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

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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

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1.0 General

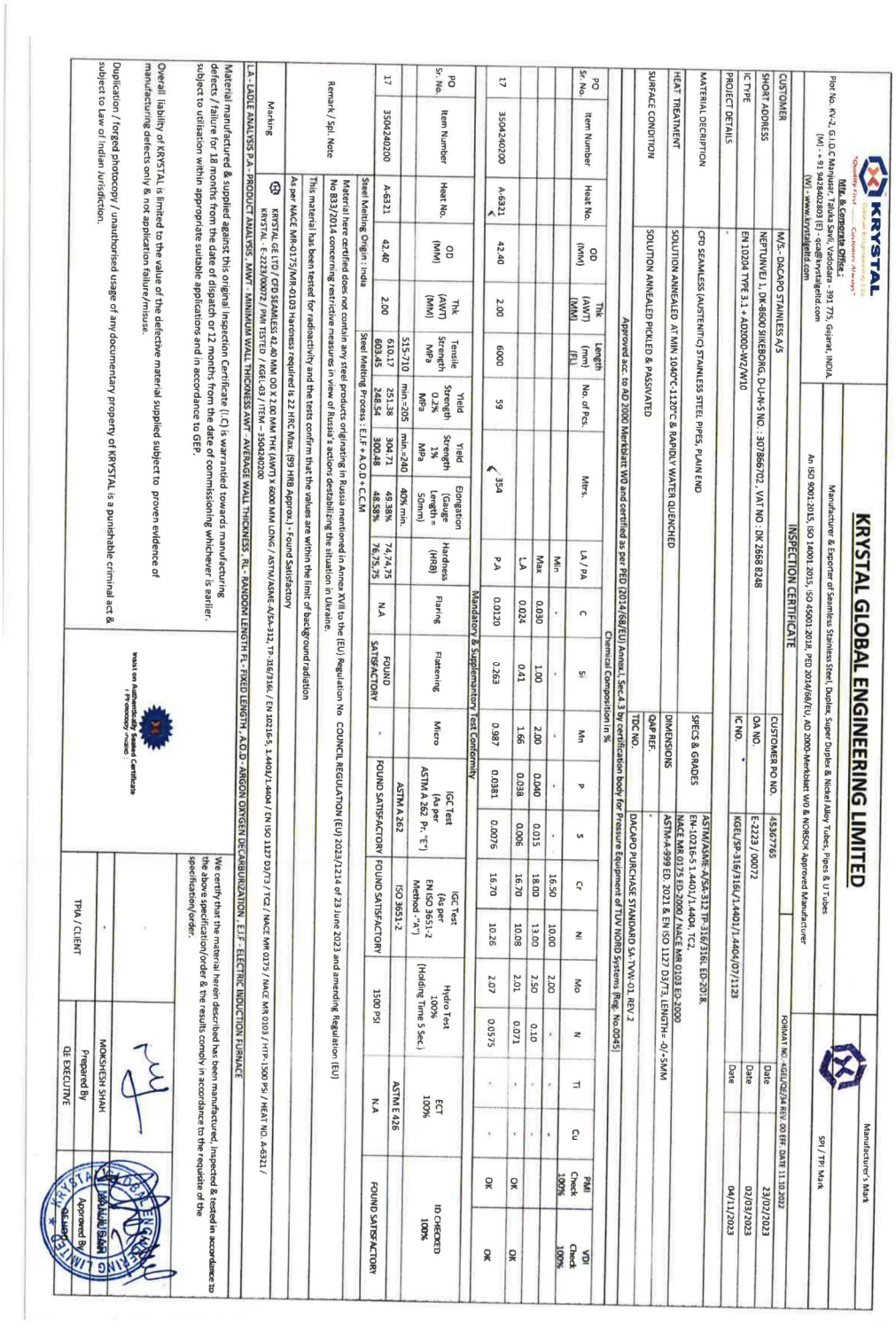
This document contains Material Test Certificates of products supplied to Ballard for the manufacturing of the H2 manifold for 1 MW Fuel Cell Power Container intended for CrossWind.

