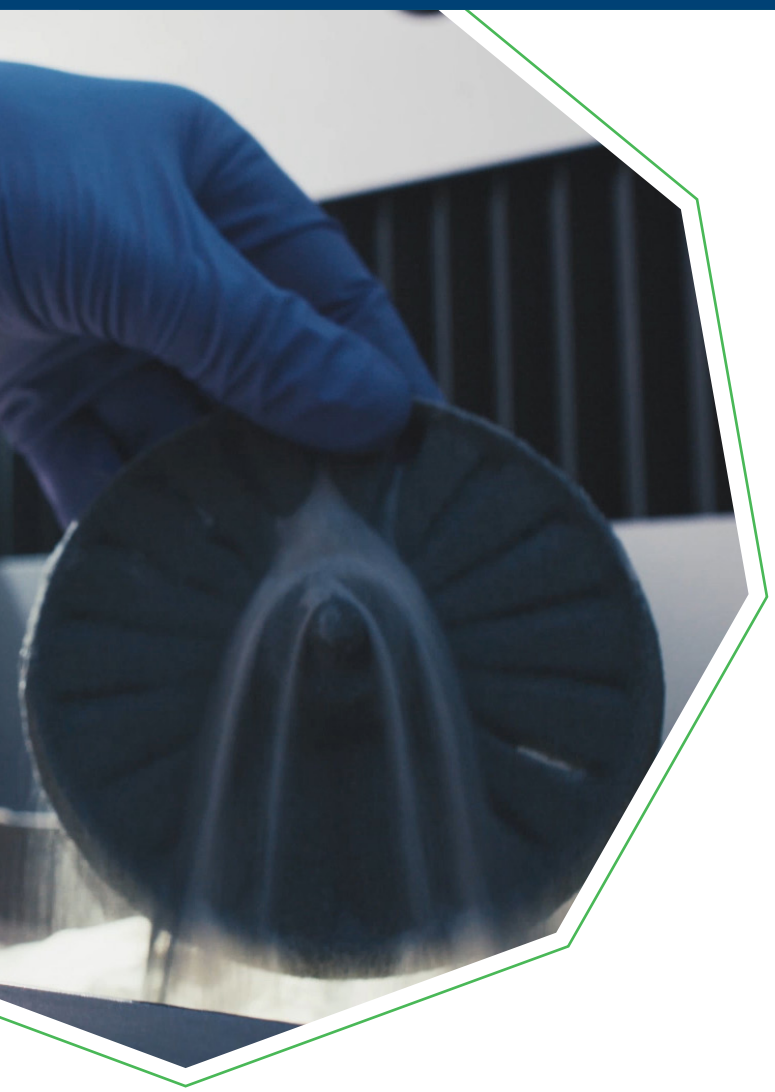
ASKURAN™ 3D



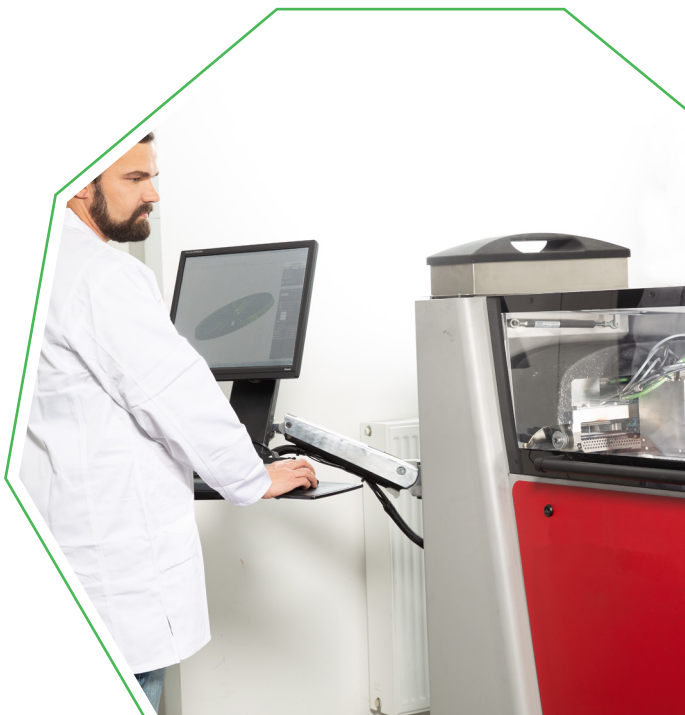
BISPHENOL A-FREE FURAN RESIN SYSTEM FOR 3D SAND PRINTING

Whether for prototypes or small batches, the advantages of additive manufacturing are obvious: the ability to represent geometries that cannot be represented in conventional core manufacturing processes, great flexibility, no waiting time for a new pattern or reduction in pattern stock, to name a few.

Furan resin-based binders for acid curing, known as ASKURAN™ 3D, have established themselves as a reliable and robust standard method.
ASK Chemicals has now further developed the well-known ASKURAN™ 3D furan resin technology into bisphenol A-free furan resins to establish a binder system with improved environmental labeling that matches the high quality and robustness of its BPA-containing predecessors.

