



Particle Technology at its Finest



Colloidal Silica Additives for Concrete

For additional information or to place an order:
Nyacol Nano Technologies, Inc.

P.O. Box 349

Megunko Road

Ashland, MA 01721-0349 U.S.A.

Telephone: 800-438-7657 (U.S. Toll-Free) or 508-881-2220 (Local Area)

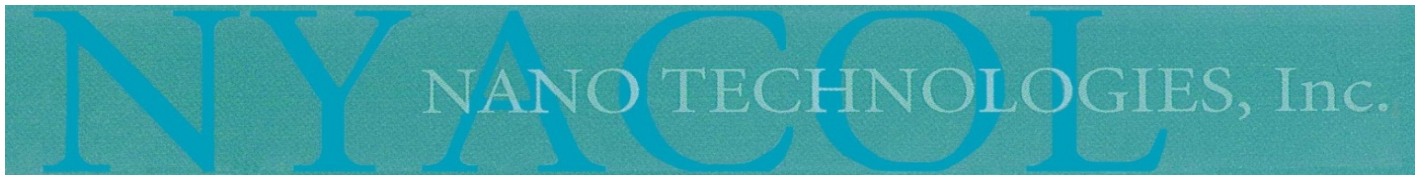
Email: info@nyacol.com

www.nyacol.com

Specializing in Colloidal Dispersions and Nano-Particle Technology

An ISO 9001:2015 Company

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NYACOL® specializes in the development and manufacture of practical and affordable cutting-edge solutions to meet customer requirements.

NYACOL has a long history in the development and manufacture of colloidal silica, starting in the 1970's. Our products find use in a wide range of colloidal silica applications, from papermaking and investment casting, to catalysts and semiconductor polishing.

We have developed a range of concrete additives based on our proprietary colloidal silica technology. The product range includes:

- D-6 - densifier.
- LiSol 3 - lithium stabilized colloidal silica based densifier.
- Nyalith - colloidal silica acrylic sealer.
- LiSol 6 - ASR controller and densifier.
- K-Sol - silicate water repellent.
- LiSil 4.1 - lithium silicate densifier.

Densifiers:

NYACOL's line of densifiers starts with D-6. D-6 is a high surface area sodium-based colloidal silica product with relatively low alkalinity. It is diluted before use to less than 3% solids and is applied with a brush or low-pressure sprayer. It dries in a few hours and there is no efflorescence.

LiSol 3 and LiSol 6 have been developed as an innovative alternative to lithium silicate and a performance enhancement over D-6. Testing by an independent laboratory has shown that LiSol 3 and LiSol 6 outperform the leading silicate based densifier, and offer advantages in ease of use. The LiSol 3 and LiSol 6 densifiers offer outstanding abrasion resistance, and a test report is available upon request.

One of the key differences between the silicate technology and the NYACOL technology is in the use of the material. The LiSol 3 and LiSol 6 are saturation-coated on the concrete surface and do not gel or form efflorescence. Within two hours the surface is dry, and will continue to harden over time. There is no extra cleanup required.

Alternatively, silicate densifiers form a gel on the surface which is slippery, slow to dry, and the deposits formed must be cleaned up. This leads to higher costs and longer installation times.

ASR Control:

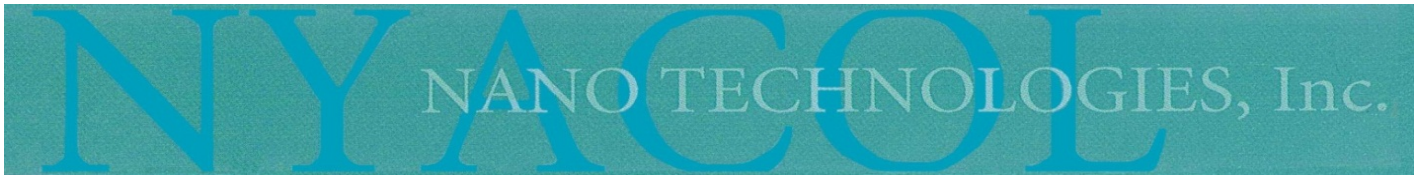
ASR is the alkali silica reaction in concrete. Reactive silica in the raw material reacts with alkali in the cement and fly ash to form a damaging gel that will result in cracking and destruction of the concrete. There are a number of strategies to control ASR, including the use of low alkali materials and the addition of lithium compounds, particularly lithium nitrate. Lithium preferentially forms a silica gel with the reactive silica that does not expand nor cause cracks.

LiSol 6 is a new approach in ASR control. The lithium stabilized colloidal silica has a high surface area of 500 m²/g, which acts to deliver the lithium throughout the concrete matrix. The nano-silica acts to increase the flexural strength and compressive strength of the concrete.

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Testing conducted by an independent laboratory confirmed that the flexural and compressive strengths increased by 15%, and ASR testing confirmed a 0.02% length change after 28 days -- well below the FAA requirement of 0.1%. A copy of the test report is available upon request.

Typical dosing is 2-4 gallons per cubic yard, making the ASR control cost competitive with lithium nitrate with the added benefit of the improved flexural and compressive strengths.

Lithium Silicate:

NYACOL offers LiSil 4.1 lithium silicate. LiSil 4.1 is made in a proprietary process resulting in lithium silicate with very low trace impurities. LiSil 4.1 is a high performer for hardening and densifying concrete. The current high price of lithium raw materials affects the competitive position of LiSil 4.1.

Water Repellent:

K-Sol is potassium silicate and provides an excellent water repellent coating for concrete and many other materials. It is easy to use and coverage is good.

NYACOL Product Name	Particle Size, nm	Surface Area	% Solids	pH	Counter-ion	Applications
D-6	5	450	15	9.5	Na	Densifier; hardener.
LiSol 3	3	800	7.5	9.5	Li	Densifier; hardener.
LiSol 6	6	500	15	9.5	Li	ASR; densifier; hardener.
Nyalith	20	130	3	10.5	Li	Sealer.
LiSil 4.1	N/A	N/A	20	10.5	Li	Densifier; hardener.
K-Sol	N/A	N/A	32	12 - 13	K	Water repellent.

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