
# ICU - INTELLIGENT COATING UNIT

Automated coating control and adjustment

VESUVIUS

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# High performance mould and core coating

## should be applied consistently

Increasing requirements from foundry applications such as thinner wall sections, complex internal geometries and new alloys, are driving the demand for high-performance coatings. However, high performance coatings need to be applied consistently to achieve best possible results on a repeatable basis. Poor application control can undermine coating performance and can in some instances lead to excessive scrap or rectification work.

### Traditional coating application control

Baumé and viscosity testing are widely used in the industry. The primary objective of these and other measures of control is the consistent application of optimum coating layer thickness. Controlling coating density, and ultimately wet layer thickness, enables the foundry to optimise coating application. Wet layer thickness can be adjusted to suit the demands of specific applications.

MORE ABOUT COATING LAYER THICKNESS ON PAGE 6

### Automated coating application control

The Intelligent Coating Unit (ICU) built on this idea to offer continuous density monitoring and control. Foseco has developed a range of equipment that is designed to optimise coating application.

- ICU Pro
- ICU Integrated
- ICU Modular
- ICU Continuous

### Benefits of coating application control:

+ Consistent coating layer thickness
+ Improved coating application efficiency
+ Reduction of coating layer related defects
+ Reduced casting scrap
+ Fewer scrap moulds / cores
+ Optimised drying
+ Improved productivity
+ Reduced coating disposal costs
+ Improved working environment
+ Lower casting manufacturing costs
+ Improved foundry profitability

# Intelligent coating unit

Options and Features

## ICU PRO

The 'mother' unit on which all subsequent ICU units are based

## INTEGRATED ICU

Integratable with customer dip tanks and flow coating stations

## MODULAR ICU

A lower-cost solution for foundries with limited space or that want a tailored solution

## CONTINUOUS ICU

To serve multiple end users without the need for a buffer tank

### ICU Features

- \+ Advanced, fast and almost maintenance free
- \+ Online density measurement system
- \+ Double filter setup for uninterrupted operation
- \+ Oversized 3" diaphragm pump to minimise shear stress on coating
- \+ Smart, web connected control cabinet with touch screen remote viewing/data logging
- \+ Remote access for service
- \+ Optional 24/7 service contract
- \+ Frequency inverter operated stirring device
- \+ Reliable overfill protection
- \+ 300 or 600 ltr working volume for continuous homogenisation & correct coating density supply
- \+ Optional Viscosity Measuring system
- \+ Coating Temperature Measurement
- \+ UV water treatment for disinfection of the water used for dilution

# ICU Pro

The standard version of the well proven concept

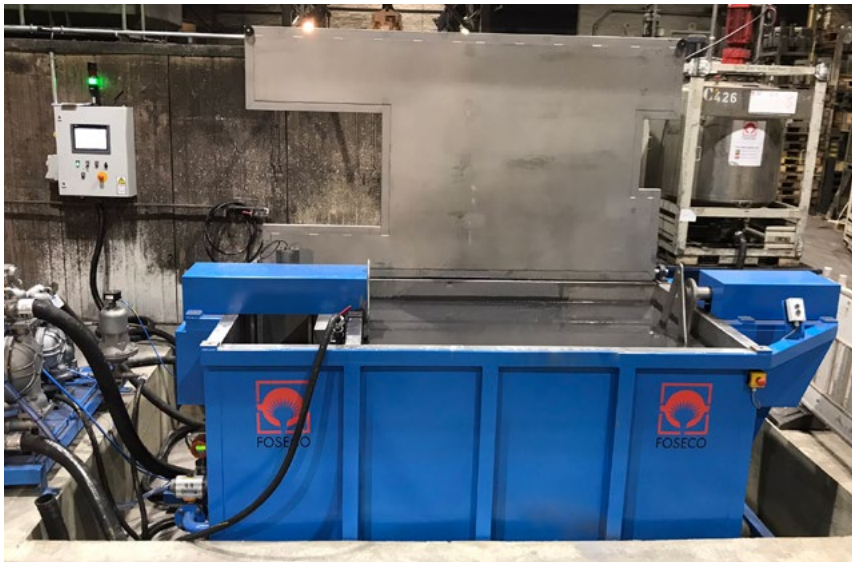
The ICU Pro is the original intelligent coating unit concept and is available for both solvent-based and water-based coatings. It delivers the following advantages:

- Consistent and predictable coating applications (layer thickness). Automatic dosing of coating or dilutant to maintain optimum density and avoid over-mixing.
- Optimised processing of diluted coating to maintain coating quality (avoid contamination, extend coating life).
- Continuous, automatic monitoring and recording of coating density.
- Reduced maintenance and downtime.
- Fully ATEX approved system – compliant with latest regulation 2014/34/EU.


# Integrated ICU

Integration of density control directly into the application

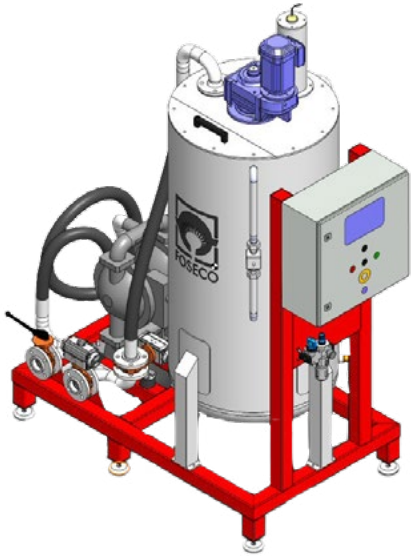
For all the benefits of the ICU Pro, many foundries do not require a central coating preparation plant. But this does not mean that the benefits of the ICU are beyond the reach of such foundries. The intelligent coating control functions of the ICU can instead be integrated directly into the dip tank. The Integrated ICU can thus be customised to the specific foundry application, for use with dip tanks of any size, and ensures that replenishment of raw coating or dilution medium takes place without delay.



