

## Casting Platinum Jewellery – A Challenging Process

Although rapid advances have been made in equipment and materials used in the process, casting platinum for jewellery is still a challenge. At around 2000°C, getting the melt temperature absolutely right for the size, type and number of pieces being cast is a fine balancing act, as is judging the correct mould temperature. Too low and the result could be an incomplete fill; too high and shrinkage porosity may occur.

It is often the caster who is blamed for porosity, but it should be remembered that a casting does not have the same structure as wrought material. All castings are porous to some extent, and it is unfair to compare any casting with a piece made from sheet or wire. Even poured ingots start out porous, but have the porosity 'squeezed' out of them during forging, rolling or drawing to sheet and wire.

Polishing platinum is very different from polishing gold. The surface of gold 'smears' and can be buffed to a high polish. Platinum, however, must be polished with abrasives, and since the whole of a casting is porous it is impossible to achieve the same surface finish on an untreated cast platinum product as could be obtained on a handmade or stamped and machined platinum piece.

An 'as-cast' structure is also softer and more brittle than a worked structure, and untreated platinum castings can be more prone to denting and deforming than pieces made from wrought platinum. Platinum-cobalt or platinum-ruthenium alloy systems are commonly used because they provide relatively hard castings (see Table I). So jewellers should ensure that they use one of these, or an alloy of equivalent hardness.

Getting the alloy right is essential, but there are other measures that manufacturers and designers can take to improve their cast platinum pieces and reduce the time and effort spent finishing them.

The first is to help reduce the amount of

| Alloy        | Hardness, Hv |
|--------------|--------------|
| 95% Pt-5% Co | 135          |
| 95% Pt-5% Ru | 130          |
| 95% Pt-5% Cu | 108          |
| 95% Pt-5% Ir | 80           |
| 95% Pt-5% Pd | 68           |

porosity in a piece, both through its design and by paying attention to how it is sprued. Rapid changes in cross-section and sprueing into fine sections can cause flow problems and result in poor castings. New designs should be discussed with the caster, seeking their input in the model making process. The second measure is further processing of the casting after delivery. Much can be done to improve the 'as-cast' structure on the surface of the casting by using a burnishing process (1, 2).

Burnishing a platinum casting squeezes out porosity near to the surface, and puts some work into the piece. The hardened surface makes it more resistant to denting and deformation. Although this is an extra process, it actually saves on finishing time by smoothing out the rough cast surface and reducing polishing time.

*This is an abridged version of an article originally published as Reference (3).*

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### References

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- 2 J. Maerz, *Jewellery in Britain*, 2004, (19), 7
- 3 N. Swan, *Jewellery in Britain*, 2004, (19), 5

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