A03/Z02

Alleima INSPECTION CERTIFICATE

C-8475/40 Rev. 00

Date : 2023-02-27 **Page :** 1 / 6

Type of inspection document : A02	**Internal order No.:** A08
Inspection certificate acc. to EN 10204 / 3.1	10050759 - 40

Purchaser : A06	**Purchase order No. :** A07
ALLEIMA BENELUX B.V. . AMUNDSENWEG 4 5928 LT VENLO THE NETHERLANDS	800745 **Purchaser's reference :** 800745 **Project Id. :** 4003215

Product : B01/B04	**Steel designation :** B02
Seamless cold finished tube	3R60 / 3R60
Dimension (OD x WT) : B09/B10	**Melting process :** C70
12,70 x 1,65AW mm	AOD

Technical requirements : B03

ASME SA213/SA213M-2021
ASTM A213/A213M-2022
ASTM A269/A269M-2015a (Reap.2019)
EN 10216-5 TC1 2021
EN 10305-1 (Only Tolerances-Table 5)
PED 2014/68/EU
Alleima SPEC S-08921
AD 2000 W2 Einbaurohre - 2016
AD 2000 W10 - 2019

Supplementary information : B14

Manufacturing of stainless steel tubes in grade 3R60 / TP316L / UNS S31603 / 1.4435 from steel origin:
Alleima Tube AB, Sweden.
The qualified pre-material supplier is mentioned in the section "Extent of material delivery".
Tube lenght 6000 mm (-0/+5 mm)

The products, covered by this certificate, comply with specification and requirements of the order. Z01

Originator of the document : A05/Z02	**Inspector's stamp:** Z03
QA - AC	Digitally signed by Dana Dormisevova DN: cn=Dana Dormisevova gn=Dana Dormisevova c=CZ Czech Republic l=CZ Czech Republic o=Alleima CZ spol.s.r.o e=dana.dormisevova@alleima.com Reason: I am the author of this document Location: Date: 2023-02-27 09:30+01:00

Chemical composition (Heat analysis)

Heat	C [%]	Si [%]	Mn [%]	P [%]	S [%]
	max 0.030	max 1.000	max 2.000	max 0.040	max 0.015
567403	0,019	0,400	1,630	0,029	0,010

Heat	Cr [%]	Ni [%]	Mo [%]	N [%]
	17.000-18.000	12.500-14.000	2.500-3.000	max 0.100
567403	17,560	13,170	2,630	0,042

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Product check analysis

Heat	Lot	C [%] max 0.030	Si [%] max 1.000	Mn [%] max 2.000	P [%] max 0.040	S [%] max 0.015
567403	2087797-11	0,020	0,410	1,650	0,030	0,009

Heat	Lot	Cr [%] 17.000-18.000	Ni [%] 12.500-14.000	Mo [%] 2.500-3.000	N [%] max 0.100
567403	2087797-11	17,470	13,130	2,530	0,053

Extent of material delivery

Heat	Lot	Hollow supp.	No. of HTcycles [1]	Pieces	Total length [m]	Total weight [kg] [2]
567403	2087762-11	ALLEIMA SE	1	438	2 628.000	1 195.740
567403	2087763-11	ALLEIMA SE	1	424	2 544.000	1 157.520
567403	2087764-11	ALLEIMA SE	1	424	2 544.000	1 157.520
567403	2087797-11	ALLEIMA SE	1	421	2 526.000	1 149.330
567403	2087799-11	ALLEIMA SE	1	427	2 562.000	1 165.710
567403	2087803-11	ALLEIMA SE	1	456	2 736.000	1 244.880
567403	2087810-11	ALLEIMA SE	1	439	2 634.000	1 198.470
567403	2087811-11	ALLEIMA SE	1	431	2 586.000	1 176.630

Note : [1] **Number of heat treatment cycles performed on the tubes.**

[2] **Weight quantity is theoretically calculated, it might differ compared to shipping documents.**

Chomutov, date : 27.2.2023

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Flaring test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
567403	2087762-11		pass
567403	2087762-11		pass
567403	2087763-11		pass
567403	2087763-11		pass
567403	2087764-11		pass
567403	2087764-11		pass
567403	2087797-11		pass
567403	2087797-11		pass
567403	2087799-11		pass
567403	2087799-11		pass
567403	2087803-11		pass
567403	2087803-11		pass
567403	2087810-11		pass
567403	2087810-11		pass
567403	2087811-11		pass
567403	2087811-11		pass

Flaring test in acc. with EN 10216-5

Heat	Lot	ST	Test result [pass/fail]
			pass
567403	2087762-11		pass
567403	2087763-11		pass
567403	2087764-11		pass
567403	2087797-11		pass
567403	2087799-11		pass
567403	2087803-11		pass
567403	2087810-11		pass
567403	2087811-11		pass

