



GUIDANCE FOR EFFECTIVE PRODUCT USE IN FOUNDRIES

COVERAL*

PRODUCTS FOR MELT TREATMENT OF ALUMINIUM ALLOYS

Optimised metal quality

Customised product range

Improved mechanical properties

Environmentally friendly

Cost effective treatment

Committed to aluminium foundries



Aluminium foundries deal with a huge number of different alloys and use various processes to produce a variety of castings. To acknowledge this high diversity, Foseco has developed a wide range of products for the melt treatment of aluminium alloys. A team of technical experts who can advise and help you to develop an optimised process supports all Foseco products.

Melt treatment

Melt treatment is an important step in foundries to ensure a high casting quality. The melt shop has to supply aluminium in a defined composition at required temperature but also at the right purity and hydrogen level. The degree of grain refining and modification are additional parameters to characterise a melt.

In recent years economical aspects have become more and more important; the need to reduce metal content within the dross has increased due to the high price of raw material and energy on the world market. The issue of refractory or crucible life in contact with fluxes began to be questioned and the chemical product development has been focused on this subject as well.



Different grain sizes
(99.75% Al)

Grain refining

- In-situ formation of nuclei, such as TiB_2 , in the melt
- Fine grain structure improves the solidified structure and reduces shrinkage porosity
- Grain refining improves mechanical properties of the casting, such as elongation

Modification

- Improvement in hot tear resistance and feeding
- Reduction in shrinkage porosity
- Sodium is the most effective modification agent

Cleaning, degassing and covering

- Cleaning fluxes remove oxides and other non-metallic inclusions from the melt
- Drossing fluxes provide a dry dross with a low metal content
- Covering fluxes protect the melt against oxidation and hydrogen pick-up
- A low hydrogen content in the melt reduces gas porosity in the casting
- Removal of impurities improves mechanical properties and avoids distortions during heat treatment and machining



Different structures
of a sodium
modified AlSi alloy

Recommendations

for the melt treatment of aluminium alloys

Type of alloy	Grain refining	Modification	Cleaning	Drossing
AlSi AlSiMg AlSiCu (5-11% Si) AlZn	COVERAL GR 2812 COVERAL GR 2815 ALUFLUX B NUCLEANT* 70 NUCLEANT 70 SS	COVERAL GR 2712 COVERAL GR 2715 COVERAL CXS COVERAL 32D SIMODAL 77	COVERAL GR 2220 COVERAL GR 2410 COVERAL 105	COVERAL GR 2510 COVERAL GR 2561 COVERAL 55 COVERAL 90
AlSi modified with Antimony or Strontium (sodium free products)	COVERAL GR 2815 NUCLEANT 70 NUCLEANT 70 SS		COVERAL GR 6511 COVERAL GR 6512 COVERAL 67 COVERAL 68	COVERAL GR 6511 COVERAL GR 6512 COVERAL 67 COVERAL 68
AlSi13 AlSi12CuN		COVERAL GR 2712 COVERAL GR 2715 COVERAL CXS COVERAL 32D SIMODAL 97	COVERAL GR 2220 COVERAL GR 2410 COVERAL 105	COVERAL GR 2510 COVERAL GR 2561 COVERAL 55 COVERAL 90
Hypereutectic alloys (sodium and calcium free products)			COVERAL GR 6512 COVERAL 67	COVERAL GR 6512 COVERAL 67
HPDC			COVERAL GR 2220 COVERAL GR 2410 COVERAL 105	COVERAL GR 2510 COVERAL GR 2561 COVERAL GR 7520 COVERAL 55 COVERAL 90
AlCu	COVERAL GR 2815 NUCLEANT 70 NUCLEANT 70 SS		COVERAL GR 6511 COVERAL GR 6512 COVERAL 67 COVERAL 68	COVERAL GR 6511 COVERAL GR 6512 COVERAL 67 COVERAL 68
AlMg	COVERAL GR 2815 NUCLEANT 70 NUCLEANT 70 SS		COVERAL GR 6511 COVERAL GR 6512 COVERAL 67 COVERAL 68	COVERAL GR 6511 COVERAL GR 6512 COVERAL 67 COVERAL 68
AlMg5Si2Mn			COVERAL 920	COVERAL 920

Products in bold type are the most recommended

Special applications

- Furnace cleaners and fluxes for furnace wall protection
 - COVERAL OR 1
 - COVERAL 88
- Fluoride free fluxes
 - COVERAL GR 2002
 - COVERAL 210
- Injectable fluxes
 - COVERAL 275 IN (cleaning)
 - COVERAL A/N (modification)
- Fluxes for element removal such as sodium, calcium or magnesium
 - DECANTAL 100
 - ELIMAG 3
- Gassing agents add a controlled hydrogen level to the melt
 - HYDRAL 40
 - DYCASTAL * 40
- Degassing tablets
 - NITRAL C 19
 - NITRAL C 19 MG

Easy application at reduced emission level



All products are applicable with FDU rotor degassing



Dry powder dross formed



COVERAL GR

granulated products

COVERAL GR granular fluxes are an environmentally friendly range of fluxes for melt treatment of aluminium alloys. Powder fluxes possess certain disadvantages such as dust generation during application, toxic emissions, and problems of inconsistent efficiency due to their morphology. In order to overcome these disadvantages, fluxes in dust free granular form have been developed.

Applications

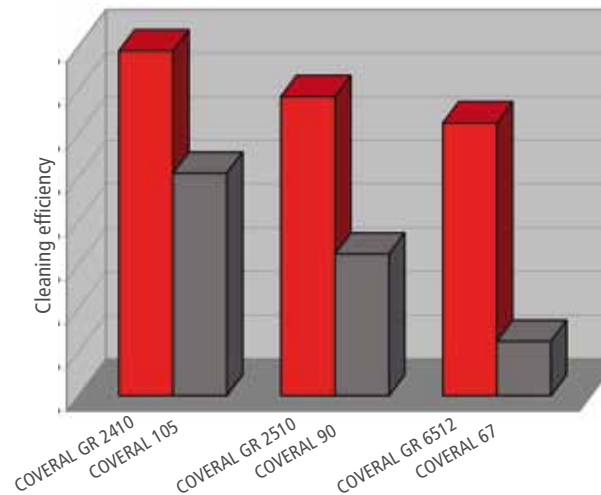
- Grain refining
- Sodium modification
- Cleaning
- Dressing / covering
- Element removal

Features and benefits

- No dust
- Low addition rates
- Easily applied
- Low fume
- All alloys and furnaces

Comparison of powder and granular flux cleaning efficiency

COVERAL powder addition rate: 0.35% of metal weight
COVERAL GR addition rate: 0.10% of metal weight



Environmental aspects

	Powder	Granular
	Concentration in mg/m ³	
Total particulate	1.5	0.46
Total Cl	0.73	0.72
F	11	3.4
NO _x	-	-
SO _x	8.5	1.6

For all details about the trial procedures, parameters and complete results shown on this page please refer to Foundry Practice 247 (2008).

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COMMITTED TO FOUNDRIES

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