

Type of inspection document : Inspection certificate acc. to EN 10204 / 3.1	A02	Internal order No.: 10076354 - 70	A08
Purchaser : ALLEIMA BENELUX B.V. AMUNDSENWEG 4 5928 LT VENLO THE NETHERLANDS	A06	Purchase order No. : 800817 Purchaser's reference : 800817 Project Id. : 4003682	A07
Product : Seamless cold finished tube	B01/B04	Steel designation : 3R60 / 3R60	B02
Dimension (OD x WT) : 9,53 x 1,65AW 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 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 [%]
569885	max 0.030 0,018	max 1.000 0,390	max 2.000 1,620	max 0.040 0,030	max 0.015 0,008
Heat	Cr [%]	Ni [%]	Mo [%]	N [%]	Co [%]
569885	17.000-18.000 17,310	12.500-14.000 13,160	2.500-3.000 2,630	max 0.100 0,044	info 0,100

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Heat	Ti [%] info
569885	<0,003

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
569885	2126154-11	0,015	0,390	1,650	0,030	0,007

Heat	Lot	Cr [%] 17.000-18.000	Ni [%] 12.500-14.000	Mo [%] 2.500-3.000	N [%] max 0.100
569885	2126154-11	17,130	12,850	2,610	0,029

Extent of material delivery

Heat	Lot	Hollow supp.	No. of HTcycles ¹⁾	Pieces	Total length [m]	Total weight [kg] ²⁾
569885	2126146-11	ALLEIMA SE	1	618	3 708.000	1 201.392
569885	2126152-11	ALLEIMA SE	1	633	3 798.000	1 230.552
569885	2126153-11	ALLEIMA SE	1	575	3 450.000	1 117.800
569885	2126154-11	ALLEIMA SE	1	451	2 706.000	876.744

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 : 26.3.2024

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Flaring test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
569885	2126146-11		pass
569885	2126146-11		pass
569885	2126152-11		pass
569885	2126152-11		pass
569885	2126153-11		pass
569885	2126153-11		pass
569885	2126154-11		pass
569885	2126154-11		pass

Flaring test in acc. with EN 10216-5

Heat	Lot	ST	Test result [pass/fail]
			pass
569885	2126146-11		pass
569885	2126152-11		pass
569885	2126153-11		pass
569885	2126154-11		pass

Flattening test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
569885	2126146-11		pass
569885	2126146-11		pass
569885	2126152-11		pass
569885	2126152-11		pass
569885	2126153-11		pass
569885	2126153-11		pass
569885	2126154-11		pass
569885	2126154-11		pass

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

Heat	Lot	ST	Hardness [HRB]	Hardness ≤22HRC [yes/no]
			max 80,000	yes
569885	2126146-11		79,000	yes
569885	2126146-11		79,000	yes
569885	2126152-11		77,000	yes
569885	2126152-11		76,000	yes
569885	2126153-11		76,000	yes
569885	2126153-11		76,000	yes
569885	2126154-11		77,000	yes
569885	2126154-11		78,000	yes

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Intergranular corrosion testing in acc. with ASTM A262E

Heat	Lot	ST	Test result [pass/fail]
			pass
569885	2126146-11		pass
569885	2126152-11		pass
569885	2126153-11		pass
569885	2126154-11		pass

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

Heat	Lot	ST	Test result [pass/fail]
			pass
569885	2126146-11		pass
569885	2126152-11		pass
569885	2126153-11		pass
569885	2126154-11		pass

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

Heat	Lot	ST	Rp0,2 [MPa]	Rm [MPa]	A2" [%]	A5 [%]	Rp1,0 [MPa]
			min 220.000	515.000-690.000	min 35.000	min 40.000	min 250.000
569885	2126146-11		309,800	568,400	52,800	59,100	340,100
569885	2126152-11		280,500	563,400	55,600	61,400	307,400
569885	2126153-11		283,300	552,600	55,000	60,000	310,000
569885	2126154-11		291,100	562,400	52,400	57,100	316,300

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
569885	2126146-11		No	6,000
569885	2126152-11		No	6,000
569885	2126153-11		No	6,000
569885	2126154-11		No	7,000

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. E426/EN ISO 10893-1

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.