FOSECO

METAL TREATMENT

OF ALUMINIUM AND ALUMINIUM ALLOYS

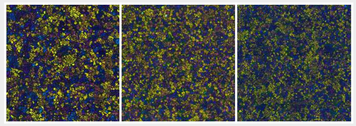
GRAIN REFINING

Effect:
- In situ formation of foreign nuclei such as TiB^2 in the melt
- Insitu germs are very flexible and are finely distributed
- Fine-grained structure improves solidification behaviour and reduces shrinkage porosity
- Grain refining has a significant influence on the mechanical properties such as elongation of the casting

Grain refining products

Tablets
TIBORAL 6 universal, without metallic titanium
NUCLEANT* 70 universal, with metallic titanium
NUCLEANT 70 SS universal, with metallic titanium self-sinking
ELDUCTAL 90 S titanium-free

Granulate
NUCLEANT 1582 Na-Ca-free, without metallic titanium



MODIFICATION

Effect:
- Modification affects the Al-Si eutectic
- Sodium is the most effective modification agent
- Reduction of the tendency to hot cracking
- Improving the feeding
- Reduction of internal blowholes

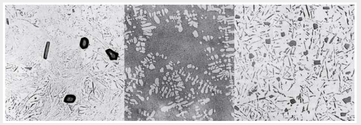
Products for sodium modification

Tablets
SIMODAL 77 universal

Maintaining the refinement
COVERAL PERMA TH (> 730 °C)
COVERAL PERMA N (< 740 °C)

Granulate
SIMODAL 1572 (> 720 °C)
SIMODAL 2715 (< 740 °C)

Metallic sodium
NAVAC* individually packaged



CLEANING

Effect:
- Removal of dissolved hydrogen from the melt
- Reduction of gas porosity
- Improving the pressure tightness of the castings
- Removal of oxides and other non-metallic inclusions
- Improvement of the mechanical properties
- Avoidance of distortion especially with die castings during heat treatment
- Targeted adjustment of the hydrogen content (forming gas)

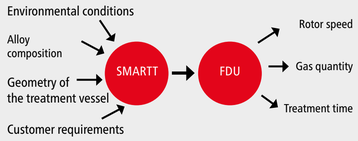
Chemical processes

NITRAL 10 Nitrogen releasing tablet
NITRAL C 19 MG Nitrogen-releasing tablet (Na-Ca-free)

Mechanical methods

FDU units (various designs) for degassing with inert gases
FDU MTS units enable the simultaneous introduction of melt treatment agents into the melt.

Options for FDU units:
- MTS 1500
- Forming gas (N_2-H_2 gas mixture)
- Treatment with chlorine gas
- Temperature measurement
- SMARTT



CLEANING, DROSSING AND COVERING SALTS

Effect:
- Cleaning salts remove oxides and other non-metallic impurities from the melt
- Scraping salts produce a loose and metal-poor dross
- Cover salts protect the melt from oxidation and hydrogen absorption

Application

	Granulate
Universal masking and scraping salt	
Cleaning < 670 °C	COVERAL ECO 2532
Cleaning > 700 °C	COVERAL ECO 2531
Sodium-free cleaning and scraping salt	COVERAL FREE 6511
Sodium and calcium-free cleaning and scraping salt	COVERAL PURE 1565
Fluoride-free cleaning and scraping salt	COVERAL 2002

SPECIAL APPLICATIONS

- Oven cleaner (corundum and oxide removal) PROTECTAL* OR 1 powder
- Preventive oven cleaner (impregnating agent) PROTECTAL 88 powder
- Recycling and remelting salt PROTECTAL 2534 powder
- Mg removal COVERAL 912 powder
- Na, Ca and Li removal EPURAL* 1591 granulate
- Fumigants DYCASTAL* 41 tablets

