



A NEW PERSPECTIVE ON PERFORMANCE

MTS 1500

AUTOMATED METAL TREATMENT STATION

Consistent mechanical and physical properties

Acceptable levels of melt cleanliness

Reducing emissions

Improving performance

Reducing treatment costs





“MTS 1500 technology is an automated process and the platform of a fully controlled degassing and melt treatment.”

A new perspective on performance

What is the MTS 1500?

The MTS 1500 is an automated metal treatment station that:

- Provides a platform to perform all necessary metal treatments in a single operation
- Improves efficiency of the various treatments
- Reduces operator involvement
- Reduces emissions

The MTS 1500 is based upon FDU rotary degassing technology, with the additional capability of injecting a range of metal treatment products.

The addition of these treatment products uses a unique method, whereby the fluxes are fed from a dispensing unit into a vortex deliberately created by the spinning rotor. This vortex is carefully controlled to effect a very efficient mixing of the treatment products.



Process parameters

The standard treatment cycle using the MTS 1500 consists of a series of stages that can be summarised as follows:

1. Consumables introduction

Shaft, rotor and baffle plate are first lowered into the melt.



2. Vortex formation

The baffle plate is deactivated and rotor speed is increased to a point at which a vortex is created around the shaft.



3. Addition of treatment agents

The required amount of flux is then dispensed directly into the vortex and drawn down into the metal.



4. Vortex termination and degassing

After the addition the baffle plate is activated again to terminate the vortex and initiate the degassing phase.





Consumable products

There are two types of products that are key to the performance of the MTS 1500

XSR rotor

A new design of rotor that

- creates the optimum vortex for the addition of the treatment products
- is highly efficient in removing dissolved hydrogen

COVERAL* MTS fluxes

A range of new treatment agents has been specifically formulated for use with the MTS 1500 that

- covers the principal foundry operations of cleaning, drossing, modification and grain refinement
- keeps smoke and fume to a minimum

Flux	Application	Purpose
COVERAL MTS 1524	Cleaning and drossing	Reduces corundum build up. Removes oxides and other non-metallic inclusions. Produces a light dry dross.
COVERAL MTS 1560	Sodium free cleaning and drossing	Reduces corundum build up. Removes oxides and other non-metallic inclusions. Produces a light dry dross. Especially suitable for AlMg alloys.
COVERAL MTS 1565	Sodium and calcium free cleaning and drossing	Reduces corundum build up. Removes oxides and other non-metallic inclusions. Produces a light dry dross. Especially suitable for AlMg and piston alloys.
COVERAL MTS 1572 COVERAL MTS 1576	Sodium modifying	Modifying metallurgical structure to reduce shrinkage defects and increase mechanical properties
COVERAL MTS 1584	Grain refining	Grain refinement to improve mechanical properties
COVERAL MTS 1540	Hydrogen addition	Introducing controlled hydrogen level
COVERAL MTS 1591	Element removal	Removes Na, Ca, Sr, Li

For detailed information refer to the datasheets and MSDS which are available on request.

Benefits of the MTS 1500

The MTS 1500 offers the foundry several benefits that can be divided into four main categories

Metallurgical benefits

The highly efficient manner in which the metal treatment products are introduced gives a number of metallurgical benefits in the finished casting:

- Consistent mechanical and physical properties
- Homogeneous microstructure and composition
- Acceptable levels of metal cleanliness
- Controlled gas porosity

Environmental benefits

The MTS 1500 assists the foundry in achieving a better environmental performance by

- using less consumables (flux, inert gas)
- reducing the amount of dross produced
- reducing emissions
- reducing treatment time and melt superheat with associated energy savings

Health and Safety benefits

The MTS 1500 contributes to the foundry: A healthier environment through reduced particulate and gaseous emissions compared to conventional treatments because

- the MTS 1500 uses less flux
- the action of the vortex draws the flux down into the melt where it is quickly mixed into the metal
- the flux used in the metal treatment is fully consumed and does not continue to react post treatment
- a safer environment through reduced operator involvement in the metal treatment process

Economic benefits

Of major importance to aluminium foundries is reducing process costs. From this perspective the MTS 1500 brings value to the foundry by

- reducing treatment costs
 - reduced inert gas consumption
 - reduced flux consumption
 - reducing aluminium loss in the dross
 - reduced labour costs
- improving performance
 - fast metal turn around
 - reproducible metal quality
 - increased reliability and decreased maintenance



An environmentally friendly process



Screw feeder system for precise and reproducible dosing



MTS process generates a light dry dross



Case study A

The foundry

A gravity die foundry producing safety critical components for the automotive industry.

Foundry practice

Foundry A casts an AlSi10Mg alloy modified with sodium. The original practice was to make a manual addition of sodium modifying tablets.

Foundry requirements

Significant variability had been found in the modification process, both in the length of time the tablet was plunged into the melt and the resulting sodium content. The result was variable mechanical properties in the finished castings.

Achievements

Using the MTS 1500 both the amount of flux added and the resultant sodium concentration were much more consistent resulting in improved consistency of casting properties.

The high efficiency of the MTS 1500 has also given significant cost savings in terms of reduced temperature loss due to shorter treatment cycles, a reduction in both absolute dross levels, and the metal content of this dross.

Foundry A	Manual tablet plunging + FDU	MTS 1500
Total melt to be treated	20,000 t/year	
Crucible	BU 400 with 380 kg of AlSi10Mg	
Product used	SIMODAL 77	COVERAL MTS 1576
Amount of product	800 g (0.21%)	700 g (0.18%)
Total treatment time	15 minutes	8 minutes
Variation in sodium content	+/- 12%	+/- 5%
Aluminium content in dross	~ 75%	~ 55%
Total savings per year		€ 50,000

Case study B

The foundry

Foundry B produces a range of castings in both high pressure and low pressure.

Foundry practice

Foundry B melts centrally and then transfers metal to the casting furnaces using a transfer ladle. Metal treatment was carried out in the transfer ladle using a rotary degassing unit with a manual addition of flux.

Foundry requirements

The foundry wanted to expand its activity by a factor of four and needed a second machine to increase metal treatment capacity.

Achievements

Installation of the MTS 1500 reduced treatment times to a point where an additional machine was no longer required even after this significant increase in the quantity of aluminium melted. The high efficiency of the MTS 1500 has also given significant cost savings in terms of reduced treatment costs and a reduction in metal loss in the dross.

Foundry B	Rotary degassing unit	MTS 1500
Production rate per degassing unit	20,000 - 25,000 kg per day	90,000 - 95,000 kg per day
Number of ladles treated per day	25 - 30	100 - 120
Type of fluxes used	Proprietary flux	COVERAL MTS 1524
Amount of flux used per cycle	475 g +/- 25 g	350 g +/- 10g
Treatment time	12 minutes	6 minutes
Consumable savings as calculated pro-rata for daily treatment of 92,500 kg		
Flux used per year	16,067 kg	12,075 kg
Total costs of nitrogen consumption (€ 1.04/m ³)	15 minutes	8 minutes
Nitrogen savings		€ 1,615
Total metal savings per year		€ 13,550
Total cost savings per year		€ 15,165

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