Specialty Admixtures

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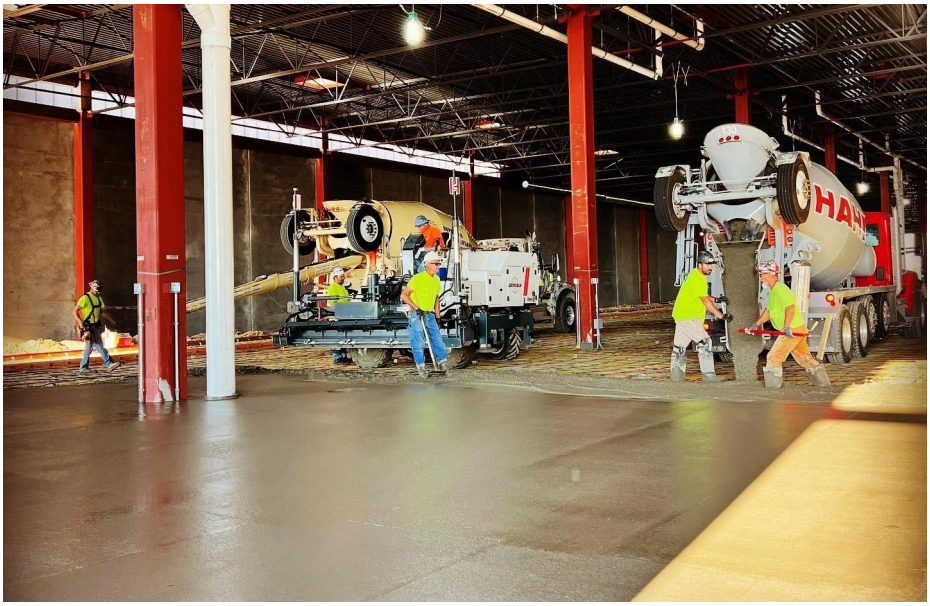
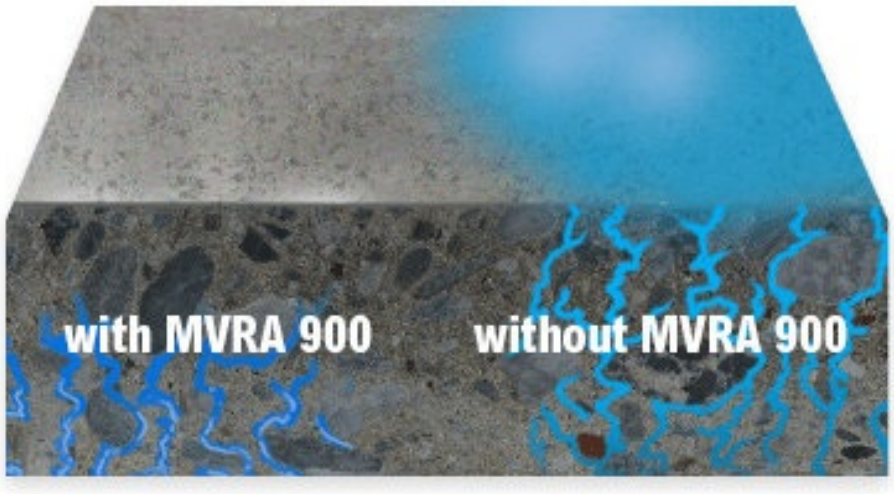


Versatile Concrete for Modern Construction Challenges.

