

MT. SAVAGE SPECIALTY REFRACTORIES



Air-Set Plastics are used in a variety of applications. Extended shelf life air set plastics are now available from both Mt. Savage Specialty plants, see page 2.

Find out what goes into the making of a good mortar, the Mt. Savage Mortar Man way.

Want to get the best possible heat transfer in your boiler? Find out how with BLACK JACK mixes on page 4.

Find out how to make your in-house cast shapes look better. VC Castables are here, page 3.



A nozzleman is shown here spraying the inside of a blast furnace with shotcrete material. Refractory shotcrete is a natural for large volume jobs where good properties are needed. Last year Mt. Savage shipped on average over 1,000 tons of shotcrete per month, making them a leader in the industry.

MT. SAVAGE SPECIALTY REFRACTORIES

736 West Ingomar Rd
Ingomar, PA 15127

Phone: 412-367-9100

Fax: 412-367-2228

www.mtsavage.com

In case you missed it, being from the Pittsburgh area we wanted to remind you:

PITTSBURGH STEELERS	27
ARIZONA CARDINALS	23

The Cardinals played a great game, congratulations to the Pittsburgh Steelers, six time Super Bowl Champions!

Air-Set Plastics

When making an air-set plastic, refractory manufacturers were always faced with a dilemma. Air-set means that in the presence of air, the plastic will get hard. Unfortunately, economic packaging of these products does not allow for the total isolation of the plastic from the atmosphere. Thus, there is a tendency for the plastic to stiffen over time, limiting its useful shelf life. Since sealing off the atmosphere is not a realistic possibility, Mt. Savage had developed a new and improved air set bonding system to get around this problem to a large degree.

An air-set plastic has a chemical in it that gets hard as water dries from the plastic. This acts much like a paste or glue, giving the plastic some degree of hardness before firing begins. These additives tend to be organic and as harmless as the flour pastes that kids play with in kindergarten and act pretty much in the same way. Of course if the plastic prematurely loses its water before installation, it will be by definition stiff. What Mt. Savage has done is found a way to keep the moisture in the plastic and to extend the water range in which the plastic stays cohesive. Thus, the shelf-life of the material and the overall cohesiveness of the plastics are radically improved, making installation easier and faster.

Mt. Savage has a variety of air-set plastics that range from **SAVAGE SUPER RAM AS**, based on Missouri calcined fireclay through **SAVAGE RAM 90 AS** based on high purity alumina. Air-set plastics are often a product of choice for reheat furnace construction and repair, boiler repairs, burners, and firing hoods. The advantage of the air set bond over chemical bonds is that this bond tends to burn out on heating and not flux the refractory like chemical bonds can while still supplying some set after installation, unlike heat set plastics. Like all the other plastics sold by Mt. Savage, these can now be made at two facilities, in Mt. Savage, Maryland or the new plastic line at Curwensville, Pennsylvania.

Mortar Man

Every refractory bricklayer in the country has a favorite refractory mortar. It is one that they know is the same, time after time. One they can count on, and that they won't hear about problems with later. For many bricklayers in the country, that mortar is Mt. Savage's **SUPER HI-MUL**.

A good mortar starts with a consistently ground aggregate system. As mortars are the finest of the refractory products made by Mt. Savage, extra care must be taken in the purchase and processing of this aggregate. If the aggregate is too coarse, the mortar will be gritty, which makes the bricklayer grit his teeth. If the mortar is too fine, it will have a tendency to crack on drying, harming the installation. Hitting the correct sizing is the first step to making a great mortar.

The next step to making a good mortar is to get it properly mixed. The finer the grind of something, the more difficult it is to mix properly. Thus, mortars, being the finest of the refractory products, is the most difficult to mix. In addition, the slaking of the clay must be done carefully to prevent the development of lumps. Mt. Savage uses a very high intensity mixer to make its **SUPER HI-MUL**, allowing the liquid binder to mix with the fine powders. Even using this high intensity mixer, Mt. Savage takes its time and has a long carefully structured mixing sequence. Though we all might have fond memories of our mother's lumpy mashed potatoes, no one has fond memories of lumpy mortars. If the binder and the fines are not properly mixed together, that is exactly what you end up with. A good mortar man knows this and takes his time. Like making fine wine, patience is important to making a good mortar.

When combining the correct aggregates with the right equipment, and the proper procedures you get a smooth consistent mortar. This is a mortar that a bricklayer can quickly learn to love. If your bricklayers have not tried **SUPER HI-MUL**, take the Mt. Savage Mortar Challenge. Have your bricklayers lay a course with the mortar they are used to, then a course with our **SUPER HI-MUL**. Mt. Savage will win that comparison on enough occasions to keep that mixer at Mt. Savage humming.



