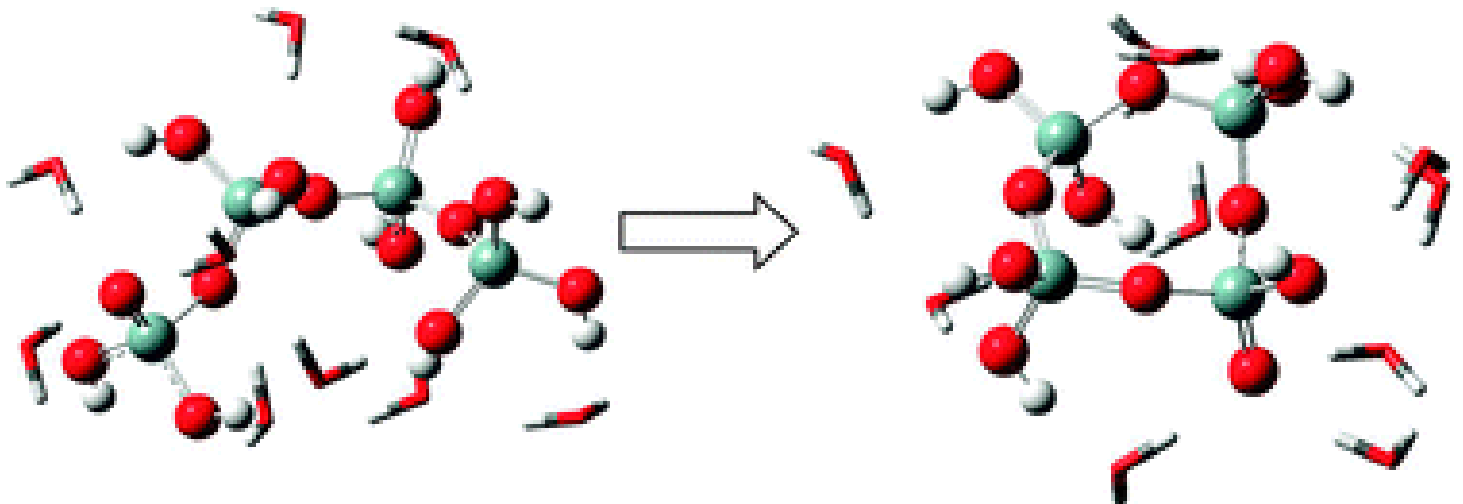


# Rx Marine International

AN ISO 9001: 2008 CERTIFIED ORGANIZATION

# Silica Sol



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# Silica Sol

The term silica sol is derived from silicic acid sol, or more accurately silicic acid aqua sol. Silica sols are colloidal dispersions solutions of silicic acid in water. Chemically speaking, a distinction should be made between colloidal dispersions of high molecular polysilicic acids and amorphous silica particles with particle sizes in the nm range. Insofar as dilute, colloidal silicic acid solutions are formed in chemical reactions, e.g. between an alkali silicate and acid, the solutions involved are often polysilicic acid solutions with a high molecular weight. Even after appropriate purification, they remain unstable and solidify by gelling. They cannot be produced in high concentration of up to approx. 50%. silica sol products on the other hand are colloidal dispersions of silicon dioxide particles that are immensely stable and resistant to gelling. Depending upon the type, the products can be manufactured to a concentration of 50% and then dispatched in this form. We have decades of experience in the production and application of colloidal dispersions.

silica sol products are being used in numerous branches of industry as bulk raw materials and as indispensable auxiliaries for special applications. RXSOL produces a wide range of products with a variety of properties. New product types are continually being developed for new applications.

## Products:

The silica sol types are aqueous colloidal dispersions of amorphous silica ( $\text{SiO}_2$ ). The silica particles contained in it occur in the form of discrete spheres that are not cross linked with each other and that have been hydroxylated on the surface.

