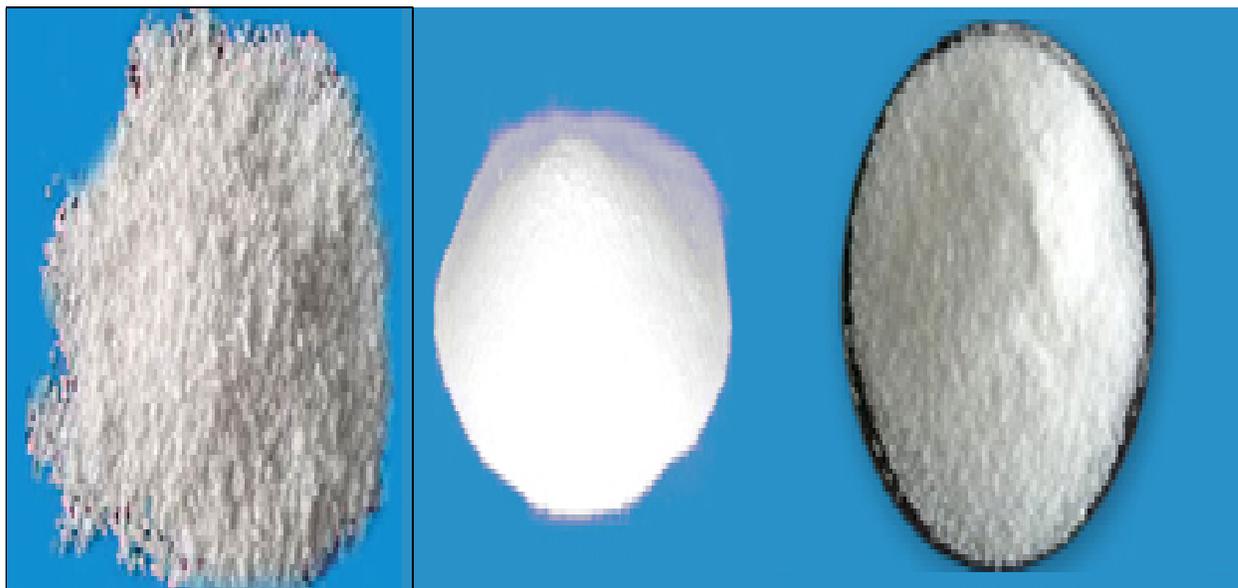


APPLICATIONS OF OUR PRODUCT

(ABROSIL SYNTHETIC AMORPHOUS SILICA)



ABRO CHIMIQUE PRIVATE LIMITED,

CONTACT ADDRESS: SWAGATAM BUILDING, OPP: JAIN PLAZA, CMD
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"ABROSIL"

IN

RUBBER PRODUCTS

RUBBER GRADE ABROSIL SYNTHETIC AMORPHOUS SILICA

1. Adhesive:

ABROSIL Synthetic Amorphous silica is useful to enhance bond strength and as a reinforcing and thickening agent. The dispersed silica particles present within a liquid adhesive hardens fast when it is in contact with solid surface. In both natural and Synthetic rubber based adhesive.

Our ABROSIL Synthetic Amorphous silica provides thixotropy, reinforcement and promotes adhesion as well as serves as extenders; therefore it raises quality and lowers cost. It is used to adjust rheology and provide reinforcement.

ABROSIL Synthetic Amorphous silica prevents resin separation and the settling of pigments and heavy fillers.

It prevents excessive penetration of adhesive into porous adherents.

It improves flow control and heat resistance of hot melts in application.

Serves as a free flowing agent for spray dried resins



2. Foot wares :

ABROSIL Synthetic Amorphous silica finds its use in shoe soles for its resistance to wear and to tearing, its non-scuffing characteristics and to obtain compounds with light color or even transparent materials. It provides superior durability and resilience and improved modulus. It Acts as white reinforcer facilitating manufacturing of colored end products. Because ABROSIL Synthetic Amorphous silica is white it allows the formulator to produce either colored or translucent non-marking soles. ABROSIL Synthetic Amorphous silica provides superior durability and resilience while improving compound stiffness for all types of rubber soled footwear.



