnished

Item	Heat No.	Production No.
0007	309901	18019710

Remark

NACE Standard: Hardness acc. to ANSI/NACE MR0175/ISO 15156 HRC max 22., Hardness acc. to ANSI/NACE MR0103/ISO 17945 HRC max. 22., Certificate remarks material free from mercury contamination, Data converted from SI units, No weld repair has been carried out, Certificate-Remark: LONGHORN

Mill Test Reports
For PO# _____
Dixie Pipe Sales, Inc.

Plant 465, 1 BENTELER DRIVE, LA 71115 Shreveport, 08/02/2021, TEL.: 0318-216-4149

Inspection representative
Pidicheti / KM

We certify that the supplied product has been processed, sampled, tested, and inspected in accordance with the agreed specifications and/or references mentioned herein and meet the requirements for the grade indicated. This document was prepared by means of electronic data processing and is valid without signature.

ANTHONY CARDWELL
12/13/2022

BEN188 / 309901 / 3.0A106XXHD / 3 XXH A106B SMLS PIPE

INSPECTION CERTIFICATE EN 10204-3.1
 EN 10204:2005-01

Document No.: 465-1020339/001/P
 Purchase Order No.: 1284-00
 Benteler Order No.: 48000372
 Dispatch Note No.:
 Product: SEAMLESS STEEL TUBES

Inspection No.: Page: 1 / 3
 Manufacturer: BSTMC Shreveport USA
 Manufacturer's brand: 
 Stamp of the inspection representative: MI
 Steelmaking process: ELECTRIC FURNACE

Terms of delivery: ASTM-A 53-2012, ASME SA-53, ASME BPVC.II.A-2015, ASTM-A 106-2015, ASME SA-106, ASME BPVC.II.A-2015, API Specification 5L Forty-Fifth Edition, December 2012 incl. Errata (2015), PSL 2, ANSI/NACE MR0175/ISO 15156-1: 2015, ANSI/NACE MR0175/ISO 15156-2:

2015, NACE Standard MR0103-2010

Dimensions-tolerances: ASTM-A 106-2015, ASME SA-106, ASME BPVC.II.A-2015, ASTM-A 53-2012, ASME SA-53, ASME BPVC.II.A-2015, API Specification 5L Forty-Fifth Edition, December 2012 incl. Errata (2015)

Steel grade: GRADE B, GRADE C, GRADE BN, GRADE X42N

Delivery condition: N

Product marking: FS: BENTELER BENTELER-Sign API 5L-1072 API-Sign Month/Year Conditions Dimension: O.D. * t inch Steel Grade
 PSL2 SMLS Inspector's sign Heat No. Tube length feet Test Pressure PSI Customer's material no. Dimension: NPS
 inch Weight Class Productio No.

AEZ = Etching ink marking FK = color marking FS = paint stenciling FSD = Color jet printer LK = Laser marking PKE = tag marking PS = die stamp TS = Ink jet spray marking

Item	Number	Dimensions	Length total feet	Weight lbs	Heat No.	Test pressure PSI sec	
0017	201	3 NPS - XXS 38 FT - 42 FT	8028.45	148955	302142	2970	5

Heat analysis [%]

Item	Heat No.	C	SI	MN	P	S	CR	MO	NI	CU	V	NB	TI	B
0017	302142	0.170	0.260	0.98	0.010	0.003	0.06	0.01	0.04	0.09	0.005	0.003	0.002	0.0004

1. Formula: $CE_{I\&W} = C + (Mn/6) + ((Cr+Mo+V)/5) + ((Cu+Ni)/15) \leq 0.43\%$

2. Formula: $Cr+Cu+Mo+Ni+V \leq 1.00\%$

3. Formula: $Nb+V \leq 0.06\%$

4. Formula: $Nb+Ti+V \leq 0.15\%$

Formula results

Item	Heat No.	1. Formula	2. Formula	3. Formula	4. Formula
0017	302142	0.357	0.205	0.008	0.010

INSPECTION CERTIFICATE EN 10204-3.1

Document No.:

465-1020339/001/P

Inspection No.:

Page: 2 / 3

Product analysis [%]