The best mortars are made in high intensity mixers such as this Eirich Mixer at Mt. Savage, MD.



Buzzi says, " A good mortar, like a good wine, takes time. Hurrying it at the production site will leave a bad taste in your mouth at the job site"

Good Cement

Good low cement castables start with good high quality cement. The people at Kerneos have always understood this and have been running tests on their 70% alumina cements for over 20 years to determine their capability of use in low cement, low moisture products. Located in Chesapeake, Virginia, Kerneos is a critical supplier to Mt. Savage and a long term partner in quality.



Floating Boats

There is an old saying, a rising tide lifts all boats. Unless you live in a cave, and then how would you be getting a Buzz Newsletter, you know the tide has not been rising lately. As recently as last September, the refractory industry was enjoying a banner year, as were their customers. U.S. Steel was reporting record profits, and even in the fourth quarter made over \$100 million. Good times always eventually come to an end, and business in the refractory world has fallen off significantly. In the first week of the new year, steel production, a good barometer of overall refractory usage, was down to 38% from 85% the same week a year earlier and a high of 92% in July of 2008.

Mt. Savage Specialty Refractories (MSSR), along with everyone else, has seen a slowing in business. Before the latest downturn in business, MSSR was enjoying rapid growth. Like everyone else in the industry, this has radically slowed the past 6 months or so. Despite this downturn in the refractory industry, crazy raw material vendors pushed through large price increases in raw materials, forcing refractory suppliers to raise prices in the teeth of the worst slow down seen since 1929. Mt. Savage has responded by keeping their price increases to a minimum while continuing to offer superior value to their customer base. The net effect has been an increase in its customer base, keeping both plants for a time at full staffing and no pay cuts, though with no over-time or part-time workers.

Lead times are down, meaning that Mt. Savage can respond to most any request our customer base can throw at us.

At Mt. Savage, we view 2009 as a year of opportunity. With everyone looking at price and value for each job they are doing, Mt. Savage products should end up on the top of many lists. With our strong contractor base, we feel that we have great opportunities for the jobs that are out there. Our strong financial backing set up before the down turn assures us of being able to address any and all opportunities that it makes sense to address. This assures you, our customer, that we will be there when you need us, and we certainly need each other in these trying times.

VC Mixes

Sometimes too much of a good thing can be bad. Take, for instance, the ability of **ULTRA-TEK** castables ability to flow and self-level at very low water contents. Normally this is a very good thing as it minimizes labor during pump cast installations and speeds installations by allowing fast and easy flow into pump cylinders, and minimizes installation time needed to vibrate a material into place. When casting a large, blocky shape however, a self-leveling castable can sometimes flow too much and give an uneven top surface due to even small air bubbles rising to the top. In the past, this has been successfully addressed by lowering the water added to the mix to limit this self-leveling tendency. Customers, however, indicated that the water range to obtain this combination was a little narrow and if the installer did not keep a close eye on the measured water then the shapes sometimes ended up with a rough surface finish. This has been rectified with the introduction of the **ULTRA-TEK VC** family of products.

VC stands for Vibration Casting. These mixes are specifically designed to be installed with the aid of vibrators, which is easy to do in a precast shop. Vibration can be by external form vibrators or internal pencil type vibrators. Even at slightly higher water levels than recommended, slight vibration is needed to move the material, giving it more body and a more consistent finish than with standard **ULTRA-TEK** products in precast shapes. Properties for these materials will generally be equivalent or superior to the standard **ULTRA-TEK** products as they are installed with the aid of vibration. Data sheets for these products are available.

Mt. Savage supplies VC mixes in alumina contents of 45% to 98%. These products can be used for a variety of applications including furnace blocks, burners, tundish furniture, tile, delta sections, and impact pads, just to name a few. Another use of the VC castables is when the installer wants to have the benefits of a high strength, low cement castable but needs to cast a slope into the top surface. The only way to do this with self-leveling castables is to form the slope, but VC mixes can hold a small slope on a top surface without forming. Standard VC mixes are not pumpable, but Mt. Savage has supplied special VC mixes to customers that can both hold a slope and be pumped! Ask your friendly Mt. Savage representative for more information about these interesting materials.

