

# Pallador II

## A NEW HIGH-OUTPUT NOBLE METAL THERMOCOUPLE

Pallador II, a thermocouple with a temperature-e.m.f. relationship equivalent to that of Chromel:Alumel, has recently been developed in the Johnson Matthey Research Laboratories.

This new thermocouple, which is a logical development from the original Pallador I—a thermocouple with thermal e.m.f. characteristics comparable to those of iron:constantan—now means that noble metal thermocouples are available as direct replacements for the two best established base metal couples.

This is most important in situations where the base metal thermocouples can deteriorate due to oxidation or corrosion, with a consequent change in output and the possibility of serious reductions in mechanical strength.

The new thermocouple has a positive limb of palladium-platinum alloy, and a negative limb of palladium-gold alloy. It is possible to use Chromel:Alumel as a compensating lead, so that a typical installation would have a short length of noble metal thermocouple where the conditions are most severe and be

connected to the base metal leads for the run back to the instrument. There is, therefore, a considerable saving in initial cost and the increased reliability of such an arrangement makes it attractive. Instruments installed for use with the base metal thermocouple will be suitable for Pallador II, although for very accurate work they should preferably be recalibrated.

Pallador II is available in the bare wire or in metal-clad form. When used as bare wire it should be protected by the normal ceramic sheath, but probably the most useful form is in the metal-sheathed, mineral insulated metal-clad construction, which provides a compact and flexible assembly with excellent resistance to thermal and mechanical shock. The sheath of the metal-clad assembly may be of noble metal, stainless steel or of composite construction—part noble metal and part stainless steel. In applications such as the measurement of temperature in aircraft jet engines, where vibrations can impose stresses upon the thermocouple wire, this construction has many advantages.

*Calibration curves for Pallador thermocouples. Pallador I gives a temperature-e.m.f. relationship closely comparable to that of iron:constantan, while the new Pallador II couple provides a noble metal alternative to Chromel:Alumel. The curve for platinum:13 per cent rhodium-platinum included for comparison emphasises the exceptionally high response obtained with the Pallador couples*

