

<b>Type of inspection document :</b> Inspection certificate acc. to EN 10204 / 3.1	A02	<b>Internal order No.:</b> 10078907 - 30	A08
<b>Purchaser :</b> ALLEIMA BENELUX B.V. . AMUNDSENWEG 4 5928 LT VENLO THE NETHERLANDS	A06	<b>Purchase order No. :</b> 800834  <b>Purchaser's reference :</b> 800834  <b>Project Id. :</b> 4003726	A07
<b>Product :</b> Seamless cold finished tube	B01/B04	<b>Steel designation :</b> 3R60 / 3R60	B02
<b>Dimension (OD x WT) :</b> 12,00 x 1,00AW mm	B09/B10	<b>Melting process :</b> AOD	C70
<b>Technical requirements :</b> 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
<b>Supplementary information :</b> 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
<b>Originator of the document :</b> QA - AC	A05/Z02	<b>Inspector's stamp:</b>	Z03

### Chemical composition (Heat analysis)

Heat	C [%]	Si [%]	Mn [%]	P [%]	S [%]
569961	max 0.030 0,020	max 1.000 0,390	max 2.000 1,580	max 0.040 0,028	max 0.015 0,008
Heat	Cr [%]	Ni [%]	Mo [%]	N [%]	Co [%]
569961	17.000-18.000 17,570	12.500-14.000 13,200	2.500-3.000 2,630	max 0.100 0,038	info 0,120

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Heat	Ti [%] info
569961	<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
569961	2125587-11	0,019	0,400	1,640	0,031	0,008

Heat	Lot	Cr [%] 17.000-18.000	Ni [%] 12.500-14.000	Mo [%] 2.500-3.000	N [%] max 0.100
569961	2125587-11	17,430	12,970	2,600	0,047

**Extent of material delivery**

Heat	Lot	Hollow supp.	No. of HTcycles <sup>1)</sup>	Pieces	Total length [m]	Total weight [kg] <sup>2)</sup>
569961	2125580-11	ALLEIMA SE	1	458	2 748.000	752.952
569961	2125581-11	ALLEIMA SE	1	464	2 784.000	762.816
569961	2125582-11	ALLEIMA SE	1	475	2 850.000	780.900
569961	2125583-11	ALLEIMA SE	1	462	2 772.000	759.528
569961	2125584-11	ALLEIMA SE	1	463	2 778.000	761.172
569961	2125585-11	ALLEIMA SE	1	479	2 874.000	787.476
569961	2125586-11	ALLEIMA SE	1	472	2 832.000	775.968
569961	2125587-11	ALLEIMA SE	1	482	2 892.000	792.408
569961	2125588-11	ALLEIMA SE	1	457	2 742.000	751.308
569961	2125589-11	ALLEIMA SE	1	422	2 532.000	693.768
569961	2125590-11	ALLEIMA SE	1	211	1 266.000	346.884

Note : <sup>1)</sup> Number of heat treatment cycles performed on the tubes.

<sup>2)</sup> Weight quantity is theoretically calculated, it might differ compared to shipping documents.

Chomutov, date : 18.3.2024

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**Flaring test in acc. with ASTM A 1016**

Heat	Lot	ST	Test result
			[pass/fail]
			pass
569961	2125580-11		pass
569961	2125580-11		pass
569961	2125581-11		pass
569961	2125581-11		pass
569961	2125582-11		pass
569961	2125582-11		pass
569961	2125583-11		pass
569961	2125583-11		pass
569961	2125584-11		pass
569961	2125584-11		pass
569961	2125585-11		pass
569961	2125585-11		pass
569961	2125586-11		pass
569961	2125586-11		pass
569961	2125587-11		pass
569961	2125587-11		pass
569961	2125588-11		pass
569961	2125588-11		pass
569961	2125589-11		pass
569961	2125589-11		pass
569961	2125590-11		pass
569961	2125590-11		pass

**Flaring test in acc. with EN 10216-5**

Heat	Lot	ST	Test result
			[pass/fail]
			pass
569961	2125580-11		pass
569961	2125581-11		pass
569961	2125582-11		pass
569961	2125583-11		pass
569961	2125584-11		pass
569961	2125585-11		pass
569961	2125586-11		pass
569961	2125587-11		pass
569961	2125588-11		pass
569961	2125589-11		pass
569961	2125590-11		pass

