Ballard Power Systems Europe A/S
Majsmarken 1
9500 Hobro
Denmark

Revision history		
Rev.	**Date.**	**Description**
001		First Issue
002		Drawing added
003		Revision corrected
004	12/2/2025	Updated according to agreement with Brenmer and Kyle

Document Title:	**BLPH Project - PED Compliance H2 Manifold Addendum**
Document Number:	K559-2254-CWIWP4202202-K01-3
Revision:	Rev004
Sequence Number:	3
File Name:	K559-2254-CWIWP4202202-K01-3Rev004
Purchaser Job:	K559-2254
Purchase Order:	CWIWP4202202
Code:	K01
Requsition Number:	n/a
Customer:	CrossWind C.V., Rotterdam, The Netherlands

PED compliance H2 manifold

Full Title: *Addendum – PED compliance H2 manifold for DoC*

Abstract: The following document will contain an internal walk through of the compliance of the Pressure equipment directive and the technical dossier for Declaration of conformity

THIS DOCUMENT, SUBMITTED IN CONFIDENCE, CONTAINS PROPERIATARY INFORMATION WHICH SHALL NOT BE REPRODUCED OR TRANSFERRED TO OTHER DOCUMENTS OR DISCLOSED TO OTHERS OR USED FOR MANUFACTURING OR ANY OTHER PURPOSE WITHOUT PRIOR WRITTEN PERMISSION FROM BALLARD POWER SYSTEMS.

Table of Contents

1.0 Executive Summary 3
2.0 Reference documents 3
3.0 Definitions and Acronyms 3
4.0 Purpose 3
5.0 Analysis of technical demands in relation to 2010/68/EU 4
5.1 Background for analysis 4
5.2 Analysis of conformity category 5
6.0 Technical documentation 6
6.1 General description of the product 6
6.2 Drawings of the Construction 6
6.3 Results of construction calculations and examination 6
6.4 Inspection and test 7
6.4.1 Hydrogen pressure test 7
6.4.2 Welding testing 7

List of Figures

Figure 1: Conformity category PED 2008/68/EU Tabel 6 5
Figure 2: Technical drawing of H2 Manifold 6

List of Tables

Table 2-1: Reference documents 3
Table 3-1: Definitions and Acronyms 3
Table 4-1: Background for conformity assessment 4

THIS DOCUMENT, SUBMITTED IN CONFIDENCE, CONTAINS PROPERIATARY INFORMATION WHICH SHALL NOT BE REPRODUCED OR TRANSFERRED TO OTHER DOCUMENTS OR DISCLOSED TO OTHERS OR USED FOR MANUFACTURING OR ANY OTHER PURPOSE WITHOUT PRIOR WRITTEN PERMISSION FROM BALLARD POWER SYSTEMS.

Here for life™
Template: FRM5104316 0A

This Document is valid only at time of Printing.
Any Copies made are considered uncontrolled unless stamped otherwise in red.

Ballard Power Systems Europe A/S
Majsmarken 1
DK-9500 Hobro

contact@ballardeurope.com
+45 8843 5500
ballard.com

Specifications and descriptions in this document were in effect at the time of publication. Ballard Power Systems, Inc. reserves the right to change specifications, product appearance or to discontinue products at any time.

1.0 Executive Summary

The document will contain a walkthrough of the analysis of Pressure equipment directive compliance according to 2008/68/EU. The analysis concluded that the maximum pipe diameter is a DN32 and a pressure of 6,5 Barg. Due to this the conformity category is "category 1" which leads to "Module A" conformity assessment procedure. Documentation according to this is described, and/or combined in a PED dossier to verify compliance with PED module A.

2.0 Reference documents

Table 2-1: Reference documents

Document no.:	Document name:
2014/68/EU	Pressure equipment directive
K559-2254-CWIWP4202202-K01-002	Declaration of Conformity (Container Solution)
K559-2254-CWIWP4202202-J09-001	Leak Test Procedure
K559-2254-CWIWP4202202-L01-001	Material Test Certificates
K559-2254-CWIWP4202202-J02-001	WPS and PQR Records (incl. J03 - NDE Procedures)

3.0 Definitions and Acronyms

Table 3-1: Definitions and Acronyms

Document no.:	Document name:
PED	Pressure Equipment directive
DoC	Declaration of Conformity

4.0 Purpose

The following document will contain the PED analysis of the H2 manifold as an add on part to the FC PowerGen 1000kW®. The document is created based on the process described in the PED 2014/68/EU

The following part which is not a part of the document 550002 and will be covered by this PED statement: **DN32 H2 collector manifold**

THIS DOCUMENT, SUBMITTED IN CONFIDENCE, CONTAINS PROPERIATARY INFORMATION WHICH SHALL NOT BE REPRODUCED OR TRANSFERRED TO OTHER DOCUMENTS OR DISCLOSED TO OTHERS OR USED FOR MANUFACTURING OR ANY OTHER PURPOSE WITHOUT PRIOR WRITTEN PERMISSION FROM BALLARD POWER SYSTEMS.

5.0 Analysis of technical demands in relation to 2010/68/EU

5.1 Background for analysis

Table 5-1: Background for *conformity assessment*

Item	**Document name:**
Dimensioning pipe size	DN32
Maximum operating pressure	6,5 Barg
Fluida groupe[1]	Hydrogen Groupe 1

[1] According to article 13 a)

THIS DOCUMENT, SUBMITTED IN CONFIDENCE, CONTAINS PROPERIATARY INFORMATION WHICH SHALL NOT BE REPRODUCED OR TRANSFERRED TO OTHER DOCUMENTS OR DISCLOSED TO OTHERS OR USED FOR MANUFACTURING OR ANY OTHER PURPOSE WITHOUT PRIOR WRITTEN PERMISSION FROM BALLARD POWER SYSTEMS.

Ballard Power Systems Europe A/S
Majsmarken 1
DK-9500 Hobro
contact@ballardeurope.com
+45 8843 5500
ballard.com
Specifications and descriptions in this document were in effect at the time of publication. Ballard Power Systems, Inc. reserves the right to change specifications, product appearance or to discontinue products at any time.

5.2 Analysis of conformity category.

According to article 4 section C, the category for Fluida groupe 1 is defined in following table 6 in the PED shown in Figure 1.

Figure 1: Conformity category PED 2008/68/EU Tabel 6

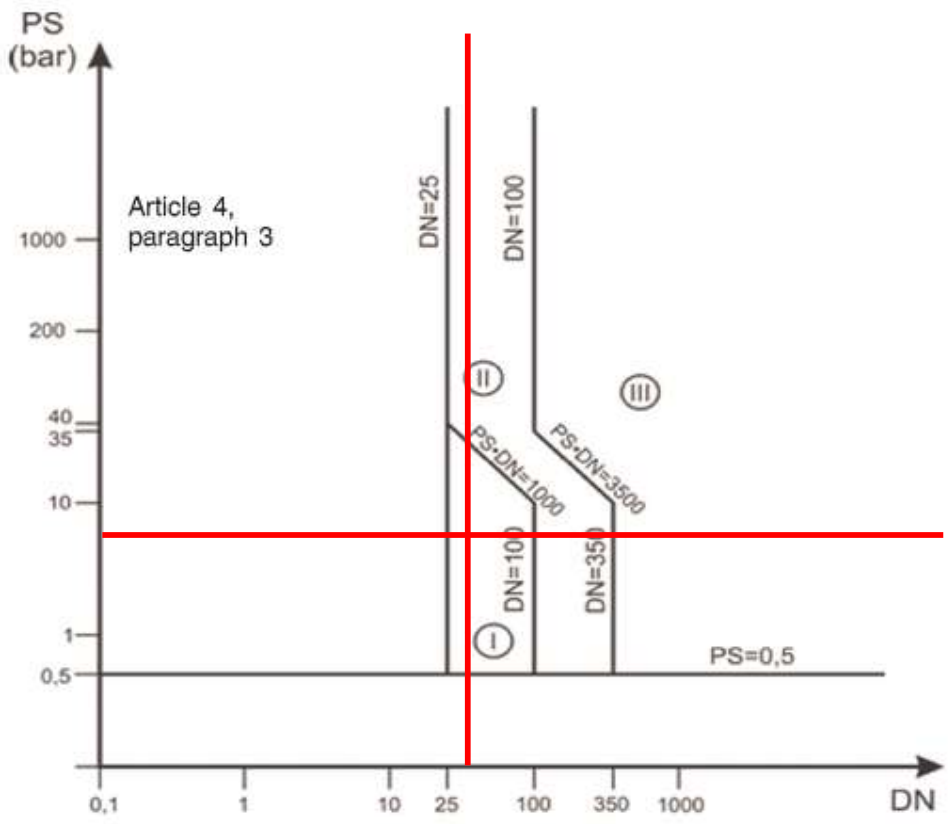


Table 6

Piping referred to in Article 4(1)(c)(i), first indent

The Red lines is an approximate line of the Size and pressure of the part. The intersection will define the point defining the category.

As visualized in the Figure 1, the category applicable for the part will be **Category 1.** As shown in the diagram from PED Annex II section 1. The "Conformity group I" will refer to a "module A" Conformity assessment procedure according to PED Annex III. The following procedure will be described in the following sections of this document.

THIS DOCUMENT, SUBMITTED IN CONFIDENCE, CONTAINS PROPERIATARY INFORMATION WHICH SHALL NOT BE REPRODUCED OR TRANSFERRED TO OTHER DOCUMENTS OR DISCLOSED TO OTHERS OR USED FOR MANUFACTURING OR ANY OTHER PURPOSE WITHOUT PRIOR WRITTEN PERMISSION FROM BALLARD POWER SYSTEMS.

6.0 Technical documentation

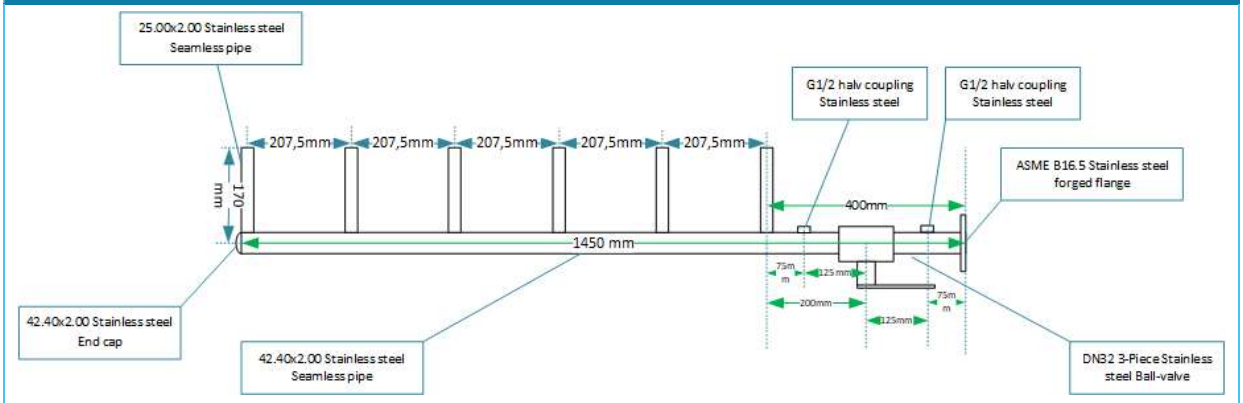
6.1 General description of the product

The product is a hydrogen manifold capable of distributing hydrogen from a single input into 6 independent outputs. The product contains an ASME B16.5 flange for connecting the input. A DN32 pipe with 25mm branches all in stainless steel. There is installed a 3-part welded ball valve type DVC 131150032 suitable for hydrogen 6,5 Barg. The valve is for manually blocking the hydrogen supply during e.g. service.

The product may not be installed in applications where a non-sufficient pressure relief valve set to 10 Barg is not installed.

6.2 Drawings of the Construction

Figure 2: Technical drawing of H2 Manifold



6.3 Results of construction calculations and examination

As the part is not relying on any structural strength since the pipe is not holding any weight, the only relevant construction is the pipe pressure rating. The following pipes are used:

- DN32 42.40x2.00mm EN-10216-5 1.4401/1.4404 TC2 pressure tested to 1500 PSI
- 25.00x2.00mm EN-10216-5 TC2 A269 213 pressure tested to 199 Barg

All assessment is done according to "module A" requirements in PED

#	Component	Material Certificate
1	42.4x2.0 Stainless Steel Cold Finish Seamless Pipes	K559-2254-CWIWP4202202-L01-001
2	25.0x2.0 Stainless Steel Seamless Pipes	K559-2254-CWIWP4202202-L01-001

THIS DOCUMENT, SUBMITTED IN CONFIDENCE, CONTAINS PROPERIATARY INFORMATION WHICH SHALL NOT BE REPRODUCED OR TRANSFERRED TO OTHER DOCUMENTS OR DISCLOSED TO OTHERS OR USED FOR MANUFACTURING OR ANY OTHER PURPOSE WITHOUT PRIOR WRITTEN PERMISSION FROM BALLARD POWER SYSTEMS.

3	42.4 ASME B16.5 Stainless Steel Forged Flanges	K559-2254-CWIWP4202202-L01-001
4	G½ Coupling Stainless	K559-2254-CWIWP4202202-L01-001
5	42.4x2.0 Stainless Steel End Caps	K559-2254-CWIWP4202202-L01-001

6.4 Inspection and test

6.4.1 Hydrogen pressure test

The hydrogen manifold has gone through several tests to verify the tightness of the system, even though the material used for manufacturing the hydrogen manifold is certified at a higher pressure than the intended maximum pressure of the Hydrogen manifold.

To sum up the test:

- Individual test of component. Procedure according to 62282-3-100:2020 section 6.2 Leakage test)
- Complete assembly test Formier gas 5% H2. Procedure according to 62282-3-100:2020 section 6.2 Leakage test and "Leak Test Procedure" K559-2254-CWIWP4202202-J09-001
- Complete test pure H2. Procedure according to 62282-3-100:2020 section 6.2 Leakage test and "Leak Test Procedure" K559-2254-CWIWP4202202-J09-001

6.4.2 Welding testing

The following welds on the hydrogen manifold has been tested according to the certificates included in the Certificate dossier.

Welding procedure and welding test results are described in document "WPS and PQR Records (incl. J03 - NDE Procedures)" K559-2254-CWIWP4202202-J02-001

7.0 Appendix documents

Appendix	Document name	Document number
Appendix A	WPS and PQR Records (incl. J03 - NDE Procedures)	K559-2254-CWIWP4202202-J02-001
Appendix B	Material Test Certificates	K559-2254-CWIWP4202202-L01-001

THIS DOCUMENT, SUBMITTED IN CONFIDENCE, CONTAINS PROPERIATARY INFORMATION WHICH SHALL NOT BE REPRODUCED OR TRANSFERRED TO OTHER DOCUMENTS OR DISCLOSED TO OTHERS OR USED FOR MANUFACTURING OR ANY OTHER PURPOSE WITHOUT PRIOR WRITTEN PERMISSION FROM BALLARD POWER SYSTEMS.

Here for life™
Template: FRM5104316 0A

This Document is valid only at time of Printing.
Any Copies made are considered uncontrolled unless stamped otherwise in red.

Ballard Power Systems Europe A/S
Majsmarken 1
DK-9500 Hobro

contact@ballardeurope.com
+45 8843 5500
ballard.com

Specifications and descriptions in this document were in effect at the time of publication. Ballard Power Systems, Inc. reserves the right to change specifications, product appearance or to discontinue products at any time.

Ballard Power Systems Europe A/S
Majsmarken 1
9500 Hobro
Denmark

Revision history		
Rev.	**Date.**	**Description**
001	6/5/2024	First Issue
002	9/2/2025	Welder certificate added

Document Title:	**BLPH Project - WPS and PQR Records**
Document Number:	K559-2254-CWIWP4202202-J02-001
Revision:	Rev002
Sequence Number:	001
File Name:	K559-2254-CWIWP4202202-J02-001Rev002
Purchaser Job:	K559-2254
Purchase Order:	CWIWP4202202
Code:	J02
Requsition Number:	n/a
Customer:	CrossWind C.V., Rotterdam, The Netherlands

Svejseprocedureprøvedokumentation

Welding Procedure Qualification Record

Complete documentation

DS/EN ISO 15613:2005

WPQR nr.:	141 T/T BBW 8.1 01
Dimension:	Rør: Ø20x3,0 - Ø50x2 mm
Materiale:	1.4301 - 1.4301

Udarbejdet af

weldadvice

Europæisk Svejse Rådgivning

For

TJ TECHNOLOGY

Ågade 65
7850 Stoholm

Indholdsfortegnelse / Table of contents

Svejseprocedureprøveattest / Welding procedure qualification record

141 T/T BBW 8.1 01

Visuel Kontrol 2015554-VT 01

Ikke Destruktiv Kontrol / Non Destructive Testing
Radiographic testing 78961-116-20219
Penetrant testing 78961-116-20219

Destruktiv Kontrol / Destructive Testing
Mechanical test report M026517:1

Materialecertifikater / Material Certificates
Chandan Steel Limited EN 10204, 3.1: Heat No: CH-2861
Siderinox S.p.a. EN 10204, 3.1: Heat No: 0440628

Tilsatsmateriale / Consumables
Hyundai SMT-316LSi, Ø1,6 mm EN 10204, 3.1: Lot No: V9988

weldadvice Europæisk Svejse Rådgivning

TJ TECHNOLOGY

Ågade 65
7850 Stoholm

SVEJSEPROCEDUREPRØVEATTEST
WELDING PROCEDURE QUALIFICATION RECORD

Kvalifikation i henhold til: Qualification i according to: DS/EN ISO 15613:2005
Standard/Norm: Standard/Code:
Kundens specifikation: Client's specification:

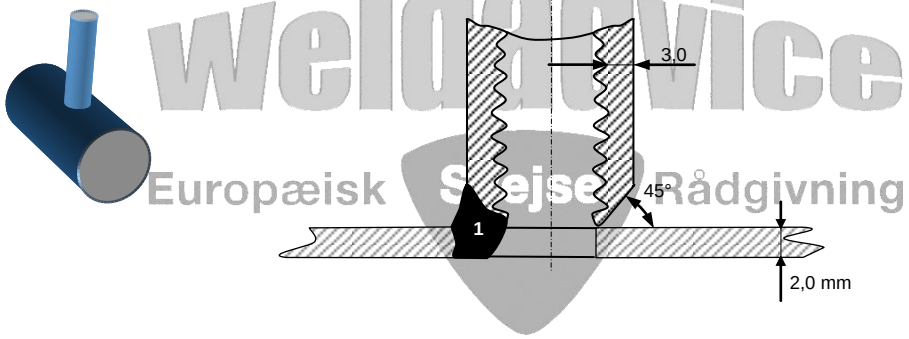
WPQR NO. 141 T/T BBW 8.1 01
Date: 15/01-2016
Blad/Sheet 1/ 1
Side/Page 1 / 2

Kunde/Client | Projekt/Project

Svejsning udført af /Welding carried out by: Brian Ravn | Mærke nr./Stamp no.

