

Type of inspection document : Inspection certificate acc. to EN 10204 / 3.1	A02	Internal order No.: 10076354 - 20	A08
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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
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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
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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
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The products, covered by this certificate, comply with specification and requirements of the order.			Z01
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Originator of the document : QA - AC	A05/Z02	Inspector's stamp: 	Z03
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Digitally signed by Sofia Müllerová
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Reason: I am the author of this document
Location:
Date: 2024-01-29 07:45+01:00

Chemical composition (Heat analysis)

Heat	C [%]	Si [%]	Mn [%]	P [%]	S [%]
569405	max 0,030 0,019	max 1,000 0,390	max 2,000 1,650	max 0,040 0,030	max 0,015 0,009

Heat	Cr [%]	Ni [%]	Mo [%]	N [%]	Co [%]
569405	17,000-18,000 17,250	12,500-14,000 13,390	2,500-3,000 2,620	max 0,100 0,041	info 0,120

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Heat	Ti [%] info
569405	<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
569405	2120515-11	0,017	0,410	1,720	0,027	0,005

Heat	Lot	Cr [%] 17.000-18.000	Ni [%] 12.500-14.000	Mo [%] 2.500-3.000	N [%] max 0.100
569405	2120515-11	17,280	13,150	2,600	0,043

Extent of material delivery

Heat	Lot	Hollow supp.	No. of HTcycles ¹⁾	Pieces	Total length [m]	Total weight [kg] ²⁾
569405	2120512-11	ALLEIMA SE	1	600	3 600.000	806.400
569405	2120513-11	ALLEIMA SE	1	595	3 570.000	799.680
569405	2120514-11	ALLEIMA SE	1	574	3 444.000	771.456
569405	2120515-11	ALLEIMA SE	1	584	3 504.000	784.896

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 : 29.1.2024

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Flaring test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
569405	2120512-11		pass
569405	2120512-11		pass
569405	2120513-11		pass
569405	2120513-11		pass
569405	2120514-11		pass
569405	2120514-11		pass
569405	2120515-11		pass
569405	2120515-11		pass

Flaring test in acc. with EN 10216-5

Heat	Lot	ST	Test result [pass/fail]
			pass
569405	2120512-11		pass
569405	2120513-11		pass
569405	2120514-11		pass
569405	2120515-11		pass

Flattening test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
569405	2120512-11		pass
569405	2120512-11		pass
569405	2120513-11		pass
569405	2120513-11		pass
569405	2120514-11		pass
569405	2120514-11		pass
569405	2120515-11		pass
569405	2120515-11		pass

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

Heat	Lot	ST	Hardness [HRB]	Hardness \leq 22HRC [yes/no]
			max 80,000	yes
569405	2120512-11		73,000	yes
569405	2120512-11		74,000	yes
569405	2120513-11		72,000	yes
569405	2120513-11		71,000	yes
569405	2120514-11		75,000	yes
569405	2120514-11		74,000	yes
569405	2120515-11		73,000	yes
569405	2120515-11		72,000	yes

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Intergranular corrosion testing in acc. with ASTM A262E

Heat	Lot	ST	Test result [pass/fail]
			pass
569405	2120512-11		pass
569405	2120513-11		pass
569405	2120514-11		pass
569405	2120515-11		pass

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

Heat	Lot	ST	Test result [pass/fail]
			pass
569405	2120512-11		pass
569405	2120513-11		pass
569405	2120514-11		pass
569405	2120515-11		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
569405	2120512-11		298,300	568,100	51,600	58,000	326,000
569405	2120513-11		296,600	554,000	44,200	51,000	325,300
569405	2120514-11		305,300	585,000	48,400	57,300	333,700
569405	2120515-11		287,600	569,600	47,000	56,300	314,500

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
569405	2120512-11		No	7,000
569405	2120513-11		No	7,000
569405	2120514-11		No	7,000
569405	2120515-11		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. 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.

Straightness check

Test results comply with specified criteria.