



Tecnimont S.p.A.

4274\_CONST

ALBA PROJECT-PP AND PEL PLANTS



MOD-ITP-XL_220		RELEASE OF SPOOLS FROM WORKSHOP	Report n° IP-WSR-P-310-000380_RFI5034_MOD-ITP-XL_220
Rev.1			RFI Nr.: Date :
Unit	-		
Plant Area	-		
Isometric Number			
Inspection Package Number	IP-WSR-P-310-000380_RFI5034 - IP Spool Release From Workshop		

Sheet 01/01

The Present Inspection Package contains the following Elements:

7111-IA00D01-4-SP19-00010;7111-IA00D01-4-SP17-00008;2211-VG62J02-1-SP03-00452;2211-VG62J02-1-SP01-00450;1126-LO36005-1-SP01-00848;1121-P40027-1-SP01-00207;1115-DMW64003-4-SP07-03085;7111-IA91F10-1-SP01-00041;7111-IA00D01-11-SP32-00033;7111-IA00D01-11-SP31-00032;1211-N81031-1-SP04-00960;1211-N81031-1-SP03-00959;1121-LS50049-4-SP01-00941;1115-DMW64003-4-SP08-03086;7111-IA00D01-9-SP29-00025;7111-IA00D01-9-SP27-00023;2121-LO40B02-1-SP03-00502;2121-LO40B02-1-SP01-00500;1211-N81031-1-SP01-00957;1211-N80024-1-SP01-00950;7111-IA00D01-9-SP26-00022;7111-IA00D01-4-SP18-0009;2211-VG62J02-1-SP04-00453;2121-IA91F63-3-SP07-00486;1211-N81031-1-SP06-00184;1126-LO36005-1-SP02-00849;7111-IA00D01-9-SP25-00021;7111-IA00D01-6-SP21-00018;2211-LS50A06-1-SP01-00387;2211-LO70A01-1-SP01-00371;1211-DMW64001-3-SP06-03055;1127-DMW63009-1-SP02-03075;7111-IA00D01-9-SP28-00024;7111-IA00D01-6-SP19-00016;7111-IA00D01-11-SP33-00034;2211-VG62J02-1-SP02-00451;2121-LO40B02-1-SP02-00501;1211-DMW64001-3-SP07-03056;1126-LO32003-1-SP03-00834;1115-DMW64003-4-SP06-03084;7111-IA91F10-1-SP02-00042;7111-IA00D01-11-SP30-00031;2211-VG62J02-1-SP05-00454;2121-IA19F63-3-SP06-00485;1211-N81031-1-SP05-00961;1211-N81031-1-SP02-00958;1121-LS50004-2-SP04-00188;1121-LS50004-2-SP03-00187;7111-IA00D01-6-SP22-00019;7111-IA00D01-6-SP20-00017;2211-LO70A01-1-SP02-00372;2121-LO40B05-1-SP01-01006;1211-DMW64001-3-SP05-03054;1127-DMW63009-1-SP01-03074

Spool No.	Ready for destination to: P: Painting (1) W: Wrapping	NDE Class	Check List					
			Visual Inspect	Traceability OK (2)	Pending NDE / PMI (Yes/No/NA)	PWHT / HARDNESS (Yes/No/NA)	Inside Cleaning (3) (Yes/No/NA)	Spool Identified (Yes/No/NA)
	F: Field							

On behalf of Tecnimont / R  
Piping Supervisor  
Cristi Sandu  
02.10.2024 C. Sandu

LEGEND OF CHECK RESULT	<input checked="" type="checkbox"/> Checked & NOT Accepted	<input checked="" type="checkbox"/> Checked & Accepted	N.A.	Not Applicable	Y / N	Punch List Produced
			Date [DD-MMM-YYYY]	Name	Signature	 C. Sandu 02.10.2024
SUBCONTRACTOR	02-10-2024	Sergio Morales Collantes				
CONTRACTOR						
COMPANY						
(Free)						



Tecnimont S.p.A.

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ALBA PROJECT-PP AND PEL PLANTS



<b>MOD-ITP-XL_220</b>		<b>RELEASE OF SPOOLS FROM WORKSHOP</b>	Report n° <b>IP-WSR-P-310-000380_RFI5034_MOD-ITP-XL_220</b>
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NOTES (\*) : 4274-XH-PQ-000000001

- 1) Painting cycle to be indicated.
- 2) Refer to: **4274-LZ-PC-00000214** (COMPANY 4001008GEN-PC-214) "Management of Site Metallic Welding Activities" and **4274-LZ-PC-00000215** (COMPANY 4001008GEN-PC-215) "Procedure for Traceability of Piping Material"
- 3) Refer to: **4274-XH-SG-00000003** (COMPANY 45-L-45-000-2-00-80005) "Specification for Piping Fabrication & Erection Amendment to EC-L-51.01 and EC-L-51.02" and **4274-XH-PQ-00000001** (COMPANY 45-L-45-000-2-00-80081) "Inspection and Test Plan for Steel Piping Works"

On behalf of Tecnimont / R  
Piping Supervisor  
Cristi Sandu  
02.10.2024 C. Sandu

LEGEND OF CHECK RESULT	<input checked="" type="checkbox"/> Checked & NOT Accepted	<input checked="" type="checkbox"/> Checked & Accepted	N.A.	Not Applicable	Y/N	Punch List Produced
			Date [DD-MMM-YYYY]	Name	Signature	
SUBCONTRACTOR	02-10-2024		Sergio Morales Collantes			
CONTRACTOR						
COMPANY						
(Free)						

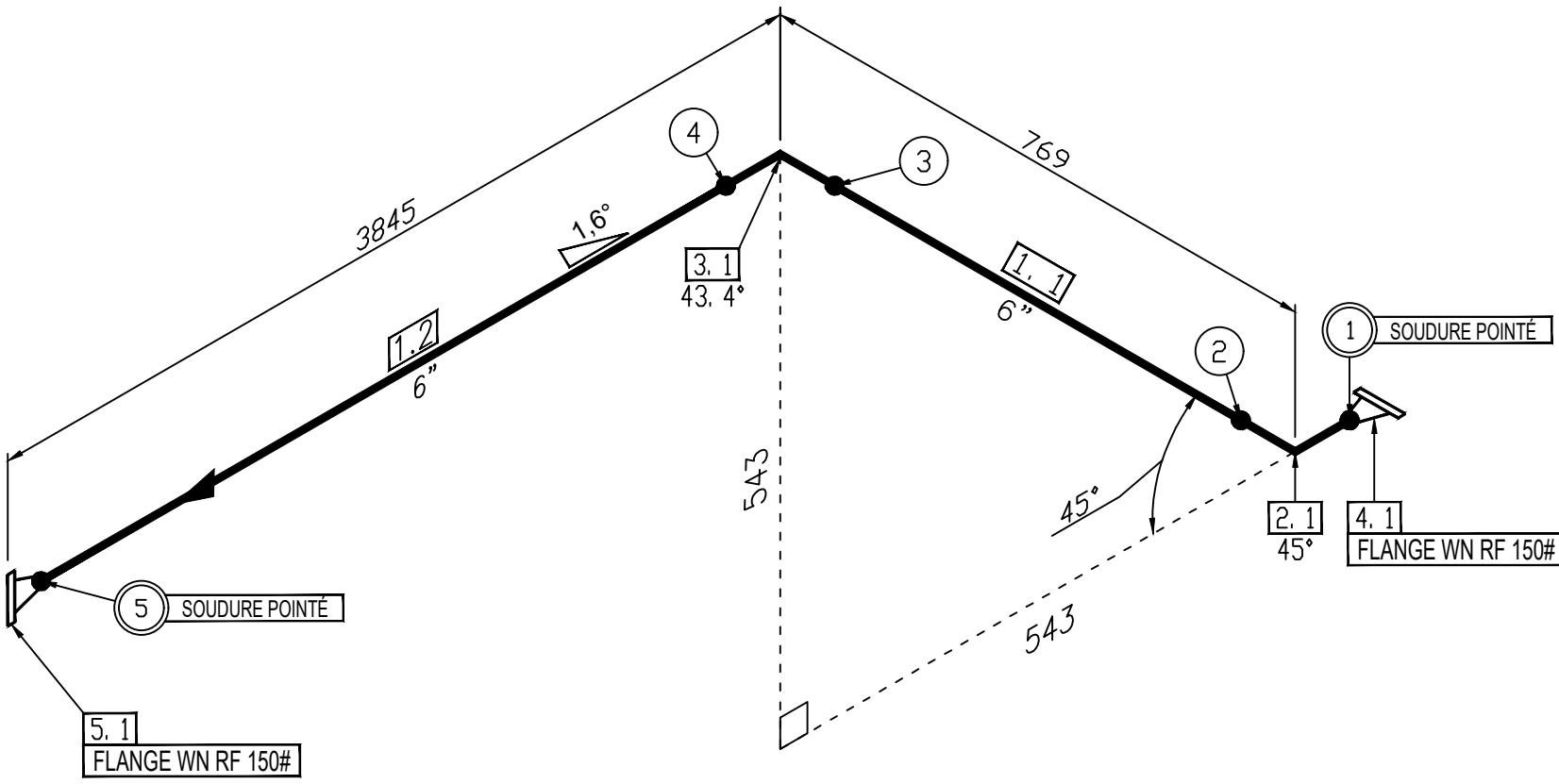
 <b>Tecnimont</b>	<h3 style="text-align: center;">Punch List</h3> <h2 style="text-align: center;">PUNCH LIST</h2>	<b>IDENTIFICATION CODE</b>			
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px 10px; text-align: center;">SHEET 1 / 1</td> <td style="padding: 2px 10px; text-align: center;">DOC.CLASS 1</td> <td style="padding: 2px 10px; text-align: center;">ISSUE 01</td> </tr> </table>	SHEET 1 / 1	DOC.CLASS 1	ISSUE 01
SHEET 1 / 1	DOC.CLASS 1	ISSUE 01			
 <b>MECWIDE</b> <small>Engineering Services</small>	<p>ISO ID: <b>2121-LO40B05-1</b></p>				

