



Aluminium – Products for chemical melt treatment of aluminium alloys

VESUVIUS



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 in the dross has increased due to the high price of the 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.

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

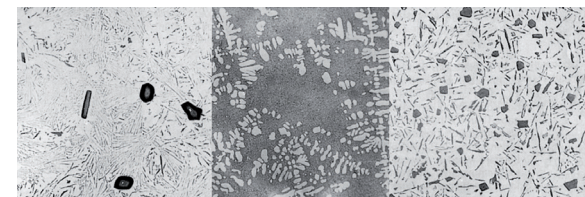
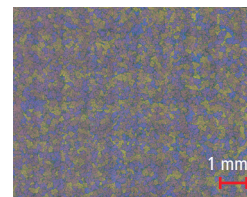
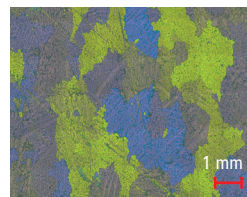
Modification

- + 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 grain sizes
AlSi7Mg



Different structures
of a sodium
modified AlSi alloy

Recommendations

for the melt treatment of aluminium alloys

Type of alloy	Grain refining	Modification	Cleaning and Drossing
AlSi AlSiMg AlSiCu (5-11% Si) AlZn	NUCLEANT* 1582 NUCLEANT 70 NUCLEANT 70 SS	SIMODAL 1576 SIMODAL 77	COVERAL* ECO 2531 COVERAL ECO 2532
AlSi modified with Antimony or Strontium (sodium free products required)	NUCLEANT 1582 NUCLEANT 70 NUCLEANT 70 SS		COVERAL FREE 6511
AlSi13 AlSi12CuNi		SIMODAL 1576 SIMODAL 97	COVERAL ECO 2531 COVERAL ECO 2532
Hypereutectic alloys (sodium and calcium free products required)			COVERAL PURE ECO 6535
HPDC			COVERAL ECO 2532 COVERAL ECO 1510
AlCu	NUCLEANT 1582 NUCLEANT 70 NUCLEANT 70 SS		COVERAL ECO 2531 COVERAL ECO 2532
AlMg	NUCLEANT 1582 NUCLEANT 70 NUCLEANT 70 SS		COVERAL PURE 6511 COVERAL PURE ECO 6535

Products in bold type are the most recommended

Special applications

- + Furnace cleaners and fluxes for furnace wall protection
 - PROTECTAL* OR 1
 - PROTECTAL 88
 - PROTECTAL 2534
- + Fluoride free flux
 - COVERAL 2002
- + Fluxes for element removal such as sodium, calcium or magnesium
 - EPURAL* 1591
- + Gassing agents to get a controlled hydrogen level to the melt
 - DYCASTAL* 41
- + Degassing tablets
 - NITRAL C 19
 - NITRAL C 19 MG



Easy application at reduced emissions level



All products are applicable with FDU rotor degassing



Dry powder dross formed

Advantages of granular

COVERAL 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

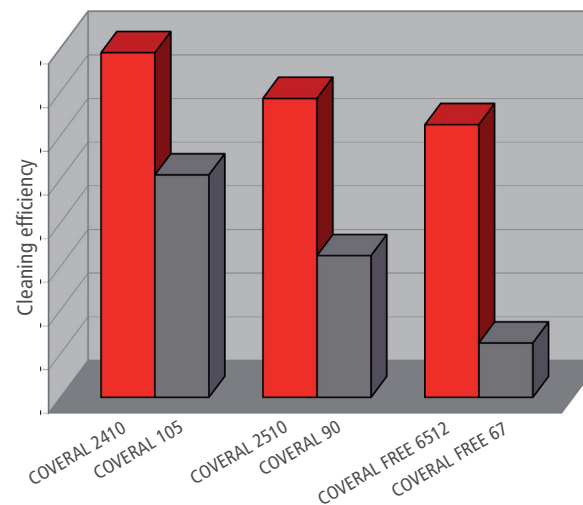
- + Grain refining - NUCLEANT
- + Sodium modification - SIMODAL
- + Cleaning - COVERAL
- + Dressing / covering - COVERAL
- + Element removal - EPURAL
- + Hydrogen addition - DYCASTAL

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 melt weight
COVERAL granular addition rate: 0.10% of melt 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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