



RAPID SET® LOW-P™ MICROSPHERICAL-AIR CEMENT

A super high performance pre-blended hydraulic cement

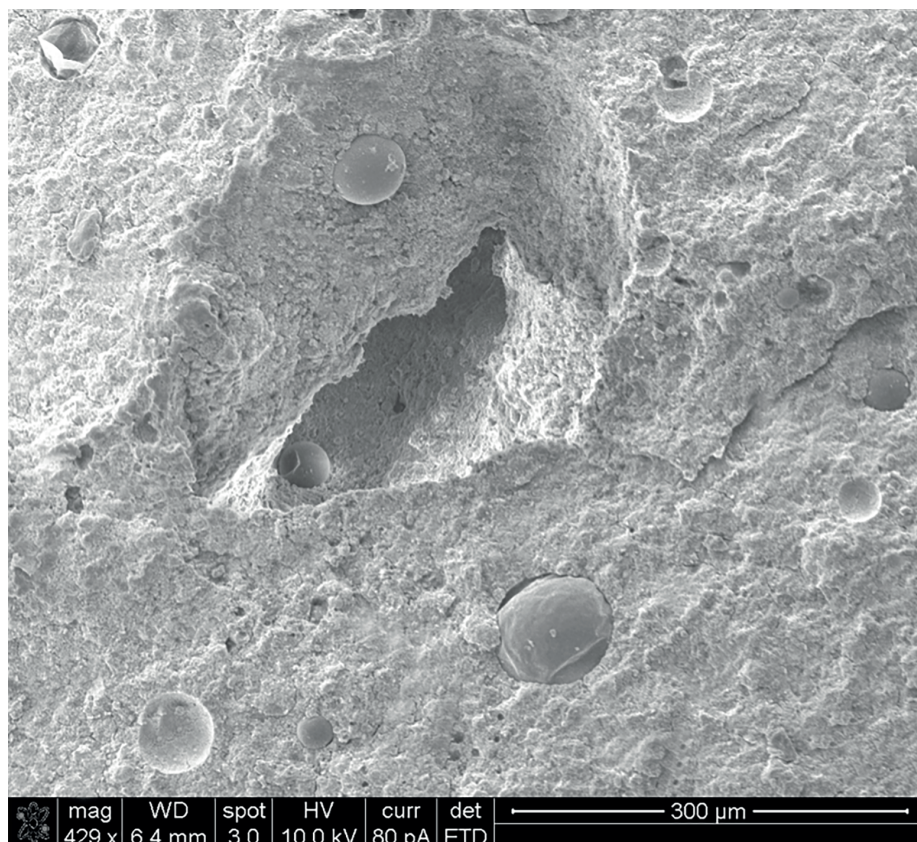


Figure 1. (Low-P MSA1): Scanning electron micrograph of a fractured cross section of Low-P MSA cement showing microspheres in the 50-100 micron range, note the deflated/ruptured microsphere in the upper left hand corner still leaves a spherical void even after failure.



*Delivers a consistent
air void structure
regardless of job*

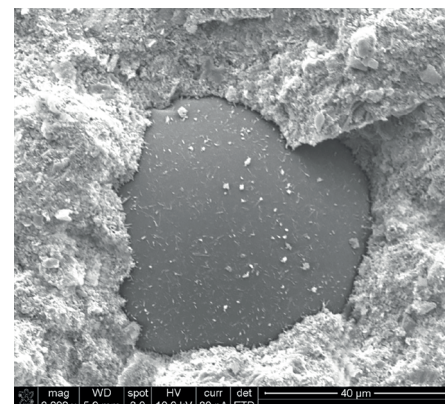


Figure 2. (Low-P MSA2): Scanning electron micrograph of a fractured cross section of Low-P MSA cement showing the flexible properties of the polymer microspheres; upper left hand portion of the sphere's surface is clearly deformed elastically by the cement matrix protrusion.

The durability and longevity of concrete and concrete repair materials are of utmost importance to those managing our infrastructure. Harsh climatic environments, specifically areas with a high frequency of freeze/thaw cycling, can be the most challenging from a durability standpoint. Achieving high freeze/thaw durability has traditionally involved the addition of an air entraining agent, with the entrained air voids acting as “shock absorbers” to allow water to expand as its temperature decreases. Total air content, size of air voids, and spacing between voids are all critical factors of the air void structure that affect the air voids’ ability to temper expansive forces. Air entraining agents, whether resin-based natural products or synthetic variants, alter the surface tension of water to stabilize bubbles, creating spherical voids in the hardened

concrete. The problem with these air entraining agents is that the air void structure they develop is variable according to several parameters. The mix design, the air entraining agent dosage level, mixing energy (both imparted shear energy and time of mixing), water to cement ratio, plastic age of concrete, delivery method (gravity or pumping) and chemistry and content of additional admixtures are all factors that can have an effect on the air void structure of the concrete, and in turn affect the freeze/thaw durability. The holy grail of air entrainment is an additive that delivers a consistent air void structure regardless of these circumstantial factors.

Rapid Set® Low-P™ MSA (“MicroSpherical-Air”) cement is a super high performance pre-blended hydraulic cement that has ultra-low permeability, achieves structural strength in as little as 1

hour, and contains advanced micro-spherical air technology for excellent freeze/thaw durability. Unlike the chemically stabilized air bubble of traditional methods, Low-P MSA’s air voids are made up of tiny, flexible hollow polymer spheres that act as microscopic forms in the cement matrix. They are rigid enough to form voids in the hardened concrete, yet soft enough to compress and allow space for expanding water to provide the desired freeze/thaw protection. Rapid Set Low-P MSA delivers a consistent air void structure regardless of job or environment-specific circumstances. Unlike admixtures using traditional air entraining agents that attempt to stabilize fragile bubbles, Low-P MSA contains an exact volume of air voids, in a specific size profile, resulting in a known and precisely formulated void structure.