## NOTES AND REMARKS

On behalf of Technimont / R  
Piping Supervisor  
Cristi Sandu  
01.10.2024 *C. Sandu*

	DATE (dd-Mmm-YYYY)	NAME	SIGNATURE
SUBCONTRACTOR			
CONTRACTOR			
COMPANY			
(Free)			



<div style="text-align: center; padding: 10px;">     </div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <b>BILL OF MATERIAL</b> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <b>PIPE</b> </div> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>ITEM</th> <th>LONGUEUR</th> <th>DIAMÈTRE</th> <th>SCH/mm</th> <th>DESCRIPTION / MATERIEL</th> <th>ITEM CODE</th> </tr> </thead> <tbody> <tr> <td>1.1</td> <td>0,579</td> <td>6"</td> <td>S-10S</td> <td>PIPE - A312-TP304/304L DUAL GR BE SMLS BExBE</td> <td>I3364305</td> </tr> <tr> <td>1.2</td> <td>3,663</td> <td>6"</td> <td>S-10S</td> <td>PIPE - A312-TP304/304L DUAL GR BE SMLS BExPE</td> <td>I3364305</td> </tr> </tbody> </table> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <b>FLANGES</b> </div> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>ITEM</th> <th>QT</th> <th>DIAMÈTRE</th> <th>PRESSION</th> <th>SCH/mm</th> <th>DESCRIPTION / MATERIEL</th> <th>ITEM CODE</th> </tr> </thead> <tbody> <tr> <td>4.1</td> <td>1</td> <td>6"</td> <td>150#</td> <td>S-10S</td> <td>WN FLANGE ASME B16.5 150# A182-F304/304L DUAL GR RF BE 125 - 250 AARH</td> <td>I2260691</td> </tr> <tr> <td>5.1</td> <td>1</td> <td>6"</td> <td>150#</td> <td>S-10S</td> <td>WN FLANGE ASME B16.5 150# A182-F304/304L DUAL GR RF BE 125 - 250 AARH</td> <td>I2260691</td> </tr> </tbody> </table> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <b>WELD FITTINGS</b> </div> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>ITEM</th> <th>QT</th> <th>DIAMETER</th> <th>SCH/mm</th> <th>DESCRIPTION / MATERIAL</th> <th>ITEM CODE</th> </tr> </thead> <tbody> <tr> <td>2.1</td> <td>1</td> <td>6"</td> <td>S-10S</td> <td>45 LR ELBOW ASME B16.9 A403-WP304/304L DG BE SMLS</td> <td>I2259148</td> </tr> <tr> <td>3.1</td> <td>1</td> <td>6"</td> <td>S-10S</td> <td>45 LR ELBOW ASME B16.9 A403-WP304/304L DG BE SMLS</td> <td>I2259148</td> </tr> </tbody> </table> <div style="text-align: right; margin-top: 20px;"> <p>P2308S 01006    2121-LO40B05-1-SP01-01006</p> </div> <div style="text-align: right; margin-top: 20px;"> <p>  <b>boccard</b>  Alliance for success  Boccard Portugal, Lda.</p> </div> <div style="margin-top: 20px;"> <p>On behalf of Tecnimont / R  Piping Supervisor  Cristi Sandu  01.10.2024 <i>C. Sandu</i></p> </div> <div style="margin-top: 20px;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Rev.</th> <th>Date</th> <th>DRW</th> <th>Check 1</th> <th>Check 2</th> <th>Marking Color:</th> <th>GREEN</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Weld Class:</td> <td>QXB-55-M</td> </tr> <tr> <td>01</td> <td>25/04/2024</td> <td>GRM</td> <td>ANP</td> <td>PCO</td> <td>Paint System:</td> <td>NA</td> </tr> </tbody> </table> </div> <div style="margin-top: 20px;"> <p>Sergio Morales  Date: 30-09-24</p> </div> <div style="margin-top: 20px;"> <p>ID Cleaning: YES      Piece Mark</p> </div> <div style="margin-top: 20px;"> <p>OD Cleaning: YES      Ref. Drawing</p> </div> <div style="margin-top: 20px;"> <p>Tolerances: ASME B31.3      Job #</p> </div> <div style="margin-top: 20px;"> <p>Spool #      Project</p> </div> <div style="margin-top: 20px;"> <p>F324-302-0</p> </div>	ITEM	LONGUEUR	DIAMÈTRE	SCH/mm	DESCRIPTION / MATERIEL	ITEM CODE	1.1	0,579	6"	S-10S	PIPE - A312-TP304/304L DUAL GR BE SMLS BExBE	I3364305	1.2	3,663	6"	S-10S	PIPE - A312-TP304/304L DUAL GR BE SMLS BExPE	I3364305	ITEM	QT	DIAMÈTRE	PRESSION	SCH/mm	DESCRIPTION / MATERIEL	ITEM CODE	4.1	1	6"	150#	S-10S	WN FLANGE ASME B16.5 150# A182-F304/304L DUAL GR RF BE 125 - 250 AARH	I2260691	5.1	1	6"	150#	S-10S	WN FLANGE ASME B16.5 150# A182-F304/304L DUAL GR RF BE 125 - 250 AARH	I2260691	ITEM	QT	DIAMETER	SCH/mm	DESCRIPTION / MATERIAL	ITEM CODE	2.1	1	6"	S-10S	45 LR ELBOW ASME B16.9 A403-WP304/304L DG BE SMLS	I2259148	3.1	1	6"	S-10S	45 LR ELBOW ASME B16.9 A403-WP304/304L DG BE SMLS	I2259148	Rev.	Date	DRW	Check 1	Check 2	Marking Color:	GREEN						Weld Class:	QXB-55-M	01	25/04/2024	GRM	ANP	PCO	Paint System:	NA
ITEM	LONGUEUR	DIAMÈTRE	SCH/mm	DESCRIPTION / MATERIEL	ITEM CODE																																																																										
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					Weld Class:	QXB-55-M																																																																									
01	25/04/2024	GRM	ANP	PCO	Paint System:	NA																																																																									

# Spool Material List

Contract : P2308

Client NERVION

Job : P2308S

Project ALBA

Job	Spool	Piece Mark	Drawing	Rev			
Item No Tag No ID No	Qty	Size1 Sch1	Size2 Sch2	Description	Heat No MTR No Folder No	Unit Weight Kgs	Weight Kgs
<b>P2308S 01006</b>	<b>2121-LO40B05-1-SP01-01006</b>			<b>2121-LO40B05-1</b>			<b>01</b>
1.1	,579 6.0000 S10S	0.0000 NA		PIPE, SEAMLESS, A312-TP304L	MT100083 0113	13,84	8,01
40415							
1.2	3,663 6.0000 S10S	0.0000 NA		PIPE, SEAMLESS, A312-TP304L	MT100083 0113	13,84	50,70
40415							
4.1	1 6.0000 S10S	0.0000 NA		WN FLG, RAISED FACE, 150#, A182-F304L	NY230225AT07 0374	11,00	11,00
37887							
5.1	1 6.0000 S10S	0.0000 NA		WN FLG, RAISED FACE, 150#, A182-F304L	NY230225AT07 0374	11,00	11,00
37887							
2.1	1 6.0000 S10S	0.0000 NA		45 ELL, SEAMLESS, A403-WP304L	JSG2312024 0460	2,61	2,61
42804							
3.1	1 6.0000 S10S	0.0000 NA		45 ELL, SEAMLESS, A403-WP304L	JSG2312024 0460	2,61	2,61
42804							

On behalf of Tecnimont / R  
Piping Supervisor  
Cristi Sandu  
01.10.2024 *C. Sandu*

Number of Items :

**6**

Total Weight :

**85,93**

<b>Signature</b>	<b>QA</b>	<b>Client</b>
	 <i>[Signature]</i>	Sergio Morales Date: 30-09-24
<b>Date</b>	2024-09-24 16:36:46	

**INSPECTION CERTIFICATE**  
**EN 10204:2004 / 3.1**

Number: TTP/MTC-2023/1828

Rev: 00

Page: 1 of 8

Created on:  
Date: 16.08.2023

Modified on:  
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## TUBACEX TUBES AND PIPES PVT LTD.

Plot No. 131/1, Umbergaon – Sanjan Road, Umbergaon – 396171

Dist. Valsad, Gujarat, INDIA

TL: +91 260 6616200, +91 260 6616240

E-MAIL: [quality@tubacexindia.com](mailto:quality@tubacexindia.com)

### CUSTOMER DESCRIPTION

#### CLIENT SOLD TO

M/S. TUBACEX SERVICE SOLUTIONS, S.A.U.

#### CLIENT SHIP TO

CLIENT ORDER: 508342 DTD: 17.11.2022

TECHNIMONT PO NO.: 7500107816

SALES ORDER: 1202171

PROJECT: ALBA PROJECT

END USER: REPSOL

MATERIAL: SEAML. STAINL. STEEL PIPES.

COLD FINISHED & HEAT-TREATED. PICKLED & PASSIVATED ACC. TO ASTM A380.

