



Technical Data Sheet

Warm Box System

The Warm Box System is a recent development in core-making technology. The resin is a high furfuryl alcohol content copolymer. The catalysts are acidic solutions of various salts. The resin, catalyst, and release agent are mixed with the sand to form a sand mix with a long shelf life. The mix is then blown into a pattern heated to 300°F to 450°F and cured. The heat from the pattern rapidly accelerates the cure of the resin to an insoluble, infusible solid: The core remains in the box long enough to develop adequate strength to be handled and is then ejected from the box. Curing continues as the core cools.

ADVANTAGES OF THE SYSTEM:

- Improved Core Quality
- High Tensile Strengths
- Long Bench Life
- High Core Density
- Reduced Cycle Times
- Fewer Casting Defects Due to Gas
- Lower Formaldehyde Emissions
- Lower Box Temperatures
- Good Moisture Resistance

APPLICATION OF THE SYSTEM:

Mixing can be done in either batch, low speed continuous, or high speed continuous mixers. Mixing times depend on the equipment but must be long enough to guarantee a consistent and complete distribution of the chemicals on the sand. In a batch mixer, typical mixing times are two (2) minutes with the catalyst and two (2) minutes with the resin and release agent. Whichever type of mixing is used, the final sand mix must be free of "resin balls" and unmixed sand.

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Standard production core blowers or shooters can be used to blow the sand into the pattern. Pattern temperatures should be maintained between 350°F and 400°F. Curing of the core continues after the core is removed from the box, so cores should not be poured on for one (1) to two (2) hours after manufacture.

If cores are to be washed with water-based coatings, they should be coated immediately after ejection and dried in an oven. Because of the high hot strength and good collapsibility of the system, it is suitable for ferrous and non-ferrous metals.

	RESIN 08-SERIES	CATALYST 6500E	CATALYST 6502E
Physical State	Liquid	Liquid	Liquid
Color	Dk Brown	Amber	Amber
<u>Visc.</u> , CPS @ 77°F	30-150	5-30	5-30
Lbs./Gallon @ 77°F	10.0	10.4	10.4
Operating Temp, F	60-90	60-90	60-90
<u>Storage Temp.</u> F	<u>60-90</u>	60-90	60-90

RESIN :

The resin is a highly reactive furfuryl alcohol containing polymer. The resin composition provides both high hot strength and good collapsibility. Depending on the application, resin levels between 0.8% and 1.5% (BOS) may be used. Factors requiring an increase in resin content are sand with a high grain fineness number, angularity, impurities, or dry additives to the sand.

CATALYSTS:

The catalysts are solutions of sulfonic acids, urea, water, and polymers. At high temperatures, strong acids are formed which cure the resin rapidly. Because of this, the chemical characteristics of the sand must be balanced with the composition of the catalyst to give the required bench life and cure rate. Lake or other sands with high ADV's require stronger catalysts to cure quickly and completely. If used with silica sand, these catalysts will significantly shorten bench life. These catalysts do not contain methanol.

ADDITIVES:

An additive to increase humidity resistance, 19-314 Silane, is recommended. It should be used at 0.5-1.0% of the resin weight and should be added at mixing or to the resin within 8 hours of mixing.

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STORAGE AND HANDLING:

The resins are neutral and may be stored in mild steel tanks or steel drums. They can be stored below 80°F for up to one year with no loss in properties. Storage at lower temperatures will increase the viscosity of the resin, making mixing difficult.

Spills on clothes and skin should be washed off immediately with soap and water. Clothes should be removed and washed before reuse. Chemical resistant gloves and eye protection should be used when working directly with the resin. Cloth gloves will provide adequate protection of the hands when working with the sand mixture. If resin is splashed in the eye, rinse immediately with large volumes of water and consult a physician. Solvents should not be used to wash the resin off the skin since chemical components could be carried through the skin and result in systemic effects. Read Material Safety Data Sheet for further information.

The catalyst should not be in contact with the skin or eyes for any length of time. Chemical resistant gloves and eye protection should be used when working directly with the catalyst. Cloth gloves will provide adequate protection of the hands when working with the sand mixture. Spills on clothes and skin should be washed off immediately with soap and water. Clothes should be removed and washed before reuse.

The catalysts are acidic and cannot be stored in metal containers. Plastic materials such as PVC, polyethylene, or polypropylene should be used for tanks, pumps, and piping. Catalysts must never be added to the resin in the absence of sand. Mixing the two liquids together will cause a violent reaction. They must be stored above 40°F for stability reasons. See Material Safety Data Sheet for more information.

The additive 19-314 is non-corrosive and flammable and may be stored in steel containers. Read Material Safety Data Sheet for further information.

DJH 5/2007

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