3. Conveyor Belt & Transmission belt:

ABROSIL Synthetic Amorphous silica finds its use to improve the tear strength due to its small particle size and complex aggregate structure. It imparts the highest degree of reinforcement to elastomer compounds.

ABROSIL Synthetic Amorphous silica finds its use to prevent from cracking and cut growth of Conveyor Belts and power transmission belts.

- Provides higher tensile strength.
- Provides longer life and durability
- Imparts abrasion resistance
- Improves tear resistance.



4. PVC Sheets:

ABROSIL Synthetic Amorphous silica finds its use to improve pigment dispersion and acts as a parting agent and as absorbent to improve the flow and imparts a dry feel to the compound.

- Improves tear resistance.
- Acts as reinforcing agent
- Provides higher tensile strength.
- Provides longer life and durability



5. Railway Pads:

ABROSIL Synthetic Amorphous silica finds its use for the following reasons in Railway Pads:

- Provides increased abrasion resistance, strength and stiffness.
- Provides superior durability and resilience and improved modulus.
- Reinforcing agent, in natural and synthetic rubber.



6. Rice Rollers and Rubber Rollers :

ABROSIL Synthetic Amorphous silica finds its use in Rubber Rollers and Rice Rollers for following reasons:

- Improves the abrasion resistance and stiffness.
- Improves tear resistance.
- Acts as reinforcing agent
- Provides higher tensile strength.
- Provides longer life and durability



7. Rubber Products and Rubber Hoses :

In industrial rubber, ABROSIL Synthetic Amorphous silica confers superior strength and durability on industrial Rubber Belts and Rubber Hoses together with improved heat resistance and tear strength. It also improves adhesion in wire and fabric coat compounds and allows for rapid and easy processing, resulting in smooth finished surfaces in molded products.

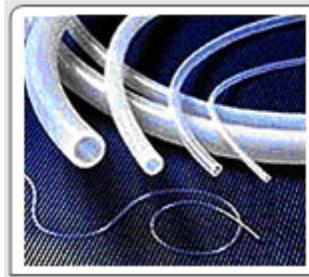


8. Silicon Tubes:

Silicone rubber is used in a number of applications where its unique properties provide a substantial benefit. Many of these properties are highly dependent on the type and quantity of filler used in the compound. Particular silicone rubber applications have certain physical strength requirements for example: wire and cable, medical and surgical, belting, hose, tubing and various fuel-resistant rubbers uses. When physical strength is a primary concern, reinforcing silica is the filler of choice.

ABROSIL Synthetic Amorphous silica finds its use in Silicon Rubber for following reasons:

- Improves process ability of raw mixture.
- Offers resistance to heat aging.
- Minimizes craze hardening.
- Provides superior resilience and compression set.



9. Rubber and Solid Tyres:

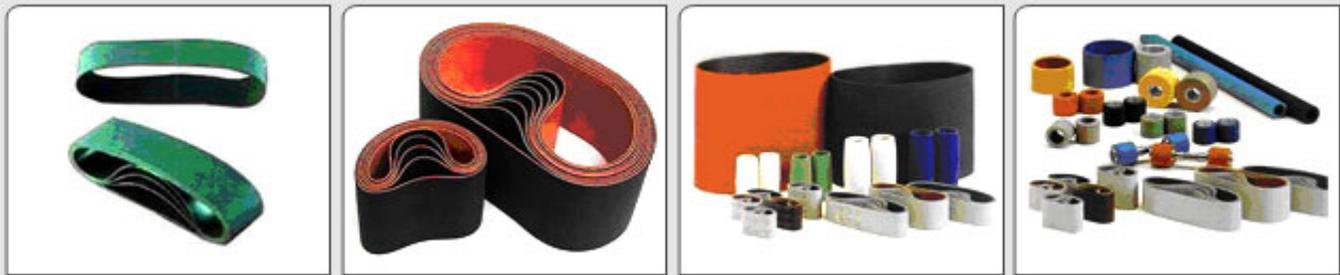
ABROSIL Synthetic Amorphous silica finds its use in Tyre industry to improve the tear resistance of truck and heavy equipment tyres and also to enhance adhesion between the metallic reinforcement and the rubber of radial tyres. Nowadays use of ABROSIL Synthetic Amorphous silica have been extended to passenger Car tyres as well.