# Modular ICU

Adaptable to individual needs

The Modular ICU is a lower-cost solution for foundries with lower coating demand, space constraints, or other bespoke requirements. Based on the original ICU concept it offers similar benefits in terms of coating preparation, continuous monitoring and adjustment, and application, all of which are optimised to the highest levels available in the industry. This minimises coating waste and ensures consistent drying times; maintenance and noise are also significantly reduced.

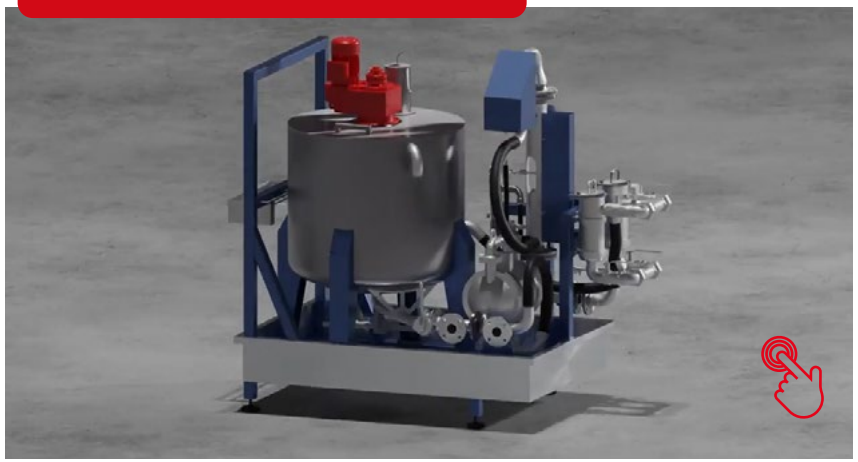


# Continuous ICU

Serve multiple end users without the need for a buffer tank

When multiple coating applications have to be controlled, the Continuous ICU can be used – without the need for an intermediate buffer tank. Density measurement occurs in a bypass system connected to the main preparation tank, which can then be used to supply application-ready coating to whatever end use is required (e.g., dip tanks, flow coaters, spray systems, etc.) in unlimited volumes.

SEE THE CONTIUOUS ICU IN 3D ROTATION



# Coating layer thickness control

Optimising coating application to achieve the highest performance

Figure 1: Coating baumé and viscosity vs. wet layer thickness

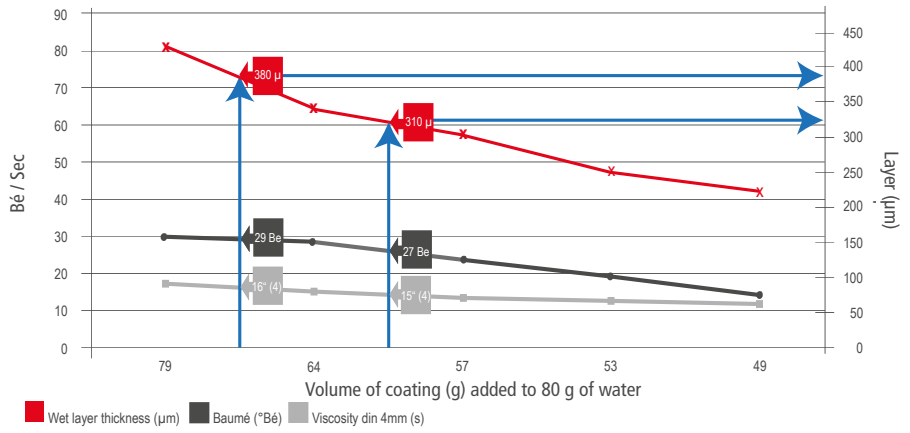
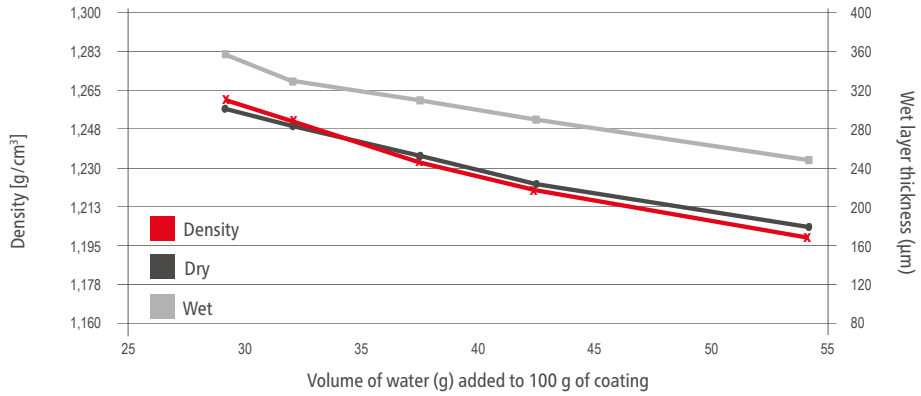



Figure 2: Coating density vs. dry and wet layer thickness




## The robustness of baumé and viscosity control methods is affected by a number of variables:

- \+ Operator influence
- \+ Coating temperature
- \+ Core temperature
- \+ Ambient foundry temperature
- \+ Energy put into a coating by pumping and mixing

The applied wet layer thickness can change significantly if either the Baumé or the viscosity control specification applied during the application is too broad (Fig. 1). To leave these critical parameters to a manual control and adjustment risks a number of problems that can eventually lead to increased cleaning and scrap costs.

## Density control

Density is directly related to the applied solids content in the coating (Fig. 2). Consequently, if coating density can be controlled, wet layer thickness consistency is greatly improved.

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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

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