

Platinum Bubbler Tubes in Glass Melting

IMPROVEMENT OF QUALITY AND OUTPUT

Bubbling is now an accepted method of improving the thermal efficiency and output of a glass melting tank. Small bubbles of gas, introduced by way of bubbling tubes inserted in the siege of the melting end of the tank, expand and rise to the surface of the glass. The agitation mixes the lower cold layers of glass with the hotter upper layers. Glass is a poor thermal conductor and this mechanical mixing considerably improves the efficiency of heat utilisation; the glass melting rate is increased and so the output of the furnace improves.

The number and disposition of the bubbler tubes naturally varies with tank design but they are placed so that a curtain of bubbles rises across the full width of the tank. The bubbles bursting on the surface form a barrier to floating scum and prevent it passing into the refining zone. While rising the expanding bubbles also absorb other small pockets of gas or air in the glass and in this way improve the quality of glass produced.

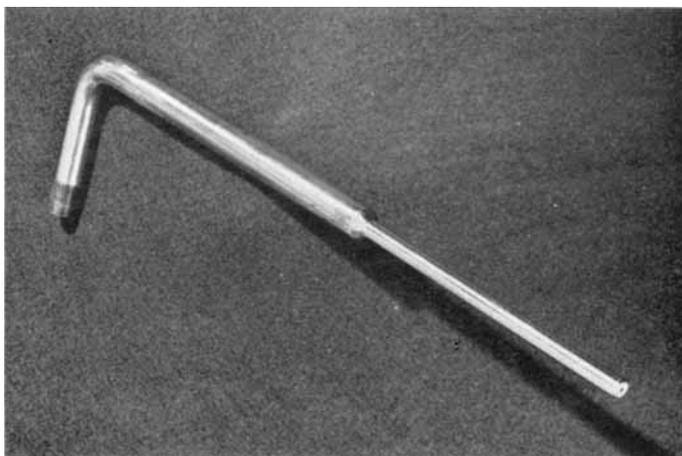
This technique is especially useful for glasses of high density, for example the 30 per

cent lead oxide containing glasses common in the radio and radio valve industry, and for highly viscous glasses such as the borosilicate heat resisting glasses.

The size of the bubble introduced into the glass is critical, and so the bubbler tubes must be made from material which can operate continuously in molten glass without being attacked. They must also be mechanically strong, be unaffected by the gas used for bubbling, and be capable of lasting the whole life of the furnace.

The illustration shows a typical 10 per cent rhodium-platinum/nickel composite bubbling tube. The bubble emerges from a hole of chosen diameter drilled on the top of the flat face. The length of the rhodium-platinum section is chosen so that the joint with the nickel is in a position where the temperature does not exceed approximately 700°C. If for any external reason a failure occurs the bubbler tubes may be replaced. Attached to the end of the nickel section, a coupling allows connection with a gas or compressed air line.

E.P.



A typical bubbler tube as fitted to a glass melting tank. The smaller diameter portion is in 10 per cent rhodium-platinum, welded to a larger diameter nickel tube