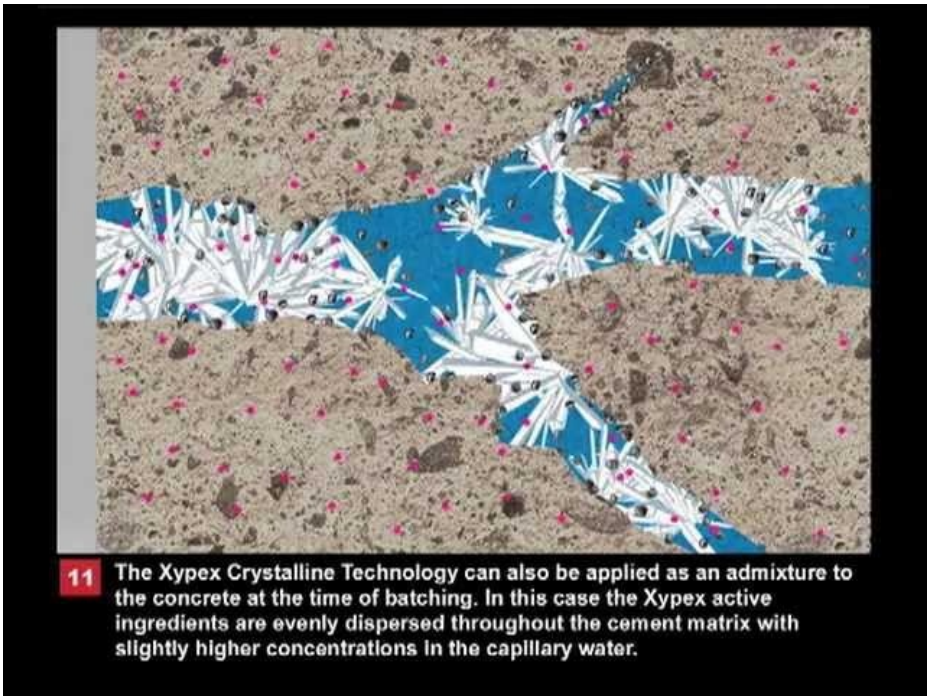
In Tech Bulletins 10, 11, and 13, we discussed the most commonly used admixtures in concrete. These powerful products have become the backbone of quality concrete production, but sometimes there are specific traits, actions, or resistances we want from our concrete that require some very specific admixtures. While these admixtures number in the hundreds, and there are surely varying degrees of science to back up some of these products, many do have a proven track record. Here are a variety of specialty admixtures with which we have some experience:

Shrinkage Reducing Admixture (SRA) - SRA's, such as GCP's Eclipse, work by reducing the surface tension of pore water during the drying process. This can reduce the shrinkage potential of a slab by 30-50%, thus minimizing cracking and curling. SRA's can also be used to extend joint spacings on a large floor. For complete shrinkage elimination, an SRA doesn't quite cut it and an expansive cement much be used.

Moisture Vapor Reducing Admixtures (MVRA's) - Products in this category such as Barrier One, Concure, and MVRA 900 attempt to address the construction industry challenge of the dry-out period in interior concrete floors. As the flooring industry has moved to more environmentally friendly adhesives, it is critical that moisture and vapor do not escape the slab and interfere with the adhesive. Traditionally, this has been achieved by waiting for the slab to “dry-out”, with huge ramifications to construction schedules. These admixtures allow adhesives to be applied to concrete with a high moisture content, by blocking the escape of this moisture.



Crystalline Waterproofers - Products in this category, such as Xypex and Penetron, work by introducing a hydrophilic crystal into the concrete that grows when exposed to water, filling all voids, capillaries and pores. This highly effective mechanism is used for complete impermeability in corrosive environments like water treatment plants, as well as wherever complete waterproofing or additional hydrostatic pressure resistance is necessary.



Viscosity Modifying Admixtures (VMA's) - VMA's, such as GCP's VMAR3, work by adjusting the viscosity or "thickening" the water in a concrete mix. This action prevents mix segregation, which means VMA's are a critical component of Self Consolidating Concrete mixes and mixes that must be pumped great distances. VMA's are effective pumping aids, as segregation is often the culprit of many pumping challenges. VMA's also can be used as anti-washout admixtures for use in underwater concrete.

Rheaology Modifying Admixtures (RMA's) - RMA's, such as GCP's VMAR F100, work by lubricating the paste of a concrete mix without adjusting the slump. RMA's help discharge zero or very low slump concrete significantly quicker and help reduce bugholes, voids and other surface imperfections. RMA's work great on slip form barrier rail and curb

projects.

