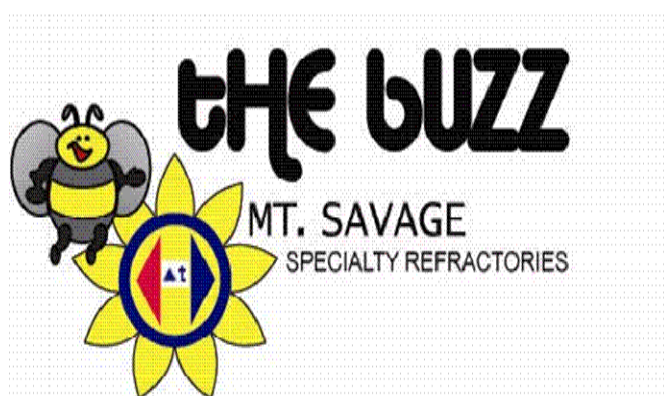




MT. SAVAGE SPECIALTY REFRACTORIES COMPANY



Special Cement Edition



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Refractories for the Cement Industry

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ULTRA-TEK Shotcrete Mixes for Cement

Mt. Savage is a leader in the area of refractory shotcrete mixes. Our Curwensville, Pennsylvania and Mt. Savage, Maryland plants manufacture upwards of 12,000 tons a year of shotcrete mixes for a variety of industries. They produce a wide variety of shotcrete mixes applicable to the cement industry. These include mixes that are resistant to abrasion, alkali and chlorides, as well as mixes containing zircon and silicon carbide to prevent preheater buildup.

Mt. Savage's **ULTRA-TEK** family of castable/shotcrete mixes are the most user friendly in the industry. Designed as true self-leveling castables, they are easy to pump at low water levels. The patented activator, "**ULTRA-SET**", is especially designed to both gel and quickly set the cement bond in the castable. This allows Mt. Savage to supply materials with very long working times, which allows for moving of equipment, lunch breaks, etc.

The "average" cement preheater is a complex animal. Certain parts of the preheater will be relatively low wear/heat containment applications, while other areas can be subjected to high abrasion, others to extreme thermal shock, and still others to material buildup. Mt. Savage has designed its **ULTRA-TEK** product line with all of these applications in mind.

ULTRA-TEK 60 is a versatile, strong, 60% alumina castable designed with excellent abrasion resistance. In its shotcrete form (SC) it has over 90% of the strength of its cast form, thanks largely to the action of the "**ULTRA-SET**" binder system. With the proper equipment, **ULTRA-TEK 60** can be installed at rates approaching 10 ton an hour, minimizing kiln turn-around time and keeping installation costs low.



ULTRA-TEK 60 ARZ-SC is Mt. Savage's largest seller to the cement industry. It is a high alumina, low cement castable with a zircon addition. This product is an excellent choice for areas that exhibit alkali attack and build up problems. The zircon addition also offers excellent strength and abrasion resistance, making **ULTRA-TEK 60 ARZ** a very versatile mix that is often used in areas not associated with material build up. Performance of this product has led to reorders year after year, as it consistently outperforms the competition.



Typical Shotcrete Rig

ULTRA-TEK AZS is the newest addition to the Mt. Savage Refractory line. Based on a fused zirconia-mullite grain, it exhibits outstanding alkali resistance, material build up resistance, and excellent abrasion resistance. Designed for lower risers and calciners, it withstands the rigors of the roughest part of a preheat tower.

BLACK JACK Castables and Shotcrete mixes are based on silicon carbide grain which offer superior alkali and build up resistance. Silicon carbide, one of the hardest substances known to man, also offers excellent abrasion resistance. **BLACK JACK** mixes are used for severe problem areas when other materials have not made the grade.

ULTRA-TEK Gunning Mixes

For a mix to be a good shotcrete mix, it must first be a good, flowable castable. A good gunning mix, conversely, is designed to be very sticky and not a good casting mix at all. A customer should be wary of a vendor that recommends the same product for both casting and gunning. It is almost by definition not going to be very good at either one.

ULTRA-TEK Gunning Mixes are low cement gunning mixes that are designed only for gunning applications. Gunning represents certain advantages and disadvantages compared to shotcreting (see comparison list on next page). **ULTRA-TEK** Gunning Mixes are designed for a combination of excellent strength and abrasion as well as excellent gunning characteristics.

Most of the ULTRA-TEK Castable/Shotcrete Mixes listed above are also available in gunning mix versions. This would include:



ULTRA-TEK 50 GM
ULTRA-TEK 60 GM
ULTRA-TEK 60 ARZ GM
BLACK JACK GM
BLACK JACK 50 GM
BLACK JACK 30 GM
BLACK JACK 15 GM

All ULTRA-TEK and BLACK JACK Gunning Mixes are clay free giving excellent hot strength and abrasion resistance. A special gunning additive is in place to give these products a wide water range and minimizes rebounds, even overhead, while not compromising physical properties. For instance, a customer recently approved Mt. Savage products because an emergency gunite repair with ULTRA-TEK 60 GM outperformed a competitor's shotcrete mix.