Item	Heat No.	C	SI	MN	P	S	CR	MO	NI	CU	V	NB	TI	B
0017	302142	0.170	0.260	0.92	0.010	0.004	0.06	0.01	0.04	0.09	0.004	0.001	0.003	0.0003
0017	302142	0.170	0.260	0.92	0.010	0.004	0.06	0.01	0.04	0.09	0.004	0.001	0.003	0.0003

1. Formula: $CE_{IW} = C + (Mn/6) + ((Cr+Mo+V)/5) + ((Cu+Ni)/15) \leq 0.43 \%$ 2. Formula: $Cr+Cu+Mo+Ni+V \leq 1.00 \%$ 3. Formula: $Nb+V \leq 0.06 \%$ 4. Formula: $Nb+Ti+V \leq 0.15 \%$

Formula results

Item	Heat No.	1. Formula	2. Formula	3. Formula	4. Formula
0017	302142	0.347	0.204	0.005	0.008
0017	302142	0.347	0.204	0.005	0.008

Test results

The tubes have been submitted to a leak tightness test by:
 available for examination by the inspector

Hydrostatic test: acc. to API 5L, Test pressure/Time-record, the test records/charts shall be

PASSED

The tubes are non destructive tested:

UT-Test standard: acc. to API 5L; longitudinal testing; UT-Test method: acc. to ASTM-E 213;
 UT-Outside notch depth: 12.5 %; UT-Inside notch depth: 12.5 %; UT-Notch length max: 2.000 IN.;
 UT-Notch width max: 0.040 IN.

PASSED

Visual inspection:

PASSED

Dimensions examination:

PASSED

Results of mechanical testing

Tensile test longitudinal at RT, Strip test specimen

Item	Specimen No.	Heat No.	Specimen dimensions	Yield strength	Tensile strength	Elongation	1. Formula	Rt 0,5/Rm
Requirements			in	RT 0,5 % PSI 42100-71800	Rm PSI 70000-95000	A2" %		MAX 0.93
0017	00001N	302142	0.75 X 0.61	44817	70198	42.00	23.00	0.64

Elongation formula

1. Formula $AF = 625000 \cdot AXC^{0,2} / U^{0,9}$

Protection

outside surface varnished

INSPECTION CERTIFICATE EN 10204-3.1

Document No.:

465-1020339/001/P

Inspection No.:

Page: 3 / 3

Item	Heat No.	Production No.
0017	302142	15004195

Remark

NACE Standard: Hardness acc. to ANSI/NACE MR0175/ISO 15156: HRC max 22., Hardness acc. to Standard MR0103 HRC max. 22.; Certificate remarks: Data converted from SI units Steel Mill Nucor – Jewett, Texas USA; Melted and Manufactured in the USA; Of Domestic Origin-USA

Shreveport, 08-01-2017, TEL.: PROGRAMME SUPPORT/SERVICE

Inspection representative

Pidicheti /Hudson

We certify that the supplied products comply with the order specification. This document was prepared by means of electronic data processing and is valid without signature.



Abnahmeprüfungszeugnis Nr.
Inspection Certificate No.
Inspection Certificate No.
DIN EN 10204-01-2005 3.1

302507 vom 14.01.2021

Zeichen des Herstellerwerkes
Manufacturer's mark/Poinçon d'usine
Zeichen des Abnahmebeauftragten
Inspector's stamp/Poinçon de l'expert

DIN EN ISO 9001 - 2015
PED 2014 / 68 / EU An. I Kap. 4.3
(TÜV NORD NB 0045)
AD2000-MB-W0 / TRD100

Wilhelm Geldbach Industrie GmbH Ziegelstraße 17 45886 Gelsenkirchen

Wilhelm Geldbach Industrie B.V.
Westerlaan 15
Netherlands 3016 CK Rotterdam

Wilhelm Geldbach Industrie GmbH
Ziegelstraße 17
DE - 45886 Gelsenkirchen
Telefon: +49 209 15803 180
Telefax: +49 209 15803 499
Email: Q+S@w-g.de

Komm.-Nr/Pos
Works-No. / Rapport-No.
20-1133 / 1060

Ihre Auftrags-Nr.
Votre Commande-No.
WGI/10010/BO

Bezeichnung des Gegenstandes
Designation of article/Designation du produit
ASME B16.5 WELDING NECK
300 LBS RF 3" XXS
item 50

