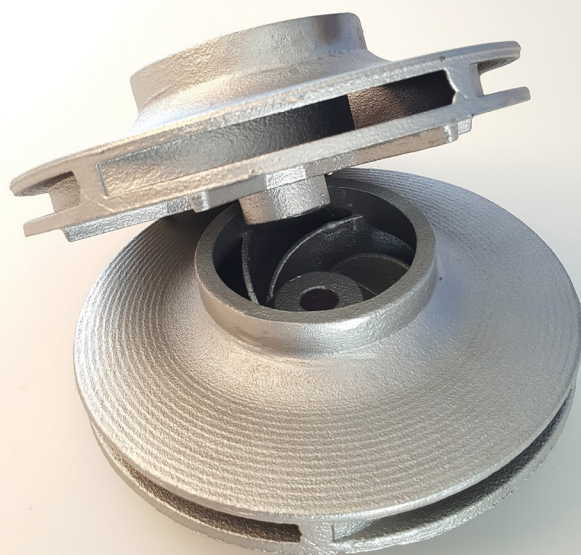


Obtaining hydraulic impellers using additive manufacturing technologies



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Sector: Energy

Challenge: The challenge of the project is to obtain two impellers using additive manufacturing technology, to reduce manufacturing time.

Solution: Indirect manufacturing was chosen using sand molds obtained by 3D printing in binder jetting technology and later casting.

CHALLENGE

Hydraulic impellers are elements of centrifugal pumps that require high reliability and durability. They are components of complex geometry, expensive and of low production, since they are part of pumping systems and very few units are required per year. The objective and challenge of the project is to obtain two impellers using additive manufacturing technology, which reduces manufacturing time while maintaining the performance of the component.

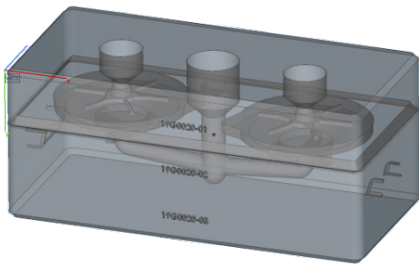


Conventional hydraulic pump impellers.

SOLUTION

To solve this challenge and taking into account the main requirements of the impeller -design, functionality, performance, time- it was opted for indirect manufacturing using sand molds obtained by 3D printing in binder jetting technology and later casting. The design and manufacture of the sand mold by 3D printing allows

the rapid obtaining of a complex mold made up of few elements. In the customer's case, the mold consisted of two cavities and was made up of only 5 parts.

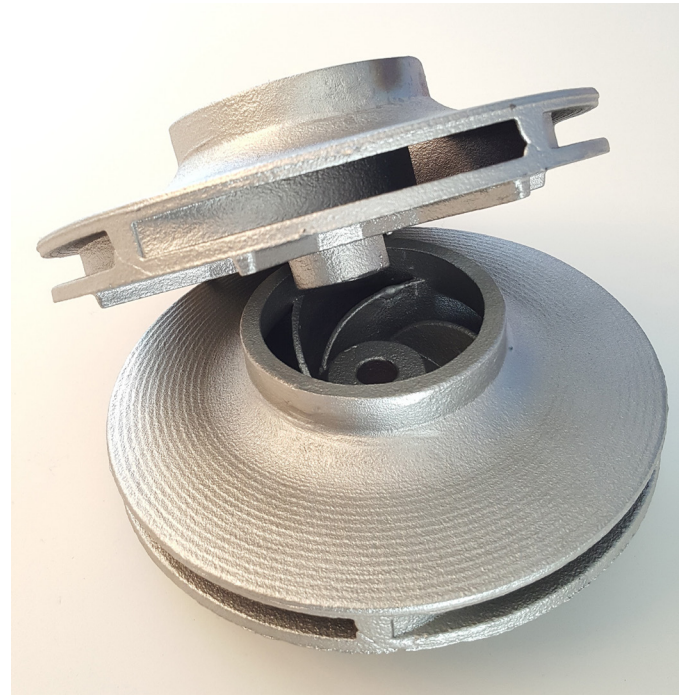


Process for obtaining the impellers: mold design - 3D printing of the sand mold - casting of 2 impellers.

ADVANTAGES

The manufacture of the impellers by casting with 3D printed sand molds allows obtaining several benefits, both at the part and mold level:

- Reduction of the manufacturing time of the molds (approx. 8h), and therefore of the process of obtaining the impellers.
- The cost is somewhat higher (approx. + 20%), acceptable since it is in the order of magnitude of hundreds of euros and in many cases they are unique pieces, of high demand and above all of high impact, where the time of obtaining is critical.
- The 3D printing mold can be geometrically much more complex than a conventional mold, also reducing the number of parts that make it up, facilitating the assembly and the casting process, which does not require a sandbox.
- The impellers casted with these molds obtain the same mechanical and surface properties, obtaining the same quality of part.



Impellers obtained with 3D printed sand molds