ABROSIL Synthetic Amorphous silica also finds its use in "Green Tyres " due to excellent dispersion capacity and low rolling resistance and improves their longevity and adherence. It is a high-quality, reinforcing particulate filler that is used in conjunction with carbon black in rubber components of tyres and mechanical goods to improve performance.



10. Textile Cots and Aprons:

ABROSIL Synthetic Amorphous silica finds its use as reinforcing for textile cots & Aprons.



"ABROSIL"

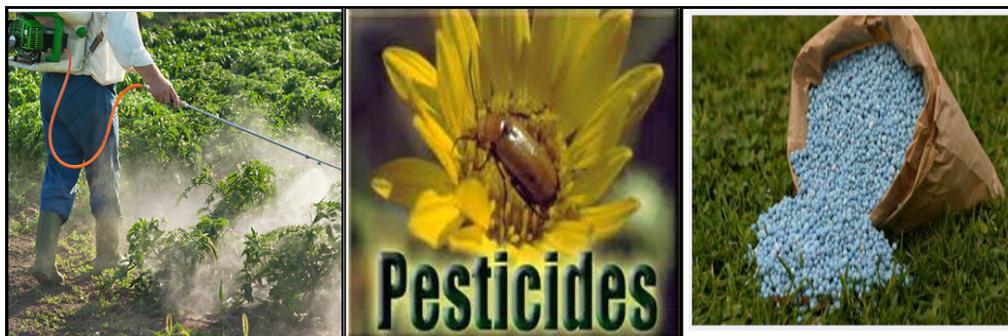
IN

NON RUBBER PRODUCTS

NON RUBBER GRADE ABROSIL SYNTHETIC AMORPHOUS SILICA

1. Pesticides :

ABROSIL Synthetic Amorphous silica finds its use as a carrier and diluents because in comparison with cheaper clays, it has high absorption, easier suspensibility, better compatibility with most toxicants and better stability, even after extended storage under tropical condition. It is most suitable for pesticides, insecticides & fungicides due to their extremely fine particles size and large surface area which account their use as an absorbent carrier and flow conditioner of solids and viscosity control of liquids. It has higher absorption, easier wetting property. Interestingly, the plant understands the protective potential of silicon, even if we don't. When a disease begins, the plant directs all available silicon to the attack site, to strengthen the surrounding cells and stop or slow the spread of the pathogen. There is a problem here, though, because silicon is immobile once incorporated into the cell wall. It must be in constant supply so that the plant can utilize it at these times. Most soils contain less than half of the soluble silicon required so there can be significant benefits in **foliar spraying silicon** at the first sign of a disease. This can stop the spread of the disease and many growers are successfully using this strategy.



Bio Fertilizers:

In the form of silicon fertilizer it finds its use as direct fertilizer in farming of various food-grain crops. The application of silicon fertilizers promotes the transformation of plant-unavailable phosphates into available forms and prevents the transition of applied phosphate fertilizers into immobile compounds. The calculations have shown that silicon fertilizers allow reducing doses of phosphoric fertilizers and raising their efficiency by 30-50%.

Photosynthesis is the most important process on the planet. The green plant is the only source of food and the management of chlorophyll, the green pigment where all the action happens, is the chief role of the farmer. **Silicon** is a gold sponsor of the sugar factories within the plant as it supports this process in several ways. The leaf is essentially a **solar panel**, the underside of which also serves to capture the CO₂ gas as it rises from the roots and soil life. The better that panel is presented, the more efficient it will prove in capturing sunlight, water and CO₂ (the three components of photosynthesis). Silicon strengthens the stem and holds that panel in perfect position. The plant is less likely to droop in warm conditions and more likely to maximize **photosynthesis**.

