

Type of inspection document : Inspection certificate acc. to EN 10204 / 3.1		A02	Internal order No.: 50006647 - 10		A08
Purchaser : ALLEIMA BENELUX B.V. . AMUNDSENWEG 4 5928 LT Venlo THE NETHERLANDS		A06	Purchase order No. : Purchaser's reference : Project Id. : 3000110		A07
Product : Seamless cold finished tube		B01/B04	Steel designation : 3R60 / 3R60		B02
Dimension (OD x WT) : 10,00 x 1,00AW 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 [%]
571895	max 0.030 0,026	max 1.000 0,390	max 2.000 1,650	max 0.040 0,029	max 0.015 0,009

Heat	Cr [%]	Ni [%]	Mo [%]	N [%]	Co [%]
571895	17.000-18.000 17,550	12.500-14.000 13,150	2.500-3.000 2,610	max 0.100 0,040	info 0,130

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Heat	Ti [%] info
571895	<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
571895	2154489-11	0,019	0,380	1,640	0,028	0,007

Heat	Lot	Cr [%] 17.000-18.000	Ni [%] 12.500-14.000	Mo [%] 2.500-3.000	N [%] max 0.100
571895	2154489-11	17,640	12,830	2,620	0,024

Extent of material delivery

Heat	Lot	Hollow supp.	No. of HTcycles ¹⁾	Pieces	Total length [m]	Total weight [kg] ²⁾
571895	2154489-11	ALLEIMA SE	1	460	2 760.000	618.240
571895	2154490-11	ALLEIMA SE	1	455	2 730.000	611.520
571895	2154491-11	ALLEIMA SE	1	232	1 392.000	311.808
571895	2154493-11	ALLEIMA SE	1	440	2 640.000	591.360

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 : 07.11.2024

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Flaring test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
571895	2154489-11		pass
571895	2154489-11		pass
571895	2154490-11		pass
571895	2154490-11		pass
571895	2154491-11		pass
571895	2154491-11		pass
571895	2154493-11		pass
571895	2154493-11		pass

Flaring test in acc. with EN 10216-5

Heat	Lot	ST	Test result [pass/fail]
			pass
571895	2154489-11		pass
571895	2154490-11		pass
571895	2154491-11		pass
571895	2154493-11		pass

Flattening test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
571895	2154489-11		pass
571895	2154489-11		pass
571895	2154490-11		pass
571895	2154490-11		pass
571895	2154491-11		pass
571895	2154491-11		pass
571895	2154493-11		pass
571895	2154493-11		pass

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

Heat	Lot	ST	Hardness [HRB]	Hardness $\leq 22\text{HRC}$ [yes/no]
			max 80,000	yes
571895	2154489-11		73,000	yes
571895	2154489-11		73,000	yes
571895	2154490-11		73,000	yes
571895	2154490-11		72,000	yes
571895	2154491-11		76,000	yes
571895	2154491-11		77,000	yes
571895	2154493-11		74,000	yes
571895	2154493-11		73,000	yes

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Intergranular corrosion testing in acc. with ASTM A262E

Heat	Lot	ST	Test result [pass/fail]
			pass
571895	2154489-11		pass
571895	2154490-11		pass
571895	2154491-11		pass
571895	2154493-11		pass

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

Heat	Lot	ST	Test result [pass/fail]
			pass
571895	2154489-11		pass
571895	2154490-11		pass
571895	2154491-11		pass
571895	2154493-11		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
571895	2154489-11		295,800	588,000	48,500	56,300	330,200
571895	2154490-11		295,200	586,800	48,900	52,300	327,500
571895	2154491-11		328,700	603,200	60,000	74,700	360,000
571895	2154493-11		296,400	590,700	47,900	55,400	330,000

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
571895	2154489-11		No	7,000
571895	2154490-11		No	7,000
571895	2154491-11		No	7,000
571895	2154493-11		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.