Lieferdatum
Delivery date/Date de livraison

Lieferplan/Pos
Delivery Note / Bon de livraison
Menge
Quantity/Quantité
100

Einsatzmaterial
base material/matériau

Schmelze
Heat-No./No. de coulée
20702930

Code-Nr.
Code-No./ Code de coulée

Werkstoff:
Material / Matière
A/SA350 LF2 CL.1

Erschmelzungsart
Melting proc./Procédé, d'élaboration
E

Schmelzanalyse
Heat analysis / Analyse sur coulée

C	Si	Mn	P	S	Cr	Mo	Ni	Al	Ti	N	Cu	V	Nb	Zr	B	Ceq
0,19	0,28	1,23	0,010	0,003	0,015	0,001	0,012				0,011	0,001	0,001			

Zugversuch
Tensile test/Traction
DIN EN ISO 6892-1/ASTM A370

Kerbschlagbiegeversuch
Impact test/Essai de flexion par choc
EN ISO 148-1/ASTM A370

Härteprüfung
DIN EN ISO 6506-1
ASTM A370

ProbenNr Test-No. No d'essai	Temp. Temp.	Richtung Direction	Streckgrenze(Re) Yield strength Limite élastique (N/mm ²) Rp1 Rp 0,2	Zugfestigkeit(Rm) Tensile strength Résistance à la traction (N/mm ²)	Dehnung(A) Elongation Allongement (%)	Einschnürung (z) Reduction of striction Réduction de striction (%)	Form Type	Temp. Temp. Celsius	Schlagarbeit KV Energy of impact Energie de rupture Joule	Härte Hardness Dureté HBW 2.5/187.5
603-1	+20	T	332	520	2ln 37	73	Charpy-V	-46	096 113 121	145-155
603-2	+20	T	317	510	2ln 37	68	Charpy-V	-46	079 092 105	

Anforderungen - Lieferzustand
Requirements / Specifications - Delivery condition / Etat de livraison

QM-System Zertifiziert gemäß DGRL2014/68/EU (TÜV-Nord NB0045)
Normalgeglüht 930°C/Luft - Normalized 930°C/Air
ASTM A350/A350M-19 - ASME BPVC SEC.2 PART A/ 2019
NACE STANDARD MR0175-2015/ISO15156-2 A.2.1.2 + A.2.1.3
Fully Killed Steel
Fine Grain Practice

Besichtigung und Maßkontrolle: o.B. / Visual and dimensional check: w.o. / Contrôle visual et dimensionnel: satisfaisant.
Die gestellten Anforderungen sind erfüllt. / The requirements are fulfilled. / Les conditions imposées sont satisfaites.

Der Abnahmebeauftragte authorized inspection representative
Horta / Peksen

Dieses Zeugnis wurde mit EDV erstellt und ist ohne Unterschrift gültig
This certificate was electronically generated and is valid without a signature

Inspection Certificate

Page 1 of: 2 Pages

acc to EN 10204/3.1

Certificate no.: 9220 348

Purchaser: Webco Industries, Inc
74063 Sand Springs OK
Your order no.: 10075464
Manufacturer: Mannesmann Precision Tubes Netherlands B.V.
NL-Helmond
Our order no.: 3400033
Product: Seamless cold drawn low-carbon steel heat exchanger and condenser tubes
Specification: (S)A 179 / (S)A 450 / NACE MR0103-05 / NACE MR0175
Steelgrade: A 179
SA 179 acc. to norm: A179
Edition: 2021
Marking: On tubes / On tags SA179 Edition: 2021

Process: Basic oxygen steel

Manufacturer's mark: MPT-HE

Steelmarks: (S)A 179 + N

Stamp of the mill's inspector: (Q-MPT-NL)

Extent of the delivery:

Shipping no.: 4400587

Our shipping date: 01-06-2022

Item	Numbers	Dimension	Heat no.	Sample no.
20	1079	1,000" OD x 0,120" MW x 30'0"	9866,39 m 17621 kg 323090	1-1

Shipping marks:

