

Type of inspection document : Inspection certificate acc. to EN 10204 / 3.1		A02	Internal order No.: 10065846 - 70	A08
Purchaser : ALLEIMA BENELUX B.V. . AMUNDSENWEG 4 5928 LT VENLO THE NETHERLANDS		A06	Purchase order No. : 800779 Purchaser's reference : 800779 Project Id. : 4003475	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 / 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)				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: 	Digitally signed by Martina Hutlasova DN: cn=Martina Hutlasova gn=Martina Hutlasova c=CZ Czech Republic l=CZ Czech Republic o=Alleima CZ spol.s.r.o. e=martina.hutlasova@alleima.com Date: 2023-09-19 08:34+02:00

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
568640	0,018	0,390	1,680	0,028	0,009
568705	0,020	0,380	1,670	0,030	0,009

Heat	Cr [%]	Ni [%]	Mo [%]	N [%]
	17,000-18,000	12,500-14,000	2,500-3,000	max 0,100
568640	17,230	13,130	2,630	0,039
568705	17,270	13,130	2,610	0,045

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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
568640	2106767-11	0,019	0,420	1,720	0,030	0,008
568705	2106770-11	0,018	0,380	1,710	0,030	0,007

Heat	Lot	Cr [%]	Ni [%]	Mo [%]	N [%]
		17.000-18.000	12.500-14.000	2.500-3.000	max 0.100
568640	2106767-11	17,250	13,060	2,530	0,031
568705	2106770-11	17,230	12,980	2,690	0,050

Extent of material delivery

Heat	Lot	Hollow supp.	No. of HTcycles ¹⁾	Pieces	Total length [m]	Total weight [kg] ²⁾
568640	2106766-11	ALLEIMA SE	1	376	2 256.000	886.608
568640	2106767-11	ALLEIMA SE	1	352	2 112.000	830.016
568640	2106768-11	ALLEIMA SE	1	327	1 962.000	771.066
568705	2106769-11	ALLEIMA SE	1	512	3 072.000	1 207.296
568705	2106770-11	ALLEIMA SE	1	520	3 120.000	1 226.160
568705	2106771-11	ALLEIMA SE	1	523	3 138.000	1 233.234
568705	2106772-11	ALLEIMA SE	1	461	2 766.000	1 087.038
568705	2106773-11	ALLEIMA SE	1	481	2 886.000	1 134.198

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 : 19.9.2023

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Flaring test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
568640	2106766-11		pass
568640	2106766-11		pass
568640	2106767-11		pass
568640	2106767-11		pass
568640	2106768-11		pass
568640	2106768-11		pass
568705	2106769-11		pass
568705	2106769-11		pass
568705	2106770-11		pass
568705	2106770-11		pass
568705	2106771-11		pass
568705	2106771-11		pass
568705	2106772-11		pass
568705	2106772-11		pass
568705	2106773-11		pass
568705	2106773-11		pass

Flaring test in acc. with EN 10216-5

Heat	Lot	ST	Test result [pass/fail]
			pass
568640	2106766-11		pass
568640	2106767-11		pass
568640	2106768-11		pass
568705	2106769-11		pass
568705	2106770-11		pass
568705	2106771-11		pass
568705	2106772-11		pass
568705	2106773-11		pass

Flattening test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
568640	2106766-11		pass
568640	2106766-11		pass
568640	2106767-11		pass
568640	2106767-11		pass
568640	2106768-11		pass
568640	2106768-11		pass
568705	2106769-11		pass
568705	2106769-11		pass
568705	2106770-11		pass
568705	2106770-11		pass
568705	2106771-11		pass
568705	2106771-11		pass
568705	2106772-11		pass
568705	2106772-11		pass
568705	2106773-11		pass
568705	2106773-11		pass

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

Heat	Lot	ST	Hardness	Hardness $\leq 22\text{HRC}$
			[HRB]	[yes/no]
			max 80,000	yes
568640	2106766-11		77,000	yes
568640	2106766-11		77,000	yes
568640	2106767-11		78,000	yes
568640	2106767-11		79,000	yes
568640	2106768-11		78,000	yes
568640	2106768-11		78,000	yes
568705	2106769-11		78,000	yes
568705	2106769-11		77,000	yes
568705	2106770-11		76,000	yes
568705	2106770-11		75,000	yes
568705	2106771-11		77,000	yes
568705	2106771-11		76,000	yes
568705	2106772-11		78,000	yes
568705	2106772-11		78,000	yes
568705	2106773-11		77,000	yes
568705	2106773-11		76,000	yes

Intergranular corrosion testing in acc. with ASTM A262E

Heat	Lot	ST	Test result
			[pass/fail]
			pass
568640	2106766-11		pass
568640	2106767-11		pass
568640	2106768-11		pass
568705	2106769-11		pass
568705	2106770-11		pass
568705	2106771-11		pass
568705	2106772-11		pass
568705	2106773-11		pass

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

Heat	Lot	ST	Test result
			[pass/fail]
			pass
568640	2106766-11		pass
568640	2106767-11		pass
568640	2106768-11		pass
568705	2106769-11		pass
568705	2106770-11		pass
568705	2106771-11		pass
568705	2106772-11		pass
568705	2106773-11		pass

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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
568640	2106766-11		303,100	571,400	59,400	62,500	328,600
568640	2106767-11		290,400	561,600	56,800	58,200	317,900
568640	2106768-11		300,500	575,200	57,200	61,000	328,800
568705	2106769-11		281,600	567,100	56,600	58,500	308,300
568705	2106770-11		275,300	548,300	58,200	61,500	300,100
568705	2106771-11		294,000	568,900	56,600	58,800	320,300
568705	2106772-11		290,800	559,900	56,000	60,200	315,800
568705	2106773-11		284,200	560,900	58,200	62,000	311,500

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
568640	2106766-11		No	7,000
568640	2106767-11		No	6,000
568640	2106768-11		No	6,000
568705	2106769-11		No	6,000
568705	2106770-11		No	5,000
568705	2106771-11		No	5,000
568705	2106772-11		No	6,000
568705	2106773-11		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.

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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.