

I - INTRODUCTION -

The purpose of this study was to ascertain the suitability of using unsaturated superfluid helium as a coolant for superconducting coils. Comparative measurements of heat transfer occurring with the same sample immersed in normal helium, in either saturated or unsaturated superfluid helium, were carried out at various temperatures and pressures.

II - EXPERIMENTAL -

Figure 1 illustrates a typical coil cooling channel :

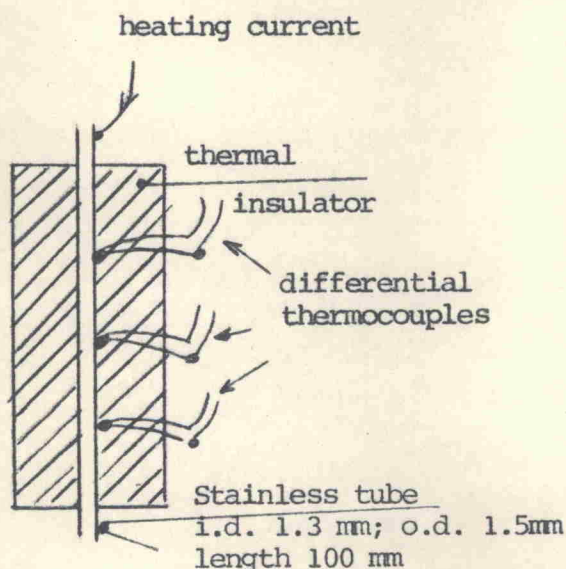


Fig. 1 : Diagram of the sample

this channel consists of a stainless steel tube, uniformly heated by an electric current of measured voltage and intensity. A thermal insulator (Stycast 2850 FT) covers the outside of the tube.

The whole assembly is immersed vertically in a helium bath for which pressure and temperature can be set independently.

Heat is evacuated through the inner heated tube, and rise in temperature with respect to the cooling bath is measured by three differential thermocouples (Au-Fe 0.3%; chromel) located outside the tube at three positions $1/4$, $1/2$, $3/4$ of the way up.