

Question to be integrated into examination of EMEC 2002/2003

1. The aluminium alloy 226 has at 0°C a density of 2.75 [t/m³].
The coefficient of linear-thermal expansion is 20×10^{-6} [K⁻¹].
The volume increases from solid to liquid state by 6.5 %. The volume between 660 °C and 1000 °C increases linearly by 3 % .
What is the density of the liquid alloy at 800 °C?

2. A holding furnace of elliptical cross-section has the following inside measures:

Horizontal diameter	2.8 m
Vertical diameter	1.9 m
Furnace length	3.2 m.

The furnace can be filled up with the above mentioned liquid alloy with 800 °C to a bath depth of 40 % of the vertical diameter. Using the calculated density what is the holding capacity of this furnace in tons of liquid metal? If you do not have the accurate formula for the calculation of the area of an ellipse, make an acceptable assessment.