The alkaline types of silica sol are anionic. silica sol types are produced from molecularly dissolved silicic acid by means of growth processes. They are not produced by re-dispersion of solid, fine, amorphous silica. The presence of crystalline silica components can therefore be ruled out.

The silica sol types are X-ray amorphous. Stabilization of colloidal particles takes place as the result of charges on the surface of the particles and not, as often is the case with organic polymer dispersions, by way of surfactant substances.

silica sol is synthesized in an aqueous medium, which consists exclusively of inorganic substances, with no organic solvents being present. Subsequent processing, if necessary using additives, allows further products with specially requested properties to be produced.

The silica sol types contain colloidal distributed non water-soluble solid silica in an aqueous solution. The key feature of most applications is that the silica sol types are used as colloidal solutions, and that after use, solid amorphous silica, which is insoluble in water, is left over.

## The Principal Applications of SILICA SOL

The Following properties of the silica sol types are of particular significance to its applications:

- ➔ transformation from non-crosslinked sol to specially crosslinked gel form.
- ➔ finely distributed , colloidal form with silica sol particles in the nm range.
- ➔ high degree of purity, and in particular the almost total absence of alkalis and electrolytes.
- ➔ solidilty , inertness , resistance to heat and temperature change of the dried silica sol particles of amorphous

# Silica Sol

The Following properties of the silica sol types are of particular significance to its applications:

## Use as a binder:-

Examples - precision casting using shell process .

- production of vacuum-formed products made from inorganic fibers.
- production of granules.

## Use as a Surface Modifier:-

Examples - anti slip treatments for linings

- anti-slip paper bags
- anti – blocking for films and aqueous coatings.

## Use in reactions of colloidal chemicals:-

Examples - fining of beverages.

- paper retention.
- modification of shortcrete.
- binder for catalyst formulation.

## silica sol **Colloidal Silica Sol For Foundry**

There are few places where precision, strength, safety and reliability are more important than in a foundry. **Colloidal silica** is one of the most important products used in foundry operations.

The foundry sector uses more colloidal silica than practically any other industry in the world, and has done for a long time. Colloidal silica's main function at the foundry is as a binder used in:

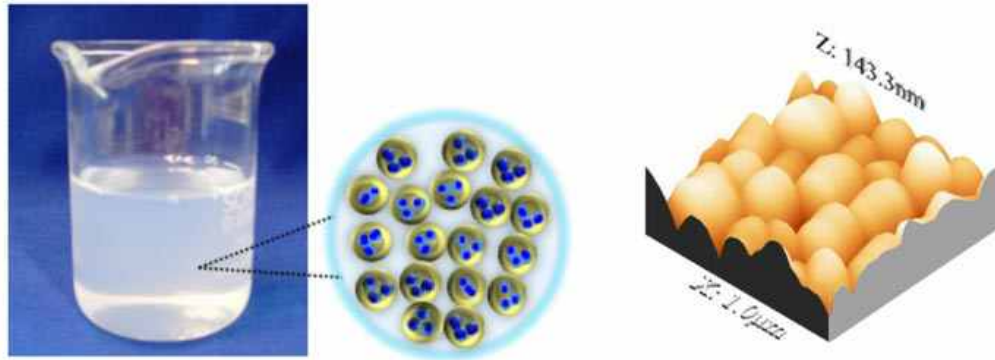
- **Refractory Fiber Bonding (RFB)**
- **Refractory Cement/ Ceramics**
- **Precision Investment Casting (PIC)**

We have several products that will meet all of your requirements in these areas.

The right stuff

Refractory Fiber Bonding ( RFB )

# Silica Sol



Refractory fibers used in high temperature insulation products require a safe and reliable binder. Colloidal silica is used for this purpose. Products made in this way include parts for the steel and glass industries, coal and log fire parts, and insulation rings for radiant heaters. Such products are normally manufactured using a vacuum forming process. There are both organic (colloidal silica plus starch) and inorganic processes. Colloidal silica is ideal for refractory fiber bonding due to its ability to withstand continuous operating temperatures of 1500C with little shrinkage and good resistance to thermal shock.