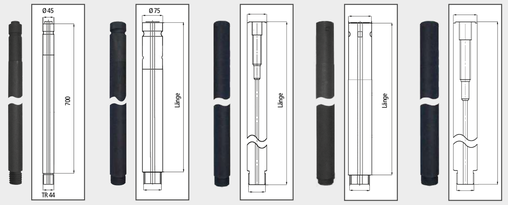
RECOMMENDED MELT TREATMENT FOR TYPICAL ALUMINIUM CASTING ALLOYS

ALLOY	GRAIN REFINING	MODIFICATION	CLEANING	CLEANING, DROSSING AND COVERING SALTS
Al-Si (3-8% Si)	Due to a high proportion of α-mixed crystal (premium aluminium) grain refinement is very effective.	Influences the Al-Si eutectic. Especially recommended for sand casting and thick-walled parts in gravity die casting.	chemical: NITRAL C 19 mechanical: FDU / MTS 1500	Covering and scraping salts are recommended for all alloys and casting processes. The salt should be selected depending on the alloy, the melting temperature and the furnace type.
Al-Si (9-13% Si)	The proportion of primary aluminium decreases in favour of the Al-Si eutectic. Grain refinement can have a positive influence on the microstructure, especially for parts that are difficult to feed.	High proportion of Al-Si eutectic requires modification of the microstructure. Modification is required for almost all casting processes and wall thicknesses.	chemical: NITRAL C 19 mechanical: FDU / MTS 1500	Covering and drossing salts are recommended for all alloys and casting processes. The salt should be selected depending on the alloy, the melting temperature and the furnace type.
Al-Si (>13% Si)	An addition of phosphorus influences the solidification of the primary silicon. A moulded-in, round primary silicon improves the mechanical values.	Not applicable.	chemical: NITRAL C 19 MG mechanical: FDU / MTS 1500	Covering and drossing salts must be free of Na and Ca in order not to have a negative influence on the microstructure formation.

GRAPHITE WEAR PARTS

XSR Rotor XDR Rotor FDR Rotor FDDR Rotor

diameter: YYY = 140, 175, 190, 220, 250 mm

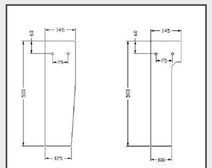


45 mm diameter BKF 45/700
75 mm diameter BKF 75/XXX.70
75 mm diameter DSK 75/XXX.70
95 mm diameter BKF 95/XXX.70
95 mm diameter DSK 95/XXX.70

75 mm diameter shafts are available with a length XXX of 600 to 1200 mm.

95 mm diameter shafts are available with a length XXX of 1500, 1800 and 2000 mm.

INSURAL BAFFLE PLATES



PL 04.500.1
PL 04.600.1
PL 04.700.1
PL 04.500.2

FDU DEVICE OVERVIEW

FDU MARK 10

For the treatment of transport ladles and ovens, the FDU Mark 10 is moved over the respective ladle or oven.

FDU ROTOSTATIV

Unit for space-saving installation on the floor; a manual swivel device (optional) allows easy access to pans and ovens.

FDU ROTOSCHWENK

The boom can be swivelled via an electric drive. Several treatment stations can be approached automatically.

FDU MINIDEGASSER

For treatment, the unit is positioned on the treatment vessel by means of a crane or forklift truck.

THE MTS 1500 METHOD

Automatic granulate addition is available for almost all FDU degassing units. Melt treatment agents for grain refinement, refinement, melt cleaning and element removal can be dosed into the melt. A vortex is specifically created by the rotating rotor; the granulate is added to this vortex. The dosing system uses a gravimetric load cell to ensure the highest dosing accuracy for best metallurgical results as well as repeatability and traceability. This MTS process enables very effective mixing of the products with the aluminium melt.

product designation	application
COVERAL ECO 2531	Cleaning / Drossing
COVERAL FREE 6511	Cleaning / Drossing Na free
COVERAL PURE 1565	Cleaning / Drossing Na-Ca free
SIMODAL 1576	Sodium modification
NUCLEANT 1582	Grain refinement
EPURAL 1591	Cleaning / Na Ca removal