

# **The ten casting rules**

# The ten rules

- **The ten rules**
- The ten casting rules are listed sequentially as follows:
- **Rule 1. Good quality melt**
- *Immediately prior to casting, the melt should be prepared and treated, if necessary, using the best current practice.*
- **Rule 2. Liquid front damage**
- *The liquid metal front (the meniscus) should not go too fast.*

- **Rule 3. Liquid front stop**
- *The liquid metal front should not go too slowly and, more exactly, should not stop at any point on the front.*
- **Rule 4. Bubble damage**
- *No bubbles of air entrained by the filling system should pass through the liquid metal in the mould cavity.*

- **Rule 5. Core blows**
- No bubbles from the outgassing of cores should pass through the liquid metal in the mould cavity. Cores must be shown to be of sufficiently low gas content and/or adequately vented to prevent bubbles from core blows.
- No clay-based core or mould repair paste must be used (unless demonstrated to be free from the risk of creating bubbles).

- **Rule 6. Shrinkage damage**
- There should be no feeding uphill because of (i) unreliable pressure gradient and (ii) complications introduced by convection.
- Good feeding design should be demonstrated, following all ten casting rules, by an approved computer solidification model, and test castings.
- It is essential to control (i) the level of flash at mould and core joints, (ii) mould coat thickness and (iii) temperatures of metal and mould.

- **Rule 7. Convection damage**
- *The freezing time should be assessed in relation to the time for convection to cause damage.*
- **Rule 8. Segregation**
- Segregation should be analysed and predicted to be within limits of the specification, or out-of-specification compositional regions should be agreed with the customer. Channel segregation formation should be avoided if possible.

- **Rule 9. Residual stress**
- There should be no quenching of light alloy castings into water following solution treatment. (Boiling water is also not permitted, but polymer quenchant or forced air quench may be acceptable if casting stress is shown to be negligible.)
- **Rule 10. Location points**
- *All castings should be provided with agreed location points for dimensional reference and for pick-up for machining.*