

Type of inspection document : Inspection certificate acc. to EN 10204 / 3.1	A02	Internal order No.: 10067446 - 50	A08
Purchaser : ALLEIMA BENELUX B.V. . AMUNDSENWEG 4 5928 LT VENLO THE NETHERLANDS	A06	Purchase order No. : 800785 Purchaser's reference : 800785 Project Id. : 4003500	A07
Product : Seamless cold finished tube	B01/B04	Steel designation : 3R60 / 3R60	B02
Dimension (OD x WT) : 12,00 x 1,50AW mm	B09/B10	Melting process : AOD	C70
Technical requirements : ASME SA213/SA213M-2023 ASTM A213/A213M-2022 ASTM A269/A269M-2015a (Reap.2019) EN 10216-5 TC1 2021 EN 10305-1 (Only Tolerances-Table 5) AD 2000 W2 Einbaurohre - 2022 AD 2000 W10 - 2019 NACE MR0175-2021/ISO 15156-3:2020, NACE MR0103/ISO 17945-1:2015 Alleima SPEC S-08921 PED 2014/68/EU			B03
Supplementary information : Manufacturing of stainless steel tubes in grade 3R60 / TP316/316L / 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)			B14
The products, covered by this certificate, comply with specification and requirements of the order.			Z01
Originator of the document : QA - AC	A05/Z02	Inspector's stamp:	Z03

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
568924	0,020	0,380	1,590	0,030	0,012
569111	0,022	0,380	1,640	0,029	0,009

Heat	Cr [%]	Ni [%]	Mo [%]	N [%]
	17.000-18.000	12.500-14.000	2.500-3.000	max 0.100
568924	17,320	13,200	2,630	0,042
569111	17,100	13,140	2,610	0,039

Type of inspection document :

Inspection certificate acc. to EN 10204 / 3.1

A02

Internal order No.:

10067446 - 50

A08

Product check analysis

Heat	Lot	C [%]	Si [%]	Mn [%]	P [%]	S [%]
		max 0.030	max 1.000	max 2.000	max 0.040	max 0.015
568924	2110759-11	0,020	0,390	1,630	0,034	0,012
569111	2110767-11	0,020	0,380	1,690	0,030	0,008

Heat	Lot	Cr [%]	Ni [%]	Mo [%]	N [%]
		17.000-18.000	12.500-14.000	2.500-3.000	max 0.100
568924	2110759-11	17,330	13,050	2,540	0,052
569111	2110767-11	17,200	13,030	2,570	0,055

Extent of material delivery

Heat	Lot	Hollow supp.	No. of HTcycles ¹⁾	Pieces	Total length [m]	Total weight [kg] ²⁾
568924	2110759-11	ALLEIMA SE	1	483	2 898.000	1 138.914
568924	2110763-11	ALLEIMA SE	1	481	2 886.000	1 134.198
568924	2110765-11	ALLEIMA SE	1	233	1 398.000	549.414
569111	2110766-11	ALLEIMA SE	1	446	2 676.000	1 051.668
569111	2110767-11	ALLEIMA SE	1	441	2 646.000	1 039.878
569111	2110776-11	ALLEIMA SE	1	466	2 796.000	1 098.828
569111	2110779-11	ALLEIMA SE	1	464	2 784.000	1 094.112
569111	2110785-11	ALLEIMA SE	1	472	2 832.000	1 112.976

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 : 24.10.2023

Type of inspection document :

A02

Inspection certificate acc. to EN 10204 / 3.1

Internal order No.:

A08

10067446 - 50

Flaring test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
568924	2110759-11		pass
568924	2110759-11		pass
568924	2110763-11		pass
568924	2110763-11		pass
568924	2110765-11		pass
568924	2110765-11		pass
569111	2110766-11		pass
569111	2110766-11		pass
569111	2110767-11		pass
569111	2110767-11		pass
569111	2110776-11		pass
569111	2110776-11		pass
569111	2110779-11		pass
569111	2110779-11		pass
569111	2110785-11		pass
569111	2110785-11		pass