GRADE: TP 304/304L

STANDARD:

ASTM A 312/A 312M-21 (ED.2022) PED 2014/68/EU

ASME B16.25 FIG.4

CUSTOMER SPECIFICATION:

4274-XH-SS-00000001, REV.01

COLOR CODE: 4274-XZ-SG-00000006

PMA:4274-XH-SS-0000100

ITP: TTP/QAP/2171/0329, REV.05, DT.05.06.2023

PROCEDURE NO:

TSS SAU-ALBA PROJECT/PSP/01 REV.00 PROCEDURE FOR PACKING/STORAGE AND PRESERVATION OF PRODUCT

TSS SAU-ALBA PROJECT/LSH/01 REV.00 PROCEDURE FOR LOADING/SHIPPING & HANDLING

CHECK ANALYSIS

HYDROTEST: ASTM A999/A999M ASTM A312

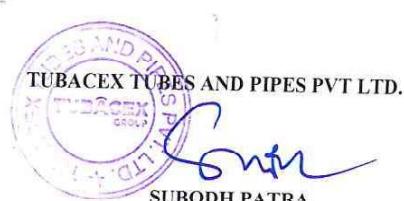
TOLERANCE: A312: A999

RANDOM LENGTHS: 9-11.8 M / 5-7 M / BEVELLED ENDS B16.25 FIG.4

DIMENSIONS: SR NO.1 - 60.33 MM OD X 2.77 MM THK - 2" X SCH 10S

DIMENSIONS: SR NO.2 - 60.33 MM OD X 5.54 MM THK - 2" X SCH 80S

DIMENSIONS: SR NO.3 - 114.30 MM OD X 6.02 MM THK - 4" X SCH 40S



Certified Management System acc. to ISO 9001, ISO 14001 & ISO 45001 by TUV-NORD

We hereby certify that the material herein described has been manufactured, sampled, tested and inspected in accordance with above standards and specifications and satisfies orders requirements. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall be legally prosecuted.



TTP

TUBACEX  
GROUPINSPECTION CERTIFICATE  
EN 10204:2004 / 3.1

Number: TTP/MTC-2023/1828

Rev: 00

Page: 2 of 8

Created on:  
Date: 16.08.2023Modified on:  
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DIMENSIONS: SR NO.4 - 168.28 MM OD X 3.40 MM THK - 6" X SCH 10S  
 DIMENSIONS: SR NO.5 - 168.28 MM OD X 7.11 MM THK - 6" X SCH 40S  
 DIMENSIONS: SR NO.6 - 168.28 MM OD X 10.97 MM THK - 6" X SCH 80S  
 DIMENSIONS: SR NO.7 - 21.34 MM OD X 4.78 MM THK - 1/2" X SCH 160S  
 DIMENSIONS: SR NO.8 - 21.34 MM OD X 2.77 MM THK - 1/2" X SCH 40S  
 DIMENSIONS: SR NO.9 - 21.34 MM OD X 3.73 MM THK - 1/2" X SCH 80S  
 DIMENSIONS: SR NO.10 - 21.34 MM OD X 3.73 MM THK - 1/2" X SCH 80S  
 DIMENSIONS: SR NO.11 - 26.67 MM OD X 2.87 MM THK - 3/4" X SCH 40S  
 DIMENSIONS: SR NO.12 - 26.67 MM OD X 3.91 MM THK - 3/4" X SCH 80S  
 DIMENSIONS: SR NO.13 - 21.34 MM OD X 3.91 MM THK - 3/4" X SCH 80S  
 DIMENSIONS: SR NO.14 - 33.40 MM OD X 6.35 MM THK - 1" X SCH 160S  
 DIMENSIONS: SR NO.15 - 33.40 MM OD X 6.35 MM THK - 1" X SCH 160S  
 DIMENSIONS: SR NO.16 - 33.40 MM OD X 3.38 MM THK - 1" X SCH 40S  
 DIMENSIONS: SR NO.17 - 33.40 MM OD X 3.38 MM THK - 1" X SCH 40S  
 DIMENSIONS: SR NO.18 - 48.26 MM OD X 3.68 MM THK - 1.1/2" X SCH 40S  
 DIMENSIONS: SR NO.19 - 21.34 MM OD X 7.47 MM THK - 1/2" X SCH XXS

Sr. No.	Sales Item	Tr item no	Ident no	Heat No	Pieces	Weight	Total Lgth	Un Lgth
1	60	6	I3364302	A-6499	3	-	33.420	9000-11800 MM
2	80	8	I2506931	A-6630	2	-	22.310	9000-11800 MM
3	120	12	I3364294	23L0253	12	-	72.72	5000-7000 MM
4	130	13	I3364305	MT100083	10	-	64.045	5000-7000 MM
5	140	14	I3364322	MT100081	3	-	17.82	5000-7000 MM
6	150	15	I3364327	MT100083	1	-	6.330	5000-7000 MM
7	170	17	I2514551	A-6500	7	-	81.715	9000-11800 MM
8	180	18	I2257937	A-6500	22	-	252.455	9000-11800 MM
9	190	19	I2257955	A-6500	27	-	304.575	9000-11800 MM
10	190	19	I2257955	A-6192	2	-	19.910	9000-11800 MM
11	210	21	I2257938	A-6500	17	-	184.605	9000-11800 MM
12	220	22	I2257956	A-6500	23	-	242.690	9000-11800 MM
13	230	23	I2514553	23L0555	3	-	28.350	9000-11800 MM
14	230	23	I2514553	A-6911	6	-	66.010	9000-11800 MM
15	240	24	I2257939	A-6968	5	-	58.320	9000-11800 MM

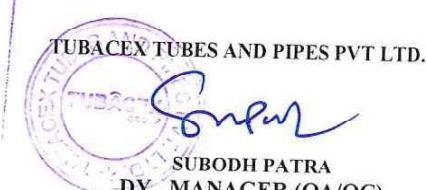


16/8/23

Certified Management System acc. to ISO 9001, ISO 14001 & ISO 45001 by TUV NORD

INVESTIGATION  
52-028

We hereby certify that the material herein described has been manufactured, sampled, tested and inspected in accordance with above standards and specifications and satisfies orders requirements. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall be legally prosecuted.



 SUBODH PATRA  
DY. MANAGER (QA/QC)


TTP

TUBACEX  
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16	240	24	I2257939	23L0545	12	133.810	9000-11800 MM
17	240	24	I2257939	235073	6	61.280	9000-11800 MM
18	260	26	I2257941	A-6911	1	10.740	9000-11800 MM
19	290	29	I6315316	22L2364	25	289.100	9000-11800 MM

## RAW MATERIAL

Sr. No.	Heat No:	Method
1	A-6499	EF-AOD-CCM
2	A-6630	EF-AOD-CCM
3	23L0253	EIF-AOD-CCM
4&6	MT100083	Electric furnace + AOD
5	MT100081	Electric furnace + AOD
7,8,9,11&12	A-6500	EIF-AOD-CCM
10	A-6192	EIF-AOD-CCM
13	23L0555	EIF-AOD-CCM
14&18	A-6911	EIF-AOD-CCM
15	A-6968	EIF-AOD-CCM
16	23L0545	EIF-AOD-CCM
17	235073	IF/AOD/CCP(EMS)/HR
19	22L2364	EIF-AOD-CCM

## CHEMICAL COMPOSITION (%) \*L: Ladle C: Products

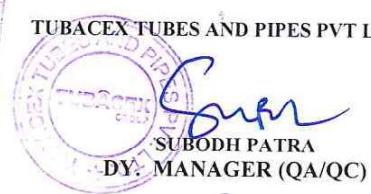
Sr. No.	*	Heat	C	Mn	Si	P	S	Ni	Cr
Req. Max.			0.035	2.00	1.00	0.045	0.030	11.00	20.00
Req. Min.			-	-	-	-	-	8.00	18.00
1	L	A-6499	0.023	1.86	0.43	0.039	0.009	8.05	18.15
1	C	A-6499	0.025	1.88	0.46	0.038	0.010	8.08	18.26
2	L	A-6630	0.021	1.84	0.37	0.039	0.011	8.06	18.12
2	C	A-6630	0.022	1.86	0.38	0.035	0.014	8.07	18.27
3	L	23L0253	0.026	1.86	0.26	0.037	0.006	8.09	18.40
3	C	23L0253	0.027	1.90	0.29	0.038	0.009	8.11	18.48

Certified Management System acc. to ISO 9001, ISO 14001 &amp; ISO 45001 by TUV-NORD 028

We hereby certify that the material herein described has been manufactured, sampled, tested and inspected in accordance with above standards and specifications and satisfies orders requirements. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall be legally prosecuted.



TUBACEX TUBES AND PIPES PVT LTD.




**INSPECTION CERTIFICATE**  
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4	L	MT100083	0.023	1.86	0.34	0.039	0.004	8.07	18.30
4	C	MT100083	0.024	1.85	0.36	0.038	0.006	8.09	18.38
5	L	MT100081	0.026	1.87	0.26	0.038	0.010	8.10	18.14
5	C	MT100081	0.027	1.88	0.27	0.037	0.011	8.13	18.26
5	L	MT100083	0.023	1.86	0.34	0.039	0.004	8.07	18.30
6	C	MT100083	0.025	1.89	0.36	0.038	0.008	8.09	18.36
6	L	A-6500	0.027	1.84	0.40	0.038	0.011	8.05	18.15
7	C	A-6500	0.028	1.86	0.43	0.039	0.013	8.10	18.27
7	L	A-6500	0.027	1.84	0.40	0.038	0.011	8.05	18.15
8	C	A-6500	0.026	1.83	0.41	0.037	0.012	8.07	18.28
8	L	A-6500	0.027	1.84	0.40	0.038	0.011	8.05	18.15
9	C	A-6500	0.028	1.86	0.41	0.037	0.015	8.07	18.26
9	L	A-6192	0.023	1.82	0.43	0.038	0.013	8.05	18.20
10	C	A-6192	0.024	1.83	0.46	0.036	0.014	8.06	18.28
10	L	A-6500	0.027	1.84	0.40	0.038	0.011	8.05	18.15
11	C	A-6500	0.026	1.83	0.41	0.034	0.014	8.10	18.28
11	L	A-6500	0.027	1.84	0.40	0.038	0.011	8.05	18.15
12	C	A-6500	0.026	1.87	0.44	0.037	0.015	8.09	18.22
12	L	23L0555	0.023	1.87	0.27	0.039	0.014	8.05	18.32
13	C	23L0555	0.025	1.88	0.29	0.036	0.015	8.07	18.39
13	L	A-6911	0.023	1.85	0.36	0.038	0.010	8.06	18.23
14	C	A-6911	0.024	1.86	0.38	0.036	0.013	8.09	18.31
14	L	A-6968	0.022	1.84	0.40	0.039	0.012	8.05	18.22
15	C	A-6968	0.024	1.86	0.43	0.037	0.014	8.07	18.29
15	L	23L0545	0.022	1.83	0.40	0.038	0.006	8.08	18.44
16	C	23L0545	0.024	1.85	0.41	0.037	0.008	8.12	18.49
16	L	235073	0.021	1.80	0.27	0.038	0.005	8.08	18.13
17	C	235073	0.023	1.82	0.28	0.037	0.008	8.09	18.26



*Wanki*  
16/08/23

Certified Management System acc. to ISO 9001, ISO 14001 & ISO 45001 by TUV-NORD

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TUBACEX TUBES AND PIPES PVT LTD.

