

Type of inspection document : Inspection certificate acc. to EN 10204 / 3.1	A02	Internal order No.: 10071659 - 30	A08
Purchaser : ALLEIMA BENELUX B.V. . AMUNDSENWEG 4 5928 LT VENLO THE NETHERLANDS	A06	Purchase order No. : 800800 Purchaser's reference : 800800 Project Id. : 4003584	A07
Product : Seamless cold finished tube Dimension (OD x WT) : 6,00 x 1,00AW mm	B01/B04 B09/B10	Steel designation : 3R60 / 3R60 Melting process : AOD	B02 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 [%]
568899	max 0.030 0,020	max 1.000 0,400	max 2.000 1,570	max 0.040 0,030	max 0.015 0,009

Heat	Cr [%]	Ni [%]	Mo [%]	N [%]
568899	17.000-18.000 17,480	12.500-14.000 13,150	2.500-3.000 2,620	max 0.100 0,035

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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
568899	2112957-11	0,018	0,370	1,610	0,027	0,009

Heat	Lot	Cr [%]	Ni [%]	Mo [%]	N [%]
		17.000-18.000	12.500-14.000	2.500-3.000	max 0.100
568899	2112957-11	17,690	12,580	2,500	0,047

Extent of material delivery

Heat	Lot	Hollow supp.	No. of HTcycles ¹⁾	Pieces	Total length [m]	Total weight [kg] ²⁾
568899	2112922-11	ALLEIMA SE	1	1 106	6 636.000	829.500
568899	2112956-11	ALLEIMA SE	1	1 111	6 666.000	833.250
568899	2112957-11	ALLEIMA SE	1	836	5 016.000	627.000

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 : 21.11.2023

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Flaring test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
568899	2112922-11		pass
568899	2112922-11		pass
568899	2112956-11		pass
568899	2112956-11		pass
568899	2112957-11		pass
568899	2112957-11		pass

Flaring test in acc. with EN 10216-5

Heat	Lot	ST	Test result [pass/fail]
			pass
568899	2112922-11		pass
568899	2112956-11		pass
568899	2112957-11		pass

Flattening test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
568899	2112922-11		pass
568899	2112922-11		pass
568899	2112956-11		pass
568899	2112956-11		pass
568899	2112957-11		pass
568899	2112957-11		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
568899	2112922-11		79,000	yes
568899	2112922-11		78,000	yes
568899	2112956-11		79,000	yes
568899	2112956-11		79,000	yes
568899	2112957-11		74,000	yes
568899	2112957-11		76,000	yes

Intergranular corrosion testing in acc. with ASTM A262E

Heat	Lot	ST	Test result [pass/fail]
			pass
568899	2112922-11		pass
568899	2112956-11		pass
568899	2112957-11		pass

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

Heat	Lot	ST	Test result [pass/fail]
			pass
568899	2112922-11		pass
568899	2112956-11		pass
568899	2112957-11		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
568899	2112922-11		342,200	553,400	54,000	72,000	366,600
568899	2112956-11		331,200	581,600	54,600	65,500	369,700
568899	2112957-11		314,000	553,300	49,400	66,500	343,100

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
568899	2112922-11		No	6,000
568899	2112956-11		No	7,000
568899	2112957-11		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.

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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.