

AN INVESTIGATION INTO THE PHENOMENON OF INTERMEDIATE
TEMPERATURE DUCTILITY MINIMUM IN 70%Cu - 30%Zn

α -BRASS

ABSTRACT

As temperature increases, 70/30 α -brass loses its ductility, and at an intermediate temperature (whose magnitude depends on the strain-rate), this ductility becomes a minimum. A further increase in temperature brings about a sudden rise in the ductility of the alloy. Thus, α -brass shows a ductility-minimum at intermediate temperatures. This effect is explained in terms of two parameters - the work hardening exponent, and the strain-rate sensitivity. On the microscopic scale, the phenomenon can be explained in terms of intermediate temperature cavitation in the material which arises from a grain-boundary shearing mechanism.

At the strain-rate of $1.65 \times 10^{-3} \text{ s}^{-1}$ 70/30 α -brass exhibits ductility-minimum at about 510°C . The ductility-minimum temperature increases as the strain-rate is increased, being just over 600°C at a strain-rate of $1.3 \times 10^{-2} \text{ s}^{-1}$.