Minerals are the major players in the photosynthesis equation. Blotches, stripes and pale colors, from shortages of minerals, represent the mismanagement of chlorophyll. Sometimes it's not just the lack of these nutrients but their delivery into the crop that is the issue. Silicon can have a big impact upon **mineral uptake**. Phloem and xylem are the pathways that govern mineral absorption and the translocation of minerals within the plant. These nutrient highways are built from silicon and their performance will suffer in its absence.

Silicon is not classed as an essential nutrient, but, in response to a wealth of new findings highlighting the importance of this nutrient, that status may soon change. **Silicon** is the second most abundant mineral on the planet. It is everywhere. Clays are alumina silicates and sand is largely silicon, so how could there be a shortage of silicon? The answer lies in the form of silicon that enters the plant. Plants uptake silicon as **silicic acid** and this is what is missing in the soil. Something we have done in conventional agriculture appears to have compromised the conversion of insoluble silicon into the plant available form. It may reflect a mineral imbalance or we may have knocked out some of the soil microbe species that solubilise this mineral. It is not yet understood what drove the widespread deficiency but we do know that a healthy, disease suppressive soil should contain **100 ppm** of monosilicic acid (as measured in a soil analysis) and very few soils come anywhere near that mark!

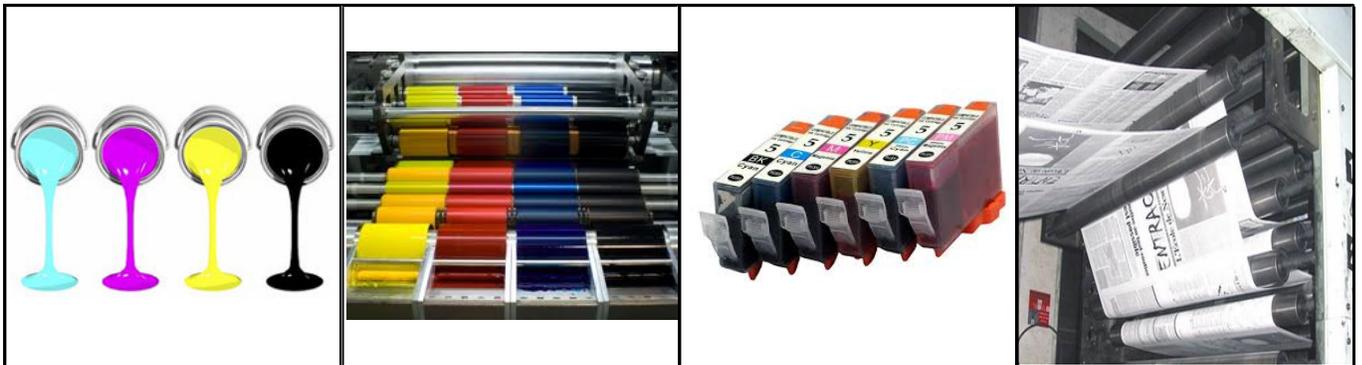
This neglected mineral is now emerging as a key player in proactive pest and disease management and the production of nutrient dense food. **ABROSIL** is in an amorphous form and is a very rich source of insoluble silica. This contains up to 85% silica dioxide. **ABROSIL** find its use as a natural insecticide it can cut up the offending insect's exoskeleton causing the creature to dehydrate and die. This material also can be used internally as a natural means to control intestinal parasites. The rich silica lode from **ABROSIL** can be made plant-available by micronising the material right down to a tiny particle size of 5 microns. It can then be held in a liquid suspension and applied via boom spray or fertigation. As little as 5 liters of liquid, micronized **ABROSIL** per hectare, applied through fertigation on a regular basis, can lift leaf levels of silica into the luxury zone, with all of the associated benefits.