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

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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

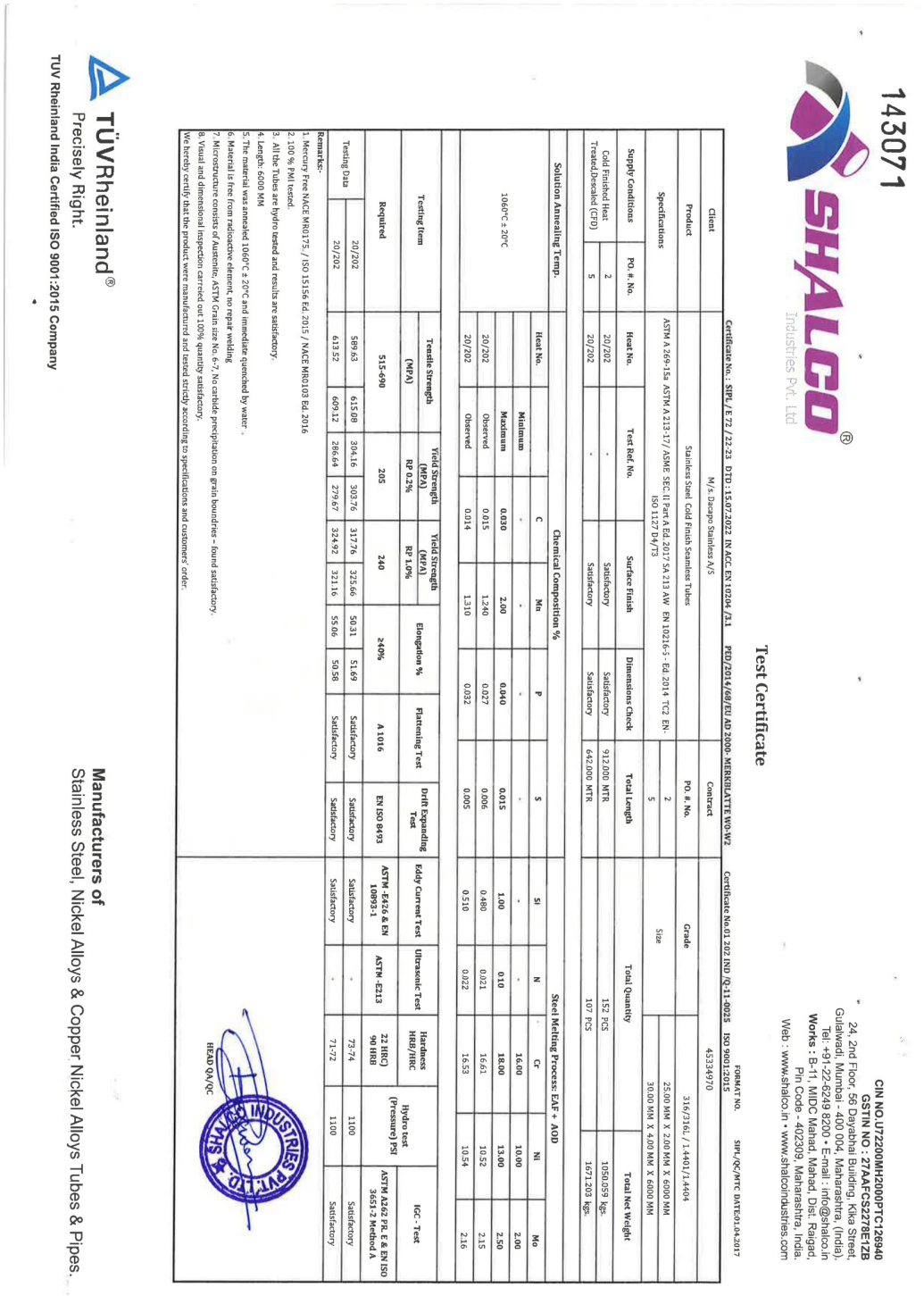
Remarks
1. EDDY CURRENT TEST : O.K.
2. HARDNESS : HRA≤ MRO175-15
3. P. M. I. TESTED : O.K.
4. FLARE TEST ACC. TO ASTM A262
5. RAW MATERIAL FOR PIPE FITTINGS
6. PED 2014/68/EU

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.

