



## Material data sheet for Phenolic-Direct-Binding (PDB) sand molds

### MOLDING MATERIALS

Molding material	Silica sand
Name	PDB 6.4/140 SI
Average grain size (µm)	140
Application	Molds and cores with demanding requirements for surfaces
Total loss on ignition (weight %)	2.0–2.6

### TECHNICAL DATA FOR SAND MOLDS

Max. size	1,000 x 600 x 500 mm
Molding material	Untreated silica sands in different granulations
Bindertype	Phenolic binder
Layer thickness	250–300 µm, Standard 300 µm
Resolution	approx. 200 µm (depending on sand used)
Accuracy	± 0.1 % (min. ± layer thickness)
Bending strength	250–500 N/cm <sup>2</sup> (depending on sand or binder used)
Recycling rate	almost 100 % of the unbound sand

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## PROCESS

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The build process is as follows: Sand is applied to the build platform in the job box. The sand layer is smoothed out during the application process. Then a specially developed phenolic 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 sand is heated using an infrared lamp in process.

The job box holding the component is removed from the machine after the build process.

A sufficient strength is reached at the time of unpacking. Therefore both small and large components can be unpacked safely.

Rough cleaning is carried out manually using brushes and paint brushes. More intensive cleaning must be carried out using compressed air or sand blasting. Ideal for sand blasting purposes are particles that are much smaller than the basic molding material and that are made of the same material.

The component can be further hardened in the furnace after cleaning. The component is no longer thermo-plastic shortly after the build process, and maintains its dimensional stability during the furnace process.

## APPLICATION

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PDB sand molds are extremely strong. 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 casting behavior in metal casting is similar to that of conventional phenolic 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.

PDB is not only used for metal casting applications. The infiltration of PDB molds is also an option. Epoxy resins result in high tensile strengths of more than 30 N/mm<sup>2</sup>. After the furnace process, the models change very little over time.