

Type of inspection document : Inspection certificate acc. to EN 10204 / 3.1	A02	Internal order No.: 10050759 - 50	A08
Purchaser : ALLEIMA BENELUX B.V. AMUNDSENWEG 4 5928 LT VENLO THE NETHERLANDS	A06	Purchase order No. : 800745 Purchaser's reference : 800745 Project Id. : 4003215	A07
Product : Seamless cold finished tube	B01/B04	Steel designation : 3R60 / 3R60	B02
Dimension (OD x WT) : 9,53 x 0,89AW mm	B09/B10	Melting process : AOD	C70
Technical requirements : ASME SA 213/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			B03
Supplementary information : 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 length 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 [%]
567403	max 0.030 0,019	max 1.000 0,400	max 2.000 1,630	max 0.040 0,029	max 0.015 0,010

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

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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
567403	2087576-11	0,018	0,420	1,680	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
567403	2087576-11	17,670	12,940	2,580	0,042

Extent of material delivery

Heat	Lot	Hollow supp.	No. of HTcycles ¹⁾	Pieces	Total length [m]	Total weight [kg] ²⁾
567403	2087573-11	ALLEIMA SE	1	556	3 336.000	640.512
567403	2087574-11	ALLEIMA SE	1	568	3 408.000	654.336
567403	2087575-11	ALLEIMA SE	1	554	3 324.000	638.208
567403	2087576-11	ALLEIMA SE	1	565	3 390.000	650.880
567403	2087578-11	ALLEIMA SE	1	595	3 570.000	685.440
567403	2087580-11	ALLEIMA SE	1	604	3 624.000	695.808

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 : 22.2.2023

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Flaring test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
567403	2087573-11		pass
567403	2087573-11		pass
567403	2087574-11		pass
567403	2087574-11		pass
567403	2087575-11		pass
567403	2087575-11		pass
567403	2087576-11		pass
567403	2087576-11		pass
567403	2087578-11		pass
567403	2087578-11		pass
567403	2087580-11		pass
567403	2087580-11		pass

Flaring test in acc. with EN 10216-5

Heat	Lot	ST	Test result [pass/fail]
			pass
567403	2087573-11		pass
567403	2087574-11		pass
567403	2087575-11		pass
567403	2087576-11		pass
567403	2087578-11		pass
567403	2087580-11		pass

Flattening test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
567403	2087573-11		pass
567403	2087573-11		pass
567403	2087574-11		pass
567403	2087574-11		pass
567403	2087575-11		pass
567403	2087575-11		pass
567403	2087576-11		pass
567403	2087576-11		pass
567403	2087578-11		pass
567403	2087578-11		pass
567403	2087580-11		pass
567403	2087580-11		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	2087573-11		74,000
567403	2087573-11		74,000
567403	2087574-11		75,000
567403	2087574-11		74,000
567403	2087575-11		75,000
567403	2087575-11		75,000
567403	2087576-11		74,000
567403	2087576-11		73,000
567403	2087578-11		76,000
567403	2087578-11		76,000
567403	2087580-11		75,000
567403	2087580-11		75,000

Intergranular corrosion testing in acc. with ASTM A262E

Heat	Lot	ST	Test result
			[pass/fail]
			pass
567403	2087573-11		pass
567403	2087574-11		pass
567403	2087575-11		pass
567403	2087576-11		pass
567403	2087578-11		pass
567403	2087580-11		pass

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

Heat	Lot	ST	Test result
			[pass/fail]
			pass
567403	2087573-11		pass
567403	2087574-11		pass
567403	2087575-11		pass
567403	2087576-11		pass
567403	2087578-11		pass
567403	2087580-11		pass

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
567403	2087573-11		288,200	563,100	52,900	59,300	322,100
567403	2087574-11		291,700	576,300	52,600	58,300	327,200
567403	2087575-11		294,300	568,200	53,600	59,000	326,300
567403	2087576-11		292,600	578,500	49,800	52,300	334,300
567403	2087578-11		301,100	580,400	50,000	56,700	337,700
567403	2087580-11		293,600	575,500	51,400	56,300	327,200

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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
567403	2087573-11		No	7,000
567403	2087574-11		No	6,000
567403	2087575-11		No	6,000
567403	2087576-11		No	6,000
567403	2087578-11		No	6,000
567403	2087580-11		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.

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.

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Straightness check

Test results comply with specified criteria.