Standard/Code: EN 10217-7			Grundmaterialer/Base Materials	Standard/Code: EN 10088-3		
Betegnelse Designation/grade: 1.4301 X5CrNi18-10	Gruppe nr. / Group no. DS/CEN ISO/TR 15608: 8.1	Ceqv. actual: -		Betegnelse Designation/grade: 1.4301 X5CrNi18-10	Gruppe nr. / Group no. DS/CEN ISO/TR 15608: 8.1	Ceqv. actual: -
Plade/rør Plate/pipe: Rør/pipe	Tykkelse/WT mm Thickness/WT mm: 2,0	Dia. mm: 50,8	til/to	Plade/rør Plate/pipe: Rør/pipe	Tykkelse/WT mm Thickness/WT mm: 3,0	Dia. mm: 20,0

Fugedetaljer og sømopbygning (Skitse)
Joint details and welding sequence (Sketch)



weldadvice
Europæisk Svejse Rådgivning

Svejsestilling/ Welding position: PC

Hæftning/Tacking:	Som Streng 1 / As run no. 1
Min. Forvarmetemp.: Min. preheat temp.:	16 °C
Længde: Length:	2 stk. af 4 mm
Antal strenge: No of runs:	1
Andre data: Other data:	
2. side: Fugning/Gouging:	☐ Ja Yes ☒ Nej No
Forvarmetemp.: Preheat temp.:	°C
Elektrode dia.: Electrode dia.:	mm
Lufttryk: Air pressure:	bar
2. side: Slibning/Grinding:	☐ Ja Yes ☒ Nej No

Streng No. / Run No.	Svejse-proces / Weld. proces	G Gas, T Tråd/Wire, P Pulver/Flux, E Electrode; ∇ Fabrikat og betegnelse / Manufacture and trade mark	Dimension: Diameter -Længde/ Diameter -Length mm	Standard: Klassifikation/ Classification (G EN ISO 14175:2008, T EN ISO 14343-A, E EN ISO 6848)	H_2 Skala/ Scale EN 1011	Beskyttelsesgas Shielding Gas: l/min	Dyse/ Nozzle mm Ø	Baggas Back shielding gas: Type/ l/min	Bem. Note No.
1	141	G *Strandmøllen, Pro Line H_2*	-	*R1*	-	*9*	*7*	*Formier* / *10*	-
1	141	T *Hyundai SMT-316LSi*	*1,6*	*G 19 12 3 L Si*	*D*	-	-	- / -	-
1	141	E *Wolframelektrode LaO_2*	*1,6*	*WL20*	-	-	-	- / -	-
								/	
								/	
								/	

Streng No. / Run No.	Program nr. / Program No.	AC DC / Pol.	Strøm/Current Amp	Tråd-hast. / Wire speed m/min	mm	Svejsehast mm/min. eller strækkelængde mm / Travel speed mm/min. or run-out length mm: Volt		S: XX: ∇ U.pendling/stringer pendling/weaving Strengbredde/ run width Max. mm	Heat input KJ/mm	Forvarme/ Preheat °C / Interpass-temp.	Bem. Note No.
1	-	*DC-*	*75*	-	-	*9,0*	*40*	*5,6*	*0,61*	*16* / -	-
										/	
										/	
										/	
										/	
										/	
										/	

Efterfølgende varmebeh./PWHT: ☒ Nej No ☐ Ja, se bilag nr.: Yes, see enclosure No.:

Bemærkninger-andre oplysninger/Notes-other informations

Vi bekræfter, at de givne oplysninger er korrekte og at prøven er tildannet, svejst og varmebehandlet i.h.t. ovennævnte standard/norm og/eller kundens specifikation./We confirm that the statements in this record are correct and that the test was prepared, welded and heat treated according to the above specified standard/code and/or client's specification.

Sted/Place | Dato/Date

Producentens underskrift
Contractor's signature

Prøvesvejsningen var mærket: The test coupon was marked: 2015544-01A, PC H.H. 15/01-2016

Charge/Heat: CH-2861
Charge/Heat: 0440628
Filler metal Lot: V9988

weldadvice
Europæisk Svejse Rådgivning
Messingvej 32 B DK 8940 Randers SV
Tlf.: +45 8640 6805 - Fax: +45 8640 6807

Gennemgået/bevidnet
Reviewed/witnessed by

Repræsenterende
Representing

Prøvningsresultat og godkendelse; Se bagside / Test results and approvals; See revers side

NON-DESTRUCTIVE EXAMINATION	WPQR No.: 141 T/T BBW 8.1 01	Blad/Sheet 1/1	Side/Page 2/2

Metode/ Method - resultat / result	Standard	Rapport nr./ Report no.
1. Visual examination Result: ***Accepteret/ Accepted***	Procedure standard: ***DS/EN ISO 17637:2011*** according to: ***DS/EN ISO 5817, Level B (C)***	***2015544-VT-01***
2. Radiographic examination Result: ***Accepteret/ Accepted***	Procedure standard: ***EN ISO 17636-1:2013 Class B*** according to: ***EN ISO 10675-1:2013, Level 1***	***78961-116-20219***
3. Ultrasonic examination Result: ***Accepteret/ Accepted***	Procedure standard: ***EN ISO 17640:2011 class B*** according to: ***EN 11666:2011- level 2***	
4. Magnetic particle testing Result: ***Accepteret/ Accepted***	Procedure standard: ***EN ISO 17638:2009*** according to: ***DS/EN ISO 23278:2009 Level 2x***	
5. Dye penetrant testing Result: ***Accepteret/ Accepted***	Procedure standard: ***EN ISO 3452-1:2013*** according to: ***DS/EN 23277:2009- Level 2x***	***78961-116-20219***
6. Other examination Procedure: Result:	Type: according to:	

Place Randers	Date 19/01-2016	Witnessed/reviewed by (Name/Signature)
Laboratory signature ***or*** Data transferred from enclosed laboratory report by- Signature		Representing (Examiner or Notified Body)

Heino Harstad

MECHANICAL TESTING

According to DS/EN ISO 15614-1:2004/A1:2008/A2:2012; PED 97/23/EC

1. Tensile tests

EN ISO 6892-1:2009; EN ISO 4136:2012

Specified Y.S. min. *N/mm²* Specified U.T.S. min. *N/mm²*

Test no.	Dim.	Area	Gauge length	Yield Load	$R_{P0,2}$ N/mm²	$R_{P1,0}$ Load	R_{eH} N/mm²	R_m N/mm²	Elong A %	Remarks

2. Bend tests

DS/EN ISO 5173:2010 / EN ISO 7438:2005

Specified degr. 180° Former dia. mm

Type and dimensions	Bend angel	Results	Type and dimensions	Bend angel	Results

3. Impact tests

EN ISO 148-1:2013/ ISO 9016

Dim.: mm Specified type of test : V-notch Specified: J Testing temp. °C

Test no. VWT	Result J	Test no. VHT 0/1	Result J	Test no. VHT 2/1	Result J	Test no. VHT 5/1	Result J	Test no. VHT 0/1	Result J	Test no. VHT 2/1	Result J	Test no. VHT 5/1	Result J
Average WM		Average FL		Average FL+2		Average FL+5		Average FL		Average FL+2		Average FL+5	

4. Macro Examination

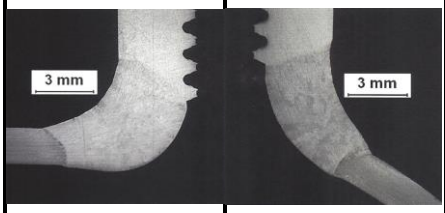
Separate sheet with picture ☐ Yes ☒ No Results:

5. Hardness tests

ISO 9015-1, EN ISO 6507-1:2006

Specified type of test: HV10 Req. max.

Sketch showing indentations



	Base metal (2mm)			HAZ (0,5 mm)				Weld metal			HAZ (0,5mm)				Base metal (2mm)		
A																	
B																	
C																	
D																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

6. Other/Supplementary Tests.

☒ No ☐ Yes See enclosures:

7. Further enclosures:

M026517:1

Place Randers	22/01-2016	Witnessed/reviewed (Name/Signature)
Laboratory signature ***or*** Data transferred from enclosed laboratory report by- Signature		Representing (Examiner or Test Body)

Heino Harstad

Vi godkender herved denne svejseprocedure til svejsning på omtalte projekt under de begrænsninger, der er givet i standarden/normen og/eller kundens specifikation.

We hereby approve this welding procedure for welding on the referring projekt within the limitations given in the standard/code and/or client´s specifikation.

Place Date

Underskrift af kunde/kunderepræsentant
Client´s or representative´s signature

Markrapport
Visuel kontrol af svejsesømme

Rekvirent TJ Technology, Ågade 65, 7850 Stoholm	**Sag nr.** 2015544	**Rapport nr.** VT-01
Entreprenør	**Dato.** 15/01-2016	**side af** 1 / 1
Emne Branch Connection Ø20x3 mm – Ø50,8x2 mm	**Tegning ref.:** 222446-D1324559	
Mrk. 2015544-01A	**Materiale:** X5 CrNi18-10	

Fugetype ☒ Stumpsøm	☐ Kantsøm	☐ Andet	☐ Slebet	**PWHT** ☐ Ja	☒ Nej	**Timer efter svejsning**
Undersøgelsesprocedure / klasse ☒ EN ISO 17637	☐ NS 10250	☐ ASME Sect. V	☐ Andet:			
Kvalitetskrav ☒ EN ISO 5817 Level B (C)	☐ ASME Sect.	☐ Andet:				
Udstyr ☒ Hulspejl	☒ Lygte	☐ Skydelære	☐ Kantsømlære	☐ Andet:		
Undersøgelsesomfang ☒ Kontrol før svejsning	☒ Kontrol under udførelse	☒ Kontrol efter svejsning	☐			
Omfang ☐ Visuel besigtigelse %	☒ Visuel kontrol 100 %	☐ Tilfældigt udvalgt	☐ Udpeget			

Undersøgelsens resultat

Accepteret / Accepted

Rep. opmærkning. ☐ På emne ☐ På skitse	**Kontrol af** ☐ Opslibning ☐ Reparation	**Bilag vedlagt** ☐ Ingen ☐ Stk.	**Inspektø**	**Certifikat type. / nr.** IWT-NO/0147

Attestationer	**Tekniker**	**Certifikat type / nr.**
	Tekniker	**Certifikat type / nr.**

9-11-01-L

Weldadvice I/S · Messingvej 32B · DK-8940 Randers SV · Tlf.: +45 8640 6805 · Fax: +45 8640 6807
CVR nr.: 2768 9620 · E-Mail: mail@weldadvice.dk ·Internet: www.weldadvice.dk/ www.weldadvice.com

Prøvningsrapport - Ikke-destruktiv Prøvning

KUNDE Weldadvice, Europæisk Svejse Rådgivning I/S, Messingvej 32 B, 8940 Randers SV, Denmark

KONTAKT Heino Harstad, Weldadvice, Europæisk Svejse Rådgivning I/S, Messingvej 32 B, 8940 Randers SV, Denmark

ENTREPRENØR

BYGHERRE

ARBEJDSSTED Force - Lab.

REKVISITIONS ID. 2015544-01

Rekvisitions Beskrivelse	Specifik Job Information
	6. Stk. svejseprøver/ kantsømme

78961-KHC A

Sammenfatning

Svejsninger, ingen sporbarhed, EN ISO 15614-1:2006/A2:2012

NDT Metode	Prøvningsspecifikation	Acceptkriterie	Andre krav
Penetrant (PT)	EN/ISO 3452-1:2013	EN/ISO 23277:2009 - 2X	
Radiografi (RT)	EN/ISO 17636-1:2013 - B	EN/ISO 10675-1:2013 - 1	

PRØVNINGSRESULTAT

	Svejsning Status	
	Acceptkriterie opfyldt	6 svejsninger

Detaljer om prøvningsresultat kan findes i "PRØVNINGSRESULTAT DETALJER" sektionen.

Tekniske data, NDT informationer, identifikation af udstyr, kalibreringsdata for udstyr, og andre relevante data, er registreret for hver NDT-metode i sektionen for Prøvningsmetode Detaljer. Uddrag fra Prøvningsrapporten må kun gengives efter skriftlig tilladelse fra FORCE Technology. Den elektroniske version af Prøvningsrapporten, som er gemt i "FORCE NDT Online", er defineret som originalen. Prøvningsresultaterne gælder kun for de emner som er testet. FORCE Technology - Almindelige betingelser er en integreret del af aftalen, medmindre andet er skriftligt aftalt.

PRØVNINGSRESULTAT - DETALJER

	Svejsninger hvor acceptkriterie er opfyldt		
Reference	**Svejsning Id. (Rep./Udv.)**	**Svejser(e)**	**Prøvningsmetode(r)**
2015544-01	01A-1	-	PT, RT
	01A-2	-	PT, RT
	02B-1	-	PT, RT
	02B-2	-	PT, RT
	03C	-	PT, RT
	04D	-	PT, RT

FORCE Technology • Division for Inspektion og Prøvning • Tueager 3 Skejby • DK-8200 Aarhus N • +45 8734 0200

PRØVNINGSOMFANG

RT. og PT. af 6. stk. svejseprøver, i muligt omfang.

SVEJSNING DETALJER

Reference	Svejsning Id. (Rep./Udv.)	Materialer	Overfladebeskaffenhed	Varmebehandling
		Dimensioner	Tidspunkt for prøvning	Temperatur (ca.)
		Nominel tykkelse	Timer efter sidste fremstillingstrin	Svejsningstype-fugeform-metode(r)
2015544-01	01A-1, 01A-2	Rustfrit stål	Som svejst	Ingen information
		20 mm	Ingen information	-
		3 mm	-	Ingen information-Ingen information-Ingen information
	02B-1, 02B-2	Rustfrit stål	Som svejst	Ingen information
		50 mm	Ingen information	-
		2 mm	-	Ingen information-Ingen information-Ingen information
	03C	Rustfrit stål	Som svejst	-
		50 mm	Ingen information	-
		2-2 mm	-	Ingen information-Ingen information-Ingen information
	04D	Rustfrit stål	Som svejst	-
		50 mm	Ingen information	-
		1,6-15 mm	-	Ingen information-Ingen information-Ingen information

Ovenstående oplysninger er til information og angives kun i den udstrækning, de er tilgængelige og relevante. Deres angivelse i denne prøvningsrapport kan ikke betragtes som en verifikation af deres rigtighed og de er ikke omfattet af nogen akkreditering.

PRØVNINGSMETODE - DETALJER

Penetrant Prøvning (PT) **Prøvningstidspunkt 19-01-2016 - 19-01-2016**

Personale

Navn (Tekniker Nr.)	Certifikattype	Certifikat nr.	Reference [Svejsning Ids]
Keld Hald Christensen (1)	EN ISO 9712 PT (EN 473) Level 2	0063-N2-P	2015544-01 [01A-1, 01A-2, 02B-1, 02B-2, 03C, 04D]

Produkter

Type	Parti Nr.	Produkt	Prøvningstekniske oplysninger Nr.
Halogenfri Opløsningsmiddel Fremkalder		Spotcheck SKD-S2	1
Vandafvaskelig/Opløsningsmiddel Rød Penetrant		Spotcheck SKL-WP	1
Halogenfri Rensevæske/Afrensning af Overskudspenetrant		Spotcheck SKC-S	1

Prøvningstekniske oplysninger

Nr.	Reference [Svejsning Ids]	For-rengøring	Penetreringstid	Fremkaldertid	Lysforhold
		Betegnelse	Emulgeringstid	-	Lys intensitet
1	2015544-01 [01A-1, 01A-2, 02B-1, 02B-2, 03C, 04D]	Penetrant Rensemiddel	15 min.	15 min.	Hvidt lys - kunstig
		IICd2	-	-	> 1000 LUX

FORCE Technology • Division for Inspektion og Prøvning • Tueager 3 Skejby • DK-8200 Aarhus N • +45 8734 0200

Radiografi Prøvning (RT) **Prøvningstidspunkt 19-01-2016 - 19-01-2016**

Personale

Navn (Tekniker Nr.)	Certifikattype	Certifikat nr.	Reference [Svejsning Ids]
Keld Hald Christensen (1)	EN ISO 9712 RT (EN 473) Level 2 (incl. aluminium)	0063-N2-R	2015544-01 [01A-1, 01A-2, 02B-1, 02B-2, 03C, 04D]

Udstyr

Type	Id.	Andre data	Prøvningstekniske oplysninger Nr.
RT X-RAY TUBE, SMART 225	XRL-10	FOCAL SPOT 3 MM, EN 12543, (DIRECT BEAM), 70-225 kV, 4,0 mA	1-4
RT FILM VIEWING UNIT, WILNOSOL	VGA-110	H UNIVERSAL, DENSITY D UP TO 3,7	1-4
RT DENSITOMETER, WILNOS LCD 51	PDE-21	MAXIMUM DENSITY D = 5,0	1-4

Prøvningstekniske oplysninger

Nr.	Optageteknik	Fremkaldelse	IQI (Certifikat nr.)	Spænding
	Antal film per svejsning/objekt	Folietype (tykkelse)	IQI placering	Strøm / Aktivitet
	Filmtype	Kilde/Brændplet størrelse	Gennemstrålet tykkelse	Eksponeringstid
	Kilde / detektor eller film afstand (SFD / SDD)	Kilde / objekt afstand (f/D)	Objekt / film afstand (b/d)	Opløsning
1	Dobbeltvæg/Enkeltbillede - Rør, Kontakt (DV/EB)	Maskine	10 FE EN ()	140 kV
	1	Pb (0.02 / 0.02 mm)	Kildeside	4.0 mA
	Foma / Indux R5	3.0 mm	2.0 mm	55 sek
	800.0 mm	750.0 mm	50.0 mm	-
2	Dobbeltvæg/Dobbeltbillede - Rør, Ellipse (DV/DB)	Maskine	10 FE EN ()	140 kV
	2	Pb (0.02 / 0.02 mm)	Kildeside	4.0 mA
	Foma / Indux R5	3.0 mm	2.0 mm	55 sek
	800.0 mm	750.0 mm	50.0 mm	-
3	Enkeltvæg/Enkeltbillede - Plade (EV/EB)	Maskine	10 FE EN ()	140 kV
	4	Pb (0.02 / 0.02 mm)	Kildeside	4.0 mA
	Foma / Indux R5	3.0 mm	2.0 mm	55 sek
	800.0 mm	790.0 mm	10.0 mm	-
4	Enkeltvæg/Enkeltbillede - Plade (EV/EB)	Maskine	13 FE EN ()	200 kV
	4	Pb (0.02 / 0.02 mm)	Filmside	4.0 mA
	Foma / Indux R5	3.0 mm	15.0 mm	90 sek
	800.0 mm	785.0 mm	15.0 mm	-

FORCE Technology • Division for Inspektion og Prøvning • Tueager 3 Skejby • DK-8200 Aarhus N • +45 8734 0200

Film

Film id.	Prøvningstekniske oplysninger Nr.	Sværtning	IQI Nr.	Følsomhed	Ug
01, 02, 05	1	2,5	16	5.00 %	0.20 mm
03, 04	2	2,5	16	5.00 %	0.20 mm
06-09	3	2,5	16	5.00 %	0.04 mm
10-13	4	2,5	13	1.33 %	0.06 mm

Svejsning på film

Reference	Svejsning Id [Film Id'er]
2015544-01	01A-1 [01], 01A-2 [02], 02B-1 [03,04], 02B-2 [05], 03C [06-09], 04D [10-13]

FORCE Technology • Division for Inspektion og Prøvning • Tueager 3 Skejby • DK-8200 Aarhus N • +45 8734 0200

PROVNINGSRAPPORT

utfärdad av ackrediterat provningslaboratorium

TEST REPORT issued by an Accredited Testing Laboratory

SWEDAC ACKREDITERING 5622 ISO/IEC 17025

SAFE CONTROL MATERIALTEKNIK

Beställare / Ordered by Weldadvice Messingvej 32B DK-8940 Randers SV	**Orderdatum / Date of order** 2016-01-20	**Reg. nummer / Reg. number** M026517:1
Er referens / Your reference Heino Harstad	**Inlämningsdatum / Object (-s) received** 2016-01-20	**Sidnummer / Page** 1(2)
Ordernummer / Order number 2015544-02	**Rapportdatum / Date of report** 2016-01-25	**Vår referens / Our reference** Johan Ageryd

Assignment:	Procedure qualification test according to EN ISO 15 614-1:2004.	
Test object(s):	Branch connection. Half V- groove.	
Material:	1.4301/ 1.4307	1.4301/ 1.4307
Group:	8.1	8.1
Dimension:	Ø 20 x 3.0 mm	Ø 50 x 2.0 mm
Heat number:	CH-2861	0440628
pWPS:	WPS TJ Tech 02	
Procedure number:	2015544-01A	
Identification mark:	2015544-01A	
Weld method:	141	
Position:	PC	
Filler metal:	Hyundai SMT-316LSi, Ø 1.6 mm	
Note:	-	
Result:	Accepted according to referenced standard.	
Signature:	SAFE CONTROL Johan Ageryd	

"Laboratorier ackrediteras av Styrelsen för ackreditering och teknisk kontroll (SWEDAC) enligt svensk lag. Den ackrediterade verksamheten vid laboratoriet uppfyller kraven i SS-EN ISO/IEC 17 025 (2005). Denna rapport får endast återges i sin helhet, om inte utfärdande laboratorium i förväg skriftligen godkänner annat". Provningsresultaten i denna rapport avser endast provade objekt.