PO : 10075464
Item : 00002 Line 1
Mat. : A32010001200B
Quantity : 1079pcs.
Tag Nr. : PO# A22-13312 T-2,3
ASTM/ASME A5SA 179 SMLS
Grade 1010
OD: 1,0000" inches
Wall: 0.1200 inches MW Wall
Melting Western Europe
Hot finished tube fabrication in Germany
Cold drawn in The Netherlands
Max. 1 heat per bundle - Max 1 heat per box

	C	Mn	P	S	Cr	Heat no.
Requirements:	0,06-0,18	0,27-0,63	≤0,035	≤0,035		
Heat analysis (%)	0,15	0,51	0,011	0,001	0,04	323090

	Mo	V	Cu	Ni	Sn	Heat no.
Requirements:						
Heat analysis (%)	0,01	0,001	0,02	0,03	0,001	323090

Heat treatment: Normalized at 920 °C

Remarks: It is certified that the products have been tested in accordance to purchase specifications and found satisfactory

Helmond(NL.) : 01-06-2022

Mannesmann Precision Tubes - NL
Inspector
B. van Lier



Test results

Page 2 of:

2 Pages

Certificate no.:

9220348

1. Visual inspection and control of dimensions: OK
2. Eddy current test acc. to: E309: OK
3. Flattening test: OK
- Flaring test: OK
4. Hardness test: OK

Mechanical data	Dimensions of the test tube mm	Hardness HRB
<i>Requirements:</i>		<i>Max 72</i>
1	25,40 x 3,26	68
2		72
3		68
4		67
5		66
6		70

Helmond: 01-06-2022

Mannesmann Precision Tubes - NL
Inspector
B. van Lier



Inspection Certificate

Page 1 of:

2 Pages

acc to EN 10204/3.1

Certificate no.:

92203419

Purchaser: Webco Industries, Inc
74063 Sand Springs OK
Your order no.: 10075464
Manufacturer: Mannesmann Precision Tubes Netherlands B.V.
NL-Helmond
Our order no.: 3400033
Product: Seamless cold drawn low-carbon steel heat exchanger and condenser tubes
Specification: (S)A 179 / (S)A 450 / NACE MR0103-05 / NACE MR0175
Steelgrade: A 179
SA 179 acc. to norm: A179
Edition: 2021
Marking: On tubes / On tags SA179
Edition: 2021

Process: Basic oxygen steel
Manufacturer's mark: MPT-H-E
Steelmarks: (S)A 179 + N
Stamp of the mill's inspector: (Q-MPT-H-L)

Extent of the delivery:

Shipping no.: 4400587
Our shipping date: 01-06-2022

Item	Numbers	Dimension	Heat no.	Sample no.
21	113	1,000" OD x 0,120" MW x 28'6"	981,63 m 1756 kg 323090	1-2

Shipping marks:

PO : 10075464
Item : 00002 Line 2
Mat. : A32010001200B
Quantity : 113 pcs
Tag Nr. : PC# A22-13312 T-2,3 SC
ASTM/ASME A/SA 179 SMLS
Grade 1010
OD: 1,0000" inches
Wall: 0,1200 inches MW Wall
Melting Western Europe
Hot finished tube fabrication in Germany
Cold drawn in The Netherlands
Max. 1 heat per bundle - Max 1 heat per box

	C	Mn	P	S	Cr	Heat no.
Requirements:	0,06-0,18	0,27-0,63	≤0,035	≤0,035		
Heat analysis (%)	0,15	0,51	0,011	0,001	0,04	323090

	Mo	V	Cu	Ni	Sn	Heat no.
Requirements:						
Heat analysis (%)	0,01	0,001	0,02	0,03	0,001	323090

Heat treatment: Normalized at 920 °C

Remarks: It is certified that the products have been tested in accordance to purchase specifications and found satisfactory

Helmond(NL.) : 01-06-2022

Mannesmann Precision Tubes - NL
Inspector
B. van Lier



Test results

Page 2 of:

2 Pages

Certificate no.:

9220349

1. Visual inspection and control of dimensions: OK
2. Eddy current test acc. to: E309; OK
3. Flattening test: OK
Flaring test: OK
4. Hardness test: OK

Mechanical data	Dimensions of the test tube mm	Hardness HRB
Requirements:		Max 72
1	25,40 x 3,26	68
2		66

Helmond: 01-06-2022

Mannesmann Precision Tubes - NL
Inspector
B. van Lier