SUBODH PATRA  
DY. MANAGER (QA/QC)



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17	L	A-6911	0.023	1.85	0.36	0.038	0.010	8.06	18.23
18	C	A-6911	0.024	1.86	0.37	0.037	0.012	8.07	18.34
18	L	22L2364	0.024	1.84	0.28	0.039	0.009	8.07	18.17
19	C	22L2364	0.026	1.86	0.29	0.038	0.010	8.08	18.27

**HEAT TREATMENT**

SOLUTION ANNEALED AT MINIMUM 1040°C, FOLLOWED BY WATER QUENCHED.

**TENSILE TEST: ACCORDING TO ASTM A 370**

Sr. No.	Heat No:	Sample	Temp	YS	UTS	A2"	Type	Spc. Type	Spc. Dim	
									mm	mm
Req. max.			---	---	---	---	---	---		
Req. Min.			---	205	515	35	---	---	WIDTH	THK
1	A-6499	1	RT	312.63	611.20	56.23	L	R	38.10	2.78
2	A-6630	1	RT	345.20	603.32	61.26	L	R	38.10	5.54
3	23L0253	1	RT	329.37	622.32	58.20	L	R	38.10	6.01
4	MT100083	1	RT	317.52	615.48	56.20	L	R	38.10	3.38
5	MT100081	1	RT	326.20	610.26	61.20	L	R	38.12	7.10
6	MT100083	1	RT	336.20	635.26	61.25	L	R	38.10	10.98
7	A-6500	1	RT	366.90	656.50	65.20	L	F	21.35	4.77
8	A-6500	1	RT	298.20	605.32	56.80	L	F	21.35	2.80
9	A-6500	1	RT	310.28	618.26	58.90	L	F	21.34	3.72
10	A-6192	1	RT	290.98	591.25	61.23	L	F	21.31	3.75
11	A-6500	1	RT	333.56	598.24	62.30	L	F	26.28	2.88
12	A-6500	1	RT	286.09	610.48	57.20	L	F	26.66	3.90
13	23L0555	1	RT	302.20	618.25	60.25	L	R	25.40	6.33
14	A-6911	1	RT	318.92	602.55	59.54	L	R	25.41	6.34
15	A-6968	1	RT	318.92	602.25	59.54	L	F	33.40	3.39
16	23L0545	1	RT	335.69	639.25	56.28	L	F	33.41	3.37



Certified Management System acc. to ISO 9001, ISO 14001 &amp; ISO 45001 by TUBACEX

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TUBACEX TUBES AND PIPES PVT LTD.

SUBODH PATRA  
DY. MANAGER (QA/QC)

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17	235073	1	RT	346.25	625.30	59.27	L	F	33.39	3.37
18	A-6911	1	RT	336.26	648.50	59.84	L	R	25.40	3.67
19	22L2364	1	RT	302.20	597.86	58.27	L	F	21.33	7.46

**HARDNESS TEST: ACCORDING TO ASTM A 370**

Sr. No.	Heat No:	Sample	HRB1	HRB2
	Req. Max		---	---
	Req. Min		---	---
1	A-6499	1	76	79
2	A-6630	1	78	81
3	23L0253	1	76	78
4	MT100083	1	74	76
5	MT100081	1	77	79
6	MT100083	1	77	80
7	A-6500	1	76	78
8	A-6500	1	77	80
9	A-6500	1	76	80
10	A-6192	1	77	79
11	A-6500	1	78	80
12	A-6500	1	76	79
13	23L0555	1	76	78
14	A-6911	1	77	80
15	A-6968	1	77	80
16	23L0545	1	77	80
17	235073	1	78	81
18	A-6911	1	77	80
19	22L2364	1	77	79

**METALLURGICAL TESTS**

INTERGRANULAR CORROSION TEST CARRIED OUT PER EACH HEAT ACC. ASTM A 262 PRACTICE "E". NO CRACKS OR ICC FISSURES OBSERVED ON BENT SPECIMEN AT 20X AND MICROSTRUCTURE FOUND NO GARIN DROPPING AT 250X



INSPECTION

Certified Management System acc. to ISO 9001, ISO 14001 &amp; ISO 45001 by TUV NORD

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TUBACEX TUBES AND PIPES PVT LTD.

SUBODH PATRA  
Dy. MANAGER (QA/QC)

**TPP****TUBACEX  
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MAGNIFICATION OBSERVED: FOUND SATISFACTORY.

**NON-DESTRUCTIVE TESTS**

POSITIVE MATERIAL IDENTIFICATION TEST CARRIED OUT BY "X-RAY-FUROSCENCE-ANALYZER" (TARGET ELEMENTS Cr &amp; Ni) BY M/s TPP &amp; 'SW' WITNESSED BY M/s ITI, M/s DNV, M/s BV: SATISFACTORY.

HYDROSTATIC PRESSURE TEST CARRIED OUT ON EACH PIPE FOR DURATION OF 5 SEC AND NO LEAKAGE OR PRESSURE DROP OBSERVED: SATISFACTORY

Sr. No.	Sales Item	Hydro Pressure (Psig)	Remarks
1	60	1400	SATISFACTORY
2	80	2500	SATISFACTORY
3	120	1600	SATISFACTORY
4	130	650	SATISFACTORY
5	140	1300	SATISFACTORY
6	150	2000	SATISFACTORY
7	170	2500	SATISFACTORY
8	180	2500	SATISFACTORY
9&10	190	2500	SATISFACTORY
11	210	2500	SATISFACTORY
12	220	2500	SATISFACTORY
13&14	230	2500	SATISFACTORY
15,16&17	240	2500	SATISFACTORY
18	260	2300	SATISFACTORY
19	290	2500	SATISFACTORY

DIMENSIONAL AND VISUAL CHECKING ON EACH PIPE FOR ALL SIZES BY M/s TPP &amp; 'SW' WITNESSED BY M/s ITI, M/s DNV, M/s BV: SATISFACTORY.

**TECHNOLOGICAL TESTS**

FLATTENING TEST: SATISFACTORY

**MARKING**
 TPP.TUBACEX GROUP/COLD FINISHED SEAMLESS PIPE /---" (---MM OD) x SCH--- (---MM THK) x --- MTR LONG /  
 ASTM A 312 / GRADE--- / HEAT NO.--- / IDENT CODE..... / ITEM NO.---/B.NO. --- / PMIV / TPP-2
**COLOR CODE:**

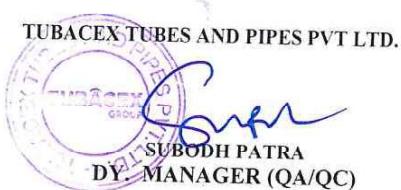
2 BLACK (RAL 9017) LONGITUDINAL COLOR BAND WITH 15-20MM WIDTH GAP BETWEEN BOTH BAND 10MM.

**REMARKS**

NO MERCURY, MERCURY COMPOUNDS OR MERCURY BEARING INSTRUMENTS AND/OR EQUIPMENT HAVE BEEN USED ALONG MANUFACTURING AND INSPECTION PROCESS.

NO WELDING OR WELD REPAIRS WERE MADE.

WE HEREBY CONFORM THAT WE ARE CERTIFIED BY TUV RHEINLAND INDUSTRIE SERVICE GmbH AS NOTIFIED BODY (0035) TO ISSUE CERTIFICATES OF SPECIFIC PRODUCT CONTROL IN ACCORDANCE TO PRESSURE EQUIPMENT

INSPECTION  
52-028SUBODH PATRA  
DY. MANAGER (QA/QC)

Certified Management System acc. to ISO 9001, ISO 14001 & ISO 45001 by TUV-NORD

We hereby certify that the material herein described has been manufactured, sampled, tested and inspected in accordance with above standards and specifications and satisfies orders requirements. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall be legally prosecuted.

**INSPECTION CERTIFICATE**  
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DIRECTIVE 2014/68/EU ANNEX 1 POINT 4.3 & AD 2000-WO.PED 2014/68/EU CERTIFICATE NO.: 01 202 IND/Q-15-0036 VALID UNTILL DECEMBER 31, 2024.

MATERIAL CHARACTERISTIC COMPLY WITH POINT 7.5 OF ANNEX 1 TO PED BY HAVING AN ELONGATION AFTER MATERIAL IS FREE OF RADIATION CONTAMINATION.

10% WITNESSED PIPES SINGLE ELECTRO ETCHED NEAR MILL MARKING "  " FOR IDENTIFICATION BY M/s DNV & " "FOR IDENTIFICATION M/s BV.

**ABBREVIATIONS**

YS-YIELD STRESS, UTS-ULTIMATE TENSILE STRESS, A2"-GAUGE LENGTH (2 INCH), A5-GAUGE LENGTH 5.65VS°, RT-ROOM TEMPERATURE, T-TRANSVERSE, L-LONGITUDINAL, R-REDUCED SECTION (STRIP), F-FULL SECTION, R/L-RANDOM LENGTH, SPC-SPECIMEN, M-METER, TTP - TUBACEX TUBES AND PIPES PVT LTD. H-HARDNESS



Certified Management System acc. to ISO 9001, ISO 14001 & ISO 45001 by TUV-NORD

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GROUPINSPECTION CERTIFICATE  
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## TUBACEX TUBES AND PIPES PVT LTD.