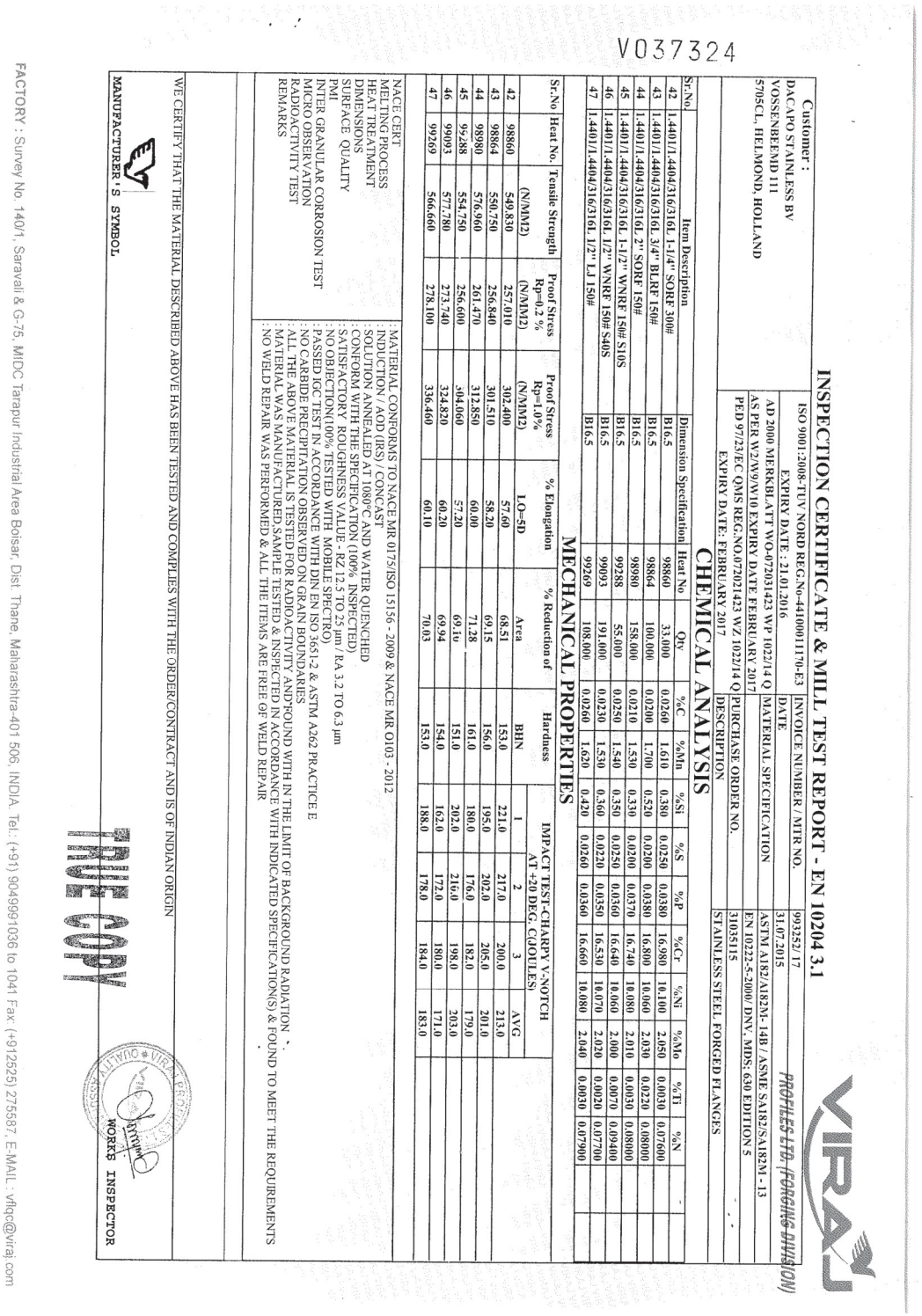
HEAD QA/QC

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

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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:

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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.

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