CHICAGO Fire Brick
A Division of Allied Mineral Products, Inc.

Technical Data

METAL KAST 70
High Alumina Low Cement Castable

Maximum Service Temperature	3200°F.
"K" Factor (BTU· in./sq. ft.· hr.· °F.) @ 1500° F	10
Material Required Per Cubic Foot	167 lbs.
Recommended Water Addition Per 100 lbs.	4 ½ - 5 ½ lbs.

Chemical Composition (Dried Basis)

Al_2O_3	70.3%
SiO_2	23.9
Fe_2O_3	1.2
TiO_2	2.5
CaO	1.7
MgO	0.1
Alkali	0.3

Physical Properties at Room Temperature

Firing Temperature – °F.	**220**	**1500**	**2550**	**2750**	**3000**
Bulk Density –lbs./cu. ft.	168	167	166	159	156
Modulus of Rupture – psi	2650	3100	3100	3000	2700
Cold Crush Strength – psi	12000	12000	12000	12000	8000
Linear Change – %	0	-0.3 0		+1.1	+1.9
Apparent Porosity – %	10	13	15	17	17

This data represents average properties obtained from commercial production lots and should not be considered guaranteed specifications. Chicago Fire Brick disclaims any express or implied warranties based on this sheet.

4/10/2000 is the date this data sheet was published. Check with your Chicago Fire Brick sales office to make sure you have a current data sheet, since this technical data may have changed.

GUIDELINE CW 8

MSDS 00127

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Low Water Castables (Catalog number starting with "8"):

All castable refractories contain a hydraulic binder. Castables should not be exposed to moist storage conditions, as over time they will absorb moisture and partially set. Stock should always be rotated to insure use of the oldest product first.

All low water castables and tempering water, prior to casting, should be in an optimum temperature range of 70° to 85°F, with a maximum range of 60° to 90°F (16° to 32°C). Colder temperatures (<60°F) promote the development of higher water content hydrate phases and alumina gels. These materials reduce the permeability of the castable which leads to more difficult dry-out conditions, and raises the susceptibility of the product to steam spalling when heated too rapidly. Cold curing temperatures may also increase the likelihood of shrinkage cracking, as well as lengthen the product set and slow strength development. Higher temperatures (>90°F) shorten working time and reduce strength.

The temperature of the low water castables is determined mostly by that of the material, rather than the water. Hot water may not warm up the product stored in near freezing temperatures sufficiently for the desired setting and curing results.

It is important that potable water be used for casting purposes. Always measure the specific water addition, using data from the product data sheet. This level of water has been found to be optimum for ease of placement, good flow and maximized density and strength. Higher water levels should be avoided as they retard set, increase shrinkage, and lower strength.

Mixing time should be sufficient to thoroughly blend the low water castable and cause the mix to transform from a damp, granular consistency to that of a good castable consistency. Normally two to five minutes of mix-ing yields a uniform mix. Longer mixing times will often improve flow. Mixers should be thoroughly cleaned before and after use to avoid contamination by foreign material, which may accelerate set and lower strength.

Forms should be ruggedly constructed to resist the hydrostatic pressure of the low water castable. All porous surfaces or wooden forms must be water proofed. If water-proofing is not done, water which is needed to carry out a proper hydration reaction is lost, resulting in poor strength.

The low water castable should be consolidated into the forms with mechanical vibrators (internal or external type). Care must be exercised when vibrating the lining to prevent segregation of the product. Finish the pour by screeding the castable surface. Slick trowelling of the surface can make water removal more difficult.

After placement of the castable, it should be covered to minimize evaporation of the tempering water to insure full hydration of the cement phase, and left to air cure for a minimum of 24 hours prior to the application of heat. Preferable ambient temperature range for air curing is 65° to 90°F. Forms may be removed or loosened after the initial setting reaction to prevent difficult removal after a hard set.

There are exceptions to these guidelines. When using one of our cement-free FREE KAST products, air cure is not necessary unless green strength is required for removal of forms. Ultra low cement castables need not be covered, because the water used for casting is far more than adequate to effect maximum hydration.

Low water castables are quite impermeable and must be carefully heated to avoid high steam pressures which might cause explosive spalling. Heating to remove the water must be gradual and be uniform over the entire cast surface. Direct flame impingement must be avoided. If the low water castable is encased in a metal shell, weep holes drilled in the wall will aid in moisture removal. Drying time is dependent upon thickness of the castable and ambient temperature conditions. More drying time is required in cold weather.

A typical drying schedule for 3 to 6 inch linings installed above 60°F is:

Ambient to 250°F	30°F/hr
Hold 250°F	1 hr per inch of thickness
250° to 450°F	30°F/hr
Hold 450°F	1 hr per inch of thickness
450° to 650°F	30°F/hr
Hold 650°F	1 hr per inch of thickness
650° to 1150°F	50°F/hr
Hold 1150°F	1 hr per inch of thickness
1150°F to Operating Temperature	100°F/hr

Thermocouples should be placed throughout the furnace/vessel to monitor the dry-out. Do not place in the direct path of hot gases from the burner. If high pressure steam is present during the heat-up or hold time, the heating schedule should be held at that temperature until steaming subsides.

For specific dry-out schedules, contact your Chicago/Wellsville Fire Brick Companies Sales Representative.