"Laboratories are accredited by the Swedish Board for Accreditation and Conformity Assessment (SWEDAC) under the terms of Swedish legislation. The accredited laboratory activities meet the requirements in SS-EN ISO/IEC 17 025 (2005). This report may not be reproduced other than in its full, except with the prior written approval of the issuing laboratory". The test results in this report refer only to tested objects.

Safe Control Materialteknik AB • Tillgängligheten 1 • S-417 01 Göteborg
Tel. +46 (0)31 65 64 70 • Fax +46 (0)31 65 64 80
E-mail: info@safecontrol.se • www.safecontrol.se

PROVNINGSRAPPORT

utfärdad av ackrediterat provningslaboratorium

TEST REPORT issued by an Accredited Testing Laboratory

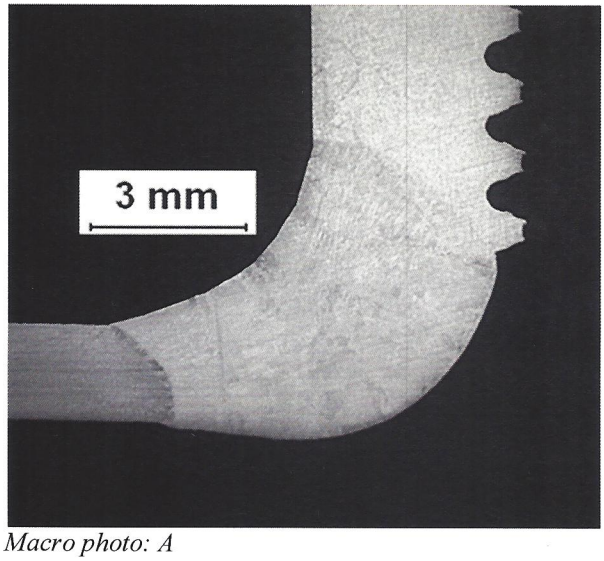
Teknisk instruktion / Technical instruction	Märkning / Marking	Reg. nummer / Reg. number
Macroscopic and microscopic examination of welds	2015544-01A	M026517:1
TI Dokumentnr./ TI Document no.	**Provningsutrustning / Testing equipment**	**Sidnummer / Page**
SCMM1	SCM 9	2(2)
Provning enligt / Testing according to	**Provningsdatum / Testing date**	**Utfört av / Performed by**
SS-EN 1321	2016-01-22	Johan Ageryd

Macroscopic examination:

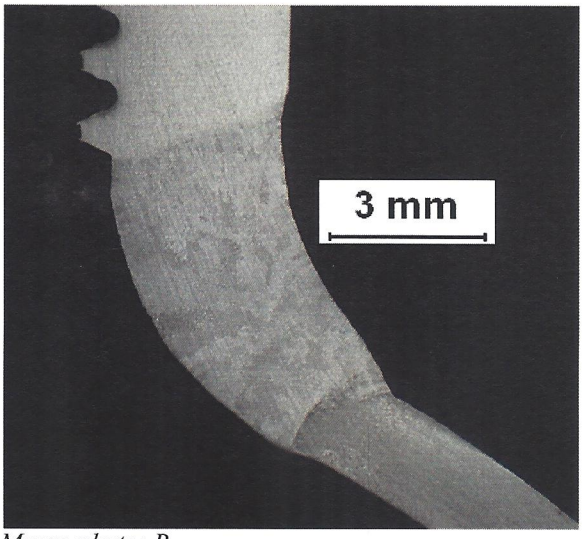
Two macro samples were cut out for macroscopic examination of weld metal, HAZ and base metal. The macro samples were ground (to 2000- paper) and examined in not etched and etched condition at magnification of 1× - 20×.

Macro sample			Base metal		Filler metal	Etchant *(acc. to SIS-CEN/CR 12361:1996)*
ID / No	Position	Orientation	Horizontal	Vertical		
2015544-01A	PC	Perpendicular to the weld direction	1.4301/ 1.4307	1.4301/ 1.4307	Hyundai SMT-316LSi	B.5 (Kalling´s)
Examined macro samples are assessed to fulfil the requirements in EN ISO 5817:2014. See macro photos below.						

Macro photos:



Macro photo: A



Macro photo: B

Den rapporterade utvidgade mätosäkerheten är baserad på en standardosäkerhet multiplicerad med täckningsfaktor, k=2, vilket för en normaldistribution motsvarar en sannolikhet med ca 95 %. Mätosäkerhetsberäkningarna är utförda i enlighet med EA-4/16:2003.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor, k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%. The uncertainty evaluation was carried out in accordance with EA-4/16:2003.

Length measurement: ± 1.5 %

Not.: Avsteg från punkt 10 i SS-EN 1321 har gjorts. Beteckning har ej redovisats i enlighet med exemplifierade versioner.
Note: Deviation from clause 10 in SS-EN 1321 has been done. Description has not been presented in accordance with exemplified versions.

Signatur/ Signature:

SAFE CONTROL
Johan Ageryd

CHANDAN STEEL LIMITED

(GOVT. OF INDIA RECOGNISED EXPORT HOUSE)

ISO 9001 : 2008 CERTIFICATE No. 04 100 011022-E3

ADM. OFFICE: 504, SUKH SAGAR, N. S. PATKAR MARG, MUMBAI 400 007, INDIA

Tel.: 91-22- 66290600. Fax.: 91-22-66290633/34

Website : www.chandansteel.net

Email : csl@chandansteel.net

WORKS: Plot No. 35, G. I. D. C., Umbergaon

Dist Valsad, Gujarat - 396 171.

Tel.: 91-260- 308 9999 Fax.: 91-260 308 9872

E-mail : exports@chandansteel.net

CE 0045 14 0045-CPR-1394

L/c. No.:

L/c. Date:

F824 QC 09A / 02 / 10.12.2012

MILL TEST /INSPECTION CERTIFICATE 3.1

ACCORDING TO EN 10204 : 2005

Consignee		Test Certificate No.	: EXP/00645 - 09/2015-2016
DACAPO STAINLESS A/S		Date of Issue	: 22.09.2015
NEPTUNVEJ 1		P. O. No.	: 45060220
8600 SILKEBORG		SC_No. & Date	: 15-16/00345, Dt.01.08.2015
DENMARK		Invoice No. & Date	: EXP/00645/2015-16 Dt.22.09.2015
PRODUCT DESCRIPTION		LENGTH	Net Wt.
STAINLESS STEEL ROUND BARS		Ordered	Actual
[CONDITION - 1D & 2D]		6.0 - 6.1 Mtrs.	6.0 - 6.1 Mtrs.
			2731 Kgs.

Article No.	Item No.	Heat No.	Material/Grade	Size mm	Tolerance	Process Route
-	5000200006	CH-2861	1.4301/1.4307	20.00 mm	h9	Electric Melting, A.O.D. Refining, Continuous Casting

CHEMICAL COMPOSITION (Weight %)

	C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Ti	Co	N
Min.	-	-	-	-	-	18.00	-	8.00	-	-	-	-
Max.	0.030	1.00	2.00	0.045	0.030	19.50	-	10.50	-	-	-	0.1000
Results	0.029	0.43	1.65	0.045	0.028	18.30	-	8.03	-	-	-	0.0650

MECHANICAL PROPERTIES

Specified Values	Test Method :- EN ISO 6892-1					Hardness EN ISO 6506-1	Test Method :- DIN EN ISO 148 - 1 Charpy (V) Impact Test (2mm) at 20 °C (Joules) Sample Size - 10 x 10 x 55 mm			
	Proof Strength N/mm² /MPa		Tensile Strength N/mm²/MPa (Rm)	Elongation after Fracture A %	Reduction of Area %					
	0.2%(Rp0.2)	1%(Rp1.0)				(BHN)	I	II	III	Avg.
Results	448	485	715	44	65	222-225	230	240	245	238

Remarks:

1. Condition : 1D & 2D (Bright drawn & Polished).
2. Solution annealed at 1050 °C.
3. PMI test done 100% & found Satisfactory.
4. Both ends Chamfered.
5. The material is fully killed and calcium treated.
6. Material has improved machinability.
7. Material is free from radio-active contamination.
8. Intergranular Corrosion test carried out as per EN/ISO 3651-2-1998 (Test method A) found satisfactory.
9. Surface Defects found satisfactory as per EN 10277-1 Class 3.
10. The material conforms to DIN EN 10088-3:2005, EN 10088-5:2009, EN 10272-2008, AD2000 W2/W10, ASTM A276-13/A182-13/A479-13a, ASME SA276-10/ SA182-10/SA 479- 2010 SECTION II, PART A Specification.
11. Location of sample - off centre, Direction - Longitudinal, Test Temp - Room Temp., Shape of Test Piece - Round.
12. Marking details - Company Logo, Size, Grade & Heat No.
13. The material is manufactured /melt in Chandan Steel Mill and is of Indian Origin.

BUNDLE NO.: 64, 65, 67 to 69 COLOUR : BLUE

Intended use : Building construction or civil engineering.

Regulated substance : No performance determined.

It is hereby certified that the above results are true and correct in every details and are meeting the requirements of specification & purchase order.

D.O.P. No.: 1.4301/ROUND BAR

D.O.P. can be seen here: www.chandansteel.net

BSR

B. S. RAUTELA

MANAGER - Q.A./WORKS INSPECTOR

SIDERINOX

Siderinox S.p.a. Frazione Caselle 20081 Morimondo (MI) Italia
Ufficio Commerciale: Tel. 02 9498151 - Fax 02 949815250/251
Ufficio Amministrativo: Tel. 02 9498161 - Fax 02 949816350
Ufficio Spedizioni: Tel. 02 949816222 - Fax 02 949815350
Ufficio Acquisti : Tel. 02 949816345 - Fax 02 949816350
Casella e-mail: sx@siderinox.it Sito web: www.siderinox.it

Capitale Sociale Euro 3.300.000 i.v.
Cod. Fiscale e Reg. Imp. MI N. 01825510157
R.E.A. Milano N. 878116
Centro Meccanografico n. MI074282
Partita IVA 01825510157

AZIENDA CON SISTEMA
DI GESTIONE QUALITÀ
CERTIFICATO DA DNV GL
=ISO 9001=

INSPECTION CERTIFICATE EN 10204 3.1 N° 424885 of 02.02.2015

Purchaser **INOX STAAL A/S**

DDT	SIDERINOX order number	Customer's order
N 8 of 02.02.2015	N 5 of 22.01.2015	N 15836-1 of 22.01.2015

Product description

Stainless steel round pipe Ø 50,8 x 2 mm AISI 304/304L brushed EN 10217-7 Longitudinally welded

Dimension	Steel type	Quantity (m)	Weight (kg)
50,8 x 2 mm	EN 1.4301/1.4307 / AISI 304/304L	366	815

Production Norm	Rolling	Tolerances	Welding factor
EN 10217-7	Hot rolled	D3 \ T3	V=1

Marking MANUFACTURER'S MARK - DIMENSION - STEELGRADE - HEAT N. - PRODUCTION NORM - EXECUTION - E.C. INSPECTOR - WORK INSPEKTOR

Manufacturing process — Surface finishing W0

CHEMICAL COMPOSITION

Heat	% C	%Mn	%P	% S	%Si	%Cr	% Ni	% Mo	% Ti
	0,000 - 0,030	0,000 - 2,000	0,000 - 0,040	0,000 - 0,010	0,000 - 1,000	17,500 - 19,500	8,000 - 10,000	0,000 - 0,000	0,000 - 0,000
0440628	0,022	1,680	0,027	0,001	0,380	18,240	8,090		

The chemical values refer to the certificate issued by the steel mill according to EN 10088 / 10028-7 / ASTM A 240 and stored at our office.

TEST RESULTS

* (D) Direction: (L) Longitudinal, (T) Transverse - ** (P) Position: (W) Welding, (M) Material

Test unit	Test Class	(D) *	(P) **	TENSILE TEST in Nmm2=MPa				HARDNESS
				Yield Strength		Tensile Strength	Elongation	
				Rp 0,2%	Rp 1%	Rm	A %	HRB
				195 -	230 -	500 - 740	40 -	
T14100996	TC1	L	M	246	330	658	48	
T14100998	TC1	L	M	235	314	627	49	

Visual inspection	OK	Drift expanding test		Sealing test	
		UNI EN ISO 8493	OK	UNI EN ISO 10893-1	OK
Check on dimensions	OK	Flattenning test		Non destructive Eddy Current test	
		UNI EN ISO 8492	OK	UNI EN ISO 10893-2	OK
Antimixing test	OK	Weld bend test		Intergranular corrosion test	
		EN 910	OK	N. P.	N. P.

WE CERTIFY THAT THE MATERIAL SUPPLIED COMPLIES WITH THE REQUIREMENTS AGREED ON THIS ORDER

Remarks:

Cerfications:
UNI EN ISO 9001
Dir. PED 97/23/EC Encl. 1, Point 4.3, Comma 3
AQUAP from Nr. 7293-06-TU to Nr 7298-06-TU

Qualifications:
WPS/WPAR: UNI EN ISO 15609-1/UNI EN ISO 15614-11
WLD: UNI EN ISO 14732 operator
NDT: UNI EN ISO 9712 operator

Document issued by the mill's Inspector
D. Ricco

Document confirmed by the authorized company responsible
W. Amodeo

CERTIFIED MATERIAL REPORT

CMR No. : 1502253500015 Date of Issue : 2015-02-25

Customer	HYUNDAI WELDING EUROPE OFFICE		
Trade Name	SMT-316LSi Inox	Size	1.6mm*1000mm*5kg
Lot No.	V9988	Purchaser's Order No.	
Applicable Specification	AWS A5.9 ER316LSi	* According to EN 10204-2004 : 3.1	

Welding Current		Shielding Gas		Post Weld Heat Treatment (℃ × hr.)	

Mechanical Properties	Tensile Test			Impact Test (CVN - Joule)				
	YS(MPa)	TS(MPa)	EL(%)	Temp.(℃)	X1	X2	X3	Avg.
	-	-	-		-	-	-	-
Spec.								

Chemical Composition (%)

	C	Si	Mn	P	S	Cu	Ni	Cr	Mo		
(WIRE)	0.021	0.97	1.71	0.027	0.011	0.20	11.33	18.30	2.57		
Spec.	≤0.03	0.65 ~1.00	1.0 ~2.5	≤0.03	≤0.03	≤0.75	11.0 ~14.0	18.0 ~20.0	2.0 ~3.0		

We hereby certifies that the material covered by this report has been inspected in accordance with and been found to meet the applicable requirements of specification and customer's requirements.

Approved by

K.W. Park

QA Manager Park K. W.

HYUNDAI HYUNDAI WELDING CO., LTD.
Head Office #507,Teheran-ro,Gangnam-gu,Seoul,Republic of Korea
Pohang Plant #100,Daesong-ro,Nam-gu,Pohang,Republic of Korea

Svejseprocedureprøvedokumentation

Welding Procedure Qualification Record

Complete documentation

DS/EN ISO 15614-1:2006/A1:2008/A:2:2012

WPQR nr.:	141 T BW 8.1 02
Dimension:	Rør: Ø50,8x2,0 mm
Materiale:	1.4301 - 1.4301

Udarbejdet af

weldadvice

Europæisk Svejse Rådgivning

For

TJ TECHNOLOGY

Ågade 65
7850 Stoholm

Indholdsfortegnelse / Table of contents

Svejseprocedureprøveattest / Welding procedure qualification record

141 T BW 8.1 02

Visuel Kontrol 2015554-VT 02

Ikke Destruktiv Kontrol / Non Destructive Testing
Radiographic testing 78961-116-20219
Penetrant testing 78961-116-20219

Destruktiv Kontrol / Destructive Testing
Mechanical test report M026517:2

Materialecertifikater / Material Certificates
Siderinox S.p.a. EN 10204, 3.1: Heat No: 0440628

Tilsatsmateriale / Consumables
Hyundai SMT-316LSi, Ø1,6 mm EN 10204, 3.1: Lot No: V9988

weldadvice Europæisk Svejse Rådgivning

TJ TECHNOLOGY
Ågade 65
7850 Stoholm

SVEJSEPROCEDUREPRØVEATTEST
WELDING PROCEDURE QUALIFICATION RECORD

Kvalifikation i henhold til: Qualification i according to: DS/EN ISO 15614-1:2006/A1:2008/A:2:2012
Standard/Norm: Standard/Code:
Kundens specifikation: Client's specification:

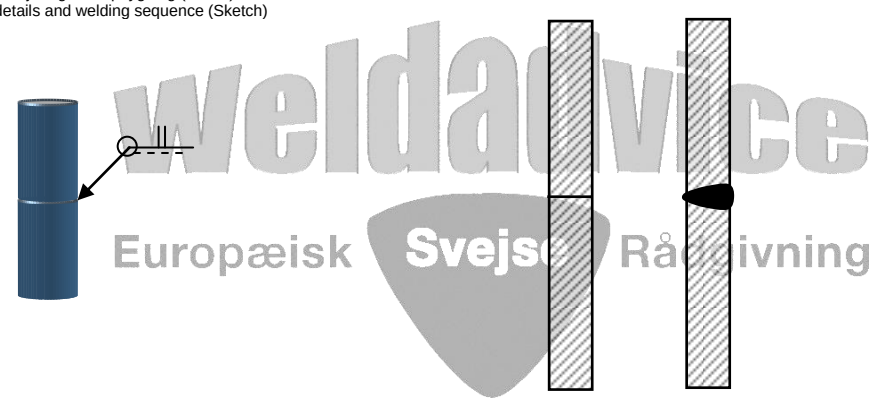
WPQR NO. 141 T BW 8.1 02
Date: 15/01-2016
Blad/Sheet 1/ 1
Side/Page 1 / 2

Kunde/Client | Projekt/Project

Svejsning udført af /Welding carried out by: Brian Ravn | Mærke nr./Stamp no.

