Platinum in Glass industry

Thermo white paper

Thermo Electric Corporation

Use of platinum in glass industries today is very vital as platinum is only metal which is un wetted to glass, so to improve the life of the assemblies which are in direct contact with molten glass platinum is essentially used.

In this paper we will discuss about an alloy of platinum called hardened platinum which is specially developed to be used in molten glass temperature measurement with thermocouples.

Platinum Thimbles for Thermocouples

Hardened Platinum Material Grain Stabilized Platinum

Thimbles made of special platinum alloy containing 10% Rhodium with small% of Zirconium oxide or yttrium oxide as grain stabilizer , are developed specially for the application in glass industries.
Theses materials offer significantly improved performance over conventional platinum and its alloys.

It is a new class of materials and has optimized it for special applications:

- High strength with good ductility in the high temperature range up to 1700°C .
- Excellent weld ability while the strength is maintained.
- Exceptional corrosion resistance and a more stable microstructure over longer service times.
- Less re-crystallization.

These characteristics allow for longer service lives for the individual components and permit the precious metals to be used more economically, for instance through reduced wall thicknesses. The higher strength of the material also has a stabilizing effect on the equipment manufactured from it. Strengthening components of e. g. molybdenum, ceramics or refractory metals thus become effectively redundant. The inclusion of finely distributed zirconia as a dispersion impedes grain growth to a temperature just below the melting point. Due to the modified, finer microstructure, it is considerably less sensitive to corrosion processes along the grain boundaries than comparable materials. This ensures better corrosion resistance.

Material	Density g/cm^3	Melting Point or solidus Temperature °C	Vickers hardness	Stress repture strength 100 h / 1400°C N/mm^2	100h / 1600°C N/mm^2
Pt	21.4	1772	45	< 1	-
Pt-10Rh	19.9	1840	95	5	2.8
Pt Harden ed	21.3	1772	72	25	-
Pt-5Au Harden ed	21.3	1675	115	5	-
Pt-10Rh Hardened	19.9	1840	150	40	17.0

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