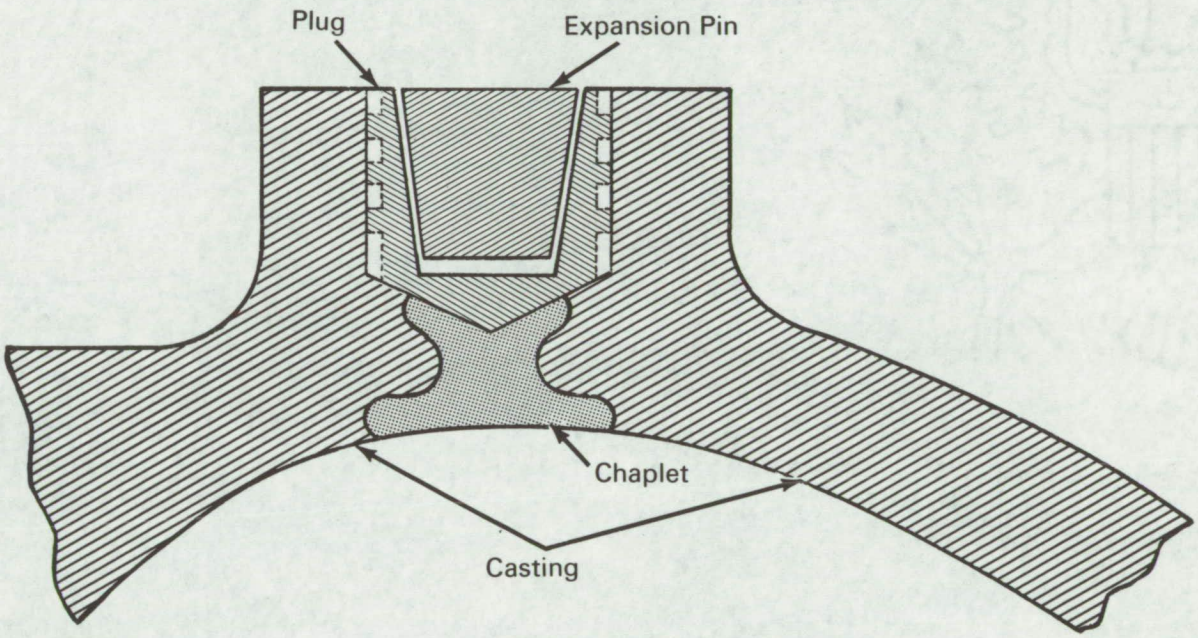
NASA TECH BRIEF

Plug Replaces Weld Filler as Seal in Complex Casting



The problem:

In casting a complex volute, it is necessary to support the mold core with small blocks, referred to as chaplets, during the casting process. These chaplets become an integral part of the housing but frequently fail to fuse completely with the poured metal and a leakage path results. It has been the practice to drill out the outer end of the chaplet and then backfill with weld metal. This is an expensive process and requires X-ray inspection to assure weld integrity. Warpage sometimes occurs during welding and subsequent heat treatments are required to restore the casting to design dimensions.

The solution:

Instead of backfilling with weld material, the chaplet is drilled out and an expandable metal plug is inserted to provide the seal.

How it's done:

The mold is supported in the normal manner with chaplets. Following pouring, the casting is heat treated to the desired condition. Then the end of each chaplet is drilled out so that a close fitting, expandable plug can be inserted.

(continued overleaf)

Notes:

1. Expandable plugs, capable of withstanding extremely high pressure are commercially available in a wide range of sizes.
2. Weld-warpage and multiple X-ray inspection are eliminated by use of this technique. This new method can result in a cost saving of $500 per component.
3. Inquiries concerning this innovation may be directed to:

   Technology Utilization Officer
   AEC/NASA Space Nuclear Propulsion Office
   U.S. Atomic Energy Commission
   Washington, D.C. 20545
   Reference: B66-10489

Patent status:

No patent action is contemplated by NASA.

Source: R. L. Goundrey and C. L. Harris
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