Pro-activity is the essence of the biological approach. If you understand how plants protect themselves, then you provide the necessary components to maximize that process and minimize the need for chemical intervention. In this context, silicon is an essential pre-requisite for **proactive pest and stress management** and should be an integral part of every good nutrition program.



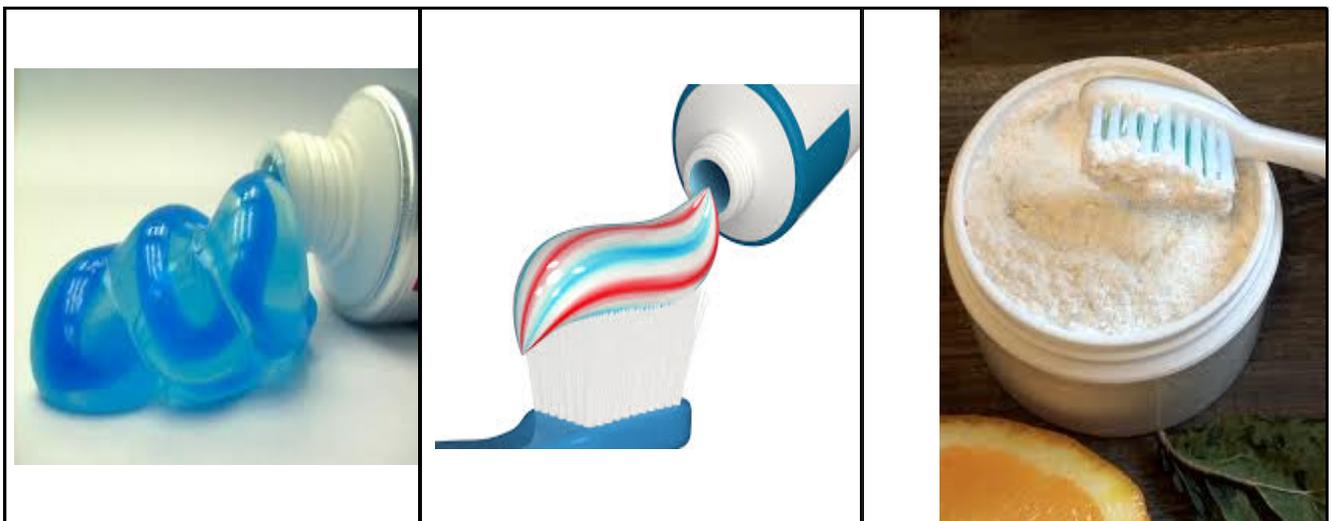
2. Printing Ink:

ABROSIL Synthetic Amorphous silica finds its use as a thickening and suspending agent, to prevent set off and picking, to heighten brilliance.



3. Tooth Paste and Tooth Powder :

ABROSIL Synthetic Amorphous silica finds its use in the manufacturing of tooth powder like normal, medicated and transparent tooth paste. ABROSIL Synthetic Amorphous silica when added to tooth powder or tooth paste acts as a thickening agent, good abrasive agent, thereby cleaning the teeth thoroughly the transparency of highly porous and high surface area of silica permits the development of transparent gel tooth paste. It is Compatible with Active Ingredients and Therapeutic Agents. It provides Crunchy effect and micro pearl mouth feeling.



4. Salt:

ABROSIL Synthetic Amorphous silica provides free flowing characteristics in salt and prevents caking. It does not effect on taste, odors, colour and nature of the salt.



5. Coatings:

ABROSIL Synthetic Amorphous silica finds its use as thickening, thixotropic, anti-settling agent and as matting agent at high concentration. It also reduces gloss of trade sale clear oil modified urethane varnish. It gives satin sheen in nitrocellulose furniture lacquer. It is also preferred in aluminum extrusion coating and coil coating with long guaranteed life, to reduce gloss at all viewing angles. It is gaining use in high solid pigmented metal office furniture finish. It is also used for corrosion control coatings.