Plot No. 131/I, Umbergaon – Sanjan Road, Umbergaon – 396171  
Dist. Valsad, Gujarat, INDIATL: +91 260 6616200, +91 260 6616240  
E-MAIL: quality@tubacexindia.com

## CUSTOMER DESCRIPTION

## CLIENT SOLD TO

M/S. TUBACEX SERVICE SOLUTIONS, S.A.U.

## CLIENT SHIP TO

CLIENT ORDER. 508342 DTD: 17.11.2022

TECHNIMONT PO NO.: 7500107816

SALES ORDER: 1202171

PROJECT: ALBA PROJECT

END USER: REPSOL

MATERIAL: SEAML. STAINL. STEEL PIPES.

COLD FINISHED &amp; HEAT-TREATED. PICKLED &amp; PASSIVATED ACC. TO ASTM A380.

GRADE: TP 316/316L

STANDARD:

ASTM A 312/A 312M-21(ED.2022) PED 2014/68/EU

ASME B16.25 FIG.4

CUSTOMER SPECIFICATION:

4274-XH-SS-00000001, REV.01

COLOR CODE: 4274-XZ-SG-0000006

PMA:4274-XH-SS-0000100

ITP: TTP/QAP/2171/0329, REV.05, DT.05.06.2023

PROCEDURE NO:

TSS SAU-ALBA PROJECT/PSP/01 REV.00 PROCEDURE FOR PACKING/STORAGE AND PRESERVATION OF PRODUCT  
TSS SAU-ALBA PROJECT/LSH/01 REV.00 PROCEDURE FOR LOADING/SHIPPING & HANDLING

CHECK ANALYSIS

HYDROTEST: ASTM A999/A999M ASTM A312

TOLERANCE: A312: A999

RANDOM LENGTHS: 9-11.8 M / 5-7 M / BEVELLED ENDS B16.25 FIG.4

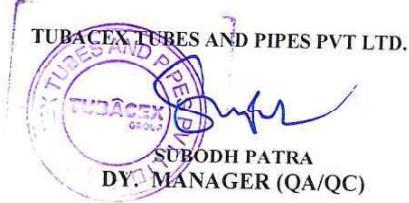
DIMENSIONS: SR NO.1 - 88.90 MM OD X 3.05 MM THK - 3" X SCH 10S

DIMENSIONS: SR NO.2 - 114.3 MM OD X 3.05 MM THK - 4" X SCH 10S

DIMENSIONS: SR NO.3 - 21.34 MM OD X 2.77 MM THK - 1/2" X SCH 40S

DIMENSIONS: SR NO.4 - 33.40 MM OD X 3.38 MM THK - 1" X SCH 40S

Sr. No.	Sales Item	Tr item no	Ident no	Heat No	Pieces	Weight	Total Lgth	Un Lgth
1	20	2	I2235324	23L0124	2	-	22.99	9000-11800 MM



Certified Management System acc. to ISO 9001, ISO 14001 &amp; ISO 45001 by TUV-NORD

52028

We hereby certify that the material herein described has been manufactured, sampled, tested and inspected in accordance with above standards and specifications and satisfies orders requirements. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall be legally prosecuted.

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2	30	3	I2235325	MT200074	5	-	30.735	5000-7000 MM
4	40	4	I2235361	A-6731	2	-	23.56	9000-11800 MM
5	50	5	I2235363	225216	4	-	38.115	9000-11800 MM

## RAW MATERIAL

Sr. No.	Heat No:	Method
1	23L0124	EIF-AOD-CCM
2	MT200074	Electric furnace + AOD
3	A-6731	EF-AOD-CCM
4	225216	IF/AOD/CCP(EMS)/HR

CHEMICAL COMPOSITION (%)			*L: Ladle C: Products							
Sr. No.	*	Heat	C	Mn	Si	P	S	Ni	Cr	Mo
Req. Max.			0.035	2.00	1.00	0.045	0.030	14.00	18.00	3.00
Req. Min.			-	-	-	-	-	10.00	16.00	2.00
1	L	23L0124	0.025	1.81	0.31	0.040	0.010	10.08	16.65	2.03
1	C	23L0124	0.027	1.83	0.32	0.038	0.012	10.09	16.72	2.05
2	L	MT200074	0.021	1.57	0.36	0.039	0.013	10.07	16.69	2.02
2	C	MT200074	0.023	1.59	0.39	0.036	0.015	10.10	16.78	2.04
3	L	A-6731	0.027	1.19	0.30	0.039	0.009	10.06	16.57	2.02
3	C	A-6731	0.028	1.23	0.32	0.037	0.010	10.08	16.65	2.06
4	L	225216	0.024	1.51	0.29	0.038	0.010	10.09	16.99	2.04
4	C	225216	0.026	1.54	0.32	0.039	0.012	10.11	17.05	2.06

## HEAT TREATMENT

SOLUTION ANNEALED AT MINIMUM 1040°C, FOLLOWED BY WATER QUENCHED.

## TENSILE TEST: ACCORDING TO ASTM A 370

Sr. No.	Heat No:	Sample	Temp	YS	UTS	A2"	Type	Spc. Type	Spc. Dim	
				°C	MPa	MPa	%		Mm	Mm
Req. max.				---	---	---	---	---	---	---
Req. Min.				---	205	515	35	---	---	---
1	23L0124	1	RT	302.17	580.15	57.30	L	R	38.10	3.06
2	MT200074	1	RT	312.23	620.43	58.00	L	F	38.12	3.07
3	A-6731	1	RT	272.33	598.37	58.24	L	F	21.35	2.79
4	225216	1	RT	305.23	615.42	59.20	L	F	33.42	3.41

## HARDNESS TEST: ACCORDING TO ASTM A 370

Sr. No.	Heat No:	Sample	HRB1	HRB2
Req. Max			---	---
Req. Min			---	---
1	23L0124	1	77	80
2	MT200074	1	76	80

INSPECTION  
52-028

TUBACEX TUBES AND PIPES PVT LTD.

SUBODH PATRA  
DY. MANAGER (QA/QC)

Certified Management System acc. to ISO 9001, ISO 14001 &amp; ISO 45001 by TUV-NORD

We hereby certify that the material herein described has been manufactured, sampled, tested and inspected in accordance with above standards and specifications and satisfies orders requirements. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall be legally prosecuted.

TTP

TUBACEX  
GROUPINSPECTION CERTIFICATE  
EN 10204:2004 / 3.1

Number: TTP/MTC-2023/1827

Rev: 00

Page: 3 of 4

Created on:  
Date: 16.08.2023Modified on:  
---

3	A-6731	1	78	80
4	225216	1	76	81

**METALLURGICAL TESTS**

INTERGRANULAR CORROSION TEST CARRIED OUT PER EACH HEAT ACC. ASTM A 262 PRACTICE "E". NO CRACKS OR IGC FISSURES OBSERVED ON BENT SPECIMEN AT 20X AND MICROSTRUCTURE FOUND NO GARIN DROPPING AT 250X MAGNIFICATION OBSERVED: FOUND SATISFACTORY.

**NON-DESTRUCTIVE TESTS**

POSITIVE MATERIAL IDENTIFICATION TEST CARRIED OUT BY "X-RAY-FLUORESCENCE-ANALYZER" (TARGET ELEMENTS Cr, Ni & Mo) BY M/s TTP & 'SW' WITNESSED BY M/s ITI, M/s DNV, M/s BV: SATISFACTORY.

HYDROSTATIC PRESSURE TEST CARRIED OUT ON EACH PIPE FOR DURATION OF 5 SEC AND NO LEAKAGE OR PRESSURE DROP OBSERVED: SATISFACTORY

Sr. No.	Sales Item	Hydro Pressure (Psig)	Remarks
1	20	1100	SATISFACTORY
2	30	800	SATISFACTORY
3	40	2500	SATISFACTORY
4	50	2500	SATISFACTORY

DIMENSIONAL AND VISUAL CHECKING ON EACH PIPE FOR ALL SIZES BY M/s TTP & 'SW' WITNESSED BY M/s ITI, M/s DNV, M/s BV: SATISFACTORY.

**TECHNOLOGICAL TESTS**

FLATTENING TEST: SATISFACTORY

**MARKING**

TTP.TUBACEX GROUP/COLD FINISHED SEAMLESS PIPE /---" (---MM OD) x SCH--- (---MM THK) x --- MTR LONG / ASTM A 312 / GRADE--- / HEAT NO.--- / IDENT CODE..... / ITEM NO.---/B.NO. --- / PMIV / TTP-2

**COLOR CODE:**

2 RED (RAL 3000) LONGITUDINAL COLOR BAND WITH 15-20MM WIDTH GAP BETWEEN BOTH BAND 10MM.

**REMARKS**

NO MERCURY, MERCURY COMPOUNDS OR MERCURY BEARING INSTRUMENTS AND/OR EQUIPMENT HAVE BEEN USED ALONG MANUFACTURING AND INSPECTION PROCESS.

NO WELDING OR WELD REPAIRS WERE MADE.

WE HEREBY CONFORM THAT WE ARE CERTIFIED BY TUV RHEINLAND INDUSTRIE SERVICE GmbH AS NOTIFIED BODY (0035) TO ISSUE CERTIFICATES OF SPECIFIC PRODUCT CONTROL IN ACCORDANCE TO PRESSURE EQUIPMENT DIRECTIVE 2014/68/EU ANNEX 1 POINT 4.3 & AD 2000-W0.PED 2014/68/EU CERTIFICATE NO.: 01 202 IND/Q-15-0036 VALID UNTILL DECEMBER 31, 2024.

MATERIAL CHARACTERISTIC COMPLY WITH POINT 7.5 OF ANNEX 1 TO PED BY HAVING AN ELONGATION AFTER



TUBACEX TUBES AND PIPES PVT LTD.



