REVİZYON TARİHÇESİ/*REVISION HISTORY*

Son Revizyon Açıklaması / *Last Revision Explanation*	**Değişen Sayfa** *Changed Page*
IATF 16949:2016 integration.	5

ONAY / *APPROVAL*		
	ADI-SOYADI/ NAME-SURNAME	UNVANI/ *TITLE*
HAZIRLAYAN ONAYI/ *PREPARATION APPROVAL*	HİKMET KAYAÇETİN	Ar-Ge Uygulamalı Araştırmalar Teknisyeni -A Approved electronically via QDMS.
YÜRÜRLÜK ONAYI/ *ENFORCEMENT APPROVAL*	MUSTAFA MURAT DÜNDAR	Teknoloji Direktörü Approved electronically via QDMS.

1.0. KAPSAM/*SCOPE*

This specification identifies the physical, chemical and metallographical characteristics of the grain refiner employed in the continuous casting operation of aluminum alloys to achieve desired grain size in the as-cast stock.

2.0. MALZEME TANIMI VE ÖZELLİKLERİ/ *PRODUCT DESCRIPTION AND SPECIFICATIONS*

The materials to be delivered shall meet the qualities stipulated in this specification.

2.1. Chemical Composition

By mass	5/1 TiBor	5/0,2 TiBor
Ti	% 4.50 - 5.50	4.50 – 5.50
B	% 0.9 - 1.10	0.18 – 0,25
Fe	max. % 0.30	max. % 0.30
Si	max. % 0.30	max. % 0.30
V	max. % 0.25	max. % 0.25
Each of the remaining	max. % 0.04	max. % 0.04
Others, total	max. % 0.10	max. % 0.10

(Base Metal Primary Alüminyum)

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YETKİLİ İSİM/ *RESPONSIBLE*		
TARİH/*DATE*		

2.2. Physical Properties

Wire diameter	9.7 mm ± 0.3 mm
Coil inside diameter	360 mm ± 10 mm
Coil weight	180 Kg ± % 10

The lot number should be printed on the Grain refiner wire with certain intervals of the wire.

The coils should be wrapped with bands at least three points to prevent uncoiling.

Color codes must be used to identify different grain refiner agents having different Ti:B ratios.

2.3 Metallographical characteristics forTi5:B0,2

2.3.1. Al_3Ti particles

Particle size: Size of Al_3Ti particles must be between 20µm - 50µm. Particles having size greater than 50µm should be detected more frequently, contrary to those greater than 100µm.

Clusters of Al_3Ti particles should be categorized according to a imaginary area encircling them. There are five categories; “0” the best, “5” the worst.

Categories	Number of $TiAl_3$ clusters	Size of $TiAl_3$ cluster	Ok or NOK for use
0	1 or 2	cluster<100 µm	OK
1	3 or more	cluster<100 µm	OK
2	1 or more	100µm<cluster<150 µm	OK
3	1 or 2	150µm< cluster <200 µm	OK
4	3 or more	150µm< cluster <200 µm	NOK
5	1 or 2	cluster >200 µm	NOK

2.3.2 TiB_2 particles

Particle size: Size of TiB_2 particles should be between boyutları 1µm - 2µm.

Clusters of Al_3Ti particles should be categorized according to a imaginary area encircling them. There are five categories; “0” the best, “5” the worst

Categories	Number of TiB_2 clusters	Cluster size of TiB_2	Ok or NOK for use
0	1 or 2	cluster<20 µm	OK
1	3 or more	cluster <20 µm	OK
2	1 or 2	20µm< cluster <50 µm	OK
3	3 or more	20µm< cluster <50 µm	OK
4	1 or 2	cluster >50 µm	NOK
5	3 or more	cluster >50 µm	NOK

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2.4 Metallographical characteristics forTi5:B1

2.4.1. Al_3Ti particles

Particle size: Size of Al_3Ti particles should be between 20µm - 50µm. Particle gretaer than 50µm should be frequently less.

Clusters of Al_3Ti particles should be categorized according to a imaginary area encircling them. There are five categories; “0” the best, “5” the worst.