Vibration Casting

The first thing that needs to be addressed in any installation are the highest wear areas. These areas of a cement kiln need the strongest, most durable product. Where practical, they will be brick. The next choice for strength and abrasion resistance would be vibration casting.

Areas like curbs and nose or tail rings often see much higher wear than other areas of the cement plant where specialty products are used. For these areas, Mt. Savage recommends that they be formed and cast at the lower end of the castables water range, and then vibrated into place using either form or immersion vibrators. All ULTRA-TEK products can be vibration cast with a definite improvement in strength and abrasion resistant properties.



ULTRA-TEK 70 ULC is specifically designed for maximum hot strength and abrasion resistance, making it an excellent choice for nose and tail rings, feed shelves and other high wear areas. At 2000°F it has a higher hot strength than any castable ever tested by Mt. Savage. When vibration cast, its abrasion resistance is also better than any castable Mt. Savage tested. For slightly less severe areas, this product can also be pumped cast by using slightly higher water additions. Hot properties will still be excellent!



Cement Kiln Preheat Tower

Shotcrete or Gun?

When a major preheater repair is needed, how does a project supervisor decide what to do, gun or shotcrete? There are several factors to consider. Listed below are advantages and disadvantages of these installation methods:

Properties: Advantage Shotcrete. Shotcreted products, particularly using the ULTRA-SET activator system, have properties very close to vibration cast linings. Low cement gun mixes have properties vastly superior to the old high cement gun mixes as well as gunning better, but the advantage goes to shotcrete here.

Installation Speed: Advantage Shotcrete. Piston pumps used in shotcreting will put out about twice the tonnage per operating hour than even the largest gunite rigs. This will often allow for faster turnaround time in an outage.

Equipment Availability: Advantage Gunite. Shotcrete rigs are very expensive and though Mt. Savage can point to several qualified contractors that have good equipment, contractors with gunite equipment are much more prevalent. ULTRA-TEK Gun Mixes can be shot through any well maintained gunning rig.

Difficult Installations: Advantage Gunite. Shotcreting has some limitations as to how far a good castable can be pumped, meaning how close set up is to the job can be important. Gunite jobs are limited primarily by the size of the compressor filling the hose with air. In general, shotcrete equipment must be within 250 feet of

the job site while gunning could be twice that. With some of the new preheat towers going up well over 300 feet high, gunning the upper preheaters is often the better choice compared to shotcreting.

Equipment Set up and Clean up: Advantage Gunite. For smaller jobs and repairs, it is easier to set up and break down a gunite rig compared to a shotcrete rig. The breakeven from a total labor time is somewhere between 12 and 20 tons of material shot. Thus, often smaller repairs lend themselves better to gunning.

Dry Out: Because shotcrete is slightly denser, slightly more care must be taken during dryout. Both materials, however, must be dried out in a controlled manner. Contact your local Mt. Savage representative for proper curing and dryout procedures.



This picture shows results of alkali attack on a product not specifically designed to resist alkali. Note the dry, expansive reaction that could be occurring in your preheater! Good reason to consider ULTRA-TEK 60 ARZ or AZS for your next downturn!

Fired Brick

Mt. Savage also has a complete line of fireclay and high alumina brick for your front end needs. These brick, manufactured in Frostburg, Maryland and Snow Shoe, Pennsylvania, range from medium duty fireclay to 98% alumina. A wide variety of shapes are available. Mt. Savage has become a large supplier of fireclay brick for new construction of preheat towers.



Mt. Savage Specialty Refractories
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"Get the Buzz"

Accurate Lightweights

Have you ever shot a lightweight gun mix and gone back and checked your count because you were short 20% or so? If you have and found that your count was right, it is likely that you had a problem with density creep. Mt. Savage's **DELTA t CRETE** lightweight products fight density creep by in process testing for density, to allow accurate ordering of products. Gun Mix versions of our lightweights also allow for gunning densification to hit data sheet properties, something that no one else we know of does in this industry.

Mt. Savage offers a variety of lightweight products, from a 35 pound mix to intermediate density mixes with good strength characteristics. All of these products are available in gunning versions that are easy to install and economical. With fuel only going one way, keep your heat in your kiln and check out the wide variety of lightweight offerings.

Consistency Pledge

During the last three years, Mt. Savage Specialty Refractories has had a 100% installation success rate. Not one bulk bag of material sent to the cement industry failed to get on the wall due to a mix problem. This represents thousands of tons shipped. Though we do not pretend to be perfect, we do set 100% success as a goal for both the Curwensville and Mt. Savage plant. To achieve this, Mt. Savage has enacted a strict set of screen and compliance testing of both raw materials and finished product. Our labor force understands that one bad bag, like the bad apple, can ruin the barrel (or the construction schedule). Our goal for this year is to continue our success streak.

Q-TEK

Mt. Savage carries a line of phosphate bonded high alumina castables and gun mixes perfect for mid-season repairs. The phosphate binder holds tight to existing refractories minimizing the need for complete tear outs. Though a patch, a very effective patch it is. These products are available in both two component (liquid phosphate shipped with dry component), or a single component (just add water). These are sold under the **Q-TEK** brand name.