TECHNOLOGICAL ADVANTAGES

- Simple and versatile
- Nitrogen and water free
- Very high reactivity
- High strengths
- Good process and printing stability
- Can be used with all common molding materials
- Suitable for all types of casting
- Very long storage stability of the binder



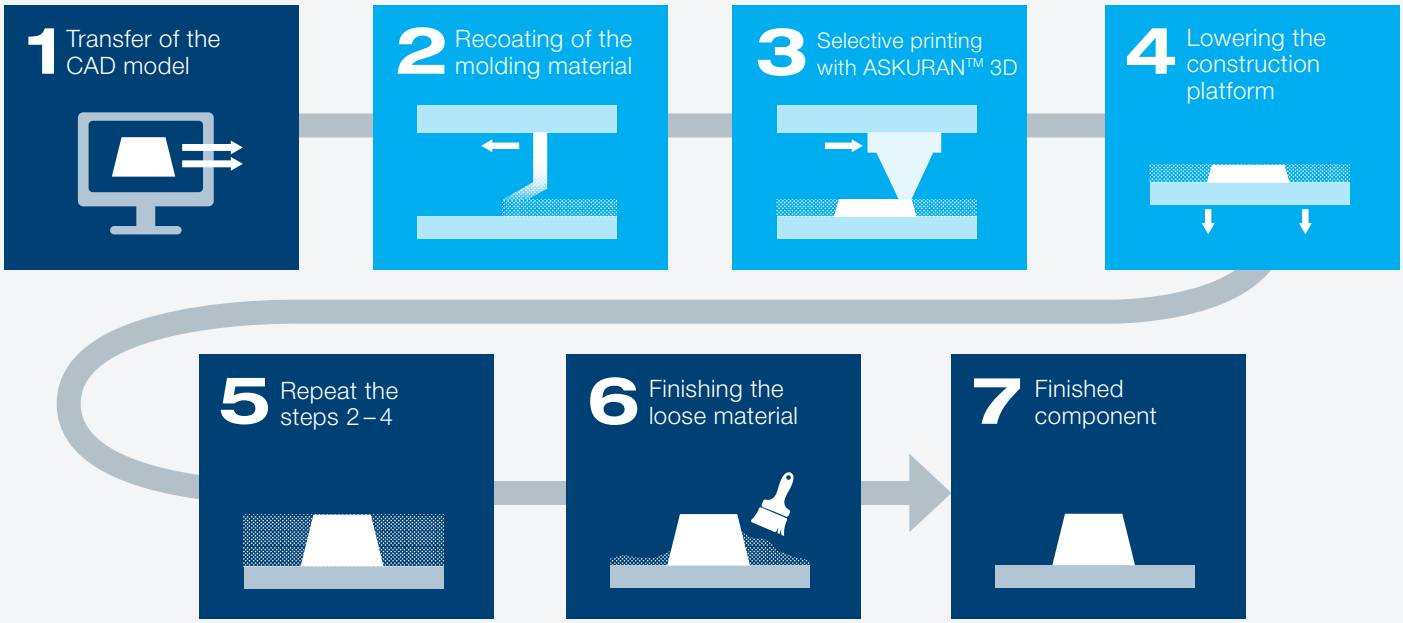


Figure 1: Process steps of the powder binder jetting process

3D sand printing process

In 3D sand printing using the powder-binder jetting process, cores and molds are created without tools on the basis of a digital 3D data model by applying the mold base material layer by layer. In the furan resin-based process, the mold base material is wetted with an acid hardener. This is followed by the application of a thin layer of the already activated mold base material („recoating“). The liquid binder is then applied selectively to the areas to be formed and the construction platform is lowered. The step-by-step repetition thus creates the geometry specified with CAD. At the end of the print job, the excess sand is removed and the printed core is removed and cleaned (finishing).
The proper functioning of the print head modules, which apply the printing fluid finely to every layer of sand, is crucial for the quality of the print result. High material compatibility and resistance of the components installed in the printhead modules to the chemical components of the 3D printing fluid is essential. In addition, the physical and chemical parameters of the 3D printing fluid, e.g.viscosity and surface tension, affect the droplet formation behavior and thus the dimensional stability of the additive core manufacturing process.

Furan resins containing bisphenol A

The bisphenol A-containing furan resins have established themselves over the years as state-of-the-art furan resin-based binders for 3D sand printing. Bisphenol A (CAS no.: 80-05-7; 4,4‘-isopropylidenediphenol), however, is a chemical that poses significant environmental and health risks. For example the media have reported a ban on the use of bisphenol A in the manufacture of drinking vessels and bottles for infants and young children.
Bisphenol A has now been classified as a reproductive toxin, among other things, and has been identified as a substance of very high concern (SVHC) under the REACH regulation. It is an endocrine disruptor (hormonally harmful substance) to human health and the environment. Further restrictions on use are currently under discussion.

Bisphenol A-free ASKURAN™ 3D

The new Bisphenol A-free ASKURAN™ 3D technology now enables print users to switch to a safe furan resin system without compromising on the robustness of the printing process or casting quality. Bisphenol A-free ASKURAN 3D shows excellent stability during printing, ensures a stable process with consistent quality and generates high strength. At the same time, the use of bisphenol A, which is harmful to the environment and health, is avoided.

YOUR SUSTAINABILITY**PLUS**

Profitability

- Good productivity thanks to good process and printing stability

Environment & Social

- Bisphenol A-free (BPA-free)
  - Improved classification
  - Improved occupational safety