

Type of inspection document : Inspection certificate acc. to EN 10204 / 3.1	A02	Internal order No.: 50006003 - 10	A08
Purchaser : ALLEIMA BENELUX B.V. . AMUNDSENWEG 4 5928 LT Venlo THE NETHERLANDS	A06	Purchase order No. : Purchaser's reference : Project Id. : 3000076	A07
Product : Seamless cold finished tube Dimension (OD x WT) : 10,00 x 1,50AW mm	B01/B04	Steel designation : 3R60 / 3R60 Melting process : AOD	B02
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 [%]
571436	max 0.030 0,018	max 1.000 0,400	max 2.000 1,510	max 0.040 0,031	max 0.015 0,007
Heat	Cr [%]	Ni [%]	Mo [%]	N [%]	Co [%]
571436	17.000-18.000 17,220	12.500-14.000 13,160	2.500-3.000 2,620	max 0.100 0,035	info 0,110

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Heat	Ti [%] info
571436	<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
571436	2150098-11	0,017	0,380	1,520	0,026	0,006

Heat	Lot	Cr [%] 17.000-18.000	Ni [%] 12.500-14.000	Mo [%] 2.500-3.000	N [%] max 0.100
571436	2150098-11	17,170	13,140	2,570	0,033

Extent of material delivery

Heat	Lot	Hollow supp.	No. of HTcycles ¹⁾	Pieces	Total length [m]	Total weight [kg] ²⁾
571436	2150097-11	ALLEIMA SE	1	595	3 570.000	1 135.260
571436	2150098-11	ALLEIMA SE	1	598	3 588.000	1 140.984
571436	2150099-11	ALLEIMA SE	1	434	2 604.000	828.072

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 : 16.09.2024

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Flaring test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
571436	2150097-11		pass
571436	2150097-11		pass
571436	2150098-11		pass
571436	2150098-11		pass
571436	2150099-11		pass
571436	2150099-11		pass

Flaring test in acc. with EN 10216-5

Heat	Lot	ST	Test result [pass/fail]
			pass
571436	2150097-11		pass
571436	2150098-11		pass
571436	2150099-11		pass

Flattening test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
571436	2150097-11		pass
571436	2150097-11		pass
571436	2150098-11		pass
571436	2150098-11		pass
571436	2150099-11		pass
571436	2150099-11		pass

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
571436	2150097-11		77,000	yes
571436	2150097-11		76,000	yes
571436	2150098-11		76,000	yes
571436	2150098-11		76,000	yes
571436	2150099-11		78,000	yes
571436	2150099-11		78,000	yes

Intergranular corrosion testing in acc. with ASTM A262E

Heat	Lot	ST	Test result [pass/fail]
			pass
571436	2150097-11		pass
571436	2150098-11		pass
571436	2150099-11		pass

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

Heat	Lot	ST	Test result [pass/fail]
571436	2150097-11		pass
571436	2150098-11		pass
571436	2150099-11		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]
571436	2150097-11		min 220,000 286,200	515.000-690.000 551,500	min 35,000 63,900	min 40,000 70,900	min 250,000 310,900
571436	2150098-11		282,600	556,800	60,400	65,700	307,900
571436	2150099-11		287,800	552,300	61,500	62,900	314,400

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 [No/Yes]	Grain size [(G)]
571436	2150097-11		No	5,000-14,000 6,000
571436	2150098-11		No	6,000
571436	2150099-11		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. E426/EN ISO 10893-1

Test results comply with specified criteria.

NDT - Visual inspection

Test results comply with specified criteria.

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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.