Certified Management System acc. to ISO 9001, ISO 14001 & ISO 45001 by TUVNORD 52-028

We hereby certify that the material herein described has been manufactured, sampled, tested and inspected in accordance with above standards and specifications and satisfies orders requirements. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall be legally prosecuted.

**INSPECTION CERTIFICATE**  
**EN 10204:2004 / 3.1**

Number: TTP/MTC-2023/1827

Rev: 00

Page: 4 of 4

Created on:  
 Date: 16.08.2023

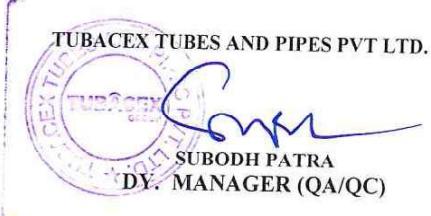
Modified on:  
 ---

MATERIAL IS FREE OF RADIATION CONTAMINATION.

10% WITNESSED PIPES SINGLE ELECTRO ETCHED NEAR MILL MARKING "W" FOR IDENTIFICATION BY M/s DNV & "FOR IDENTIFICATION M/s BV.

**ABBREVIATIONS**

YS-YIELD STRESS, UTS-ULTIMATE TENSILE STRESS, A2"-GAUGE LENGTH (2 INCH), A5-GAUGE LENGTH 5.65VS°, RT-ROOM TEMPERATURE, T-TRANSVERSE, L-LONGITUDINAL, R-REDUCED SECTION (STRIP), F-FULL SECTION, R/L-RANDOM LENGTH, SPC-SPECIMEN, M-METER, TTP - TUBACEX TUBES AND PIPES PVT LTD. H-HARDNESS



Certified Management System acc. to ISO 9001, ISO 14001 & ISO 45001 by TUV-NORD

We hereby certify that the material herein described has been manufactured, sampled, tested and inspected in accordance with above standards and specifications and satisfies orders requirements. In case the owner of the certificate would release as a copy of it, he must attest its conformity to the issued, assuming the responsibility for any unlawful or TUBACEX, not allowed use. Any forgery or falsification of this certificate shall be legally prosecuted.

江阴市天宁管道有限公司/JiangYin TianNing Metal Pipe Fitting Co., Ltd  
质量证明书 / MILL TEST CERTIFICATE (According to EN 10204/3.1)

TNF TIANNING  
PIPE FITTINGS & FLANGES

PED 2014/68/EU

Q/JL15-15

客户 Customer:	CUNADO S.A.	证书号 Certificate No.:	F23-346-7
合同号 Order-No.:	PC0184380	7500107864	
材料规范 Material Specification:	ASTM A182/A182M-2022	日期 Date:	2023-10-24
尺寸标准 Dimensional Standard:	ASME B16.5-2020		
热处理方式 Heat Treatment:	固溶 Solution treated at 1060°C, 水冷 Water quenched.		

A. 产品交货范围/Extend of material delivery

序号 Item No.	Rli Pos	Ident Code	产品描述 Product Description			材料牌号 Material	炉号 Heat No.	数量 Qty	试样号 Sample No.	备注 Remarks
6	393*	I2260690	4"	SCH10S 150#	WN RF	F304/304L NY230225AT07	1	F23346-1		
7	394*	I2260701	4"	SCH40S 150#	WN RF	F304/304L NY230225AT07	3	F23346-1		
8	395*	I2260691	6"	SCH10S 150#	WN RF	F304/304L NY230225AT07	33	F23346-1		
14	401*	I2497417	2"	SCH40S 300#	WN RF	F304/304L NY230225AT07	12	F23346-1		
20	407*	I2375377	2"	SCH40S 600#	WN RF	F304/304L NY230225AT07	13	F23346-1		
39	426*	I2515449	1-1/2"	SCH80S 600#	SW RF	F304/304L NY230225AT07	19	F23346-1		
45	432*	I2260408	3"	150#	BL RF	F304/304L NY230225AT07	2	F23346-1		
46	433*	I2260409	4"	150#	BL RF	F304/304L NY230225AT07	1	F23346-1		
54	441*	I64403580	1"	SCH160 1500#	WN LF	F304/304L NY230225AT07	1	F23346-1		
57	444*	I2501431	1-1/2"	SCH40S 600#	SW RF	F304/304L NY230225AT07	4	F23346-1		
61	448*	I2373796	2"	SCH10S 300#	WN RF	F304/304L NY230225AT07	3	F23346-1		
67	454*	I2373795	1-1/2"	SCH40S 300#	WN RF	F304/304L NY230225AT07	15	F23346-1		
Total							107			

B. 化学成分/Chemical Analysis

序号 Item No.	试样号 Sample No.	C%	Si%	Mn%	P%	S%	Cr%	Ni%	Mo%	Ti%	N%	Cu%	V%	Other
		≤0.030	≤1.00	≤2.00	≤0.045	≤0.030	18.00-20.00	8.00-11.00	-	-	≤0.10	-	-	-
1	F23346-1	0.018	0.42	1.36	0.031	0.005	18.06	8.19			0.07			

C. 机械性能/Mechanical Properties

序号 Item No.	试样号 Sample No.	试验温度 Test temp & 取样方向 Sampling position	抗拉强度 Tensile Strength Rm (Mpa)	屈服强度 Yield Strength Rp0.2(Mpa)	延伸率 Elongation L0=50mm%	断面收缩率 Reduction of Area %*	硬度 Hardness (HBW)*	冲击韧性 Impact Akv* 10*10*55(mm) (V)	备注 Remarks
		室温 RT / (Tr)①	≥515	≥205	≥30	≥50	-	-	
1	F23346-1	-	598	295	61	73	-	-	-

D. 无损检测和其余检测/NDE And Other Tests

检测项目 Test Items	晶间腐蚀 IGC*	磁粉检查 MT*	超声波检查 UT*	渗透检查 PT*	材料识别 PMI*	尺寸和外观 Visual & Dimension	备注 Remarks
检测标准 Test Standard	-	-	-	-	-	-	-
结论 Verdict	N/A	N/A	N/A	N/A	合格 Accept	合格 Accept	

E. 说明/Explanation

注Notes①: [纵向L—longitudinal] [横向Tr—transverse]

1: 有“\*”标记的实验项目，如无标准要求或者客户附加条件，一般不做检测。

The items with note "\*" normally no need to do the test, in case that no requirement from the standard or client specification.

2: 兹证明本表所列产品，均依照标准规定的制造和检验，并符合标准要求。

We certify this material has been manufactured and examined in accordance with all requirements of the specification(s) and the results of all examinations are acceptable.

质量责任人  
QA Director:

检验部门章:  
Quality Stamp:



地址: 江苏省江阴市澄江工业园区创新大道281号  
Address: No.281 Chuangxin Road, Chengjiang Town, Jiangyin City, Jiangsu Province, China  
Tel: +86-510-86132158 Fax: +86-510-86135178

Rimel OBO Teciment

Lv Xiyang 2023.11.4

## **MATERIAL TEST CERTIFICATE**

MANUFACTURER: Yingkou Guangming Pipeline Industry Co.,Ltd

MATERIAL: ASTM A403 WP304/304L P.O NO: 1179/2023/OF

DIMENSION: ASME B16.9 WORK NO: GMDFOR231222C

**CUSTOMER:** Chero Binina Sdn A

DATE: April 10th 2024

PAGE NO: 17/29

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## **COMPOSITION%**

NOTE

## 1.1 HEAT TREATMENT: SOLUTION ANNEALED TEMPERATURE 1050°C X 0.5HR. COOLING IN WATER.

WE HEREBY CERTIFY THAT THE PRODUCT DESCRIBED HEREIN HAS BEEN MANUFACTURED IN ACCORDANCE WITH THE  
SPECIFICATIONS OF THE DRAWINGS.

SPECIFICATIONS CONCERNED AND ALSO WITH THE PURCHASER'S REQUIREMENTS AND THAT THE TEST RESULTS SHOWN HEREIN ARE CORRECT AND WE CONFIRM THAT P.M.I HAS BEEN DONE.

CHIEF OF INSPECTION DEPARTMENT





Contract : P2300

Drawing : 2121-LO40B05-1

## Welding and QC Report Per Spool

Job : P2300S

Material : Stainless Steel 304, 316, 317

Client : NERVION

Revision : 01

Spool : 01006

Spec : QXB-55-M

Project : ALBA

Piece Mark : 2121-LO40B05-1-SP01-01006

## Weld data

## Welding

## Control

Weld No.	Type	Dia	Sch	Weld Proc.	1st Pass	1st MTR	Final Pass	Final MTR	Dim	Date DIM	Visual	Date Visual	PT	Date PT	MT	Date MT	PMI	Date PMI	Ferite	Date Ferrite	PWHT	Date PWHT	BHN	Date BHN	Ultra	Date UT	Xray	Date Xray
0001	TW	6	S10S								000947	16-09-2024																
0002	BW	6	S10S	MW.26_BW	BC	12-09-2024	4712055	BC	12-09-2024	4712055		000947	16-09-2024				001006	21-09-2024										
0003	BW	6	S10S	MW.26_BW	BC	12-09-2024	4712055	BC	12-09-2024	4712055		000947	16-09-2024				001006	21-09-2024										
0004	BWC	6	S10S	MW.26_BW	BC	12-09-2024	4712055	BC	12-09-2024	4712055		000947	16-09-2024				001006	21-09-2024										
0005	TW	6	S10S								000947	16-09-2024																

On behalf of Tecnimont / R  
Piping Supervisor  
Cristi Sandu  
01.10.2024 *C. Sandu*

Notes:

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Signature	Boccard Portugal QC	Client
		Sergio Morales Date: 30-09-24
Date	24-09-2024 16:36:46	



