



Material data sheet for Furan-Direct-Binding (FDB) sand molds

MOLDING MATERIALS

Molding material	Silica sand			Cerabeads
Type	GS 14	GS 19	GS 25	Cerabeads
Medium grain size (µm)	140	190	250	200
Application	Molds and cores with high surface requirements	Cores with high gas permeability	Cores; highest gas permeability	High thermal resistance, low thermal extension, good packaging, good strength and surface, alternative to Chromite, Kerphalite or Zircon
Loss on ignition (weight %)	≤ 1.9	≤ 1.9	≤ 1.9	≤ 1.5
Layer thickness (µm)	300	300/400	300	300
Bending strength (N/cm ²)	≥ 220	≥ 220	≥ 250	≥ 300
Gas permeability	≥ 80	≥ 180	≥ 300	≥ 150

TECHNICAL DATA FOR SAND MOLDS

Build platform	4,000x2,000x1,000 mm
Molding material	Silica sand of different grain size
Binder-type	Cold hardening furan resin
Binder-content	Adjustable between 0.9-2.1 weight %
Layer thickness	300–400 µm; standard 300 µm
Accuracy	± 0,1 % (min. ± 1,5* layer thickness)
Bending strength	From 220 N/cm ² (depending on sand and/or binder used)

PROCESS

The build process is as follows: Sand pre-mixed with acid is applied to the build platform in the job box. The sand layer is smoothed out during the application process. Then a furan resin binder is printed on the sand at the locations that correspond with the cut through the component. The build platform is then lowered by one layer. The application, printing and lowering processes are repeated until the component is complete.

The job box holding the component is removed from the machine after the build process. No waiting times are required since an adequate level of unpacking strength already forms during the build process.

A strength of min. 220 N/cm² is reached at the time of unpacking (with the exception of FDB 2/90 SI). Therefore both small and large components can be unpacked safely.

Rough cleaning is carried out manually using brushes and paint brushes. More intensive cleaning is carried out using compressed air. Prior to cleaning, the components are dried in the furnace at 90°C, so that adherent particles can be removed more easily.

APPLICATION

FDB sand molds are extremely strong and cost-effective. Their range of characteristics makes them suitable for the production of molds and cores for casting applications. Large and small wall thicknesses are possible. The binder system allows for the safe unpacking of molds up to 4 meters long and a weight of more than 5 tonnes.

The casting behavior in metal casting is similar to that of conventional furan resin binders. The high specific strength of the binder allows for the use of low binder contents. This results in a moderate discharge of gas, which can be safely controlled by selecting the proper basic molding material.

FDB is not only used for metal casting applications. The infiltration of FDB molds is also an option. Epoxy resins result in high tensile strengths of more than 30 N/mm². The color of the molds will change over time.

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