



IN-STREAM INOCULATION FOR DEMANDING APPLICATIONS

MSI+ DC

THE NEW DYNAMIC AND CONTROLLED METAL STREAM INOCULATION SYSTEM

Highly reliable

Controlled addition

Consistent distribution

Reduced casting defects

Lower costs





MSI+ DC

Automatic in-stream inoculation system

The MSI+ DC is a fully automated in-stream inoculation system for use on mechanised and automatic pouring systems.

After having sold over 600 MSI 900 inoculation devices, the new generation, named MSI+ DC, was designed to meet the high requirements of the automotive industry.

It is extremely flexible and compatible with both modern and older pouring systems. It also incorporates all the functionality of the MSI 900 system.

The MSI+ DC consists of a control cabinet, a dosing device (the so called Hot Box) and a cable package. The switching equipment can be either triggered with an electrical signal or with the help of an optic module. Flow, level and amount of the inoculant, discharge pipe, flow rate, compressed air and equipment temperature are continuously monitored.

With the help of a camera, especially developed for use with MSI+ DC, the addition of inoculant to the metal stream can be accurately controlled.

All functions can be adjusted to the specific needs of the foundry. All critical pouring data such as date, time, number, pouring time and inoculant addition are recorded by the system and can be stored for an extended period of time.

This facilitates the ability to retrospectively check the inoculation parameters post-production.

According to the composition of the inoculant, melting and pouring temperatures and the chemical composition of the base iron, the effectiveness of the inoculant fades sooner or later after adding it to the molten metal.

In order to achieve consistent solidification, the inoculant has to be added as late as possible to the melt, ideally immediately before solidification begins. The efficiency of an inoculant is highest when it is added to the pouring stream as it enters the mould cavity.

The economical and effective application of inoculant places stringent demands on both inoculation product and equipment.

Ideally, the inoculant should must have a low melting point and have a consistent grain size distribution. It also has to be suitable for the specific iron composition used.

And here the benefits of Foseco products can be seen:

- The new MSI+ DC in-stream inoculation system provides a quick, convenient, controlled and comprehensible addition of inoculant to the melt and is ideally suited to meet the high demands of the automotive industry.
- In combination with INOCULIN*, Foseco's high quality inoculant range, it guarantees superior casting quality at a consistently high level.

Stabilising the nucleation state of iron: MSI+ DC ITACA

Because of process variability, such as the holding time and metal temperature in the pouring furnace, the nucleation state of iron varies.

This means that a constant inoculant addition rate will result in fluctuating final levels of nucleation, and therefore, varying metallurgy and properties (free-carbide, graphite-shape, shrinkage tendency, nodule count, nodularity, ferrite/pearlite ratio).

MSI+ DC ITACA combines and integrates ITACA (Incremental Thermal and Chemical Analysis) with an MSI+ unit. The iron is periodically sampled and the nucleation state is measured and automatically derived from the cooling curve and first derivative analysis.

ITACA measures the iron's actual carbonequivalent-value (CEV) and combines this with the nucleation state information so that the appropriate inoculant addition rate can be calculated.

The ITACA equipment fine-tunes the rate of INOCULIN delivery to compensate for the variability in the base iron. ITACA system is exclusive to Foseco's MSI+ DC system.



MSI+ DC control unit



MSI+ DC dosing equipment (Hot Box)



Internal view of the dosing equipment

MSI+ DC

Control and analysis with the help of MSI VISION

The MSI VISION equipment continuously controls the precise injection of INOCULIN in sufficient quantity into the iron stream during mould filling.

MSI VISION works by analysing the images taken by a digital camera which is directed at the plane formed by the iron stream and the end of the tube delivering INOCULIN.

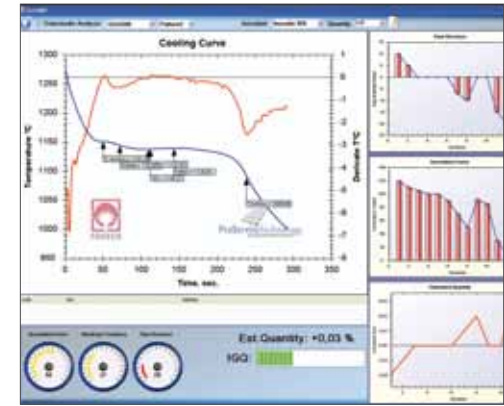
As soon as the iron stream appears during the filling cycle, the system detects and quantifies the presence of grains of inoculant visible in the iron stream. The system assesses the average left and right distribution and immediately alerts to any deviation observed.

To ensure perfect traceability, the MSI VISION equipment stores the images of each pouring operation. The data can be easily sorted by category and displayed by using INOVIEW software. In the event of a metallurgical problem with castings, this system therefore removes any doubt as to the quality of late inoculation of each mould poured.

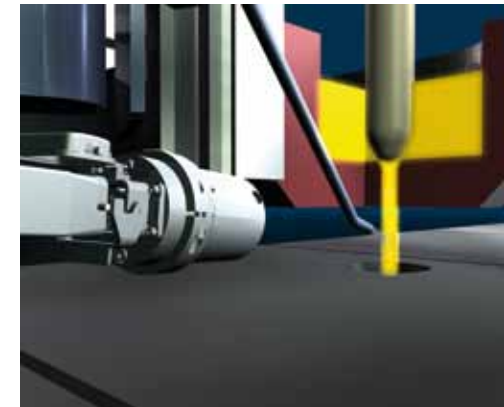
The MSI VISION equipment thus enables

- checking that each mould has been sufficiently inoculated
- the operator to ensure that the injection of inoculant is synchronised with the flow of the metal stream
- the operator to check that the inoculant stream is always directed at the metal stream (automatic misalignment checking).

MSI+ DC ITACA
cooling curve and
first derivative
analysis



MSI VISION
sensor



*FOSECO, the Logo and INOCULIN are trade marks of the Vesuvius Group, registered in certain countries, used under licence. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system of any nature or transmitted in any form or by any means, including photocopying and recording, without the written permission of the copyright holder or as expressly permitted by law. Applications for permission shall be made to the publisher at the address mentioned.
Warning: The doing of an unauthorised act in relation to a copyright work may result in both a civil claim for damages and criminal prosecution. All statement, information and data contained herein are published as a guide and although believed to be accurate and reliable (having regard to the manufacturer's practical experience) neither the manufacturer, licensor, seller nor publisher represents nor warrants, expressly or impliedly: (1) their accuracy/reliability, (2) that the use of the product(s) will not infringe third party rights, (3) that no further safety measures are required to meet local legislation. The seller is not authorised to make representations nor contract on behalf of the manufacturer/licensor. All sales by the manufacturer/seller are based on their respective conditions of sale available on request.
© Foseco International Limited 05/11.

Foseco International Limited
Drayton Manor Business Park,
Tamworth, Staffordshire,
England B78 3TL
Phone: +44 (0)1827 262021
Fax: +44 (0)1827 283725
www.Foseco.com
Please contact your local Foseco team



COMMITTED TO FOUNDRIES

VESUVIUS