

Type of inspection document : Inspection certificate acc. to EN 10204 / 3.1	A02	Internal order No.: 10050759 - 20	A08
Purchaser : ALLEIMA BENELUX B.V. . AMUNDSENWEG 4 5928 LT VENLO THE NETHERLANDS	A06	Purchase order No. : 800745 Purchaser's reference : 800745 Project Id. : 4003215	A07
Product : Seamless cold finished tube	B01/B04	Steel designation : 3R60 / 3R60	B02
Dimension (OD x WT) : 12,70 x 1,24AW mm	B09/B10	Melting process : AOD	C70
Technical requirements : ASME SA 213/SA213M-2021 ASTM A213/A213M-2022 ASTM A269/A269M-2015a (Reap.2019) EN 10216-5 TC1 2021 EN 10305-1 (Only Tolerances-Table 5) PED 2014/68/EU Alleima SPEC S-08921 AD 2000 W2 Einbaurohre - 2016 AD 2000 W10 - 2019			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:	Z03

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
567122	0,020	0,440	1,600	0,031	0,009
567183	0,020	0,460	1,670	0,031	0,010

Heat	Cr [%]	Ni [%]	Mo [%]	N [%]
	17.000-18.000	12.500-14.000	2.500-3.000	max 0.100
567122	17,240	13,110	2,620	0,041
567183	17,280	13,080	2,620	0,040

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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
567122	2085699-11	0,019	0,440	1,590	0,032	0,007
567183	2085706-11	0,021	0,470	1,680	0,034	0,010

Heat	Lot	Cr [%]	Ni [%]	Mo [%]	N [%]
		17.000-18.000	12.500-14.000	2.500-3.000	max 0.100
567122	2085699-11	17,150	12,940	2,560	0,057
567183	2085706-11	17,130	12,850	2,510	0,059

Extent of material delivery

Heat	Lot	Hollow supp.	No. of HTcycles ¹⁾	Pieces	Total length [m]	Total weight [kg] ²⁾
567122	2075048-11	ALLEIMA SE	1	352	2 112.000	747.648
567122	2085697-11	ALLEIMA SE	1	474	2 844.000	1 006.776
567122	2085699-11	ALLEIMA SE	1	364	2 184.000	773.136
567122	2085700-11	ALLEIMA SE	1	389	2 334.000	826.236
567122	2085702-11	ALLEIMA SE	1	373	2 238.000	792.252
567122	2085703-11	ALLEIMA SE	1	376	2 256.000	798.624
567122	2085704-11	ALLEIMA SE	1	371	2 226.000	788.004
567183	2085705-11	ALLEIMA SE	1	287	1 722.000	609.588
567183	2085706-11	ALLEIMA SE	1	276	1 656.000	586.224

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 : 6.2.2023

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Flaring test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
567122	2075048-11		pass
567122	2075048-11		pass
567122	2085697-11		pass
567122	2085697-11		pass
567122	2085699-11		pass
567122	2085699-11		pass
567122	2085700-11		pass
567122	2085700-11		pass
567122	2085702-11		pass
567122	2085702-11		pass
567122	2085703-11		pass
567122	2085703-11		pass
567122	2085704-11		pass
567122	2085704-11		pass
567183	2085705-11		pass
567183	2085705-11		pass
567183	2085706-11		pass
567183	2085706-11		pass

Flaring test in acc. with EN 10216-5

Heat	Lot	ST	Test result [pass/fail]
			pass
567122	2075048-11		pass
567122	2085697-11		pass
567122	2085699-11		pass
567122	2085700-11		pass
567122	2085702-11		pass
567122	2085703-11		pass
567122	2085704-11		pass
567183	2085705-11		pass
567183	2085706-11		pass

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Flattening test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
567122	2075048-11		pass
567122	2075048-11		pass
567122	2085697-11		pass
567122	2085697-11		pass
567122	2085699-11		pass
567122	2085699-11		pass
567122	2085700-11		pass
567122	2085700-11		pass
567122	2085702-11		pass
567122	2085702-11		pass
567122	2085703-11		pass
567122	2085703-11		pass
567122	2085704-11		pass
567122	2085704-11		pass
567183	2085705-11		pass
567183	2085705-11		pass
567183	2085706-11		pass
567183	2085706-11		pass

Hardness test (HRB) in acc. with ASTM E18 / 7-2-1261

Heat	Lot	ST	Hardness [HRB]
			max 80,000
567122	2075048-11		78,000
567122	2075048-11		78,000
567122	2085697-11		78,000
567122	2085697-11		78,000
567122	2085699-11		77,000
567122	2085699-11		79,000
567122	2085700-11		78,000
567122	2085700-11		78,000
567122	2085702-11		77,000
567122	2085702-11		76,000
567122	2085703-11		79,000
567122	2085703-11		77,000
567122	2085704-11		77,000
567122	2085704-11		77,000
567183	2085705-11		77,000
567183	2085705-11		77,000
567183	2085706-11		78,000
567183	2085706-11		78,000

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Intergranular corrosion testing in acc. with ASTM A262E

Heat	Lot	ST	Test result [pass/fail]
			pass
567122	2075048-11		pass
567122	2085697-11		pass
567122	2085699-11		pass
567122	2085700-11		pass
567122	2085702-11		pass
567122	2085703-11		pass
567122	2085704-11		pass
567183	2085705-11		pass
567183	2085706-11		pass

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

Heat	Lot	ST	Test result [pass/fail]
			pass
567122	2075048-11		pass
567122	2085697-11		pass
567122	2085699-11		pass
567122	2085700-11		pass
567122	2085702-11		pass
567122	2085703-11		pass
567122	2085704-11		pass
567183	2085705-11		pass
567183	2085706-11		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
567122	2075048-11		305,100	595,100	57,000	59,500	334,300
567122	2085697-11		303,100	585,800	56,800	61,200	334,800
567122	2085699-11		300,600	586,800	53,600	54,500	331,200
567122	2085700-11		301,600	601,700	58,800	65,200	332,700
567122	2085702-11		297,100	589,900	59,400	63,600	330,200
567122	2085703-11		313,500	581,700	54,600	57,000	340,700
567122	2085704-11		296,500	578,200	56,000	59,800	325,100
567183	2085705-11		307,900	594,600	55,600	58,200	338,400
567183	2085706-11		302,200	586,000	58,600	62,500	328,200

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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
567122	2075048-11		No	6,000
567122	2085697-11		No	6,000
567122	2085699-11		No	6,000
567122	2085700-11		No	6,000
567122	2085702-11		No	6,000
567122	2085703-11		No	6,000
567122	2085704-11		No	6,000
567183	2085705-11		No	6,000
567183	2085706-11		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.

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.

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Straightness check

Test results comply with specified criteria.