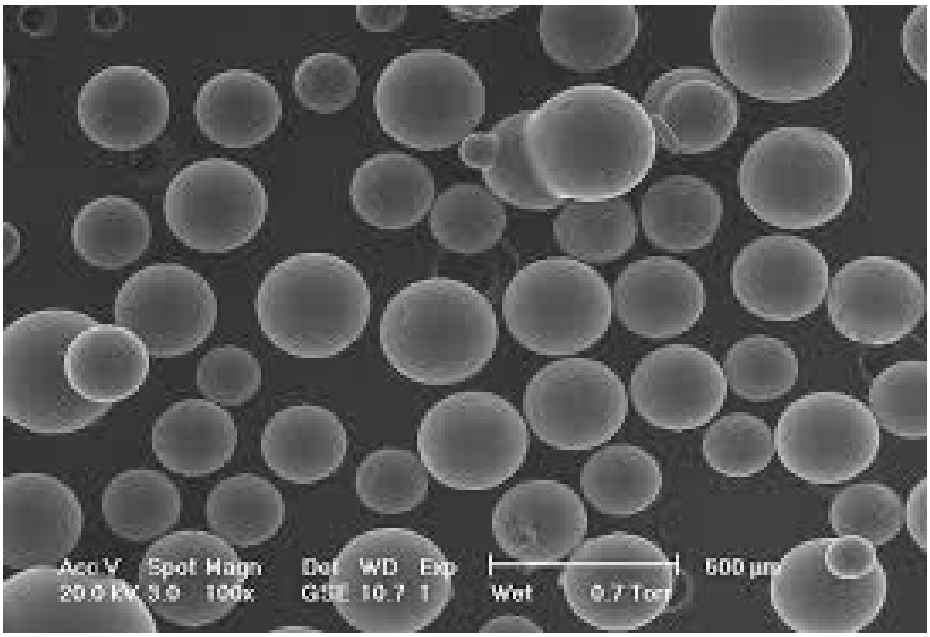
Corrosion Inhibitors - Corrosion Inhibitors, such as GCP's DCI, help reduce corrosion of reinforcing steel in concrete. They also act as an accelerator, making them a popular admixture for high early patches. With the prevalence of epoxy coated bar, the use of DCI and similar admixtures has become more rare over the last decade.

Lithium Nitrate - Lithium Nitrate admixtures, such as GCP's RASIR, are used to mitigate alkali-aggregate reactivity (coming to a Tech Bulletin soon). It is typically only used in extreme cases or where SCMs are not allowed for use in mitigating alkali-aggregate reactivity.

Integral Bonding Agents - Admixtures in this category, such as Gill-33, are used to help bond topping pours over existing concrete.

Strength Enhancing Admixtures - These admixtures, such as the e5 series, are colloidal silica that are used to maximize the C-S-H growth in a concrete mix, by introducing additional silica to bond with calcium-hydroxide molecules. In certain situations, these admixtures can be used to reduce the total cementitious content of a mix design.

Superabsorbent Polymers (SAP) - Almost literally what is used in diapers to absorb moisture, SAPs, such as Hydromax, can be introduced to a concrete mix with excess water to absorb the water and then release it into the mix after it has hardened, thus internally curing the concrete. More on this in a future Tech Bulletin. SAPs are also a critical ingredient in Pervious Concrete.



Flowability Admixtures - These products, such as GCP's Darafill, use organic compounds to build ~25% air and promote extreme flowability in grout mixes. These admixtures are necessary to make flowable fill when fly ash is not available. As a consequence of the high air, mixes utilizing these admixtures have very little strength.

As mentioned at the top of the bulletin, new admixtures come out all the time and it is can be difficult to separate the quality products from the snake oils. Often these new admixtures describe themselves as a miracle cure for all the concrete ailments that exist. In our experience, if an unknown admixture claims to do one specific thing to the concrete, it is

more likely that it does what it says it does. An admixture that claims to fix 20 problems at once, likely doesn't do any of it. In any event, it's always a good idea to check into any studies that have been done on the new admixture or better yet, speak with someone who has used it.

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