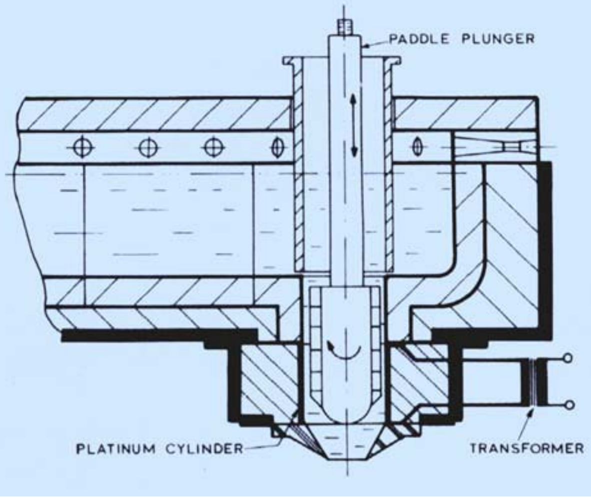
Platinum Components Improve Glass Container Manufacture

ADVANTAGES RESULT IN TEMPERATURE HOMOGENEITY AND CONSTANCY OF GOB WEIGHT

The glass container industry is continually seeking ways to improve its products, while at the same time striving to reduce its costs and improve its productivity in order to compete with other forms of packaging. For many years platinum has been widely used in the manufacture of optical glass, but a recent paper by Diether Böttger of Eglasstrek of Hochheim in the Federal Republic of Germany (*Glass*, 1983, **60**, (1), 36–37) demonstrates its great usefulness in the production of industrial and household glass.

Efficient glass container manufacture requires the formation of a thermally homogeneous glass gob of constant weight. These two factors are very difficult to achieve and for many years efforts have been made to overcome the production problems. Electrically heated bushings made in platinum or in a rhodium-platinum alloy have been used in the fibre glass industry for more than thirty years, and this concept has now been introduced into the container field in a procedure recently patented by Eglasstrek. By arranging several platinum contact flanges at regular intervals around the platinum cylinder that acts as a connection between the spout and the orifice ring the cylinder can be heated by direct current. This enables the molten glass to be heated to a constant temperature immediately before leaving the orifice ring, which is held against the platinum cylinder by a retaining attachment. The orifice ring may then be rapidly changed at any time.

Further, the conventional plunger is replaced by a platinum coated paddle plunger, as shown in the diagram, while the use of a double plunger of the same type is also possible. In this way a thermally homogeneous gob is produced and the quality of the glass is greatly improved with beneficial results when the glass is blown. The process known as HTG, Homogeneous Temperature of Glass Gobs, is said to be suitable for all types of glass products in container



In the process known as HTG, developed by Eglasstrek, an electrically heated platinum cylinder serves to maintain a constant temperature in the glass gob. The paddle plunger is also coated with platinum

glass, coloured glass, lead crystal and borosilicate glass, the advantages including flawless industrial and household glass and an exceptional constancy of weight. The author concludes that increased production and efficiency can definitely be furthered by the use of platinum components at a number of the most crucial locations.

A New International Thermocouple Standard

The International Electrotechnical Commission (IEC) based in Geneva is instrumental in forming new standards of measurements. Since all the industrialised nations of the world are represented on the IEC technical committees considering topics in which they have a special interest the decisions or agreements reached express as nearly as possible an international consensus of opinion on the subjects dealt with, and so promote international unification.

Of particular significance in the field of temperature measurement was the approval in 1978 of IEC Publication 584–1 "Thermocouples. Part 1: Reference Tables" containing the tables for use in converting thermocouple voltages into their equivalent measured temperatures and vice versa, which was reported here earlier (P. I. Roberts, *Platinum Metals Rev.*, 1978, **22**, (3), 89). These tables confirmed the e.m.f.-temperature relationships detailed in the British Standards Institution Publication B.S. 4937: Parts 1–7: 1973/74 and the U.S. National Bureau of Standards Monograph 125. Since that time a number of national standards—including those of Japan (JIS 1602) and Germany (DIN 43710)—have been re-issued to bring them into line with IEC 584–1.

However, even in 1978 it was realised that an international standard was required to define the manufacturing tolerances of thermocouples satisfying Part 1 of the standard. The relevant British Standard, B.S. 1041: Part 4: 1966 "Thermocouples" included a section on thermocouple tolerances, but was not considered to form an acceptable basis for an international standard, particularly as the tolerances applied to the noble metal thermocouples varied in a step-wise manner rather than increasing linearly with temperature. Now a new standard, IEC 584–2 has been issued.

Platinum Metal Thermocouples

The new standard contains the manufacturing tolerances for both noble and base metal thermocouples and representatives of Johnson Matthey Metals Limited and Engelhard Industries Limited assisted the relevant subcommittees of the British Standards Institution during the preparation of their comments on the IEC proposals relating to the three recognised noble metal thermocouple combinations, namely:

Type S: 10 per cent Rhodium-Platinum: Platinum
Type R: 13 per cent Rhodium-Platinum: Platinum
Type B: 30 per cent Rhodium-Platinum: 6 per cent Rhodium-Platinum

The National Committees of twenty-one major industrialised countries voted explicitly in favour of publishing the new standard.

IEC Publication 584–2 "Thermocouples Part 2: Tolerances" gives tolerance values for thermocouples manufactured in accordance with IEC 584–1 as delivered to the user but does not allow for calibration drift during service. The tolerance values for the noble metal thermocouples are tabulated below, t being the temperature in degrees Celsius; the greater value applies.

The new tolerance standard is to be adopted by the British Standards Institution and an equivalent British Standard will be issued in due course. P.I.R.

Thermocouple Type	Temperature Range °C	Tolerance Class		
		1	2	3
R or S	0–1600	± 1 °C or ± [1 + 0.003(t − 1100)]°C	± 1.5°C or ± 0.0025t	Not applicable
B	600–1700	Not applicable	± 1.5°C or ± 0.0025t	± 4°C or ± 0.005t