



MTS 1500 Newsletter

MTS 1500 Customer brochure



A new perspective on performance.....

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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 the FDU* rotary degassing technology but 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.



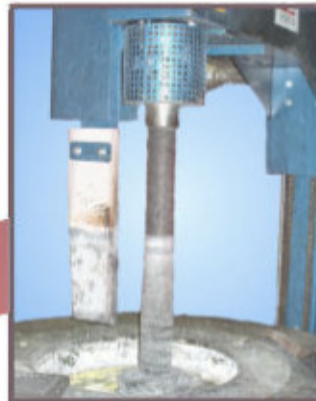
Process Parameters

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

1

Shaft and rotor Introduction

The shaft and rotor is first lowered into the melt



2

Vortex formation

The 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 is complete, the baffle plate is lowered into the melt to terminate the vortex and initiate the degassing phase.



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

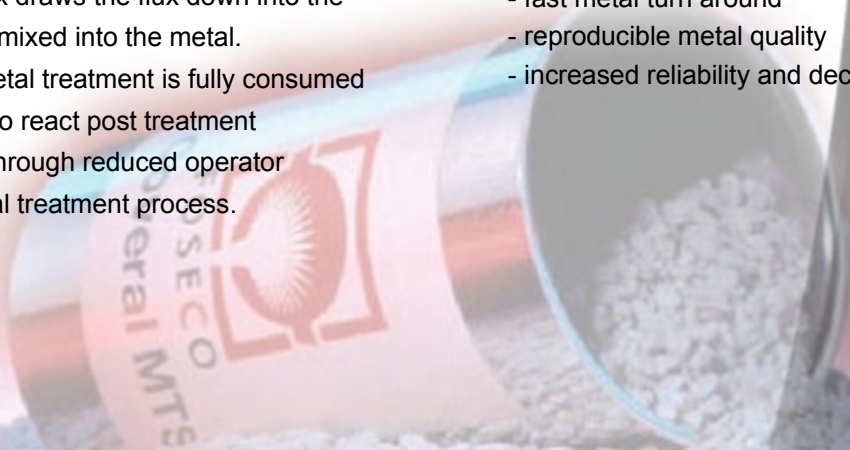
The MTS 1500 contributes to the foundry:

- 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



CASE STUDY A

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

Foundry Practice: Foundry A cast a 12% silicon alloy modified with sodium. The original practice was to make a manual addition of a granulated sodium modifying flux.

Foundry Requirements: Significant variability had been found in the modification process both in the amount of flux added and the length of time the flux was stirred in the melt. 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. Additionally, treatment times and the amount of flux added were reduced giving saving in treatment costs.

CASE STUDY B

The Foundry: A low pressure die foundry producing safety critical components for the automotive industry.

Foundry Practice: Foundry B melt centrally and then transfer metal to the casting furnaces using a transfer ladle. Metal treatment was carried out in the transfer ladle using a conventional rotary flux injection machine.

Foundry Requirements: The foundry faced reliability problems with the rotary flux injection machine which meant that a dedicated maintenance team was employed to periodically unblock the rotor and shafts. In addition, this frequent blocking of the shafts resulted in inconsistent flux delivery, variable metal quality and high scrap rates. The time required for maintenance

meant a significant down time resulting in high production costs.

Achievements: Installation of the MTS 1500 resulted in much improved reliability that has improved productivity and released the maintenance team for other work. Other benefits include a more efficient treatment process that has reduced treatment times and consumable costs.

CASE STUDY C

The Foundry: Foundry C produces a range of castings in both high pressure and low pressure.

Foundry Practice: Foundry C melt centrally and then transfer metal to the casting furnaces using a transfer ladle. Metal treatment was carried out in the transfer ladle using a rotary degassing unit and a manual addition of flux.

Foundry Requirements: The foundry wanted to expand its activity approximately four times and needed a second machine to increase metal treatment capacity.

Achievements: Installation of the MTS 1500 reduced treatment times to a point where all the increased volume of metal can be treated using the MTS 1500 with the original machine being used only as back up. 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.

economic value for the customer

Foundry A	FDU + Manual treatment	MTS 1500
Flux used	COVERAL* GR 2712	COVERAL MTS 1572
Amount of flux used	890g ±8%	270g ±3%
Treatment time	15 minutes (±3 minutes)	9 minutes
Variation in sodium content	±12.7%	±5%
Flux savings per year		€ 600

Foundry B	Conventional rotary flux injector	MTS 1500
Flux used	Proprietary product	COVERAL MTS 1565
Amount of flux used/treatment	300g +/- 24g	150g +/- 4g
Degassing time	7 minutes	3 minutes
Total flux used in year	8,500 Kg	4,000 Kg
Flux savings		€ 950
Nitrogen gas savings/year		€ 1,800
Aluminium content of dross	44%	36%
Metal savings/year		€ 3,000
Total savings/year		€ 6,000

Foundry C	Rotary degassing unit	MTS 1500
Production rate/day/machine	20,000 – 25,000 Kg per day	90,000 – 95,000 Kg per day
Number of ladles treated per day	25 – 30 ladles per day	112 – 118 ladles per day
Type of flux used	Proprietary flux	COVERAL MTS 1524
Treatment time	12 minutes	6 minutes
Amount of flux used per cycle	474g +/- 25g	350g +/- 10g
Consumable savings as calculated pro-rata for a daily treatment of 92,500 Kg		
Flux used per year	16,000 Kg	12,000 Kg
Total cost of nitrogen consumption (€ 1.04/m3)	€ 3,000	€ 1,500
Nitrogen savings		€ 1,500
Total metal savings / year		€ 13,500
Total cost savings / year		€ 15,000

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 new 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
- Keep smoke and fume to a minimum.



Application	Melting unit	Alloy type	Purpose	COVERAL
Cleaning and drossing	Bulk melting transport ladles, crucibles	All types of aluminium alloys except those sensitive to the presence of sodium	For metal temperatures of 700°C and higher. Reduces corundum build up. Removes oxides and other non-metallic inclusions. Produces a light dry dross	COVERAL MTS 1524
Sodium free cleaning and drossing	Bulk melting transport ladles, crucibles	All types of aluminium alloys but especially AlMg alloys	For metal temperatures of 650°C and higher. Reduces corundum build up. Removes oxides and other non-metallic inclusions. Produces a light dry dross	COVERAL MTS 1560
Sodium and calcium free cleaning and drossing	Bulk melting transport ladles	All types of aluminium alloys but especially AlMg and piston alloys	For metal temperatures of 650°C and higher. Reduces corundum build up. Removes oxides and other non-metallic inclusions. Produces a light dry dross	COVERAL MTS 1565
Sodium modifying	Crucible bale-out	AlSi alloys with 7-13% Si	Modifying metallurgical structure to reduce shrinkage defects and increase mechanical properties. For metal temperatures >720°C	COVERAL MTS 1576
Grain refining	Crucible bale-out	All aluminium alloys except hyper-eutectic alloys	Grain refinement for metal temperatures >680°C	COVERAL MTS 1584

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