Standard/Code: EN 10217-7			Grundmaterialer/Base Materials	Standard/Code: EN 10217-7		
Betegnelse Designation/grade: 1.4301 X5CrNi18-10	Gruppe nr. / Group no. DS/CEN ISO/TR 15608: 8.1	Ceqv. actual: -		Betegnelse Designation/grade: 1.4301 X5CrNi18-10	Gruppe nr. / Group no. DS/CEN ISO/TR 15608: 8.1	Ceqv. actual: -
Plade/rør Plate/pipe: Rør/pipe	Tykkelse/WT mm Thickness/WT mm: 2,0	Dia. mm: 50,8	til/to	Plade/rør Plate/pipe: Rør/pipe	Tykkelse/WT mm Thickness/WT mm: 2,0	Dia. mm: 50,8

Fugedetaljer og sømopbygning (Skitse)
Joint details and welding sequence (Sketch)



weldadvice Europæisk Svejse Rådgivning

Svejsestilling/Welding position: PC

Hæftning/Tacking:	Som Streng 1 / As run no. 1
Min. Forvarmetemp.: Min. preheat temp.:	16 °C
Længde: Length:	4 stk. 2-4 mm
Antal strenge: No of runs:	1
Andre data: Other data:	
2. side: Fugning/Gouging:	☐ Ja Yes ☒ Nej No
Forvarmetemp.: Preheat temp.:	°C
Elektrode dia.: Electrode dia.:	mm
Lufttryk: Air pressure:	bar
2. side: Slibning/Grinding:	☐ Ja Yes ☒ Nej No

Streng No. / Run No.	Svejse-proces / Weld. proces	G T P E ∇	Gas, Tråd/Wire, Pulver/Flux, Electrode; Fabrikat og betegnelse / Manufacture and trade mark	Dimension: Diameter -Længde/ Diameter -Length mm	Standard: Klassifikation/ Classification G T E	H_2 Skala/ Scale EN 1011	Beskyttelsesgas Shielding Gas: l/min	Dyse/ Nozzle mm Ø	Baggas Back shielding gas: Type/ l/min	Bem. Note No.
1	141	G	Strandmøllen, Pro Line H_2	-	EN ISO 14175:2008 / EN ISO 6848: R1	-	9,0	7	Formier / 10	-
1	141	E	Wolframelektrode LaO_2	1,6	WL20	-	-	-	- / -	-
									/ -	-
									/	
									/	
									/	

Streng No. / Run No.	Program nr. / Program No.	AC DC Pol.	Strøm/Current Amp	Tråd-hast. Wire speed m/min	mm	Svejsehast mm/min. eller strækkelængde mm. Travel speed mm/min. or run-out length mm	Volt	S: XX: ∇ U.pendling/stringer pendling/weaving Strengbredde/ run width Max. mm	Heat input KJ/mm	Forvarme/ Preheat /Interpass-temp. °C	Bem. Note No.
1	Pulsed		82	-	-	9,0	99		0,27	16 / -	1*)
										/	
										/	
										/	
										/	
										/	
										/	

Efterfølgende varmebeh./PWHT: ☒ Nej No ☐ Ja, se bilag nr.: Yes, see enclosure No.:

Bemærkninger-andre oplysninger/Notes-other informations
1*) Welding without filler metal

Vi bekræfter, at de givne oplysninger er korrekte og at prøven er tildannet, svejst og varmebehandlet i.h.t. ovennævnte standard/norm og/eller kundens specifikation./We confirm that the statements in this record are correct and that the test was prepared, welded and heat treated according to the above specified standard/code and/or client's specification.

Sted/Place | Dato/Date

Producentens underskrift
Contractor's signature

Prøvesvejsningen var mærket: The test coupon was marked: 2015544-02B, PC H.H. 15/01-2016

Charge/Heat:
Charge/Heat: 0440628
Filler metal Lot: Welded without filler metal

weldadvice Europæisk Svejse Rådgivning
Messingvej 32 B DK 8940 Randers SV
Tlf.: +45 8640 6805 - Fax: +45 8640 6807

Gennemgået/bevidnet
Reviewed/witnessed by

Repræsenterende
Representing

Prøvningsresultat og godkendelse; Se bagside / Test results and approvals; See revers side

NON-DESTRUCTIVE EXAMINATION	WPQR No.: 141 T BW 8.1 02	Blad/Sheet 1/1	Side/Page 2/2

Metode/ Method - resultat / result	Standard	Rapport nr./ Report no.
1. Visual examination Result: ***Accepteret/ Accepted***	Procedure standard: ***DS/EN ISO 17637:2011*** according to: ***DS/EN ISO 5817, Level B (C)***	***2015544-VT-02***
2. Radiographic examination Result: ***Accepteret/ Accepted***	Procedure standard: ***EN ISO 17636-1:2013 Class B*** according to: ***EN ISO 10675-1:2013, Level 1***	***78961-116-20219***
3. Ultrasonic examination Result: ***Accepteret/ Accepted***	Procedure standard: ***EN ISO 17640:2011 class B*** according to: ***EN 11666:2011- level 2***	
4. Magnetic particle testing Result: ***Accepteret/ Accepted***	Procedure standard: ***EN ISO 17638:2009*** according to: ***DS/EN ISO 23278:2009 Level 2x***	
5. Dye penetrant testing Result: ***Accepteret/ Accepted***	Procedure standard: ***EN ISO 3452-1:2013*** according to: ***DS/EN 23277:2009- Level 2x***	***78961-116-20219***
6. Other examination Procedure: Result:	Type: according to:	

Place Randers	Date 19/01-2016	Witnessed/reviewed by (Name/Signature)
Laboratory signature ***or*** Data transferred from enclosed laboratory report by- Signature Heino Harstad		Representing (Examiner or Notified Body)

MECHANICAL TESTING

According to DS/EN ISO 15614-1:2004/A1:2008/A2:2012; PED 97/23/EC

1. Tensile tests

EN ISO 6892-1:2009; EN ISO 4136:2012

Specified Y.S. min. *≥195; ≥230 N/mm²* Specified U.T.S. min. *500 - 700 N/mm² - 470 670 N/mm²*

Test no.	Dim.	Area mm²	Gauge length	Yield Load	$R_{P0,2}$ N/mm²	$R_{P1,0}$ Load	R_{eH} N/mm²	R_m N/mm²	Elong A %	Remarks
TT/1	12.01x1.58	19.16						638		HAZ
TT/2	12.02x1.77	21.49						632		HAZ

2. Bend tests

DS/EN ISO 5173:2010 / EN ISO 7438:2005

Specified degr. 180° Former dia. 4x2 mm

Type and dimensions	Bend angel	Results	Type and dimensions	Bend angel	Results
TFBB/1 (2x18 mm)	180	Accepteret / Accepted	TRBB/1 (2x19 mm)	180	Accepteret / Accepted
TFBB/2 (2x21 mm)	180	Accepteret / Accepted	TRBB/2 (2x19 mm)	180	Accepteret / Accepted

3. Impact tests

EN ISO 148-1:2013/ ISO 9016

Dim.: mm Specified type of test : V-notch Specified: J Testing temp. °C

Test no. VWT	Result J	Test no. VHT 0/1	Result J	Test no. VHT 2/1	Result J	Test no. VHT 5/1	Result J	Test no. VHT 0/1	Result J	Test no. VHT 2/1	Result J	Test no. VHT 5/1	Result J
Average WM		Average FL		Average FL+2		Average FL+5		Average FL		Average FL+2		Average FL+5	

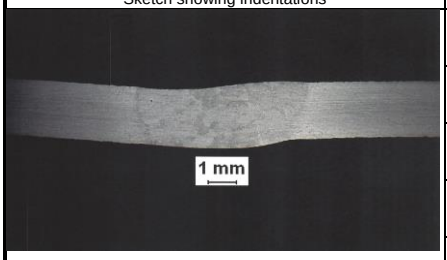
4. Macro Examination

Separate sheet with picture ☒ Yes ☐ No Results: Accepteret / Accepted

5. Hardness tests

ISO 9015-1, EN ISO 6507-1:2006

Specified type of test: HV10 Req. max.

Sketch showing indentations		Base metal (2mm)			HAZ (0,5 mm)				Weld metal			HAZ (0,5mm)				Base metal (2mm)		
	A																	
	B																	
	C																	
	D																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

6. Other/Supplementary Tests.

☒ No ☐ Yes See enclosures:

7. Further enclosures:

M026517:2

Place Randers	25/01-2016	Witnessed/reviewed (Name/Signature)
Laboratory signature ***or*** Data transferred from enclosed laboratory report by- Signature Heino Harstad		Representing (Examiner or Test Body)

Vi godkender herved denne svejseprocedure til svejsning på omtalte projekt under de begrænsninger, der er givet i standarden/normen og/eller kundens specifikation.

We hereby approve this welding procedure for welding on the referring projekt within the limitations given in the standard/code and/or client´s specifikation.

Place Date

Underskrift af kunde/kunderepræsentant
Client´s or representative´s signature

Markrapport
Visuel kontrol af svejsesømme

Rekvirent TJ Technology, Ågade 65, 7850 Stoholm	**Sag nr.** 2015544	**Rapport nr.** VT-02
Entreprenør	**Dato.** 15/01-2016	**side af** 1 / 1
Emne Rør: Ø50,8x2 mm	**Tegning ref.:** 222446-D1324560	
Mrk. 2015544-02B	**Materiale:** X5 CrNi18-10	

Fugetype
☒ Stumpsøm ☐ Kantsøm ☐ Andet ☐ Slebet

PWHT
☐ Ja ☒ Nej

Timer efter svejsning

Undersøgelsesprocedure / klasse
☒ EN ISO 17637 ☐ NS 10250 ☐ ASME Sect. V ☐ Andet:

Kvalitetskrav
☒ EN ISO 5817 Level B (C) ☐ ASME Sect. ☐ Andet:

Udstyr
☒ Hulspejl ☒ Lygte ☐ Skydelære ☐ Kantsømlære ☐ Andet:

Undersøgelsesomfang
☒ Kontrol før svejsning ☒ Kontrol under udførelse ☒ Kontrol efter svejsning ☐

Omfang
☐ Visuel besigtigelse % ☒ Visuel kontrol 100 % ☐ Tilfældigt udvalgt ☐ Udpeget

Undersøgelsens resultat

Accepteret / Accepted

Rep. opmærkning.	**Kontrol af**	**Bilag vedlagt**	**Inspektør**	**Certifikat type. / nr.**
☐ På emne ☐ På skitse	☐ Opslibning ☐ Reparation	☐ Ingen ☐ Stk.		IWT-NO/0147

Attestationer	**Tekniker**	**Certifikat type / nr.**
	Tekniker	**Certifikat type / nr.**

9-11-01-L

PROVNINGSRAPPORT

utfärdad av ackrediterat provningslaboratorium

TEST REPORT issued by an Accredited Testing Laboratory

SWEDAC ACKREDITERING 5022 ISO/IEC 17025

SAFE CONTROL MATERIALTEKNIK

Beställare / Ordered by
Weldadvice
Messingvej 32B
DK-8940 Randers SV

Orderdatum / Date of order
2016-01-20

Reg. nummer / Reg. number
M026517:2

Er referens / Your reference
Heino Harstad

Inlämningsdatum / Object (-s) received
2016-01-20

Sidnummer / Page
1(4)

Ordernummer / Order number
2016544-02

Rapportdatum / Date of report
2016-01-25

Vår referens / Our reference
Johan Ageryd

Assignment:	Procedure qualification test according to EN ISO 15 614-1:2004.
Test object(s):	Butt weld. Two welded pipes.
Material:	1.4301/1.4307
Group:	8.1
Dimension:	Ø 50.8 x 2 mm
Heat number:	0440628 – C1309304
pWPS:	WPS TJ Tech 01
Procedure number:	2015544-02B
Identification mark:	2015544-02B
Weld method:	141
Position:	PC
Filler metal:	Hyundai SMT-316LSi, Ø1,6 mm.
Note:	-
Result:	Accepted according to referenced standard.
Signature:	SAFE CONTROL Johan Ageryd

"Laboratorier ackrediteras av Styrelsen för ackreditering och teknisk kontroll (SWEDAC) enligt svensk lag. Den ackrediterade verksamheten vid laboratoriet uppfyller kraven i SS-EN ISO/IEC 17 025 (2005). Denna rapport får endast återges i sin helhet, om inte utfärdande laboratorium i förväg skriftligen godkänner annat". Provningsresultaten i denna rapport avser endast provade objekt.

"Laboratories are accredited by the Swedish Board for Accreditation and Conformity Assessment (SWEDAC) under the terms of Swedish legislation. The accredited laboratory activities meet the requirements in SS-EN ISO/IEC 17 025 (2005). This report may not be reproduced other than in its full, except with the prior written approval of the issuing laboratory". The test results in this report refer only to tested objects.

Safe Control Materialteknik AB • Tillgängligheten 1 • S-417 01 Göteborg
Tel. +46 (0)31 65 64 70 • Fax +46 (0)31 65 64 80
E-mail: info@safecontrol.se • www.safecontrol.se

SWEDAC ACKREDITERING 5622 ISO/IEC 17025

PROVNINGSRAPPORT

utfärdad av ackrediterat provningslaboratorium

TEST REPORT issued by an Accredited Testing Laboratory

Teknisk instruktion / Technical instruction
Tensile testing

Märkning / Marking
2015544-02B

Reg. nummer / Reg. number
M026517:2

TI Dokumentnr./ TI Document no.
SCDR1

Provningsutrustning / Testing equipment
SCM 1, 39, UTM V.2.10.02
SCM 107 extensometer L_e 50 mm

Sidnummer / Page
2(4)

Provning enligt / Testing according to
SS-EN ISO 6892-1:2009B10

Provningsdatum / Testing date
2016-01-21

Utfört av / Performed by
Harald Fredriksson

Tensile testing:

Pipe strip acc. to ISO 4136 / No	Dimensions		Square-area	Yield strength				Tensile strength	Elongation	Location of fracture
	Diameter/ width	Thickness		$R_{p0.2}$	$R_{p1.0}$	R_{eL}	R_{eH}	R_m	A_5	
	mm		mm^2	MPa					%	
TT/1	12.01	1.58	19.16	-	-	-	-	638	-	HAZ
TT/2	12.02	1.77	21.49	-	-	-	-	632	-	HAZ
SS-EN 10217-7:2005 1.4307:				≥180	≥215	-	-	470-670	≥35 T ≥40 L	-
SS-EN 10217-7:2005 1.4301:				≥195	≥230	-	-	500-700	≥35 T ≥40 L	-

Result: Satisfactory according to the requirement for the base material.

Den rapporterade utvidgade mätosäkerheten är baserad på en standardosäkerhet multiplicerad med täckningsfaktor, k=2, vilket för en normaldistribution motsvarar en sannolikhet med ca 95 %. Mätosäkerhetsberäkningarna är utförda i enlighet med EA-4/16:2003.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor, k=2, which for a normal distribution corresponds to a coverage probability of approximately 95 %. The uncertainty evaluation was carried out in accordance with EA-4/16:2003.

R_m: 2.0 % *$R_{p0.2}$ / $R_{p1.0}$:3.0 %* *R_{eH} / R_{eL}: 2.0 %*

Signatur/ Signature:

SAFE CONTROL Harald Fredriksson

PROVNINGSRAPPORT

utfärdad av ackrediterat provningslaboratorium

TEST REPORT issued by an Accredited Testing Laboratory

Teknisk instruktion / Technical instruction	Märkning / Marking	Reg. nummer / Reg. number
Bend testing	2015544-02B	M026517:2
TI Dokumentnr./ TI Document no.	**Provningsutrustning / Testing equipment**	**Sidnummer / Page**
SCSP1	SCM 1 and mandrel Ø 8mm	3(4)
Provning enligt / Testing according to	**Provningsdatum / Testing date**	**Utfört av / Performed by**
SS-EN ISO 7438:2005	2016-01-21	Harald Fredriksson

Bend testing:

Sample type acc. to SS-EN ISO 5173 / No	Dimensions		Bending-angle	Diameter of mandrel	Observations and result
	Thickness (a)	Width (b)			
	mm	mm	°		
TFBB/1	2	18	180	4 x Test thickness (a)	Satisfactory, without remarks.
TFBB/2	2	21	180	4 x Test thickness (a)	Satisfactory, without remarks.
TRBB/1	2	19	180	4 x Test thickness (a)	Satisfactory, without remarks.
TRBB/2	2	19	180	4 x Test thickness (a)	Satisfactory, without remarks.

Result: Satisfactory according to the requirement in EN ISO 15614-1.

Den rapporterade utvidgade mätosäkerheten är baserad på en standardosäkerhet multiplicerad med täckningsfaktor, k=2, vilket för en normaldistribution motsvarar en sannolikhet med ca 95 %. Mätosäkerhetsberäkningarna är utförda i enlighet med EA-4/16:2003.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor, k=2, which for a normal distribution corresponds to a coverage probability of approximately 95 %. The uncertainty evaluation was carried out in accordance with EA-4/16:2003.