Flattening test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
567403	2087762-11		pass
567403	2087762-11		pass
567403	2087763-11		pass
567403	2087763-11		pass
567403	2087764-11		pass
567403	2087764-11		pass
567403	2087797-11		pass
567403	2087797-11		pass
567403	2087799-11		pass
567403	2087799-11		pass
567403	2087803-11		pass
567403	2087803-11		pass
567403	2087810-11		pass
567403	2087810-11		pass
567403	2087811-11		pass
567403	2087811-11		pass

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Hardness test (HRB) in acc. with ASTM E18 / 7-2-1261

Heat	Lot	ST	Hardness [HRB]
			max 80,000
567403	2087762-11		76,000
567403	2087762-11		77,000
567403	2087763-11		77,000
567403	2087763-11		77,000
567403	2087764-11		77,000
567403	2087764-11		77,000
567403	2087797-11		77,000
567403	2087797-11		77,000
567403	2087799-11		78,000
567403	2087799-11		78,000
567403	2087803-11		76,000
567403	2087803-11		77,000
567403	2087810-11		78,000
567403	2087810-11		77,000
567403	2087811-11		77,000
567403	2087811-11		76,000

Intergranual corrosion testing in acc. with ASTM A262E

Heat	Lot	ST	Test result [pass/fail]
			pass
567403	2087762-11		pass
567403	2087763-11		pass
567403	2087764-11		pass
567403	2087797-11		pass
567403	2087799-11		pass
567403	2087803-11		pass
567403	2087810-11		pass
567403	2087811-11		pass

Intergranual corrosion testing in acc. with EN ISO 3651-2/A

Heat	Lot	ST	Test result [pass/fail]
			pass
567403	2087762-11		pass
567403	2087763-11		pass
567403	2087764-11		pass
567403	2087797-11		pass
567403	2087799-11		pass
567403	2087803-11		pass
567403	2087810-11		pass
567403	2087811-11		pass

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Longitudinal tensile test in acc. with A370 / EN ISO 6892-1

Heat	Lot	ST	Rp0,2 [MPa]	Rm [MPa]	A2" [%]	Amb.temper. [°C]	A5 [%]
			min 220.000	515.000-690.000	min 35.000	10.000-35.000	min 40.000
567403	2087762-11		277,300	563,600	59,000	23,000	60,900
567403	2087763-11		281,800	567,200	60,800	23,000	63,100
567403	2087764-11		276,400	570,900	62,600	24,000	63,600
567403	2087797-11		284,200	564,900	62,000	24,000	62,900
567403	2087799-11		281,400	563,100	62,400	24,000	63,300
567403	2087803-11		277,400	559,800	62,000	24,000	63,100
567403	2087810-11		273,600	571,900	62,200	24,000	63,100
567403	2087811-11		279,100	561,000	62,200	24,000	63,100

Heat	Lot	ST	Rp1,0 [MPa]
			min 250.000
567403	2087762-11		304,200
567403	2087763-11		307,700
567403	2087764-11		306,700
567403	2087797-11		312,400
567403	2087799-11		311,000
567403	2087803-11		306,000
567403	2087810-11		304,400
567403	2087811-11		308,200

Microstructure evaluation and Grain size WI-3815/ASTM E112

The structure is free from grain boundary chromium carbide precipitations.

Heat	Lot	ST	G.B.Cr.Carbides [No/Yes]	Grain size [(G)]
			No	5.000-14.000
567403	2087762-11		No	5,000
567403	2087763-11		No	6,000
567403	2087764-11		No	6,000
567403	2087797-11		No	6,000
567403	2087799-11		No	6,000
567403	2087803-11		No	6,000
567403	2087810-11		No	6,000
567403	2087811-11		No	6,000

Dimensional check

Test results comply with specified criteria.

HT - Final heat treatment of straight tubes

Bright annealing at 1150°C with min. 0,25 minute holding time.
Quenched by forced cooled inert gas.

Inside cleanliness check

Test results comply with specified criteria.

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NDT - Eddy current flaw detection in acc. ASTM E426

Test results comply with specified criteria.

NDT - Visual inspection

Test results comply with specified criteria.

PMI - 100% positive material identification

Test results comply with specified criteria.

Statement

The raw material is free from radioactive contamination.

Statement

Material free from mercury and asbestos contamination.

Statement

The material have been manufactured within the scope of certified Quality Management System maintained in accordance with EN ISO 9001:2015.

Straightness check

Test results comply with specified criteria.

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