Flaring test in acc. with EN 10216-5

Heat	Lot	ST	Test result [pass/fail]
			pass
568924	2110759-11		pass
568924	2110763-11		pass
568924	2110765-11		pass
569111	2110766-11		pass
569111	2110767-11		pass
569111	2110776-11		pass
569111	2110779-11		pass
569111	2110785-11		pass

Flattening test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
568924	2110759-11		pass
568924	2110759-11		pass
568924	2110763-11		pass
568924	2110763-11		pass
568924	2110765-11		pass
568924	2110765-11		pass
569111	2110766-11		pass
569111	2110766-11		pass
569111	2110767-11		pass
569111	2110767-11		pass
569111	2110776-11		pass
569111	2110776-11		pass
569111	2110779-11		pass
569111	2110779-11		pass
569111	2110785-11		pass
569111	2110785-11		pass

Type of inspection document :

A02

Inspection certificate acc. to EN 10204 / 3.1

Internal order No.:

A08

10067446 - 50

Hardness test (HRB/HRC) in acc. with E18/S-08921/NACE

Heat	Lot	ST	Hardness	Hardness ≤22HRC
			[HRB]	[yes/no]
			max 80,000	yes
568924	2110759-11		78,000	yes
568924	2110759-11		77,000	yes
568924	2110763-11		77,000	yes
568924	2110763-11		78,000	yes
568924	2110765-11		77,000	yes
568924	2110765-11		77,000	yes
569111	2110766-11		73,000	yes
569111	2110766-11		74,000	yes
569111	2110767-11		75,000	yes
569111	2110767-11		75,000	yes
569111	2110776-11		74,000	yes
569111	2110776-11		75,000	yes
569111	2110779-11		77,000	yes
569111	2110779-11		77,000	yes
569111	2110785-11		76,000	yes
569111	2110785-11		77,000	yes

Intergranular corrosion testing in acc. with ASTM A262E

Heat	Lot	ST	Test result
			[pass/fail]
			pass
568924	2110759-11		pass
568924	2110763-11		pass
568924	2110765-11		pass
569111	2110766-11		pass
569111	2110767-11		pass
569111	2110776-11		pass
569111	2110779-11		pass
569111	2110785-11		pass

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

Heat	Lot	ST	Test result
			[pass/fail]
			pass
568924	2110759-11		pass
568924	2110763-11		pass
568924	2110765-11		pass
569111	2110766-11		pass
569111	2110767-11		pass
569111	2110776-11		pass
569111	2110779-11		pass
569111	2110785-11		pass

Type of inspection document :

A02

Inspection certificate acc. to EN 10204 / 3.1

Internal order No.:

A08

10067446 - 50

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

Heat	Lot	ST	Rp0,2	Rm	A2"	A5	Rp1,0
			[MPa]	[MPa]	[%]	[%]	[MPa]
			min 220,000	515,000-690,000	min 35,000	min 40,000	min 250,000
568924	2110759-11		301,400	575,300	57,000	61,000	329,700
568924	2110763-11		292,700	575,900	59,400	64,000	321,200
568924	2110765-11		294,900	567,100	58,200	62,000	321,900
569111	2110766-11		269,400	561,500	63,200	65,000	294,400
569111	2110767-11		284,700	558,600	59,400	63,300	310,400
569111	2110776-11		278,300	561,800	60,000	62,000	303,700
569111	2110779-11		279,500	558,100	58,800	63,000	307,000
569111	2110785-11		274,300	555,500	58,600	63,000	300,400

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	Grain size
			[No/Yes]	[(G)]
			No	5,000-14,000
568924	2110759-11		No	7,000
568924	2110763-11		No	7,000
568924	2110765-11		No	7,000
569111	2110766-11		No	6,000
569111	2110767-11		No	6,000
569111	2110776-11		No	5,000
569111	2110779-11		No	5,000
569111	2110785-11		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.

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.

Manufacturer's works

A01

Alleima CZ spol. s r.o., ID No. 60278773, VAT No. CZ60278773, V. Nezvala 5502,

430 01 Chomutov, Czech Republic, www.alleima.com

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A08

10067446 - 50

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.