

A02/Z03

A06

PROCESSKONTROLL ITEMS AB
STORA HÖGA INDUSTRIOMRÅDE
VALLENVÄGEN 5
444 60 STORA HÖGA
SWEDEN

Customer References		A07
765444	Customer order	
	2024-05-14	
SEPROCESSK 9002757		

Alleima References			A08
Order No.	Subs No.	Dispatch note	
609605	727893	1674561	
Suppl. No			
0010105219			

Material Description	B01/B04
Metallurgical process	Origin
Electric Arc Furnace+AOD CZ	C70

Steel/material designations	B02

Technical Requirements	B03
Cover Sheet	
Please see appendix for results.	

Extent of delivery							B07-B13
lt	Product designation	Heat	Lot	Pcs	Kg	m	
1	3R60 16.00-2.00 0.698 kg/m	568283	0002143003	84	353,0	504	
	16.00 x 2.00		Total	84	353,0	504	
The material is manufactured according to a Quality system, approved and registered to ISO 9001:2015.							

Quality assurance - Quality assurance - Helen Jämtemyr / QA-manager	A05/Z02



Type of inspection document : Inspection certificate acc. to EN 10204 / 3.1	A02	Internal order No.: 50008801 - 10	A08
Purchaser : ALLEIMA TUBE AB Järnverksleden 8 Centrala Utlastningen 81181 SANDVIKEN SWEDEN	A06	Purchase order No. : Purchaser's reference : Project Id. : 3000206	A07
Product : Seamless cold finished tube	B01/B04	Steel designation : 3R60 / 3R60	B02
Dimension (OD x WT) : 16,00 x 2,00AW mm	B09/B10	Melting process : AOD	C70
Technical requirements : ASME SA-213/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 [%]
	max 0.030	max 1.000	max 2.000	max 0.040	max 0.015
568283	0,018	0,370	1,700	0,031	0,009
570890	0,020	0,390	1,720	0,029	0,008

Heat	Cr [%]	Ni [%]	Mo [%]	N [%]	Co [%]
	17.000-18.000	12.500-14.000	2.500-3.000	max 0.100	info
568283	17,400	13,130	2,620	0,044	0,130
570890	17,390	13,240	2,620	0,037	0,130

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Heat	Ti [%] info
568283	<0,003
570890	<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
568283	2143003-11	0,017	0,370	1,750	0,029	0,009
570890	2143004-11	0,018	0,390	1,770	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
568283	2143003-11	17,460	12,970	2,580	0,057
570890	2143004-11	17,280	12,940	2,600	0,042

Extent of material delivery

Heat	Lot	Hollow supp.	No. of HTcycles ¹⁾	Pieces	Total length [m]	Total weight [kg] ²⁾
568283	2143003-11	ALLEIMA SE	1	199	1 194.000	833.412
570890	2143004-11	ALLEIMA SE	1	230	1 380.000	963.240

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 : 1.7.2024

Type of inspection document :

A02

Internal order No.:

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Inspection certificate acc. to EN 10204 / 3.1

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Flaring test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
568283	2143003-11	EnF	pass
568283	2143003-11	WnF	pass
570890	2143004-11	EnF	pass
570890	2143004-11	WnF	pass

ST (sample type): WnF-West end, tube did not not used for flattening test,Enf-East end, tube did not not used for flattening test;

Flaring test in acc. with EN 10216-5

Heat	Lot	Test result [pass/fail]
		pass
568283	2143003-11	pass
570890	2143004-11	pass

Flattening test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
568283	2143003-11	E	pass
568283	2143003-11	W	pass
570890	2143004-11	E	pass
570890	2143004-11	W	pass

ST (sample type): E-East end of tube; W-West end of tube;

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

Heat	Lot	Hardness	Hardness \leq 22HRC
		[HRB]	[yes/no]
		max 80,000	yes
568283	2143003-11	78,000	yes
568283	2143003-11	75,000	yes
570890	2143004-11	77,000	yes
570890	2143004-11	76,000	yes

Intergranular corrosion testing in acc. with ASTM A262E

Heat	Lot	Test result [pass/fail]
		pass
568283	2143003-11	pass
570890	2143004-11	pass

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

Heat	Lot	Test result [pass/fail]
		pass
568283	2143003-11	pass
570890	2143004-11	pass

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

Heat	Lot	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
568283	2143003-11	282,600	579,000	51,400	49,800	314,600
568283	2143003-11	286,600	588,100	50,200	48,900	319,700
570890	2143004-11	293,000	578,200	52,000	51,300	326,100
570890	2143004-11	277,300	578,400	52,200	50,000	311,500

Microstructure evaluation and Grain size WI-3815/ASTM E112

The structure is free from grain boundary chromium carbide precipitations.

Heat	Lot	G.B.Cr.Carbides [No/Yes]	Grain size [(G)]
		No	5,000-14,000
568283	2143003-11	No	5,000
570890	2143004-11	No	6,000

Dimensional check

Test results comply with specified criteria.

HT - Final heat treatment of straight tubes

All tubes have been solution annealed followed by accelerated cooling.
Solution annealing temperature 1090°C, soaking time min. 2 minutes.
Quench medium - protective gas.

Inside cleanliness check

Test results comply with specified criteria.

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.

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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.