## A vital ingredient Ceramic



In the refractory cement/ceramics industry Colloidal Silica is used as a binder in the manufacturing of big molded high temperature insulation parts/blocks. They are mainly used in steel, aluminium and gas furnaces. The ability of Colloidal Silica to withstand continuous operating temperatures of 1500C with little shrinkage and good resistance to thermal shock make it indispensable in the ceramics casting process.

# Silica Sol

## Perfect results Investment Casting



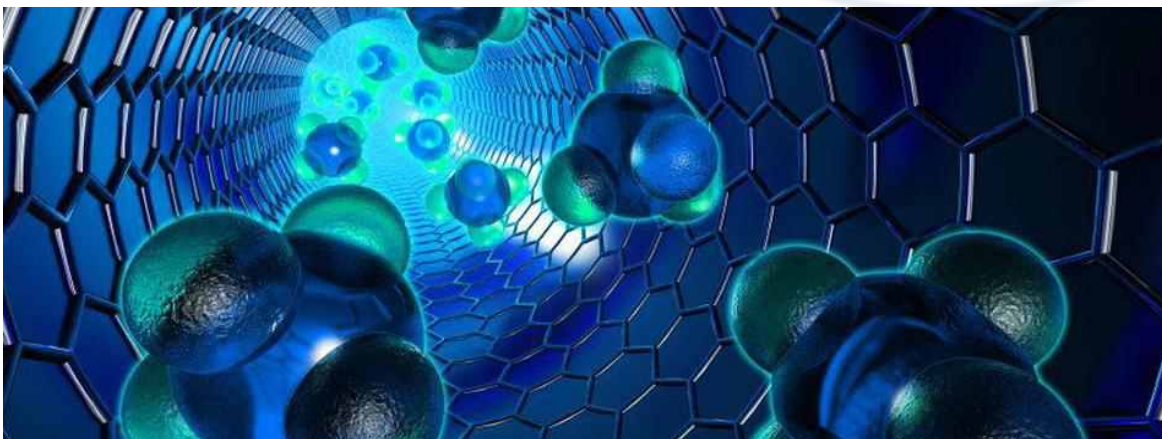
When it comes to investment casting, only the best materials give great results.

Colloidal Silica is the preferred binder in investment casting. It is used in the building of shells for ceramic molds during the investment casting process. It allows for greater intricacy of design and its high temperature tolerance and chemical inertness make it useful in binding a wide variety of refractory materials and for casting many metals and alloys.

Typical products made this way include turbine blades for aerospace and stationary engines, turbo fans and other parts for the automotive and weapons industries, medical and dental implants/instruments, and parts for household appliances.

## Silica Sols from RXSOL For Catalyst

### Catalyst Material



Gujarat Silicon has various innovative raw material solutions for the catalyst formulator. Our specially developed Colloidal Silica have exclusive benefits and can effectively meet your needs in the following applications:

# Silica Sol

## Colloidal Silica Binders for Spray Dried and Extruded Catalysts

- ✓ Improved catalyst strength, attrition resistance, and surface area; RXSOL Silicon has a wide range of particle sizes, size distributions, and concentrations.
- ✓ Specially developed approach to reducing metal contaminants; Ultra high purity and Ammonia Stabilized Colloidal Silica.

We understand the technical requirements for catalyst formulators and are capable of offering appropriate Colloidal Silica for various formulations.

## Silica Based Zeolite

Gujarat Silicon expertise in producing nano particles offer's the formulator with new options to improve manufacturing efficiency and final catalyst performance, including the following benefits:

- Nanoparticle silica promotes more efficient zeolite formation
- Atomic level mixtures of silica and alumina promote efficient crystallization of zeolites
- Ultra high purity levels are available to reduce crystal defects