Length measurment: ± 0.2mm

Signatur/ Signature: SAFE CONTROL Harald Fredriksson

PROVNINGSRAPPORT

utfärdad av ackrediterat provningslaboratorium

TEST REPORT issued by an Accredited Testing Laboratory

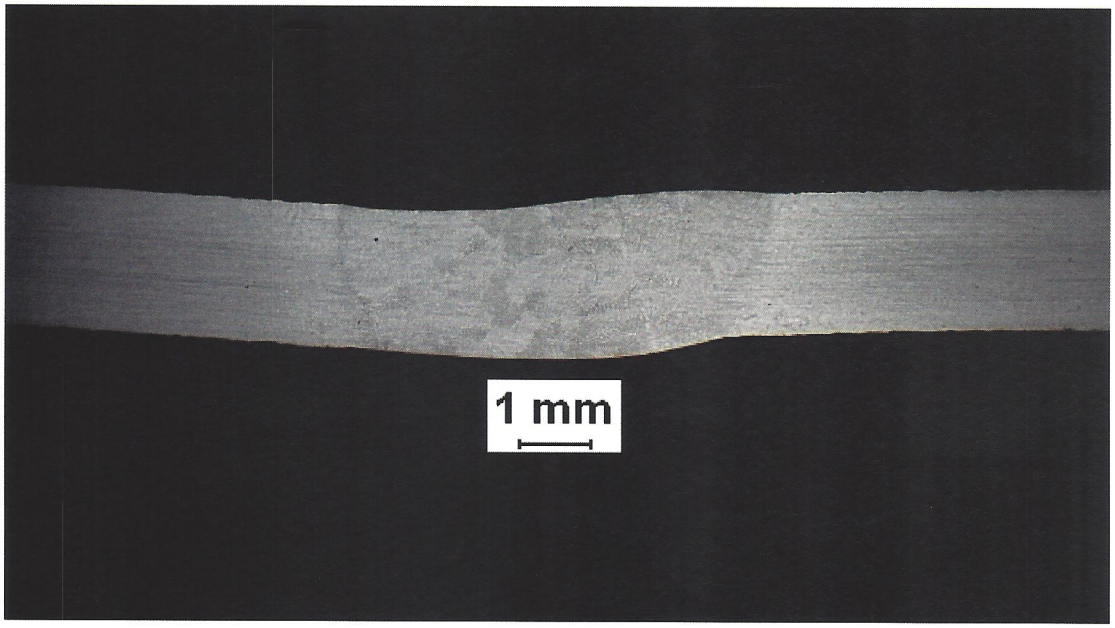
Teknisk instruktion / Technical instruction Macroscopic and microscopic examination of welds	**Märkning / Marking** 2015544-02B	**Reg. nummer / Reg. number** M026517:2
TI Dokumentnr./ TI Document no. SCMM1	**Provningsutrustning / Testing equipment** SCM 9	**Sidnummer / Page** 4(4)
Provning enligt / Testing according to SS-EN 1321	**Provningsdatum / Testing date** 2016-01-21	**Utfört av / Performed by** Johan Ageryd

Macroscopic examination:

One macro sample was cut out for macroscopic examination of weld metal, HAZ and base metal. The macro sample was ground (to 2000- paper) and examined in not etched and etched condition at magnification of 1× - 20×.

Macro sample			Base metal		Filler metal	Etchant *(acc. to SIS-CEN/CR 12361:1996)*
ID / No	Position	Orientation	Left	Right		
2015544-02B	PC	Perpendicular to the weld direction	1.4301/1.4307	1.4301/1.4307	Hyundai SMT-316LSi	B.5 (Kalling´s)
Examined macro sample is assessed to fulfil the requirements in EN ISO 5817:2014. See macro photo below.						

Macro photo:



Den rapporterade utvidgade mätosäkerheten är baserad på en standardosäkerhet multiplicerad med täckningsfaktor, k=2, vilket för en normaldistribution motsvarar en sannolikhet med ca 95 %. Mätosäkerhetsberäkningarna är utförda i enlighet med EA-4/16:2003.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor, k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%. The uncertainty evaluation was carried out in accordance with EA-4/16:2003.

Length measurement: ± 1.5 %

Not.: Avsteg från punkt 10 i SS-EN 1321 har gjorts. Beteckning har ej redovisats i enlighet med exemplifierade versioner.
Note: Deviation from clause 10 in SS-EN 1321 has been done. Description has not been presented in accordance with exemplified versions.

Signatur/ Signature:

SAFE CONTROL
Johan Ageryd

SIDERINOX

Siderinox S.p.a. Frazione Caselle 20081 Morimondo (MI) Italia
Ufficio Commerciale: Tel. 02 9498151 - Fax 02 949815250/251
Ufficio Amministrativo: Tel. 02 9498161 - Fax 02 949816350
Ufficio Spedizioni: Tel. 02 949816222 - Fax 02 949815350
Ufficio Acquisti : Tel. 02 949816345 - Fax 02 949816350
Casella e-mail: sx@siderinox.it Sito web: www.siderinox.it

Capitale Sociale Euro 3.300.000 i.v.
Cod. Fiscale e Reg. Imp. MI N. 01825510157
R.E.A. Milano N. 878116
Centro Meccanografico n. MI074282
Partita IVA 01825510157

AZIENDA CON SISTEMA
DI GESTIONE QUALITÀ
CERTIFICATO DA DNV GL
=ISO 9001=

INSPECTION CERTIFICATE EN 10204 3.1 N° 424885 of 02.02.2015

Purchaser **INOX STAAL A/S**

DDT	SIDERINOX order number	Customer's order
N 8 of 02.02.2015	N 5 of 22.01.2015	N 15836-1 of 22.01.2015

Product description

Stainless steel round pipe Ø 50,8 x 2 mm AISI 304/304L brushed EN 10217-7 Longitudinally welded

Dimension	Steel type	Quantity (m)	Weight (kg)
50,8 x 2 mm	EN 1.4301/1.4307 / AISI 304/304L	366	815

Production Norm	Rolling	Tolerances	Welding factor
EN 10217-7	Hot rolled	D3 \ T3	V=1

Marking MANUFACTURER'S MARK - DIMENSION - STEELGRADE - HEAT N. - PRODUCTION NORM - EXECUTION - E.C. INSPECTOR - WORK INSPEKTOR

Manufacturing process — Surface finishing W0

CHEMICAL COMPOSITION

Heat	% C	%Mn	%P	% S	%Si	%Cr	% Ni	% Mo	% Ti
	0,000 - 0,030	0,000 - 2,000	0,000 - 0,040	0,000 - 0,010	0,000 - 1,000	17,500 - 19,500	8,000 - 10,000	0,000 - 0,000	0,000 - 0,000
0440628	0,022	1,680	0,027	0,001	0,380	18,240	8,090		

The chemical values refer to the certificate issued by the steel mill according to EN 10088 / 10028-7 / ASTM A 240 and stored at our office.

TEST RESULTS

* (D) Direction: (L) Longitudinal, (T) Transverse - ** (P) Position: (W) Welding, (M) Material

Test unit	Test Class	(D) *	(P) **	TENSILE TEST in Nmm2=MPa				HARDNESS
				Yield Strength		Tensile Strength	Elongation	
				Rp 0,2%	Rp 1%	Rm	A %	HRB
				195 -	230 -	500 - 740	40 -	
T14100996	TC1	L	M	246	330	658	48	
T14100998	TC1	L	M	235	314	627	49	

Visual inspection	OK	Drift expanding test		Sealing test	
		UNI EN ISO 8493	OK	UNI EN ISO 10893-1	OK
Check on dimensions	OK	Flattenning test		Non destructive Eddy Current test	
		UNI EN ISO 8492	OK	UNI EN ISO 10893-2	OK
Antimixing test	OK	Weld bend test		Intergranular corrosion test	
		EN 910	OK	N. P.	N. P.

WE CERTIFY THAT THE MATERIAL SUPPLIED COMPLIES WITH THE REQUIREMENTS AGREED ON THIS ORDER

Remarks:

Cerfications:
UNI EN ISO 9001
Dir. PED 97/23/EC Encl. 1, Point 4.3, Comma 3
AQUAP from Nr. 7293-06-TU to Nr 7298-06-TU

Qualifications:
WPS/WPAR: UNI EN ISO 15609-1/UNI EN ISO 15614-11
WLD: UNI EN ISO 14732 operator
NDT: UNI EN ISO 9712 operator

Document issued by the mill's Inspector
D. Ricco

Document confirmed by the authorized company responsible
W. Amodeo

CERTIFIED MATERIAL REPORT

CMR No. : 1502253500015 Date of Issue : 2015-02-25

Customer	HYUNDAI WELDING EUROPE OFFICE		
Trade Name	SMT-316LSi Inox	Size	1.6mm*1000mm*5kg
Lot No.	V9988	Purchaser's Order No.	
Applicable Specification	AWS A5.9 ER316LSi	* According to EN 10204-2004 : 3.1	

Welding Current		Shielding Gas		Post Weld Heat Treatment (℃ × hr.)	

Mechanical Properties	Tensile Test			Impact Test (CVN - Joule)				
	YS(MPa)	TS(MPa)	EL(%)	Temp.(℃)	X1	X2	X3	Avg.
	-	-	-		-	-	-	-
Spec.								

Chemical Composition (%)

	C	Si	Mn	P	S	Cu	Ni	Cr	Mo		
(WIRE)	0.021	0.97	1.71	0.027	0.011	0.20	11.33	18.30	2.57		
Spec.	≤0.03	0.65 ~1.00	1.0 ~2.5	≤0.03	≤0.03	≤0.75	11.0 ~14.0	18.0 ~20.0	2.0 ~3.0		

We hereby certifies that the material covered by this report has been inspected in accordance with and been found to meet the applicable requirements of specification and customer's requirements.

Approved by

K.W. Park

QA Manager Park K. W.

HYUNDAI HYUNDAI WELDING CO., LTD.
Head Office #507,Teheran-ro,Gangnam-gu,Seoul,Republic of Korea
Pohang Plant #100,Daesong-ro,Nam-gu,Pohang,Republic of Korea

Certifikat for svejsere i henhold til DS/EN ISO 9606-1:2017

Welders Certificate in accordance with DS/EN ISO 9606-1:2017

Betegnelse i henhold til DS/EN ISO 9606-1:
Designation in accordance with DS/EN ISO 9606-1: 141 P/T FW 5.1 FM3 S t2 D21.3 PH sl

Udført på DS 322-certificeret svejseskole. Navn og adresse:
Performed at DS 322 certified welding school. Name and address: Mercantec, H.C. Andersens Vej 9 8800 Viborg

DS-licens-nr.: 516
DS license No.:

Svejsepas-nr.: 32584
Welding passport No.:

Svejserens navn: Frederik Faber Jensen
Welder's name:

Fødselsdato: 9-7-1995
Birth date:

Adresse: Firkløvervej 4B, 8830 Tjele
Address:

Prøvningsinstans: Nordisk Svejse Kontrol A/S, Stejlundvænget 4 6870 Ølgod
Examining body:

Reference-nr./Reference No. 242580 Fornyelse/Revalidation ☐

Variabler Variables	Anvendte data Actual data used		Gyldighedsområde Range of approval	
Svejsemetode(r)/Dråbeovergang Welding process(es)/Transfer mode	141		ISO 4063 - 141,142,143,145	
Plade eller rør Plate or pipe	P/T		P:Plade T:Rør	
Sømtype Type of joint	FW		FW:Kantsøm	
Materialegruppe(r) Material group(s)	5.1		All materials acc. EN ISO 15608, Table 1	
Tilsatsmateriale Welding consumables	FM3		FM1, FM2, FM3	
Type og betegnelse Type and designation Tabel/table 4 Tabel/table 5	 S	DS EN ISO 21952-A W CrMo1 Si	S, M	
Beskyttelsesgas Shielding gas	I1	DS/EN ISO 14175	--	
Tilbehør (fx baggas) Auxiliaries (e.g. backing gas)				
Strømtype og polaritet Type of current and polarity	DC-			
Nedsmeltet tykkelse i mm for BW Deposit thickness in mm for BW				
Materialetykkelse i mm for FW Material thickness in mm for FW	2		2 - 4	
Rørdiameter i mm Pipe diameter in mm	21.3		21.3-42,6	
Svejseposition Welding position BW tabel/table 9 FW tabel/table 10	 PH		all FW positions, except vertical dowr	
Svejsetekniske detaljer og lag Weld details and layer	sl		(sl)	

Svejseproceduresspecifikations-nr.:
Welding procedure specification No.: SP141-075

Jobkundskab/Job knowledge: Bestået/Accepted ☒ Omprøve/Retest ☐

PED-APPROVED
NSK NB 2735

Svejsning af prøveemne udført/Welding of test piece terminated: 09-06-2022

Den praktiske prøve er gennemført tilfredsstillende og er indstillet til prøvning.
Svejseskolens eksaminator (dato/navn/underskrift):
13-06-2022 Frank Jeppesen

The welder's approval test is accepted and released for testing.
Welding coordinator of the welding school (date/name/signature): 09-06-2022 Brian Gravgaard

Bedømmelse af svejsesømme/Evaluation of welds

Prøvningsinstans:
Examining body: Nordisk Svejse Kontrol A/S

Sags-nr.:
Job No.:

Identifikation af prøveemne:
Identification of test piece: 242580

Prøveemne undersøgt (dato):
Test piece examined (date): 10-06-2022

med de anførte metoder i henhold til anførte standarder og acceptkriterier med nedenstående resultater:
with the referred method in accordance to the referred standards and accept criteria with the following results:

Bemærkninger Remarks				
Prøvningsmetode Type of test	Prøvningsstandard Testing standard	Acceptkriterier Acceptance requirements	Modsvarende acceptkriterier Corresponding acceptance criteria	Godkendt/ikke udført Acceptable/not performed
Visuel Visual	ENISO17637	ENISO5817B(C)	-	Godkendt
Radiografi Radiography	-	-	-	Ikke udført
Ultralyd Ultrasonic	-	-	-	Ikke udført
Magnetpulver Magnetic particles	-	-	-	Ikke udført
Penetrant Dye penetrant	-	-	-	Ikke udført
Makro Macro	ENISO17639	ENISO5817B	-	Godkendt
Brudprøve Fracture	-	-	-	Ikke udført
Bøjeprøve Bend	-	-	-	Ikke udført
Kærvtrækprøvning Notch tensile test	-	-	-	Ikke udført

Prøvningsinstans (dato/underskrift):
Examining body (date/signature): 10-06-2022 Nordisk Svejse Kontrol A/S Gert S Pedersen

Kvalifikation gyldig fra (dato):
Qualification valid from (date): 09-06-2022

Fornyelsesmetode
Revalidation method EN ISO 9606-1, 9.3 a) ☒

Kvalifikation gyldig til (dato):
Qualification valid until (date): 09-06-2025

Svejseskolens eksaminator (dato/underskrift):
Welding coordinator of the welding school (date/signature): 15-06-2022 Brian Gravgaard

Forlængelse/Prolongation

Bekræftelse af gyldigheden ved arbejdsgiver eller virksomhedens svejseansvarlig for de følgende 6 måneder Confirmation of the validity by employer/welding coordinator for the following 6 months		
Dato/Date	Stilling eller titel/Position or title	Underskrift/Signature
8/12-22	CEO	
6/6-23	CEO	
4/12-23	CEO	

Certifikat for svejsere i henhold til DS/EN ISO 9606-1:2017

Welders Certificate in accordance with DS/EN ISO 9606-1:2017

Betegnelse i henhold til DS/EN ISO 9606-1:
Designation in accordance with DS/EN ISO 9606-1: 141 T BW 8.1 FM5 S s2 D21.3 H-L045 ss gb

Udført på DS 322-certificeret svejseskole. Navn og adresse:
Performed at DS 322 certified welding school. Name and address: Mercantec, H.C. Andersens Vej 9 8800 Viborg

DS-licens-nr.: 516
DS license No.:

Svejsepas-nr.: 32584
Welding passport No.:

Svejserens navn: Frederik Faber Jensen
Welder's name:

Fødselsdato: 9-7-1995
Birth date:

Adresse: Firkløvervej 4B, 8830 Tjele
Address:

Prøvningsinstans: Nordisk Svejse Kontrol A/S, Stejlundvænget 4 6870 Ølgod
Examining body:

Reference-nr./Reference No. 242582

Fornyelse/Revalidation ☐

Variabler Variables	Anvendte data Actual data used		Gyldighedsområde Range of approval	
Svejsemetode(r)/Dråbeovergang Welding process(es)/Transfer mode	141		ISO 4063 - 141,142,143,145	
Plade eller rør Plate or pipe	T		T:Rør	
Sømtype Type of joint	BW		BW:Stumpsøm	
Materialegruppe(r) Material group(s)	8.1		All materials acc. EN ISO 15608, Table 1	
Tilsatsmateriale Welding consumables	FM5		FM5	
Type og betegnelse Type and designation Tabel/table 4		DS EN ISO 14343-A W 19 9 L Si	S, M	
Tabel/table 5	S			
Beskyttelsesgas Shielding gas	I1	DS/EN ISO 14175	--	
Tilbehør (fx baggas) Auxiliaries (e.g. backing gas)	DS/EN ISO 14175 N5		Same or similar	
Strømtype og polaritet Type of current and polarity	DC-			
Nedsmeltet tykkelse i mm for BW Deposit thickness in mm for BW	2		2-4	
Materialetykkelse i mm for FW Material thickness in mm for FW				
Rørdiameter i mm Pipe diameter in mm	21.3		21.3-42,6	
Svejseposition Welding position BW tabel/table 9	H-L045		all BW positions, except vertical down	
FW tabel/table 10				
Svejsetekniske detaljer og lag Weld details and layer	ss gb		(ss,mb) (bs) (ss,gb)	

Svejseprocedurespecifikations-nr.: SP141-199
Welding procedure specification No.:

Jobkundskab/Job knowledge: Bestået/Accepted ☒ Omprøve/Retest ☐

PED-APPROVED
NSK NB 2735

Svejsning af prøveemne udført/Welding of test piece terminated: 09-06-2022

Den praktiske prøve er gennemført tilfredsstillende og er indstillet til prøvning.
Svejseskolens eksaminator (dato/navn/underskrift):
13-06-2022 Frank Jeppesen

The welder's approval test is accepted and released for testing.
Welding coordinator of the welding school (date/name/signature): 09-06-2022 Brian Gravgaard

Bedømmelse af svejsesømme/Evaluation of welds

Prøvningsinstans:
Examining body: Nordisk Svejse Kontrol A/S

Sags-nr.:
Job No.:

Identifikation af prøveemne:
Identification of test piece: 242582

Prøveemne undersøgt (dato):
Test piece examined (date): 10-06-2022

med de anførte metoder i henhold til anførte standarder og acceptkriterier med nedenstående resultater:
with the referred method in accordance to the referred standards and accept criteria with the following results:

Bemærkninger Remarks				
Prøvningsmetode Type of test	Prøvningsstandard Testing standard	Acceptkriterier Acceptance requirements	Modsvarende acceptkriterier Corresponding acceptance criteria	Godkendt/ikke udført Acceptable/not performed
Visuel Visual	ENISO17637	ENISO5817B(C)	-	Godkendt
Radiografi Radiography	ENISO17636	ENISO5817B	ENISO10675-1	Godkendt
Ultralyd Ultrasonic	-	-	-	Ikke udført
Magnetpulver Magnetic particles	-	-	-	Ikke udført
Penetrant Dye penetrant	-	-	-	Ikke udført
Makro Macro	-	-	-	Ikke udført
Brudprøve Fracture	-	-	-	Ikke udført
Bøjeprøve Bend	-	-	-	Ikke udført
Kærvtrækprøvning Notch tensile test	-	-	-	Ikke udført

Prøvningsinstans (dato/underskrift):
Examining body (date/signature): 10-06-2022 Nordisk Svejse Kontrol A/S Gert S Pedersen

Kvalifikation gyldig fra (dato):
Qualification valid from (date): 09-06-2022

Fornyelsesmetode
Revalidation method EN ISO 9606-1, 9.3 a) ☒

Kvalifikation gyldig til (dato):
Qualification valid until (date): 09-06-2025

Svejseskolens eksaminator (dato/underskrift):
Welding coordinator of the welding school (date/signature): 15-06-2022 Brian Gravgaard

Forlængelse/Prolongation

Bekræftelse af gyldigheden ved arbejdsgiver eller virksomhedens svejseansvarlig for de følgende 6 måneder Confirmation of the validity by employer/welding coordinator for the following 6 months		
Dato/Date	Stilling eller titel/Position or title	Underskrift/Signature
8/12-22	CEO	
6/6-23	CEO	
4/12-23	CEO	

