

Final MSE-411

Q.1 Using Al-Cu phase diagrams ($C_0=4$) ($C_{\alpha+Al_2Cu}=5.65$ wt %, $C_{Cu}=33$ wt %, $C_{Al_2Cu}=54$ wt %, $T_{Al}=660$ C $T_{Cu}=555$ C)

- Calculate $k=?$
- Calculate m_l and m_s (slope of liq. and sol. lines)
- Calculate equilibrium solidification range
- Calculate non-equilibrium solidification range
- Calculate amount of non-equilibrium structure ($\alpha+Al_2Cu$) due to Gullier-Scheil Eq.
- Calculate amount of non-equilibrium phase of Al_2Cu

Q.2 Calculate complete dissolution time for Q.1 when $D_s=0.0001 \mu m^2/s$ and $L=100 \mu m$ (for $T=555C$).

Q.3 Calculate the feeder volume and size.

Q.4 Calculate the time to fill mould for Q.3

Q.5 Explain investment casting briefly and list its advantages and disadvantages

Q.6 Explain macrosegregation in steel ingots.

Q.7 Classify eutectic structures and explain briefly.

Q.8 Explain and list advantages of ceramic filters.