# Shop QC Inspection Report

P2308-000981

Client : NERVION  
 Contract : P2308 / Project : ALBA  
 Material: Stainless Steel 304, 316, 317

Job number: P2308S  
 Spool N°: 01006  
 Piece Mark: 2121-LO40B05-1-SP01-01006

Procedure / Instruction reference: 20.2 IT 011 MF 324 - Rev: A

Control Date: 16-09-2024

Remarks: The results refer to the controlled items

Actions / Tasks List	Required		Done/ Identified
	Yes	No	
Welder / weld list labels printed and pasted on the spool sheet	X	<input type="checkbox"/>	X
Spool Barcode label printed	X	<input type="checkbox"/>	X
Spool is identified with the metal tag	X	<input type="checkbox"/>	X
Spool stencil required (hard stamp low stress)	<input type="checkbox"/>	X	<input type="checkbox"/>
Joint preparation & cleanliness / spool dimensions checked	X	<input type="checkbox"/>	X
Level, plumb, Two holes, flanges and internal alignment, Squareness	X	<input type="checkbox"/>	X
Material checked (type of material, rate, heat numbers, filler material, etc.)	X	<input type="checkbox"/>	X
Welders list match with actual welder stencil / Id. on pipe	X	<input type="checkbox"/>	X
PWHT- Spool identified as per Procedure / Instruction for PWHT	<input type="checkbox"/>	X	<input type="checkbox"/>
HT ( Hardness Test)- Welds identified as per Procedure / Instruction	<input type="checkbox"/>	X	<input type="checkbox"/>
MT - Welds identified as per Procedure / Instruction	<input type="checkbox"/>	X	<input type="checkbox"/>
PT - Welds identified as per Procedure / Instruction	<input type="checkbox"/>	X	<input type="checkbox"/>
PMI - Welds identified as per Procedure / Instruction	X	<input type="checkbox"/>	X
FE (Ferrite test) - Welds identified as per Procedure / Instruction	<input type="checkbox"/>	X	<input type="checkbox"/>
RT - Welds identified as per Procedure / Instruction	<input type="checkbox"/>	X	<input type="checkbox"/>
UT - Welds identified as per Procedure / Instruction	<input type="checkbox"/>	X	<input type="checkbox"/>
Spool identified (by marker) as per Procedure / Instruction (Job number, sheet number and Paint type if required)	X	<input type="checkbox"/>	X
Hydro - Spool identified as per Procedure / Instruction	<input type="checkbox"/>	X	<input type="checkbox"/>
Cleanliness - Cleaned inside free of slag, scale, sand, weld spatter, cutting chips, etc. and blow out by compressed air	X	<input type="checkbox"/>	X

Comments:

Performed by: MATOS, MARCO (N2 VT/PT)  Date: 16-09-2024  Signature 	QA/QC Inspection: RAIMUNDO, MARIANA  Date: 24-09-2024 16:36:46  Signature 	Customer Inspection: <b>Sergio Morales</b>  Date: 30-09-24  
--	---	--

On behalf of Tecnímont / R  
 Piping Supervisor  
 Cristi Sandu  
 01.10.2024 C. Sandu

# Visual Examination Report (Welds)

P2308-000947

Contract : P2308

Job number: P2308S

Material: Stainless Steel 304, 316, 317

Client : NERVION

Spool Nº: 01006

Procedure &amp; Instructions: 4274-LZ-VF-W31010370QAC04 - Rev: 1

Project : ALBA

Piece Mark: 2121-LO40B05-1-SP01-01006

Testing Date: 16-09-2024

Remarks: The results refer to the controlled items

Unacceptable indications for welding

ACCEPTANCE CRITERIA : ASME B31.3

Weld reinforcement greater than specified in project procedure

The illumination of the surface must be at least 500 lux. However, a value of 1000lux is recommended

Any linear indications greater than specified in project procedure, surface porosity with rounded indications having a dimension greater than specified project procedure

Indications of lack of fusion open to the surface / Cracks located on external surfaces

Surface finish that could interfere with other testing required

Incomplete penetration of welds / Indications of undercut on surfaces which are greater than specified in project procedure

Misalignment greater than specified in applicable code or poor fit up of weld joints

Identification			Welder	Temp. (°F/°C)	Accepted	Rejected	Defect	Technique Used	Comments
Weld No.	Weld Desc.								
0001	6.0000 S10S TW-Tack Weld ()			24	X			Direct	
0002	6.0000 S10S BW-Buttweld Straight (MW.26_BW)		BC	24	X			Direct	
0003	6.0000 S10S BW-Buttweld Straight (MW.26_BW)		BC	24	X			Direct	
0004	6.0000 S10S BWC-Miter / Angle / Trim weld >0,5° (MW.26_BW)		BC	24	X			Direct	
0005	6.0000 S10S TW-Tack Weld ()			24	X			Direct	

Sketch / Photo:

Defects									
Clustered Porosity	CP	Porosity	P	Cap	C	Lack of Cleanup	LC	Hollow in Cap	W
Unibmly Porosity	UP	Slag	S	Undercut	UC	Crack	CR	Surface	SU

Test Performed by: MATOS, MARCO (N2 VT/PT)

QA/QC Inspection: RAIMUNDO, MARIANA

Customer Inspection:

Date: 16-09-2024

Date: 24-09-2024 16:36:46

Sergio Morales

Signature



Signature



Date: 30-09-24


On behalf of Tecnimont / R  
Piping Supervisor  
Cristi Sandu  
01.10.2024 C. Sandu



# Positive Material Identification Report (PMI)

P2308-001006

Client : NERVION

Contract : P2308 / Project : ALBA

Remarks: The results refer to the controlled items

Job number: P2308S

Spool N°: 01006

Piece Mark: 2121-LO40B05-1-SP01-01006

Material: Stainless Steel 304, 316, 317

Procedure / Instruction reference: 4274-LZ-VF-FW31010370QAC11 - Rev: 1

PMI Equipment : Niton XL3t800 Serial N° 32735 (FP01)

Equipment Deviation : + - 5%

Testing Date: 21-09-2024

Weld / Item No	Description	Reading Number	Chemical Elements										Accepted	Rejected	Comments
			%Ti	%Mo	%Cu	%Ni	%Fe	%Mn	%Cr	%Nb	%Al	%V			
0002	6.0000 S10S BW-Buttweld Straight (MW.26_BW)	81	0	0	0	9	69	1	19	0	0	0	<input checked="" type="checkbox"/>		
0003	6.0000 S10S BW-Buttweld Straight (MW.26_BW)	84	0	0	0	8	69	1	19	0	0	0	<input checked="" type="checkbox"/>		
0004	6.0000 S10S BWC-Miter / Angle / Trim weld >0,5° (MW.26_BW)	86	0	0	0	9	69	1	18	0	0	0	<input checked="" type="checkbox"/>		
1.1	6.0000 S10S PIPE, SEAMLESS, A312-TP304L (MT100083)	83	0	0	0	8	72	1	17	0	0	0	<input checked="" type="checkbox"/>		
1.2	6.0000 S10S PIPE, SEAMLESS, A312-TP304L (MT100083)	87	0	0	0	8	71	1	17	0	0	0	<input checked="" type="checkbox"/>		
2.1	6.0000 S10S 45 ELL, SEAMLESS, A403-WP304L (JSG2312024)	80	0	0	0	8	71	1	18	0	0	0	<input checked="" type="checkbox"/>		
3.1	6.0000 S10S 45 ELL, SEAMLESS, A403-WP304L (JSG2312024)	85	0	0	0	8	71	1	18	0	0	0	<input checked="" type="checkbox"/>		
4.1	6.0000 S10S WN FLG, RAISED FACE, 150#, A182-F304L (NY230225AT07)	79	0	0	0	8	71	1	18	0	0	0	<input checked="" type="checkbox"/>		
5.1	6.0000 S10S WN FLG, RAISED FACE, 150#, A182-F304L (NY230225AT07)	88	0	0	0	7	71	1	18	0	0	0	<input checked="" type="checkbox"/>		

On behalf of Tecnimont / R  
Piping Supervisor  
Cristi Sandu  
01.10.2024 C. Sandu

Test Performed by: GONCALVES(QA), J. (N2 PT/RT) QA/QC Inspection: RAIMUNDO, MARIANA

Date: 21-09-2024

Signature



Date: 24-09-2024 16:36:46

Signature



Customer Inspection:

Sergio Morales

Date:

Signature Date: 30-09-24



Boccard Portugal, Lda  
Zona Industrial de Montalvo, Lote 3  
Constância, Portugal 2250-999

## Certificate of PMI Reading

XL3t-32735

---

Reading No	81
Mode	ALLOY
Time	2024-09-21 06:59
Duration	13.19
Sequence	Final
Alloy1	304SS : 0.20
Alloy2	No Match : *2.10
Flags	
SAMPLE	
HEAT	
LOT	
BATCH	
MISC	
NOTE	

---

	%	±	Error
Sb	< LOD	:	0.035
Sn	< LOD	:	0.044
Pd	< LOD	:	0.033
Ag	< LOD	:	0.159
Al	< LOD	:	80.000
Mo	0.032	±	0.006
Nb	0.008	±	0.004
Zr	< LOD	:	0.003
Bi	< LOD	:	0.010
Pb	< LOD	:	0.011
Se	< LOD	:	0.006
W	< LOD	:	0.070
Zn	< LOD	:	0.022
Cu	< LOD	:	0.130
Ni	9.385	±	0.266
Co	< LOD	:	0.422
Fe	69.225	±	0.392
Mn	1.720	±	0.179
Cr	19.204	±	0.230
V	< LOD	:	0.114
Ti	< LOD	:	0.139

---

Sergio Morales

Date: 30-09-24



On behalf of Tecnimont / R  
Piping Supervisor  
Cristi Sandu  
01.10.2024 C. Sandu

Boccard Portugal, Lda  
Zona Industrial de Montalvo, Lote 3  
Constância, Portugal 2250-999