Certifikat for svejsere i henhold til DS/EN ISO 9606-1:2017

Welders Certificate in accordance with DS/EN ISO 9606-1:2017

Betegnelse i henhold til DS/EN ISO 9606-1:
Designation in accordance with DS/EN ISO 9606-1: 141 P/T FW 8.1 FM5 S t2 D50 PH sl

Udført på DS 322-certificeret svejseskole. Navn og adresse:
Performed at DS 322 certified welding school. Name and address: Mercantec
H.C. Andersens Vej 9 8800 Viborg

DS-licens-nr.: 516
DS license No.:

Svejsepas-nr.: 25350
Welding passport No.:

Svejserens navn: Morten Pedersen
Welder's name:

Fødselsdato: 21-4-1988
Birth date:

Adresse: Bækkevej 6
Address: 9500 Hobro

Prøvningsinstans: Nordisk Svejse Kontrol A/S
Examining body: Stejlundvænget 4 6870 Ølgod

Reference-nr./Reference No. 241393

Fornyelse/Revalidation ☒

Variabler Variables	Anvendte data Actual data used		Gyldighedsområde Range of approval	
Svejsemetode(r)/Dråbeovergang Welding process(es)/Transfer mode	141		ISO 4063 - 141,142,143,145	
Plade eller rør Plate or pipe	P/T		P:Plade T:Rør	
Sømtype Type of joint	FW		FW:Kantsøm	
Materialegruppe(r) Material group(s)	8.1		All materials acc. EN ISO 15608, Table 1	
Tilsatsmateriale Welding consumables	FM5		FM5	
Type og betegnelse Type and designation Tabel/table 4		DS EN ISO 14343-A W 19 9 L Si	S, M	
Tabel/table 5	S			
Beskyttelsesgas Shielding gas	I1	DS/EN ISO 14175	--	
Tilbehør (fx baggas) Auxiliaries (e.g. backing gas)				
Strømtype og polaritet Type of current and polarity	DC-			
Nedsmeltet tykkelse i mm for BW Deposit thickness in mm for BW				
Materialetykkelse i mm for FW Material thickness in mm for FW	2		2 - 4	
Rørdiameter i mm Pipe diameter in mm	50		>=25	
Svejseposition Welding position BW tabel/table 9			all FW positions, except vertical dowr	
FW tabel/table 10	PH			
Svejsetekniske detaljer og lag Weld details and layer	sl		(sl)	

Svejseprocedurespecifikations-nr.:
Welding procedure specification No.: SP141-123

Jobkundskab/Job knowledge: Bestået/Accepted ☒ Omprøve/Retest ☐

PED-APPROVED
NSK NB 2735

Svejsning af prøveemne udført/Welding of test piece terminated: 17-03-2022

Den praktiske prøve er gennemført tilfredsstillende og er indstillet til prøvning.
Svejseskolens eksaminator (dato/navn/underskrift): 18-03-2022 Frank Jeppesen

The welder's approval test is accepted and released for testing.
Welding coordinator of the welding school (date/name/signature): 17-03-2022 Brian Gravgaard

Bedømmelse af svejsesømme/Evaluation of welds

Prøvningsinstans:
Examining body: Nordisk Svejse Kontrol A/S

Sags-nr.:
Job No.:

Identifikation af prøveemne:
Identification of test piece: 241393

Prøveemne undersøgt (dato):
Test piece examined (date): 18-03-2022

med de anførte metoder i henhold til anførte standarder og acceptkriterier med nedenstående resultater:
with the referred method in accordance to the referred standards and accept criteria with the following results:

Bemærkninger Remarks				
Prøvningsmetode Type of test	Prøvningsstandard Testing standard	Acceptkriterier Acceptance requirements	Modsvarende acceptkriterier Corresponding acceptance criteria	Godkendt/ikke udført Acceptable/not performed
Visuel Visual	ENISO17637	ENISO5817B(C)	-	Godkendt
Radiografi Radiography	-	-	-	Ikke udført
Ultralyd Ultrasonic	-	-	-	Ikke udført
Magnetpulver Magnetic particles	-	-	-	Ikke udført
Penetrant Dye penetrant	-	-	-	Ikke udført
Makro Macro	ENISO17639	ENISO5817B	-	Godkendt
Brudprøve Fracture	-	-	-	Ikke udført
Bøjeprøve Bend	-	-	-	Ikke udført
Kærvtrækprøvning Notch tensile test	-	-	-	Ikke udført

Prøvningsinstans (dato/underskrift):
Examining body (date/signature): 18-03-2022 Nordisk Svejse Kontrol A/S Gert S Pedersen

Kvalifikation gyldig fra (dato):
Qualification valid from (date): 17-03-2022

Fornyelsesmetode
Revalidation method EN ISO 9606-1, 9.3 a) ☒

Kvalifikation gyldig til (dato):
Qualification valid until (date): 17-03-2025

Svejseskolens eksaminator (dato/underskrift):
Welding coordinator of the welding school (date/signature): 21-03-2022 Brian Gravgaard

Forlængelse/Prolongation

Bekræftelse af gyldigheden ved arbejdsgiver eller virksomhedens svejseansvarlig for de følgende 6 måneder Confirmation of the validity by employer/welding coordinator for the following 6 months		
Dato/Date	Stilling eller titel/Position or title	Underskrift/Signature
14/9-22	CEO	
16/3-23	CEO	
11/9-23	CEO	

Bedømmelse af svejsesømme/Evaluation of welds

Prøvningsinstans:
Examining body: Nordisk Svejse Kontrol A/S

Sags-nr.:
Job No.:

Identifikation af prøveemne:
Identification of test piece: 238073

Prøveemne undersøgt (dato):
Test piece examined (date): 29-10-2021

med de anførte metoder i henhold til anførte standarder og acceptkriterier med nedenstående resultater:
with the referred method in accordance to the referred standards and accept criteria with the following results:

Bemærkninger Remarks				
Prøvningsmetode Type of test	Prøvningsstandard Testing standard	Acceptkriterier Acceptance requirements	Modsvarende acceptkriterier Corresponding acceptance criteria	Godkendt/ikke udført Acceptable/not performed
Visuel Visual	ENISO17637	ENISO5817B(C)	-	Godkendt
Radiografi Radiography	ENISO17636	ENISO5817B	ENISO10675-1	Godkendt
Ultralyd Ultrasonic	-	-	-	Ikke udført
Magnetpulver Magnetic particles	-	-	-	Ikke udført
Penetrant Dye penetrant	-	-	-	Ikke udført
Makro Macro	-	-	-	Ikke udført
Brudprøve Fracture	-	-	-	Ikke udført
Bøjeprøve Bend	-	-	-	Ikke udført
Kærvtrækprøvning Notch tensile test	-	-	-	Ikke udført

Prøvningsinstans (dato/underskrift):
Examining body (date/signature): 29-10-2021 Nordisk Svejse Kontrol A/S Gert S Pedersen

Kvalifikation gyldig fra (dato):
Qualification valid from (date): 28-10-2021

Fornyelsesmetode
Revalidation method EN ISO 9606-1, 9.3 a) ☒

Kvalifikation gyldig til (dato):
Qualification valid until (date): 28-10-2024

Svejseskolens eksaminator (dato/underskrift):
Welding coordinator of the welding school (date/signature): 01-11-2021 Brian Gravgaard

Forlængelse/Prolongation

Bekræftelse af gyldigheden ved arbejdsgiver eller virksomhedens svejseansvarlig for de følgende 6 måneder Confirmation of the validity by employer/welding coordinator for the following 6 months		
Dato/Date	Stilling eller titel/Position or title	~~Underskrift~~/Signature
27/4 - 22	CEO	
24/10 - 22	CEO	
28/4 - 23	CEO	
23/10 - 23	CEO	

Certifikat for svejsere i henhold til DS/EN ISO 9606-1:2017

Welders Certificate in accordance with DS/EN ISO 9606-1:2017

Betegnelse i henhold til DS/EN ISO 9606-1:
Designation in accordance with DS/EN ISO 9606-1: 141 T BW 8.1 FM5 S s1.5 D76 H-L045 ss gb

Udført på DS 322-certificeret svejseskole. Navn og adresse:
Performed at DS 322 certified welding school. Name and address: Mercantec, H.C. Andersens Vej 9 8800 Viborg

DS-licens-nr.: 516
DS license No.:

Svejsepas-nr.: 25350
Welding passport No.:

Svejserens navn: Morten Pedersen
Welder's name:

Fødselsdato: 21-4-1988
Birth date:

Adresse: Bækkevej 6, 9500 Hobro
Address:

Prøvningsinstans: Nordisk Svejse Kontrol A/S, Stejlundvænget 4 6870 Ølgod
Examining body:

Reference-nr./Reference No. 238073

Fornyelse/Revalidation ☒

Variabler Variables	Anvendte data Actual data used		Gyldighedsområde Range of approval	
Svejsemetode(r)/Dråbeovergang Welding process(es)/Transfer mode	141		ISO 4063 - 141,142,143,145	
Plade eller rør Plate or pipe	T		P:Plade T:Rør	
Sømtype Type of joint	BW		BW:Stumpsøm	
Materialegruppe(r) Material group(s)	8.1		All materials acc. EN ISO 15608, Table 1	
Tilsatsmateriale Welding consumables	FM5		FM5	
Type og betegnelse Type and designation Tabel/table 4		DS EN ISO 14343-A W 19 9 L Si	S, M	
Tabel/table 5	S			
Beskyttelsesgas Shielding gas	I1	DS/EN ISO 14175	--	
Tilbehør (fx baggas) Auxiliaries (e.g. backing gas)	DS/EN ISO 14175 N5		Same or similar	
Strømtype og polaritet Type of current and polarity	DC-			
Nedsmeltet tykkelse i mm for BW Deposit thickness in mm for BW	1.5		1.5-3,0	
Materialetykkelse i mm for FW Material thickness in mm for FW				
Rørdiameter i mm Pipe diameter in mm	76		>=38	
Svejseposition Welding position BW tabel/table 9	H-L045		all BW positions, except vertical down	
FW tabel/table 10				
Svejsetekniske detaljer og lag Weld details and layer	ss gb		(ss,mb) (bs) (ss,gb)	

Svejseprocedurespecifikations-nr.: SP141-189
Welding procedure specification No.:

Jobkundskab/Job knowledge: Bestået/Accepted ☒ Omprøve/Retest ☐

PED-APPROVED

Svejsning af prøveemne udført/Welding of test piece terminated: 28-10-2021

NSK NB 2735

Den praktiske prøve er gennemført tilfredsstillende og er indstillet til prøvning.
Svejseskolens eksaminator (dato/navn/underskrift):

29-10-2021 Frank Jeppesen

The welder's approval test is accepted and released for testing.
Welding coordinator of the welding school (date/name/signature): 28-10-2021 Brian Gravgaard

Ballard Power Systems Europe A/S
Majsmarken 1
9500 Hobro
Denmark

Revision history		
Rev.	**Date.**	**Description**
001	7/19/2024	First Issue
002	12/1/2025	Updated, naming of components and cerrificates

Document Title:	**BLPH Project - Material Test Certificates**
Document Number:	K559-2254-CWIWP4202202-L01-001
Revision:	Rev002
Sequence Number:	001
File Name:	K559-2254-CWIWP4202202-L01-001Rev002
Purchaser Job:	K559-2254
Purchase Order:	CWIWP4202202
Code:	L01
Requsition Number:	n/a
Customer:	CrossWind C.V., Rotterdam, The Netherlands

Short Title	Material Test Certificates
Full Title	Material Test Certificates

This document, submitted in confidence, contains proprietary information which shall not be reproduced or transferred to other documents or disclosed to others or used for manufacturing or any other purpose without prior written permission of Ballard Power Systems.

Revision Record

Rev #	Description	Revised By	Date
1.0	Initial Release	EZE	July 19, 2024
2.0	Update, naming of components	JTA	Dec 01, 2025

THIS DOCUMENT IS VALID ONLY AT TIME OF PRINTING.
ANY COPIES MADE ARE CONSIDERED UNCONTROLLED UNLESS STAMPED OTHERWISE IN RED.

Table of Contents

1.0 General 4
1.1 42.4x2.0 Stainless Steel Cold Finish Seamless Pipes 5
1.2 25.0x2.0 Stainless Steel Seamless Pipes 8
1.3 42.4 ASME B16.5 Stainless Steel Forged Flanges 9
1.4 G½ Coupling Stainless Steel 10
1.5 42.4x2.0 Stainless Steel End Caps 11

THIS DOCUMENT IS VALID ONLY AT TIME OF PRINTING.
ANY COPIES MADE ARE CONSIDERED UNCONTROLLED UNLESS STAMPED OTHERWISE IN RED.

1.0 General

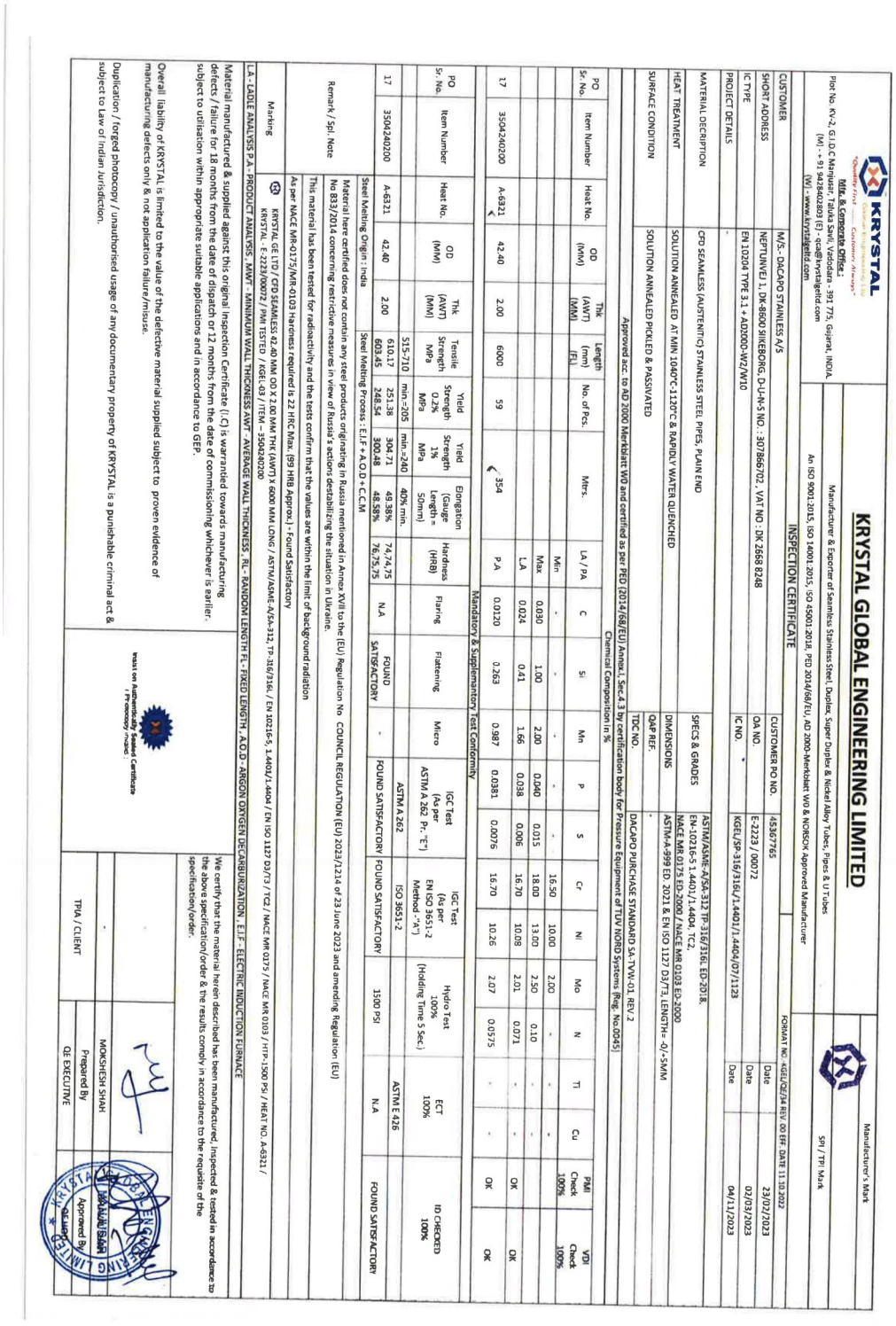
This document contains Material Test Certificates of products supplied to Ballard for the manufacturing of the H2 manifold for 1 MW Fuel Cell Power Container intended for CrossWind.

The Material Test Certificates state the national material specifications that the materials conform to, incl. chemical analysis, specification range analysis mechanical test results, and heat-treated conditions, and are valid for the following products:

- 42.4x2.0 Stainless Steel Cold Finish Seamless Pipes
- 25.0x2.0 Stainless Steel Seamless Pipes
- 42.4 ASME B16.5 Stainless Steel Forged Flanges
- G½ Coupling Stainless
- 42.4x2.0 Stainless Steel End Caps

THIS DOCUMENT IS VALID ONLY AT TIME OF PRINTING.
ANY COPIES MADE ARE CONSIDERED UNCONTROLLED UNLESS STAMPED OTHERWISE IN RED.

