

This online training course is presented over eight weekly sessions. It covers the origin, impacts and measurement methods for aluminium molten metal impurities, and the batch and in-line treatments designed to improve the quality of molten aluminium prior to casting.



## A fresh approach

Many technical training courses start from basic principles, building towards a detailed analysis of the particular technology. This often leaves attendees floundering in a sea of concepts and equations, unsure how the physical basics relate to the actual workplace.

Our approach, based on extensive experience in delivering training courses to industry, overcomes these difficulties. We first provide an appreciation of what the various technologies are expected to deliver to their customers, and why they are important. Only then do we consider how everyday operations relate to the physical basics.

Most importantly, we use workshops extensively, where attendees investigate the relationships between actuators they control (e.g. gas flow rate, furnace settling time *etc.*) and the performance of each manufacturing stage. All workshops are computer based for the live online course.

Such 'discovery-based learning' results in a deeper understanding, and better knowledge retention and usage in the workplace.



## Course structure

The course focuses on:

- the major impurities found in molten aluminium: dissolved hydrogen, inclusions and alkali metals
- the origin of each impurity, and the downstream effects which occur when the impurity levels become excessive
- the different techniques developed to measure the impurities, and their limitations
- technologies developed to reduce the impurities to acceptable levels: batch and in-line processing.

Each weekly session is centred on a seminar delivered live, allowing hand-raising and discussion.

Following the seminar, a related workshop is introduced, which attendees can tackle in their own time. This workshop is reviewed at the start of the next live session.

## Agenda

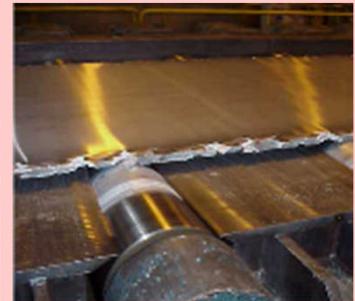
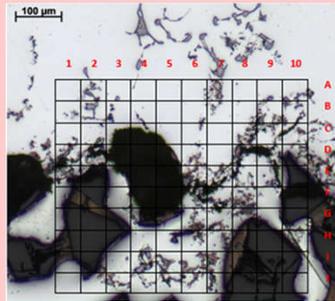
1. Introduction to molten metal quality
2. Hydrogen: origin and measurement
3. Degassing
4. Inclusions: measurement
5. Inclusion control: furnace practices
6. Filtration
7. Alkalis: origin and removal
8. Grain refinement

*'Would highly recommend this course to anyone looking to broaden their knowledge on metal treatment. The presenters are a great team, very knowledgeable and always happy to help'.  
T. Bown, Hydro*

## Course structure (cont.)

### Molten metal quality

The key quality measures of molten aluminium are introduced: hydrogen content, non-metallic inclusions and alkali metals. The problems encountered when their respective concentrations reach too high a level are reviewed, both in the cast operation, and during downstream processing. Measurement technologies are assessed and compared, and their limitations and best practices clearly explained.



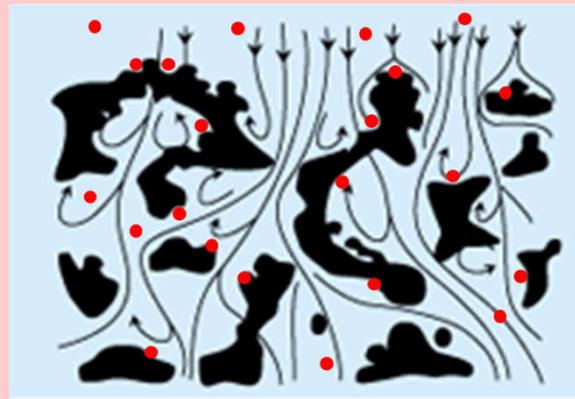
### Batch melt treatments (furnace, crucible)

Crucible treatments to control alkali metal are analysed, and the additional benefit of carbon removal demonstrated. Furnace fluxing practices, using either salts or reactive gas, are described and quantified in terms of alkali metal and inclusion removal. The limited potential to control hydrogen is understood in terms of the inevitable humidity content in the furnace atmosphere.

### In-line melt treatments

In-line degassers for the removal of dissolved hydrogen are described, and the relative advantages and disadvantages of box type and trough degassers compared. The dependence of degassing efficiency on operational parameters is explained.

The range of available technologies for filtration are compared (ceramic foam, bed and porous tube filters). The importance of priming and specific metal flow rate is emphasised, and best operational practices are determined.



### Presenters

**Paul Evans** and **Ricky Ricks** were formerly directors of research and innovation for Alcan. They set up **tsc** to help clients develop their technology strategy, including knowledge management and technical training.

**David Humphreys** has managed remelts and casthouses in Alcan and Alcoa and has extensive technical and practical expertise.

### Registration

Register online on the course website:

[www.training.tecstrat.com](http://www.training.tecstrat.com)

Alternatively contact us here: [enquiries@tecstrat.com](mailto:enquiries@tecstrat.com)

*'So in depth and yet so practical, these sessions! The TSC team is just incredibly knowledgeable. The best part is that they are ever ready to help you!! I was fortunate to attend three different courses with them around Metal Treatment and Cast House technology'.*

*S. Bhat, Foseco*

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