

# CASTING PERFECTION

Overcoming technical challenges when casting Zoltan David's African Promise pendant

The African Promise pendant, designed by Zoltan David of Bee Cave, Texas, has the appearance of a hand-fabricated piece. However, it was actually cast by Techform Advanced Casting in Portland, Oregon. Made of palladium with 24k inlay, the piece offered some daunting casting challenges—thin walls and sharp angles that could lead to incomplete fills, cutouts that could clog with investment. But David wanted perfection, and how Techform helped him realize that vision serves as a case study in how technical obstacles can be overcome, without compromising integrity or vision.

Casting a piece of this shape and size—it measures 54 mm long by 30 mm wide—with relatively thin walls (1.1 mm) in palladium is a challenge because of the metal's quick solidification rate. "When you are casting a piece with thin walls and sharp angles in palladium, you need to ensure that there are enough sprues to enable proper feeding for optimal fill and solidification, as well as degassing," explains Teresa Fryé, owner of Techform.

"We worked with Zoltan to build sprue pads into the CAD file. These pads enable a nice clean connection between the sprue and the piece—much better than simply waxing the sprue onto the model. This has to be a true collaboration between the designer and the caster to ensure that there are enough properly placed sprues for feeding, and that they are the correct diameter and height. From the designer's perspective, he wants the cleanest connection possible, which results in easier clean up and less metal loss."

Another challenge when casting this piece was preventing investment failure in all of the cutout areas, which include the grooves for David's patented inlay technique and the cut-away details on the body of the pendant. "If all of these cutouts are sharp 90 degree angles, you will no doubt get cracks in the investment, which result in inclusions and pitting in the cast surface," says Fryé. "We consulted with Zoltan to build a radius of at least 0.05 mm into [the cut-away areas]." Such a small radius will improve casting quality yet be barely

discernable to the naked eye.

In addition, the holes built into the CAD file for the 1.5 mm diameter (0.015 carat) diamonds set in this piece were carefully evaluated by Techform to be sure that the depth was shallow enough to prevent investment failure. "As a general rule, you don't want the depth of a hole to exceed its diameter by very much, especially on small diameters where a strong bond with the investment is more difficult."

Last, it was essential to cast the bail for the pendant as a separate component. "You'd never be able to feed the bail through the pendant and avoid shrinkage porosity where the pieces come together," says Fryé. "Casting as two separate components that are carefully joined by the laser is much cleaner and gives the piece the fabricated look that Zoltan strives for in most of his work."

In the end, the process was a true collaboration between the designer and the caster—and it resulted in a quality cast piece that is difficult to distinguish from a hand-fabricated creation. Zoltan David's vision was perfected.

A donation for a fundraiser for the nonprofit Africa's Promise Village, the African Promise pendant by designer Zoltan David is cast in 950 palladium and features the designer's patented 24k gold inlay technique. It showcases a 6.7 carat oval tanzanite donated by the Liquidation Channel. The retail value of the finished piece is \$14,900.

To prevent investment failure in the cutout areas of the piece, which include the grooves for David's patented inlay technique and the cut-away details on the body of the pendant, David builds a radius of at least a couple thousandths into these features.

The bail for the pendant was cast as a separate component. "You'd never be able to feed the bail through the pendant and avoid shrinkage porosity where the pieces come together," says Teresa Fryé of Techform Advanced Casting. "Casting as two separate components that are carefully joined by the laser is much cleaner and gives the piece the fabricated look that Zoltan strives for in most of his work."

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Casting a piece of this shape and size—it measures 54 mm long by 30 mm wide—with relatively thin walls (1.1 mm) in palladium is a challenge because of the metal's quick solidification rate. Fryé worked with David to ensure the designer added enough sprue pads to the piece to enable proper feeding and allow the metal to degas. "We worked with Zoltan to build sprue pads into the CAD file," says Fryé. "These pads enable a nice clean connection between the sprue and the piece—much better than simply waxing the sprue onto the model."