1.1 42.4x2.0 Stainless Steel Cold Finish Seamless Pipes



150861

KRYSTAL

Manufacturer & Exporter of Seamless Stainless Steel, Duplex, Super Duplex & Nickel Alloy Tubes, Pipes & U/T-Tubes

An ISO 9001:2015, ISO 14001:2015, ISO 45001:2018, PED 2014/68/EU, AD 2000-Merkblatt W0 & NORSOK Approved Manufacturer

KRYSTAL GLOBAL ENGINEERING LIMITED

Manufacturer's Mark

SPI / TPI Mark

Mfg. & Corporate Office :
Plot No. KV-2, G.I.D.C Manjusar, Taluka Savli, Vadodara - 391 775, Gujarat, INDIA
(M) : - 91 9428402803 (E) - qca@krystalgetd.com
(W) : www.krystalgetd.com

FORMAT NO: KGEL/QE/04 REV. 00 EFF. DATE 11.10.2022

INSPECTION CERTIFICATE

CUSTOMER: M/S.- DACAPO STAINLESS A/S — CUSTOMER PO NO.: 4536765 — Date: 23/02/2023
SHORT ADDRESS: NEPTUNVEJ 1, DK-8600 SILKEBORG, D-U-N-S NO. : 307866702 , VAT NO : DK 2668 8248 — QA NO.: E-2223 / 00072 — Date: 02/03/2023
I.C TYPE: EN 10204 TYPE 3.1 + AD2000-W2/W10 — I.C NO.: KGEL/SP-316/316L/1-4401/1-4404/07/1123 — Date: 04/11/2023
PROJECT DETAILS: -
MATERIAL DESCRIPTION: CFD SEAMLESS (AUSTENITIC) STAINLESS STEEL PIPES, PLAIN END — SPECS & GRADES: ASTM/ASME-A/SA-312 TP-316/316L ED-2018. EN-10216-5 1.4401/1.4404. TC1, NACE MR 0175 ED-2009 / NACE MR 0103 ED-2000
HEAT TREATMENT: SOLUTION ANNEALED AT MIN 1040°C-1120°C & RAPIDLY WATER QUENCHED — DIMENSIONS: ASTM-A-999 ED: 2021 & EN ISO 1127 D3/T3, LENGTH+ -0/+5MM
SURFACE CONDITION: SOLUTION ANNEALED PICKLED & PASSIVATED — Q&P REF.: -
TDC NO.: DACAPO PURCHASE STANDARD SA-TUV-01 REV 2

Approved acc. to AD 2000 Merkblatt W0 and certified as per PED (2014/68/EU) Annex I, Sec.4.3 by certification body for Pressure Equipment of TUV NORD Systems (Reg. No.0045)

Chemical Composition in %

PO Sr. No.	Item Number	Heat No.	OD (MM)	Thk (AWT) (MM)	Length (mm) (FL)	No. of Pcs.	Mtrs.	LA / PA	C	Si	Mn	P	S	Cr	Ni	Mo	N	Ti	Cu	PMI Check 100%	VDI Check 100%
								Min.	-	-	-	-	-	16.50	10.00	2.00	-	-	-		
								Max	0.030	1.00	2.00	0.040	0.015	18.00	13.00	2.50	0.10	-	-		
								LA	0.024	0.41	1.66	0.038	0.006	16.70	10.08	2.01	0.071	-	-	OK	OK
17	3504240200	A-6321	42.40	2.00	6000	59	354	PA	0.0120	0.263	0.987	0.0381	0.0076	16.70	10.26	2.07	0.0575	-	-	OK	OK

Mandatory & Supplementary Test Conformity

PO Sr. No.	Item Number	Heat No.	OD (MM)	Thk (AWT) (MM)	Tensile Strength MPa	Yield Strength 0.2% MPa	Yield Strength 1% MPa	Elongation (Gauge Length – 50mm)	Hardness (HRB)	Flaring	Flattening	Micro	IGC Test (As per ASTM A 262 Pr. "E")	IGC Test (As per EN ISO 3651-2 Method "A")	Hydro Test 100% (Holding Time 5 Sec.)	ECT 100%
					515-710	min-205	min-240	40% min.					ASTM A 262	ISO 3651-2		ASTM E 426
17	3504240200	A-6321	42.40	2.00	610.17 / 603.45	251.38 / 248.54	304.71 / 300.48	49.38% / 48.58%	74,74,75 / 76,75,75	N.A	FOUND SATISFACTORY	-	FOUND SATISFACTORY	FOUND SATISFACTORY	1500 Psi	N.A

Steel Melting Origin : India — Steel Melting Process : E.I.F + A.O.D + C.C.M

Material here certified does not contain any steel products originating in Russia mentioned in Annex XVII to the (EU) Regulation No COUNCIL REGULATION (EU) 2022/1214 of 23 June 2023 and amending Regulation (EU) No 833/2014 concerning restrictive measures in view of Russia's actions destabilizing the situation in Ukraine.

Remark / Spl. Note: This material has been tested for radioactivity and the tests confirm that the values are within the limit of background radiation

As per NACE MR-01/75/MR-0103 Hardness required is 22 HRC Max. (99 HRB Approx.) - Found Satisfactory

Marking: KRYSTAL GE LTD / CFD SEAMLESS 42.40 MM OD X 2.00 MM THK (AWT) X 6000 MM LONG / ASTM/ASME-A/SA-312, TP-316/316L / EN 10216-5, 1.4401/1.4404 / EN ISO 1127 D3/T3 / TC2 / NACE MR 0175 / NACE MR 0103 / HTP-1500 PSI / HEAT NO. A-6321 / KRYSTAL - E-2223/00072 / PMI TESTED / KGEL-03 / ITEM - 3504240200

LA - LADLE ANALYSIS, P.A - PRODUCT ANALYSIS, AWT - MINIMUM WALL THICKNESS, AWT - AVERAGE WALL THICKNESS, RL - RANDOM LENGTH, FL - FIXED LENGTH, A.O.D - ARGON OXYGEN DECARBURIZATION, E.I.F. - ELECTRIC INDUCTION FURNACE

Material manufactured & supplied against this original Inspection Certificate (I.C) is warranted towards manufacturing defects / failure for 18 months from the date of dispatch or 12 months from the date of commissioning whichever is earlier, subject to utilisation within appropriate suitable applications and in accordance to GEP.

Overall liability of KRYSTAL is limited to the value of the defective material supplied subject to proven evidence of manufacturing defects only & not application failure/misuse.

Duplication / forged photocopy / unauthorised usage of any documentary property of KRYSTAL is a punishable criminal act & subject to Law of Indian Jurisdiction.

We certify that the material herein described has been manufactured, inspected & tested in accordance to the above specification/order & the results comply in accordance to the requisite of the specification/order.

TPIA / CLIENT — Prepared By QE EXECUTIVE: MOKSHESH SHAH — Approved By QUALITY CONTROL: MR. ANJU BAAR

KRYSTAL ENGINEERING LIMITED

Inspection Certificate

TA CHEN STAINLESS PIPE CO., LTD.
NO. 125 HSIN-TIEN 2ND ST.,
JENG-TEH, TAINAN, TAIWAN
TEL:(06)2793254 FAX:(06)2701382
COUNTRY ORIGIN:TAIWAN

EN 10204-3.1

Commodity : STAINLESS STEEL WELDED PIPE
Customer : DACAPO STAINLESS B.V.
Specification : ASTM A312/A312M-2022a /ASTM A999-2018
ASME SA312-2021/ASME BPVC.II.A-2021
Destination : ROTTERDAM
Grade : TP316
Customer O/N :31134407 **Certificate No** : XF0200034
Delivery Condition: ANNEALED AND PICKLED
Factory O/N : _____ **Date** : 2023/6/19 **INVOICE No** : HO27XF0200

Item No.	Case No. (Crate No.)	Heat No.	Size		Quantity	Weight	Chemical Composition in %								
					(Pcs)	(Kgs)	C	Si	Mn	P	S	Ni	Cr	Mo	N
01	006	1014299	2-1/2"	SCH40S			0.080	1.000	2.000	0.045	0.030	14.00	18.00	3.000	-
							0.020	0.480	0.917	0.031	0.0012	10.23	16.800	2.063	0.030
02	004	1017422	1"	SCH40S			0.022	0.440	0.940	0.036	0.0057	10.17	16.770	2.100	0.029
03	006	1025545	2"	SCH40S			0.020	0.460	0.990	0.025	0.0009	10.11	16.750	2.040	0.019
04	004	1027133	3/4"	SCH40S			0.009	0.360	0.940	0.032	0.0033	10.06	16.710	2.060	0.021
05	004	1027133	3/4"	SCH40S			0.009	0.360	0.940	0.032	0.0033	10.06	16.710	2.060	0.021
Total															

Item No.	Tensile Test (Gage Lth=50mm)				Hardness	Bend	Flattening	HT TEMP °F	Dimension And	Hydrostatic
	0.2% Yield Strength PSI	1.0% Yield Strength PSI	Tensile Strength PSI	Elongation %	Test HRB	Test	Test	Quenching In Water	Surface Condition	Test PSI
	30000		75000	T25/L35				1900		2500
	-	-	-					-		-
01	43100	-	89000	50	84.00	OK	OK	1904	OK	2100
02	40200	-	88000	51.5	80.00	OK	OK	1904	OK	2500
03	38400	-	84100	55	79.00	OK	OK	1904	OK	1900
04	42800	-	87600	50	80.00	OK	OK	1904	OK	2500
05	42800	-	87600	50	80.00	OK	OK	1904	OK	2500

Remarks
1. EDDY CURRENT TEST : O.K.
2. HARDNESS : MADE WITH ASTM A262
3. P.M.I. TESTED : O.K.
4. LOT MATERIAL ACC. ASTM A262
5. RAW MATERIAL FOR PIPE FITTINGS
6. PED 2014/68/EU

TA CHEN STAINLESS PIPE CO.,LTD. Q/C Dept. NO.125 HSIN-TIEN 2ND STREET, TAINAN, TAIWAN, R.O.C.

We hereby certify the above statement to be true and correct every detail
TA CHEN has established a QMS according to ISO 9001, which is certified by LRQA (ISO 9001-0067066)

George Yang
Manager of Inspection Section/George Yang

Inspection Certificate

TA CHEN STAINLESS PIPE CO., LTD.
NO. 125 HSIN-TIEN 2ND ST.,
JENG-TEH, TAINAN, TAIWAN
TEL:(06)2793254 FAX:(06)2701382
COUNTRY ORIGIN:TAIWAN

EN 10204-3.1

Commodity : STAINLESS STEEL WELDED PIPE
Customer : DACAPO STAINLESS B.V.
Specification : ASTM A312/A312M-2022a /ASTM A999-2018
ASME SA312-2021/ASME BPVC.II.A-2021
Destination : ROTTERDAM
Grade : TP316
Customer O/N :31134407
Certificate No : XF0200035
Delivery Condition: ANNEALED AND PICKLED
Factory O/N :
Date : 2023/6/19
INVOICE No : HO27XF0200

Item No.	Case No. (Crate No.)	Heat No.	Size	Quantity (Pcs)	Weight (Kgs)	Chemical Composition in % C	Si	Mn	P	S	Ni	Cr	Mo	N
06	004	1027136	1" SCH40S		0.080	-	-	-	-	-	10.00	16.00	2.000	-
					0.009	0.420	1.000	2.000	0.045	0.030	14.00	18.00	3.000	-
07	001	1028471	1-1/4" SCH40S		0.016	0.440	0.890	1.110	0.032	0.0033	10.07	16.650	2.070	0.018
08	001	28037601	1/2" SCH40S		0.014	0.350	1.320	0.029	0.029	0.0018	10.08	16.880	2.050	0.021
											10.05	16.110	2.050	-
Total														

Item No.	Tensile Test (Gage Lth=50mm) 0.2% Yield Strength PSI	1.0% Yield Strength PSI	Tensile Strength PSI	Elongation %	Hardness Test HRB	Bend Test	Flattening Test	HT TEMP °F And Quenching In Water	Dimension And Surface Condition	Hydrostatic Test PSI
	30000		75000	T25/L35				1900		2500
	-		-					-		-
06	40300	-	82700	57	82.00	OK	OK	1904	OK	2500
07	41500	-	87100	48.5	78.00	OK	OK	1904	OK	2500
08	34084	-	78610	70	72.00	OK	OK	1904	OK	2500

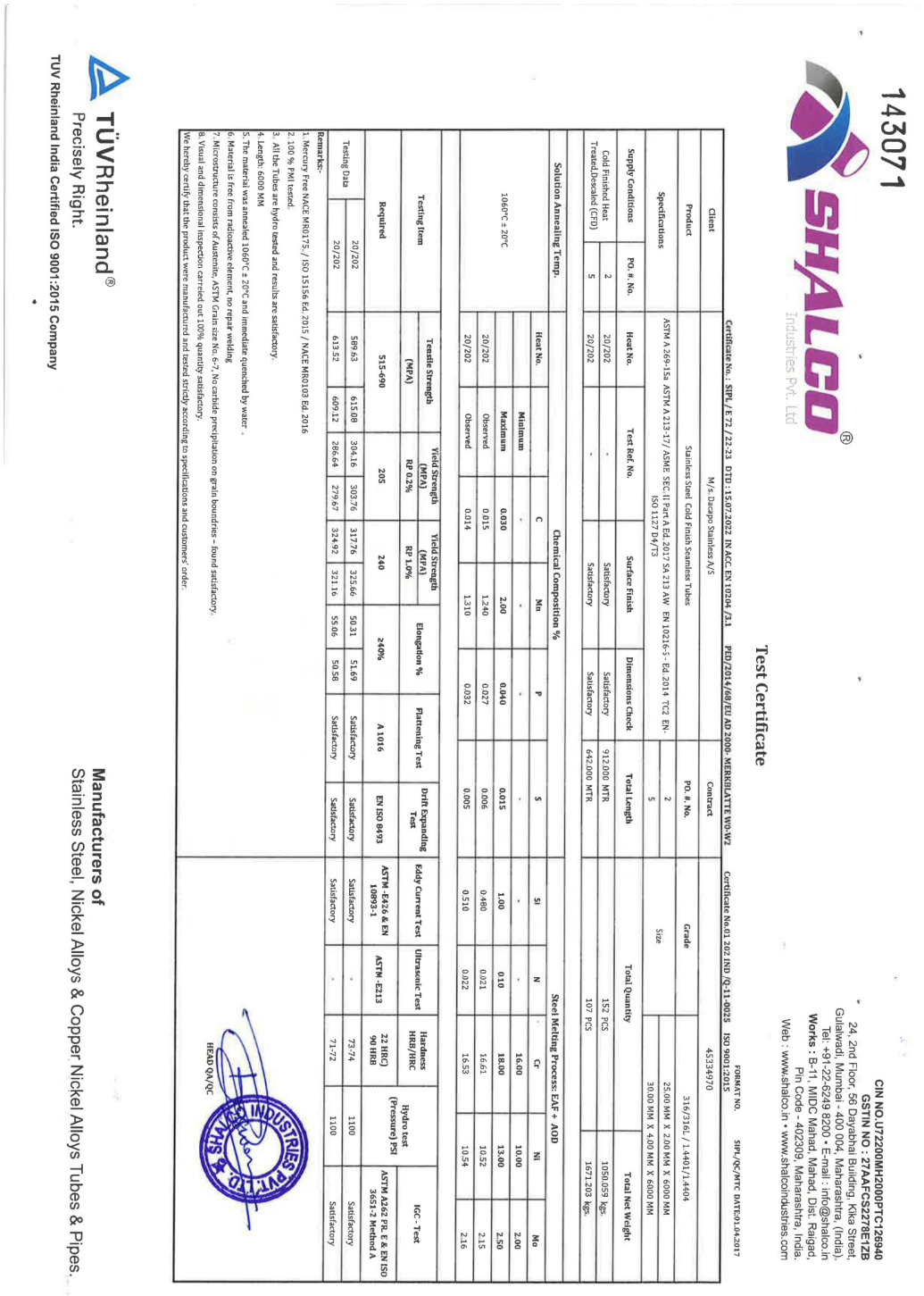
Remarks
1. EDDY CURRENT TEST : O.K.
2. HARDNESS : HRA≤ MRO175-15
3. P. M. I. TESTED : O.K.
4. FLARE TEST ACC. TO ASTM A262
5. RAW MATERIAL FOR PIPE FITTINGS
6. PED 2014/68/EU

TA CHEN STAINLESS PIPE CO. LTD. Q/C Dept. 125 HSIN-TIEN 2ND STREET, TAINAN, TAIWAN, R.O.C.

We hereby certify the above statement to be true and correct every detail
TA CHEN has established a QMS according to ISO 9001, which is certified by LRQA (ISO 9001-0067066)

George Yang
Manager of Inspection Section/George Yang

1.2 25.0x2.0 Stainless Steel Seamless Pipes



143071

SHALCO® Industries Pvt. Ltd

CIN NO.U72200MH2000PTC126940
GSTIN NO : 27AAFCS2278E1ZB
24, 2nd Floor, 56 Dayabhai Building, Kika Street, Gulalwadi, Mumbai - 400 004, Maharashtra, (India).
Tel: +91-22-6249 8200 • E-mail : info@shalco.in
Works : B-11, MIDC Mahad, Mahad, Dist. Raigad, Pin Code - 402309, Maharashtra, India.
Web : www.shalco.in • www.shalcoindustries.com

FORMAT NO. SHPL/QC/MTC DATE:01.04.2017

Test Certificate

Certificate No.: SHPL/E 72 /22-23 DTD :15.07.2022 IN ACC.EN 10204 /3.1 PED/2014/68/EU AD 2000- MERKBLATTE W0-W2 Certificate No.01 202 IND /Q-11-0025 ISO 9001:2015 45334970

Client	M/s. Daraqo Stainless A/S	Contract			
Product	Stainless Steel Cold Finish Seamless Tubes	PO. #. No.	Grade	316/316L / 1.4401/1.4404	
Specifications	ASTM A 269-15a ASTM A 213-17/ ASME SEC. II Part A Ed. 2017 SA 213 AW EN 10216-5 : Ed. 2014 TC2 EN-ISO 1127 D4/T3	2 5	Size	25.00 MM X 2.00 MM X 6000 MM 30.00 MM X 4.00 MM X 6000 MM	

Supply Conditions	PO. #. No.	Heat No.	Test Rel. No.	Surface Finish	Dimensions Check	Total Length	Total Quantity	Total Net Weight
Cold Finished Heat Treated,Descaled (CFD)	2	20/202	-	Satisfactory	Satisfactory	912.000 MTR	152 PCS	1050.059 kgs.
	5	20/202	-	Satisfactory	Satisfactory	642.000 MTR	107 PCS	1671.203 kgs.

Solution Annealing Temp.: 1060°C ± 20°C

Chemical Composition %

Steel Melting Process: EAF + AOD

Heat No.		C	Mn	P	S	Si	N	Cr	Ni	Mo
20/202	Minimum	-	-	-	-	-	-	16.00	10.00	2.00
	Maximum	0.030	2.00	0.040	0.015	1.00	0.10	18.00	13.00	2.50
	Observed	0.015	1.240	0.027	0.006	0.480	0.021	16.61	10.52	2.15
20/202	Observed	0.014	1.310	0.032	0.005	0.510	0.022	16.53	10.54	2.16

Testing Item		Tensile Strength (MPA)	Yield Strength (MPA) RP 0.2%	Yield Strength (MPA) RP 1.0%	Elongation %	Flattening Test	Drift Expanding Test	Eddy Current Test	Ultrasonic Test	Hardness HRB/HRC	Hydro test (Pressure) PSI	IGC - Test
Required		515-690	205	240	≥40%	A 1016	EN ISO 8493	ASTM -E426 & EN 10893-1	ASTM -E213	22 HRC/ 90 HRB		ASTM A262 PR. E & EN ISO 3651-2 Method A
Testing Data	20/202	589.63	615.08	304.16	303.76	317.76	325.66	50.31	51.69	Satisfactory	Satisfactory	-	73.74	1100	Satisfactory
	20/202	613.52	609.12	286.64	279.67	324.92	321.16	55.06	50.58	Satisfactory	Satisfactory	Satisfactory	-	71.72	1100	Satisfactory

Remarks:-
1. Mercury Free NACE MR0175 / ISO 15156 Ed. 2015 / NACE MR0103 Ed. 2016
2. 100 % PMI tested.
3. All the Tubes are hydro tested and results are satisfactory.
4. Length: 6000 MM
5. The material was annealed 1060°C ± 20°C and immediate quenched by water .
6. Material is free from radioactive element, no repair welding
7. Microstructure consists of Austenite, ASTM Grain size No. 6-7, No carbide precipitation on grain boundries - found satisfactory.
8. Visual and dimensional inspection carreied out 100% quantity satisfactory.

We hereby certify that the product were manufactured and tested strictly according to specifications and customers' order.

