



ICU - INTELLIGENT COATING UNIT

Automated coating control and adjustment



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. Hence Foseco has developed a new range of equipment that is designed to optimise coating application.

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. However, the robustness of such control methods is affected by a number of variables¹:

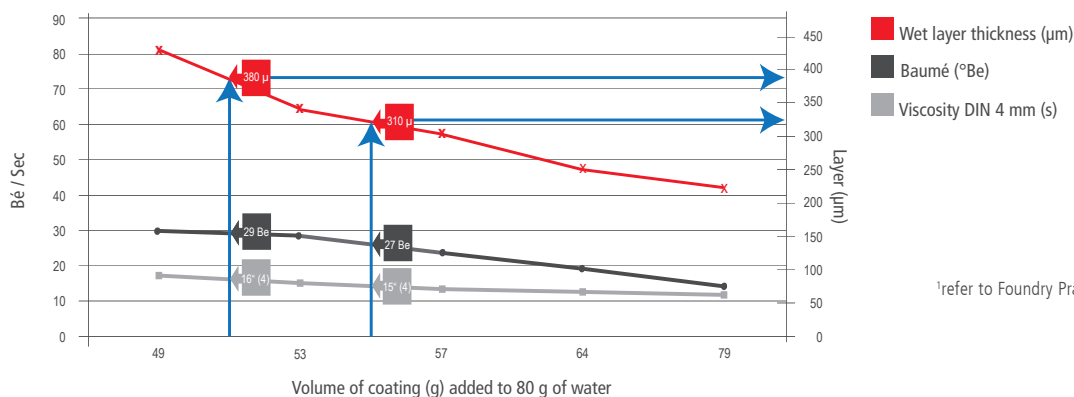
Variables

- + 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.

Fig. 1 Coating baumé and viscosity vs. wet layer thickness



¹refer to Foundry Practice 246 for more information

Viscosity is highly influenced by temperature, however, foundries do not typically adjust the set viscosity specifications in the cooler or warmer period of the year. Temperature induced viscosity change will have an influence on the final layer thickness applied, and therefore casting quality.

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.

Automated coating control

The Intelligent Coating Unit (ICU) uses robust sensors to measure very accurate density to the 4th decimal. It automates the adjustment of the coating preparation from its as supplied state to the required density to

achieve the desired wet layer thickness. Consequently, application consistency is lifted to previously unachievable levels.

Process consistency

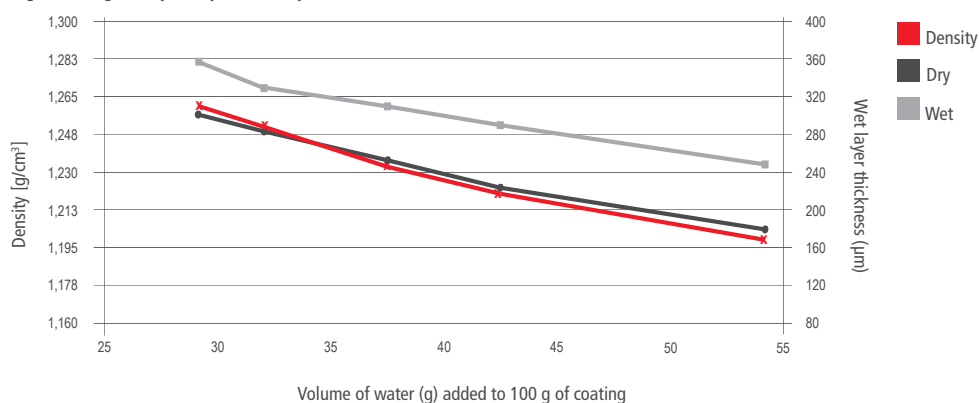
The consistency of the process is carefully monitored and controlled through a series of reports, information screens, text messages and alarms. The system also generates a comprehensive database of coating application information.

Versatility

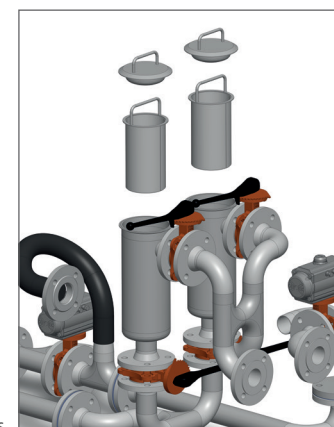
The ICU is available in 300 or 600 litre versions. Its built-in intelligence enables the unit to be highly configurable. It can receive coating from all typical coating supply methods and can supply all application processes, such as dip tanks, flow coating stations and spray equipment.

Optional water disinfection modules can be incorporated.

Fig. 2 Coating density vs. dry and wet layer thickness



Dip tank with integrated ICU control system



Main ICU assembly - filters



Water disinfecting system on ICU

Automated coating control

Optimising coating application to achieve the highest performance

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. Consequently, a number of benefits are achieved:

Benefits

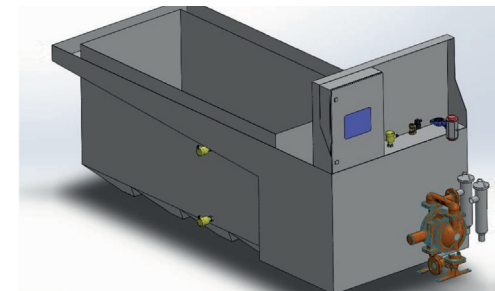
- + Consistent coating layer thickness
- + Improved coating application efficiency
- + Reduction of coating layer related defects
- + Reduced casting scrap
- + Fewer scrap moulds / cores
- + Optimised drying
- + Improved productivity
- + Reduced coating disposal costs
- + Improved working environment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

ICU Features

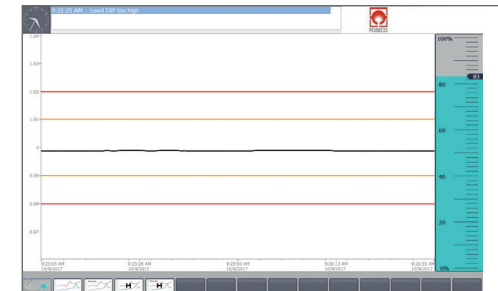
- + Advanced, fast and almost maintenance free inline density measurement system
- + Double filter setup for uninterrupted operation
- + Oversized 3" diaphragm pump to minimise shear stress on coating
- + Smart, web connected control cabinet with touch screen remote viewing/data logging
- + Remote access 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



Dip tank with integrated ICU



ICU intelligence integrated



ICU control accuracy and level control



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