Categories	Numebr of $TiAl_3$ clusters	Size of $TiAl_3$ cluster	OK or Nok for use
0	1 or 2	cluster<100 µm	OK
1	3 or more	cluster <100 µm	OK
2	1 or 2	100µm< cluster <150 µm	OK
3	3 or more	100µm< cluster <150 µm	NOK
4	1 or 2	cluster >150 µm	NOK
5	3 or more	cluster >150 µm	NOK

2.4.2. TiB_2 particles

Particle size: Size of TiB_2 particles must be between 1µm - 2µm.

Clusters of Al_3Ti particles should be categorized according to a imaginary area encircling them. There are five categories; “0” the best, “5” the worst.

Categories	Number of TiB_2 clusters	Size of TiB_2 cluster	OK or NOK for use
0	1 or 2	cluster<50 µm	OK
1	3 or more	cluster <50 µm	OK
2	1 or 2	50µm< cluster <100 µm	OK
3	3 or more	50µm< cluster <100 µm	NOK
4	1 or 2	cluster >100 µm	NOK
5	3 or more	cluster >100 µm	NOK

3.0. TEST SERTİFİKASI VE / VEYA KOŞULLARI/ *TEST CERTIFICATE AND/OR CONDITIONS*

The supplier must provide a test certificate for each material delivered. It must involve chemical composition of each production lot (if more than one lot), metallographic analysis of each production lot and its details according to item 2.3 and 2.4 The following information should also be included in the certificate:

Supplier’s Name

Assan Order Number

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Product Name (and code)

Lot number

Chemical composition

Results of metallographical analysis

4.0. TESLİMAT ŞEKLİ/ *DELIVERY CONDITIONS*

4.1. Packaging

Shall be packed into coiled wires in max. of 2500 kg packages. Each package must be secured and fastened with at least five (5) plastic straps.

4.2. Labeling

The following information should be shown on the label prepared for each skid:

Supplier's Name

Material Name

Net Weight

Shipping date

Production lot no

5.0. YÜKÜMLÜLÜK/ *OBLIGATION*

The supplier is obliged to meet the requirements indicated in this specification for each lot of materials delivered. The materials that do not meet with the requirements specified shall be returned. If failure in the grain refinement performance or other problems related with the grain refiner itself is encountered, proven and documented with well accepted methods with ASSAN Aluminum, all the losses including metal and processing cost so far incurred and any charges endorsed by the customer of ASSAN with the use of end product will be charged to the supplier. In case of any disripancy related to the resolution of the quality issue violating the specification, the investigation conducted and reported by the local research institutes, TUBİTAK or universities İTÜ, ODTÜ, YTÜ will be employed for resolution.

6.0. SORUMLULUK/ *RESPONSIBILITIES*

The Product and Process Development Department is responsible from checking of certificate provided by the supplier for compliance with the specification. The Cast shop is responsible from checking physical properties and the proper use of the material in prescribed practices.

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7.0. DİĞER HUSUSLAR/ *OTHER*

7.1. Product and System Documents

Supplier must declare that all materials are in conformance with the following regulations;

System and Product Documents		Period	Time
System Documents	ISO 9001 (association which prepares the documents must be accredited by one of IAF MLA members http://www.iaf.nu//articles/IAF_MEMBERS_SIGNATORIES/4)	Supplier Selection & Each Update (once in every three year)	
	Certificate of KOSHER (association which prepares the documents must be declared by this web site specified below; http://www.akokosher.org/members.html	Supplier Selection & Each Update (yearly)	
Product Documents	MSDS, TDS	Every year	January
	RoHS Analysis	Every year	January
	Reach Declaration	Twice in a year	January December
	Allergene Declaration	Every year	January
	Food Contact Declaration	Every year	January
	Declaration for none of your products contain Palm Oil	Every year	January
	Declaration for none of your products contain MOSH, MOA POSH, PAO	Every year	January
	Declaration for none of your products contain Silicone	Every year	January
	Declaration for none of your products contain PFAS (Polyfluoroalkyl Substances)	Every year	January
	Declaration for none of your products contain PFCs (Perfluorinated Compound)	Every year	January
	Declaration for none of your products contain latex	Every year	January
	Declaration for none of your products contain Bisphenol compounds (BPA, BPS, BPF)	Every year	January
	Declaration for none of your products contain asbestos	Every year	January

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