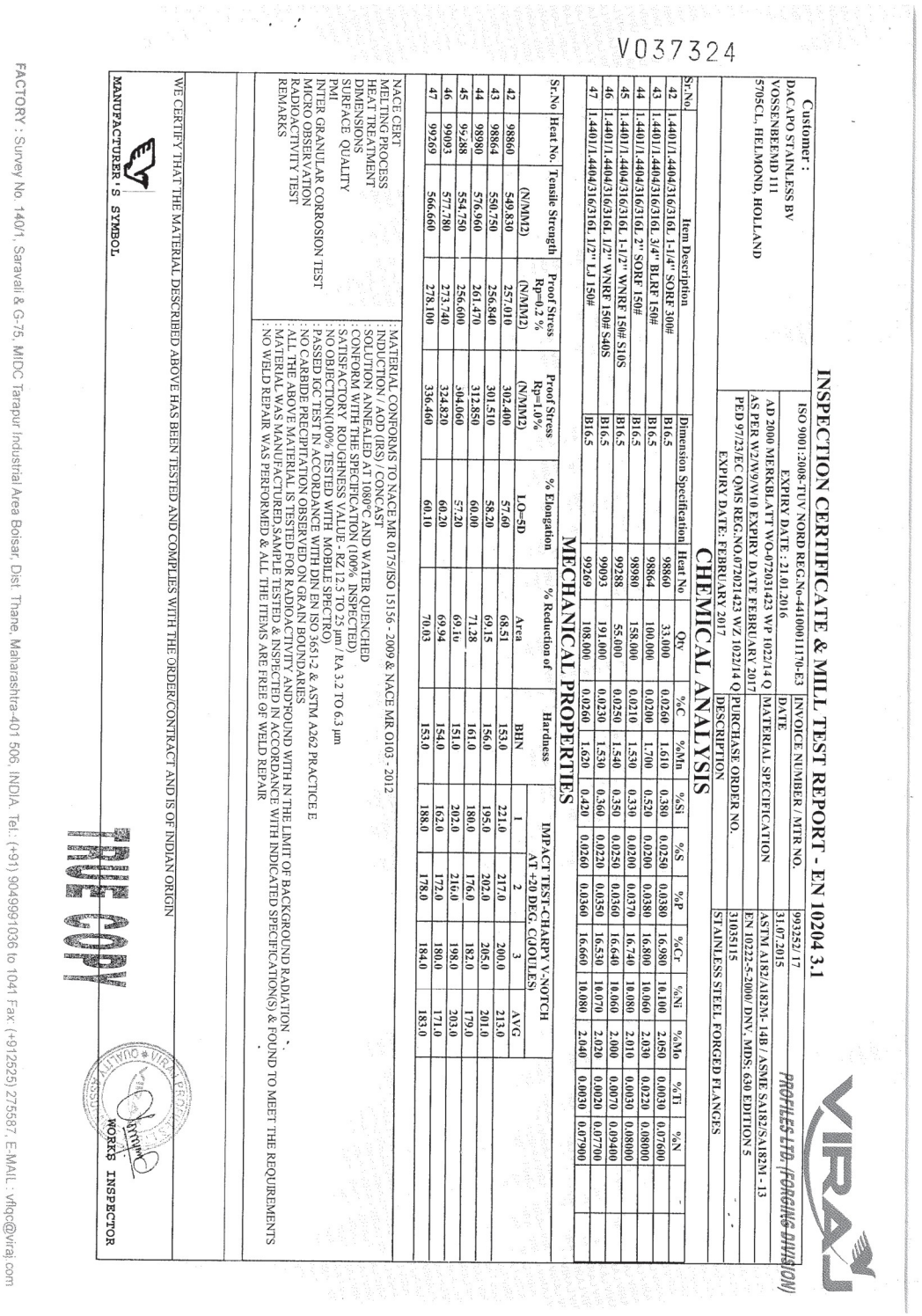
HEAD QA/QC

SHALCO INDUSTRIES PVT. LTD.

TÜVRheinland®
Precisely Right.
TUV Rheinland India Certified ISO 9001:2015 Company

Manufacturers of
Stainless Steel, Nickel Alloys & Copper Nickel Alloys Tubes & Pipes.

1.3 42.4 ASME B16.5 Stainless Steel Forged Flanges



VIRAJ

PROFILES LTD. (FORGING DIVISION)

INSPECTION CERTIFICATE & MILL TEST REPORT - EN 10204 3.1

Customer :
DACAPO STAINLESS BV
VOSSENBEEMD 111
5705CL, HELMOND, HOLLAND

ISO 9001:2008-TUV NORD REG.No-44100011170-E3
EXPIRY DATE : 21.01.2016
AD 2000 MERKBLATT WO-0720314423 WP 1022/14 Q
AS PER W2/W9/W10 EXPIRY DATE FEBRUARY 2017
FED 97/23/EC QMS REG.NO.07202142 WZ 1022/14 Q
EXPIRY DATE: FEBRUARY 2017

INVOICE NUMBER / MTR NO. 993252/ 17
DATE 31.07.2015
MATERIAL SPECIFICATION ASTM A182/A182M- 14B / ASME SA182/SA182M - 13
EN 10222-5-2000/ DNV, MDS: 630 EDITION 5
PURCHASE ORDER NO. 31035115
DESCRIPTION STAINLESS STEEL FORGED FLANGES

V037324

CHEMICAL ANALYSIS

Sr.No	Item Description	Dimension Specification	Heat No.	Qty	%C	%Mn	%Si	%S	%P	%Cr	%Ni	%Mo	%Ti	%N
42	1.4401/1.4404/316/316L 1-1/4" SORF 300#	B16.5	98860	33.000	0.0260	1.610	0.380	0.0250	0.0380	16.980	10.100	2.050	0.0030	0.07600
43	1.4401/1.4404/316/316L 3/4" BLRF 150#	B16.5	98864	100.000	0.0200	1.700	0.520	0.0200	0.0380	16.800	10.060	2.030	0.0220	0.08000
44	1.4401/1.4404/316/316L 2" SORF 150#	B16.5	98980	158.000	0.0210	1.530	0.330	0.0200	0.0370	16.740	10.080	2.010	0.0030	0.08000
45	1.4401/1.4404/316/316L 1-1/2" WNRF 150# S10S	B16.5	99288	55.000	0.0250	1.540	0.350	0.0250	0.0360	16.640	10.060	2.000	0.0070	0.09400
46	1.4401/1.4404/316/316L 1/2" WNRF 150# S40S	B16.5	99093	191.000	0.0230	1.530	0.360	0.0220	0.0350	16.530	10.070	2.020	0.0020	0.07700
47	1.4401/1.4404/316/316L 1/2" LJ 150#	B16.5	99269	108.000	0.0260	1.620	0.420	0.0260	0.0360	16.660	10.080	2.040	0.0030	0.07900

MECHANICAL PROPERTIES

Sr.No	Heat No.	Tensile Strength	Proof Stress Rp=0.2 %	Proof Stress Rp=1.0%	% Elongation	% Reduction of	Hardness	IMPACT TEST-CHARPY V-NOTCH AT +20 DEG. C(JOULES)			
		(N/MM2)	(N/MM2)	(N/MM2)	LO=5D	Area	BHN	1	2	3	AVG
42	98860	549.830	257.010	302.400	57.60	68.51	153.0	221.0	217.0	200.0	213.0
43	98864	550.750	256.840	301.510	58.20	69.15	156.0	195.0	202.0	205.0	201.0
44	98980	576.960	261.470	312.850	60.00	71.28	161.0	180.0	176.0	182.0	179.0
45	99288	554.750	256.600	304.060	57.20	69.16	151.0	202.0	216.0	198.0	203.0
46	99093	577.780	273.740	324.820	60.20	69.94	154.0	162.0	172.0	180.0	171.0
47	99269	566.660	278.100	336.460	60.10	70.03	153.0	188.0	178.0	184.0	183.0

NACE CERT : MATERIAL CONFORMS TO NACE MR 0175/ISO 15156 - 2009 & NACE MR 0103 - 2012
MELTING PROCESS : INDUCTION / AOD (IRS) / CONCAST
HEAT TREATMENT : SOLUTION ANNEALED AT 1080°C AND WATER QUENCHED
DIMENSIONS : CONFORM WITH THE SPECIFICATION (100% INSPECTED)
SURFACE QUALITY : SATISFACTORY ROUGHNESS VALUE - RZ 12.5 TO 25 µm / RA 3.2 TO 6.3 µm
PMI : NO OBJECTION(100% TESTED WITH MOBILE SPECTRO)
INTER GRANULAR CORROSION TEST : PASSED IGC TEST IN ACCORDANCE WITH DIN EN ISO 3651-2 & ASTM A262 PRACTICE E
MICRO OBSERVATION : NO CARBIDE PRECIPITATION OBSERVED ON GRAIN BOUNDARIES
RADIOACTIVITY TEST : ALL THE ABOVE MATERIAL IS TESTED FOR RADIOACTIVITY AND FOUND WITH IN THE LIMIT OF BACKGROUND RADIATION
REMARKS : MATERIAL WAS MANUFACTURED,SAMPLE TESTED & INSPECTED IN ACCORDANCE WITH INDICATED SPECIFICATION(S) & FOUND TO MEET THE REQUIREMENTS
: NO WELD REPAIR WAS PERFORMED & ALL THE ITEMS ARE FREE OF WELD REPAIR

WE CERTIFY THAT THE MATERIAL DESCRIBED ABOVE HAS BEEN TESTED AND COMPLIES WITH THE ORDER/CONTRACT AND IS OF INDIAN ORIGIN

MANUFACTURER'S SYMBOL

TRUE COPY

WORKS INSPECTOR

FACTORY : Survey No. 140/1, Saravali & G-75, MIDC Tarapur Industrial Area Boisar, Dist. Thane, Maharashtra-401 506. INDIA. Tel.: (+91) 9049991036 to 1041 Fax :(+912525) 275587, E-MAIL : vftqc@viraj.com

THIS DOCUMENT IS VALID ONLY AT TIME OF PRINTING.
ANY COPIES MADE ARE CONSIDERED UNCONTROLLED UNLESS STAMPED OTHERWISE IN RED.

1.4 G½ Coupling Stainless Steel

V153121

TA CHEN STAINLESS PIPE CO., LTD.

INSPECTION CERTIFICATE

ISO 9001-2015

Certificate No. 0067066

Commodity : STAINLESS STEEL PIPE NIPPLE

Customer : DACAPO STAINLESS B.V.

EN 10204/3.1

NO.125 HSIN-TIEN 2ND STREET,
HSIN-TIEN JENG-TEH ,TAINAN
TAIWAN, R.O.C.
TEL:+886 6 2701756
FAX:+886 6 2701382 , 2798057

Specification: ASTM A312/A312M 2022a
Grade ____: TP316L

Destination : ROTTERDAM
Customer's O/N : 31134407
Factory O/N : HO27X3741
Invoice No : HO27XF0200

Certificate No : MTR112060059002
Date : 2023/06/19

No.	Size	Article	End Type	Part No.	Qty (pcs)	Heat No.	CHEMICAL ANALYSIS(%) C	Si	Mn	P	S	Ni	Cr	Mo	TENSION TEST Yield Strength MPA	Tensile Strength MPA	Elongation %
							max 0.035	max 1.000	max 2.000	max 0.045	max 0.030	10.00 14.00	16.00 18.00	2.00 3.00	min 170	min 485	min 35
10	1/4"	FULL COUPLING	ISO228-1G	TB03211855	2000	28037601	0.014	0.350	1.320	0.029	0.002	10.05	16.11	2.05	235	542	70
11	1/2"	FULL COUPLING	ISO228-1G	TB03212580	2000	1027133	0.009	0.360	0.940	0.032	0.003	10.06	16.71	2.06	278	594	54
12	1"	FULL COUPLING	ISO228-1G	TB03213590	2100	1028471	0.016	0.440	1.110	0.029	0.004	10.08	16.88	2.05	284	601	50
13	1-1/2"	FULL COUPLING	ISO228-1G	TB03214505	276	1025545	0.020	0.460	0.990	0.025	0.001	10.11	16.75	2.04	265	580	55
14	2"	FULL COUPLING	ISO228-1G	TB03215135	112	1014299	0.020	0.480	0.917	0.031	0.001	10.23	16.80	2.06	286	611	50
15	1/2"	HALF COUPLING	ISO228-1G	TB04212580	2400	1027133	0.009	0.360	0.940	0.032	0.003	10.06	16.71	2.06	278	594	54
16	3/4"	HALF COUPLING	ISO228-1G	TB04213045	64	1017422	0.022	0.440	0.940	0.036	0.006	10.17	16.77	2.10	259	596	54
17	3/4"	HALF COUPLING	ISO228-1G	TB04213045	486	1027136	0.009	0.420	0.890	0.032	0.003	10.07	16.65	2.07	271	598	50.5

REMARK:FULL COUPLINGS(SOCKETS) AND HALF COUPLINGS ARE MADE FROM PIPE.
REMARK:ASTM A262 PRACTICE E:O.K.

TA CHEN STAINLESS PIPE CO., LTD. Q/C Dept. NO.125, HSIN-TIEN 2ND STREET, HSIN-TIEN JENG-TEH, TAINAN, TAIWAN, R.O.C.

Supervisor:

page:2 / 2

1.5 42.4x2.0 Stainless Steel End Caps

V159283

BERCELLESI BERINOX STAINLESS STEEL FITTINGS

Quality Management System certified by LRQA

The QMS supports the requirements of Annex I Sec. 4.3 of PED 2014/68/EU

CERTIFICATO DI COLLAUDO EN 10204 3.1
Inspection certificate
Certificat d'inspection

Num: 22514 / 23 **Data:** 12/12/2023

Cliente Customer Client: DACAPO STAINLESS BV
VOSSENBEEMD 111

5705CL HELMOND -

Specifica prodotto/Product specification/Spécification du produit: EN 10253/4 type A

Pos Item Poste	Qta Qty Qté	Articolo Item Article	Descrizione e dimensione Description and size Désignation et dimension	Grado acciaio Grade Nuance	Colata Heat Coulée
10	250,00		END CAPS 316L 42.4x2	1.4404/316L	0468184
20	100,00		END CAPS 304L 60.3x3	1.4301/304/1.4307/304L	Y210918D41-6
30	100,00		END CAPS 304L 76.1x3	1.4301/304/1.4307/304L	53586
40	50,00		END CAPS 304L 101.6x3	1.4301/304/1.4307/304L	150057
50	30,00		END CAPS 316L 101.6x3	1.4404/316L	22000841
60	500,00		END CAPS 316L 60.3x2	1.4404/316L	0547275

Pos Item Poste	Costruttore materia prima Manufacturer raw material Fabricant matériel de base	Certificato Certificate Certificat	Specifica materia prima Requirement material Spécification matériel de base
10	MARCEGAGLI SPECIALTIES	723284184	EN10028-7 EN10088-2 EN10088-4 ASTM A240 A480
20	PT. INDONESIA GUANG CHING	2021110604	EN10088-2 EN10028-7 EN10088-4 ASTM A240 A480
30	MARCEGAGLI SPECIALTIES	723394949	EN10028-7 EN10088-2 EN10088-4 ASTM A240 A480
40	APERAM GENK BELGIUM	22K0005913	EN10088-2 EN10028-7 ASTM A240 SA240 ADW2 W10
50	LIEN KUO METAL IND. CO.	1091029013	EN10088-2 EN10028-7 ASTM A240 A480
60	MARCEGAGLI SPECIALTIES	723387929	EN10028-7 10088-2 10088-4 ASTM A240 A480 ADW0 W2

Analisi chimica/Chemical composition/Analyse chimique — **Caratteristiche meccaniche/Mechanical properties/Caractéristiques mécaniques**

Colata Heat Coulée	C %	Mn %	Si %	P %	S %	Cr %	Ni %	Mo %	Ti %	Cu%	N%	Snerv. Rp 0,2/1,0 Yield Strength Limite élastique	Rottura Rm Tensile strength Rupture	Allung. A50mm Elongation Allongement	Durezza Hardness Dureté
0468184	0,016	1,100	0,350	0,032	0,00100	16,820	10,080	2,030			0,048	286 / 323 N/mm²	605 N/mm²	53,10	81 HRB
Y210918D41-6	0,022	1,410	0,380	0,029	0,00200	18,130	8,010				0,068	284 /	648 MPa	59,10	86 HRB
53586	0,024	1,300	0,390	0,031	0,00200	18,200	8,000				0,068	320 / 373 N/mm²	640 N/mm²	46,30	84 HRB
150057	0,024	1,510	0,470	0,034	0,00400	18,080	8,010				0,073	298 / 339 MPa	634 MPa	52,00	86 HRB
22000841	0,024	1,210	0,240	0,040	0,00500	16,230	10,050	2,030			0,042	323 /	591 N/mm²	52,00	79 HRB
0547275	0,024	1,090	0,380	0,029	0,00100	16,690	10,030	2,060			0,049	265 / 304 N/mm²	585 N/mm²	56,70	79 HRB

L'analisi chimica e le caratteristiche meccaniche sono conformi al certificato originale rilasciato dal fabbricante di materia prima.
The chemical analysis and mechanical properties fully comply with the certificate issued by the manufacturer of the base material.
L'analyse chimique et les caractéristiques mécaniques sont conformes au certificat émis par le producteur de la matière première.

Doc. di trasporto n. Delivery note n. Bon de livraison n. 62 / d40 **Data** Date Date 07/12/2023 **Ordine n.** Order n. Commande n. 380000477

Si attesta che i prodotti spediti sono conformi ai requisiti dell'ordine.
We certify that delivered products comply with the customer's requirement.
Nous certifions que les produits livrés sont conformes aux spécifications de la commande.

Note / Remarks / Remarques

Test superati con esito positivo:
Test passed successfully / Test passé avec succès

Dimensional	X
Visual	X
Antimixing Test	X
Intergranular Corrosion Test EN ISO 3651-2	X

Test aggiuntivi richiesti nell'ordine:
Additional tests required in order
Tests supplémentaires requis dans la commande

I certificati sono conservati nel nostro archivio.
The certificates are kept in our archives.
Les certificats sont conservés dans nos archives.

Il materiale è conforme alle specifiche di prodotto dichiarate.
The material correspond to the product's specification declared.
Le matériel est conforme aux spécifications du produit declaré.

Per dimensioni diverse alle specifiche è garantita la conformità al ns catalogo.
Size different from the specifications are guaranteed to be in compliance with our catalogue.
Les dimensions différentes de la spécification sont conformes à notre catalogue.

MARCHIO DI FABBRICA:
Trade mark
Marque du producteur

APPROVATO
Approved
Approuvé
P. BERCELLESI

PB

Questo certificato costruito da un processo di trattamento dei dati informatici è applicabile senza firme in originale. La sua emissione attesta che il processo di costruzione e controllo degli articoli in oggetto è stato eseguito conformemente alle prescrizioni del sistema./ This certificate was built from a data processing system and can be applied without an original signature. Its release certifies that the process of construction and inspection of the items mentioned was executed in accordance with the requirements of the system./ Ce certificat a été conçu à partir d'un procédé de traitement des données et peu être diffusé sans signature originale. Son émission certifie que le procédé de construction et d'inspection des articles en question e été mené en conformément aux exigences du système.

BERCELLESI BERINOX SRL - Via per Carpiano, 24 - 20077 Melegnano (Mi) - Tel.(02) 98.23.10.72 ra Fax (02) 98.39.103