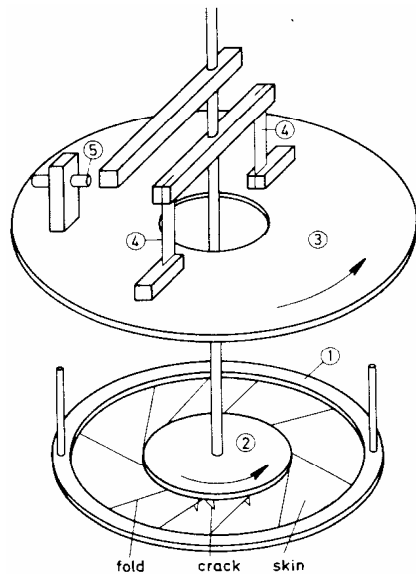


Oxide Skin Strength on Molten Foundry Al-Alloys

Martin Syvertsen, SINTEF Materials and Chemistry

Challenge

- Instant oxidation of aluminium
 - Generation of dross \Rightarrow metal loss
- Mould filling
 - Oxide skin break-up during filling



Strength:

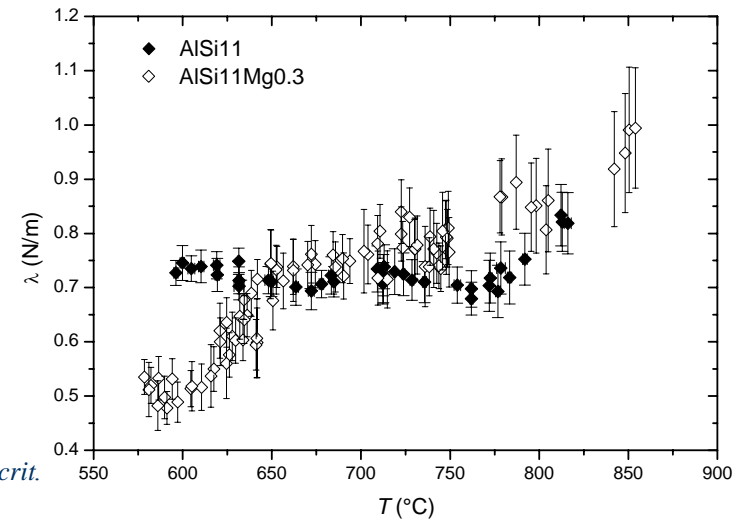
$$\lambda = T/2\pi R^2 \text{ (N/m)}$$

Dross formation

Freti (1985);
Amount dross
per time due to
melt flowing out
of a nozzle at
height h

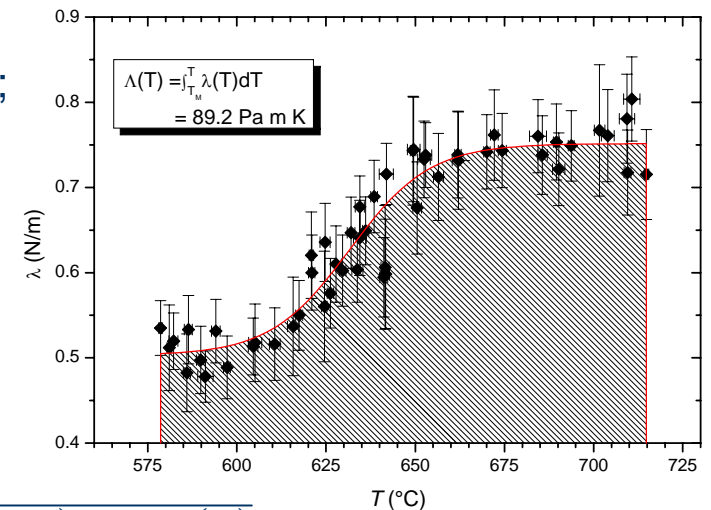
$$\dot{M} \propto h; \quad h \geq h_{crit.}$$

$$h_{crit.} \propto \lambda$$



Fluidity length

Hagen-Poiseuille;
low Re-flow in
circular tube
decreasing
temperature and
pressure



$$L(T) = \sqrt{C_1(T - T_M) - C_2\Lambda(T)}$$