## Certificate of PMI Reading

XL3t-32735

---

Reading No	84
Mode	ALLOY
Time	2024-09-21 07:01
Duration	8.00
Sequence	Final
Alloy1	304SS : 0.36
Alloy2	No Match : 1.76
Flags	
SAMPLE	
HEAT	
LOT	
BATCH	
MISC	
NOTE	

---

	%	±	Error
Sb	< LOD	:	0.046
Sn	< LOD	:	0.056
Pd	< LOD	:	0.043
Ag	< LOD	:	0.197
Al	< LOD	:	80.000
Mo	0.038	±	0.009
Nb	< LOD	:	0.008
Zr	< LOD	:	0.004
Bi	< LOD	:	0.010
Pb	< LOD	:	0.030
Se	< LOD	:	0.006
W	< LOD	:	0.091
Zn	< LOD	:	0.042
Cu	< LOD	:	0.173
Ni	8.724	±	0.341
Co	< LOD	:	0.550
Fe	69.853	±	0.517
Mn	1.756	±	0.237
Cr	19.135	±	0.304
V	< LOD	:	0.161
Ti	< LOD	:	0.184

---

Sergio Morales

Date: 30-09-24



On behalf of Tecnimont / R  
Piping Supervisor  
Cristi Sandu  
01.10.2024 C. Sandu

Boccard Portugal, Lda  
Zona Industrial de Montalvo, Lote 3  
Constância, Portugal 2250-999

## Certificate of PMI Reading

XL3t-32735

Reading No	86
Mode	ALLOY
Time	2024-09-21 07:01
Duration	8.67
Sequence	Final
Alloy1	304SS : 0.03
Alloy2	No Match : *2.10
Flags	
SAMPLE	
HEAT	
LOT	
BATCH	
MISC	
NOTE	

	%	±	Error
Sb	< LOD	:	0.047
Sn	< LOD	:	0.051
Pd	< LOD	:	0.042
Ag	< LOD	:	0.167
Al	< LOD	:	80.000
Mo	0.029	±	0.008
Nb	< LOD	:	0.009
Zr	< LOD	:	0.006
Bi	< LOD	:	0.011
Pb	< LOD	:	0.020
Se	< LOD	:	0.009
W	< LOD	:	0.094
Zn	< LOD	:	0.029
Cu	< LOD	:	0.154
Ni	9.351	±	0.332
Co	< LOD	:	0.529
Fe	69.573	±	0.489
Mn	1.815	±	0.225
Cr	18.861	±	0.285
V	< LOD	:	0.142
Ti	< LOD	:	0.145

Sergio Morales

Date: 30-09-24



On behalf of Tecnimont / R  
Piping Supervisor  
Cristi Sandu  
01.10.2024 C. Sandu

Boccard Portugal, Lda  
Zona Industrial de Montalvo, Lote 3  
Constância, Portugal 2250-999

## Certificate of PMI Reading

XL3t-32735

Reading No	83
Mode	ALLOY
Time	2024-09-21 07:00
Duration	15.48
Sequence	Final
Alloy1	304SS : 1.62
Alloy2	No Match : *1.97
Flags	
SAMPLE	
HEAT	
LOT	
BATCH	
MISC	
NOTE	

	%	±	Error
Sb	< LOD	:	0.033
Sn	< LOD	:	0.040
Pd	< LOD	:	0.030
Ag	< LOD	:	0.144
Al	< LOD	:	80.000
Mo	< LOD	:	0.005
Nb	< LOD	:	0.004
Zr	< LOD	:	0.003
Bi	< LOD	:	0.002
Pb	< LOD	:	0.010
Se	< LOD	:	0.005
W	< LOD	:	0.073
Zn	< LOD	:	0.019
Cu	< LOD	:	0.115
Ni	8.063	±	0.232
Co	< LOD	:	0.390
Fe	72.064	±	0.357
Mn	1.445	±	0.159
Cr	17.879	±	0.205
V	0.159	±	0.056
Ti	< LOD	:	0.119

Sergio Morales

Date: 30-09-24



On behalf of Tecnimont / R  
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Constância, Portugal 2250-999

## Certificate of PMI Reading

XL3t-32735

Reading No	87
Mode	ALLOY
Time	2024-09-21 07:02
Duration	27.65
Sequence	Final
Alloy1	304SS : 1.75
Alloy2	No Match : *2.43
Flags	
SAMPLE	
HEAT	
LOT	
BATCH	
MISC	
NOTE	

	%	±	Error
Sb	< LOD	:	0.029
Sn	< LOD	:	0.036
Pd	< LOD	:	0.028
Ag	< LOD	:	0.173
Al	< LOD	:	80.000
Mo	< LOD	:	0.006
Nb	< LOD	:	0.005
Zr	< LOD	:	0.003
Bi	< LOD	:	0.005
Pb	< LOD	:	0.012
Se	< LOD	:	0.006
W	< LOD	:	0.065
Zn	< LOD	:	0.023
Cu	< LOD	:	0.103
Ni	8.482	±	0.219
Co	< LOD	:	0.342
Fe	71.494	±	0.313
Mn	1.628	±	0.146
Cr	17.829	±	0.195
V	0.164	±	0.038
Ti	< LOD	:	0.053

Sergio Morales

Date: 30-09-24



On behalf of Tecnimont / R  
Piping Supervisor  
Cristi Sandu  
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Constância, Portugal 2250-999

## Certificate of PMI Reading

XL3t-32735

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Reading No	80
Mode	ALLOY
Time	2024-09-21 06:59
Duration	24.95
Sequence	Final
Alloy1	304SS : 0.54
Alloy2	No Match : *2.70
Flags	
SAMPLE	
HEAT	
LOT	
BATCH	
MISC	
NOTE	

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	%	±	Error
Sb	< LOD	:	0.028
Sn	< LOD	:	0.037
Pd	< LOD	:	0.027
Ag	< LOD	:	0.183
Al	< LOD	:	80.000
Mo	< LOD	:	0.007
Nb	< LOD	:	0.004
Zr	< LOD	:	0.003
Bi	< LOD	:	0.008
Pb	< LOD	:	0.007
Se	< LOD	:	0.007
W	< LOD	:	0.066
Zn	< LOD	:	0.021
Cu	< LOD	:	0.103
Ni	8.237	±	0.221
Co	0.428	±	0.172
Fe	71.127	±	0.331
Mn	1.626	±	0.145
Cr	18.187	±	0.263
V	0.173	±	0.053
Ti	< LOD	:	0.054

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Sergio Morales

Date: 30-09-24



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## Certificate of PMI Reading

XL3t-32735

Reading No	85
Mode	ALLOY
Time	2024-09-21 07:01
Duration	11.23
Sequence	Final
Alloy1	304SS : 0.21
Alloy2	No Match : *2.12
Flags	
SAMPLE	
HEAT	
LOT	
BATCH	
MISC	
NOTE	

	%	±	Error
Sb	< LOD	:	0.032
Sn	< LOD	:	0.048
Pd	< LOD	:	0.033
Ag	< LOD	:	0.159
Al	< LOD	:	80.000
Mo	0.010	±	0.005
Nb	< LOD	:	0.005
Zr	< LOD	:	0.003
Bi	< LOD	:	0.008
Pb	< LOD	:	0.016
Se	< LOD	:	0.009
W	< LOD	:	0.086
Zn	< LOD	:	0.028
Cu	< LOD	:	0.135
Ni	8.117	±	0.273
Co	< LOD	:	0.461
Fe	71.445	±	0.419
Mn	1.665	±	0.190
Cr	18.003	±	0.241
V	0.184	±	0.067
Ti	< LOD	:	0.129

Sergio Morales

Date: 30-09-24



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## Certificate of PMI Reading

XL3t-32735

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Reading No	79
Mode	ALLOY
Time	2024-09-21 06:58
Duration	24.72
Sequence	Final
Alloy1	304SS : 0.81
Alloy2	No Match : *2.67
Flags	
SAMPLE	
HEAT	
LOT	
BATCH	
MISC	
NOTE	

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	%	±	Error
Sb	< LOD	:	0.028
Sn	< LOD	:	0.038
Pd	< LOD	:	0.028
Ag	< LOD	:	0.163
Al	< LOD	:	80.000
Mo	< LOD	:	0.007
Nb	< LOD	:	0.005
Zr	< LOD	:	0.004
Bi	< LOD	:	0.007
Pb	< LOD	:	0.009
Se	< LOD	:	0.007
W	< LOD	:	0.071
Zn	< LOD	:	0.022
Cu	0,196	±	0.060
Ni	8.216	±	0.225
Co	< LOD	:	0.350
Fe	71.148	±	0.337
Mn	1.437	±	0.148
Cr	18.343	±	0.261
V	0.153	±	0.051
Ti	< LOD	:	0.069

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Sergio Morales

Date: 30-09-24



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## Certificate of PMI Reading

XL3t-32735

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Reading No	88
Mode	ALLOY
Time	2024-09-21 07:02
Duration	8.40
Sequence	Final
Alloy1	304SS : 1.26
Alloy2	No Match : *2.47
Flags	
SAMPLE	
HEAT	
LOT	
BATCH	
MISC	
NOTE	

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	%	±	Error
Sb	< LOD	:	0.045
Sn	< LOD	:	0.056
Pd	< LOD	:	0.039
Ag	< LOD	:	0.149
Al	< LOD	:	80.000
Mo	0.037	±	0.008
Nb	< LOD	:	0.008
Zr	< LOD	:	0.003
Bi	< LOD	:	0.019
Pb	< LOD	:	0.020
Se	< LOD	:	0.007
W	< LOD	:	0.094
Zn	< LOD	:	0.040
Cu	0.242	±	0.091
Ni	7.926	±	0.317
Co	< LOD	:	0.538
Fe	71.533	±	0.493
Mn	1.268	±	0.217
Cr	18.414	±	0.286
V	< LOD	:	0.142
Ti	< LOD	:	0.173

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