Ask Dr. Dirt

Dear Dr. Dirt, Why are some castables and specialties in metal applications so black colored? How are they different than their lighter counterparts? **Larry in Ironton, CO**

Dear Larry, The dark color of castables, whether it is gray or black, is from carbon. The gray color seen in low cement castables comes from a carbon contamination common in one of the raw materials, that being fumed silica. Truly black colored castables contain either graphite or silicon carbide or both in them, which are very dark colored materials. Carbon is a perfect refractory under reducing conditions. It has a very high melting temperature, heck, it never melts, it sublimates at some temperature like 10,000°F. It is non-wetting to most every metal and slag known to man and works equally well in acid or basic environments. The one negative, put some oxygen around and it burns! Even diamonds, a form of carbon, burn at high temperatures (sorry dear, I dropped your wedding ring in a fire on the way to getting it cleaned said the husband back from the pawn shop). Thus, carbon is limited to applications that do not see high temperatures and oxygen at the same time. Underneath metal, like an iron trough, is an excellent place to put some carbon! If you ever see an iron trough, it happens to be black!

Dr. Dirt

How far can you pump **ULTRA-TEK** Castables? **Brian in sunny San Diego**

Dear Brian, Why would you worry about that in San Diego, I don't think they let refractories in that county anyway. A castable's pumpability is dependant on three features; its ability to flow, its ability to resist (or not resist) kinetic energy (movement), and its ability to hold onto its water (please wait until we can pull over Johnny!).

Flow is something that is seen at rest and low pressure. It has to feed the pump cylinders well to pump, and this is dictated by flow. The next thing the castable sees is this pump cylinder pushing it into a pipe or hose that already has castable in it. The easier a castable moves under pressure, the easier it is to pump. Our QA Laboratory runs kinetic resistance tests on every lot of castable and shotcrete shipped to assure that material pumps easily in the field.

The third feature is the ability to hold onto its water. High pressures will have a tendency to separate a castable and its water. When this occurs, the water moves and the castable stays, limiting how far you can pump it. Materials that hold onto their water better can be pumped further. Mt. Savage has pumped **ULTRA-TEK's** over 400 feet and are working on modifications to have the materials hold onto their water still better, extending the distance that these materials can be pumped.

Dr. Dirt



Buzzi says, "Past Dr. Dirt columns can be found in archived Buzz Newsletters at the Mt. Savage web site; www.mtsavage.com."

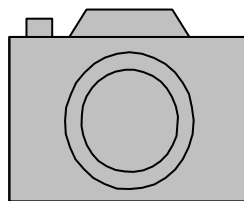
Black Jack Low Cement Gun Mix

In 2005, Mt. Savage introduced new and improved versions of low cement gun mixes called **ULTRA-TEK Gun Mixes**. These unique, low dust, low rebound, high strength mixes have been hugely successful as customer after customer have found them to not only be the best low cement gun mixes available, but perhaps the best gunning dense mixes available period! During that time, the same principles in **ULTRA-TEK** Gun Mixes were applied to the **BLACK JACK** family of gun mixes to give the densest, strongest, high silicon carbide gun mixes in the industry.

High silicon carbide gun mixes are often used in coal fired cyclone boilers where high thermal conductivity and stud protection are desired. For maximized stud efficiency, you want the highest thermal conductivity and the highest percentage stud contact possible. We believe that **BLACK JACK** gunning mixes give you this. The two things that affect thermal conductivity are silicon carbide content and density. The low cement gunning bond used in **ULTRA-TEK** Gun Mixes allows us to stuff high amounts of high purity silicon carbide into the gun mix, as high as or higher than any competitor's mix while still maintaining very high strength.

The second key to an effective thermal conductivity is stud contact. A big problem with studded boiler tubes is an affect known as shadowing, caused by material being gunned onto tubes and leaving a void behind the stud. A competitor says the way to solve this is to use their fine grained silicon carbide gun mix so that more material can fit between the tightly packed studs. A better way is to design a gun system that will have some plastic behavior and have a tendency to flow behind the boiler studs and thus prevent shadowing almost entirely. This is exactly what Mt. Savage's low cement gunning mix system does.

BLACK JACK and **ULTRA-TEK** Gun Mixes from Mt. Savage are designed to be gunned without predampening. These mixes when mixed with water at the nozzle will stay plastic for a second or two, allowing them to flow around boiler tubes and minimize shadowing. Minimizing shadowing maximizes the efficiency of the silicon carbide. The slightly coarser grain that this technique allows you to use increases the installed density further increasing stud efficiency. Thus making **BLACK JACK** gun mixes the way to go for your next cyclone boiler installation!



Have a refractory installation picture that you care to share? Send them to Dr. Dirt care of gushughes@mtsavage.com and they may appear in a future newsletter. Write a small story about what the installation is and Dr. Dirt will say something nice about you.