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**Flattening test in acc. with ASTM A 1016**

Heat	Lot	ST	Test result [pass/fail]
			pass
569961	2125580-11		pass
569961	2125580-11		pass
569961	2125581-11		pass
569961	2125581-11		pass
569961	2125582-11		pass
569961	2125582-11		pass
569961	2125583-11		pass
569961	2125583-11		pass
569961	2125584-11		pass
569961	2125584-11		pass
569961	2125585-11		pass
569961	2125585-11		pass
569961	2125586-11		pass
569961	2125586-11		pass
569961	2125587-11		pass
569961	2125587-11		pass
569961	2125588-11		pass
569961	2125588-11		pass
569961	2125589-11		pass
569961	2125589-11		pass
569961	2125590-11		pass
569961	2125590-11		pass

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

Heat	Lot	ST	Hardness	Hardness ≤22HRC
			[HRB]	[yes/no]
			max 80,000	yes
569961	2125580-11		73,000	yes
569961	2125580-11		73,000	yes
569961	2125581-11		73,000	yes
569961	2125581-11		74,000	yes
569961	2125582-11		76,000	yes
569961	2125582-11		76,000	yes
569961	2125583-11		72,000	yes
569961	2125583-11		73,000	yes
569961	2125584-11		73,000	yes
569961	2125584-11		72,000	yes
569961	2125585-11		72,000	yes
569961	2125585-11		71,000	yes
569961	2125586-11		72,000	yes
569961	2125586-11		72,000	yes
569961	2125587-11		73,000	yes
569961	2125587-11		77,000	yes
569961	2125588-11		71,000	yes
569961	2125588-11		73,000	yes
569961	2125589-11		72,000	yes
569961	2125589-11		73,000	yes
569961	2125590-11		73,000	yes
569961	2125590-11		73,000	yes

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**Intergranular corrosion testing in acc. with ASTM A262E**

Heat	Lot	ST	Test result [pass/fail]
			pass
569961	2125580-11		pass
569961	2125581-11		pass
569961	2125582-11		pass
569961	2125583-11		pass
569961	2125584-11		pass
569961	2125585-11		pass
569961	2125586-11		pass
569961	2125587-11		pass
569961	2125588-11		pass
569961	2125589-11		pass
569961	2125590-11		pass

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

Heat	Lot	ST	Test result [pass/fail]
			pass
569961	2125580-11		pass
569961	2125581-11		pass
569961	2125582-11		pass
569961	2125583-11		pass
569961	2125584-11		pass
569961	2125585-11		pass
569961	2125586-11		pass
569961	2125587-11		pass
569961	2125588-11		pass
569961	2125589-11		pass
569961	2125590-11		pass

**Longitudinal tensile test in acc. with A370 / EN ISO 6892-1**

Heat	Lot	ST	Rp0,2	Rm	A2"	A5	Rp1,0
			[MPa]	[MPa]	[%]	[%]	[MPa]
			min 220.000	515.000-690.000	min 35.000	min 40.000	min 250.000
569961	2125580-11		311,700	596,600	54,200	64,500	342,400
569961	2125581-11		316,000	597,700	56,800	64,300	347,200
569961	2125582-11		329,600	588,900	51,900	56,300	357,700
569961	2125583-11		316,600	596,400	56,300	61,600	346,400
569961	2125584-11		305,500	596,400	56,200	64,900	336,300
569961	2125585-11		309,700	597,700	53,200	58,500	341,200
569961	2125586-11		305,000	592,100	55,400	63,400	336,200
569961	2125587-11		306,600	596,000	56,200	62,000	336,800
569961	2125588-11		305,100	582,000	57,200	66,300	333,600
569961	2125589-11		312,400	588,600	55,000	64,500	341,200
569961	2125590-11		304,300	587,000	57,600	65,700	336,900

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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
569961	2125580-11		No	6,000
569961	2125581-11		No	6,000
569961	2125582-11		No	6,000
569961	2125583-11		No	6,000
569961	2125584-11		No	6,000
569961	2125585-11		No	6,000
569961	2125586-11		No	6,000
569961	2125587-11		No	6,000
569961	2125588-11		No	6,000
569961	2125589-11		No	6,000
569961	2125590-11		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.

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**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.