Amorphous silica has many benefits for corrosion control coatings. In the electroplating industry, there is a push to move away from hexavalent chrome (Cr VI) to trivalent chrome (Cr III) for health and safety reasons. It can sometimes be a challenge to replace Cr VI with Cr III, but Amorphous silica has been found to improve the performance of Cr III to almost Cr VI standards. Also, Amorphous silica has an extra benefit in the stabilization of electroplating baths by providing ionic stabilization without adversely effecting bath performance.

For zinc rich coatings used to protect steel in construction facilities, Amorphous silica can be used as a binder. This results in a hard, durable coating that protects steel and prevents oxidation in construction environments

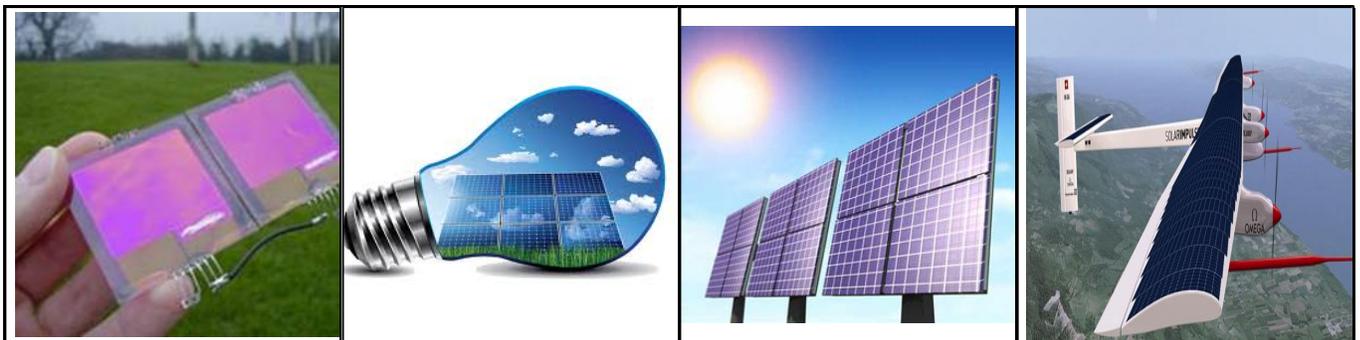


6. Fire Extinguishing Powders :

ABROSIL Synthetic Amorphous silica ensures extremely good humidity protection due to its hygroscopic nature, so extinguishers remain fully operational even after extended storage. It also can be used as flame retardant.



7. Solar panels: Amorphous Silica finds its use to manufacture solar cells. Our company in future intends to manufacture the grade suitable for this use.



8. Specialty Paints :

It is suitable for diluting or flattening effects in paints, prevents settling of pigment in storage, stabilizer emulsion and helps to covers greater surface area.



9. Animal feed:

ABROSIL Synthetic Amorphous silica finds its use as a carrier and diluents & fillers for feed; it has high absorption, easier suspensibility, better compatibility with most ingredients and better stability. Even after extended storage under tropical condition. To use as Anti- caking agent, improves flow-ability in animal feed.

CATTLE FEED

FISH FEED

PIGRI FEED

DOG FOOD

POULTRY FEED



10. Food, Healthcare(medical), Cosmetics:

ABROSIL Synthetic Amorphous silica finds its use as a carrier and diluents; it has high absorption, easier suspensibility, better compatibility with most ingredients and better stability. Even after extended storage under tropical condition. Can be used in ready to use Dried Food & Healthcare & Cosmetic products as rheology modifier (dryness & free flow characteristics), ABROSIL Synthetic Amorphous silica provides free flowing characteristics.

ABROSIL Synthetic Amorphous silica for pharmaceutical use can meet the requirements of international pharmacopoeias. They provide thickening in pastes and ointments to inhibit the separation of components

and maintain flow properties in powder products. They can also function as a carrier for fragrances or flavors. They also can be used in beer and wine clarification.



DRIED FOODS

COSMETICS

MEDICAL

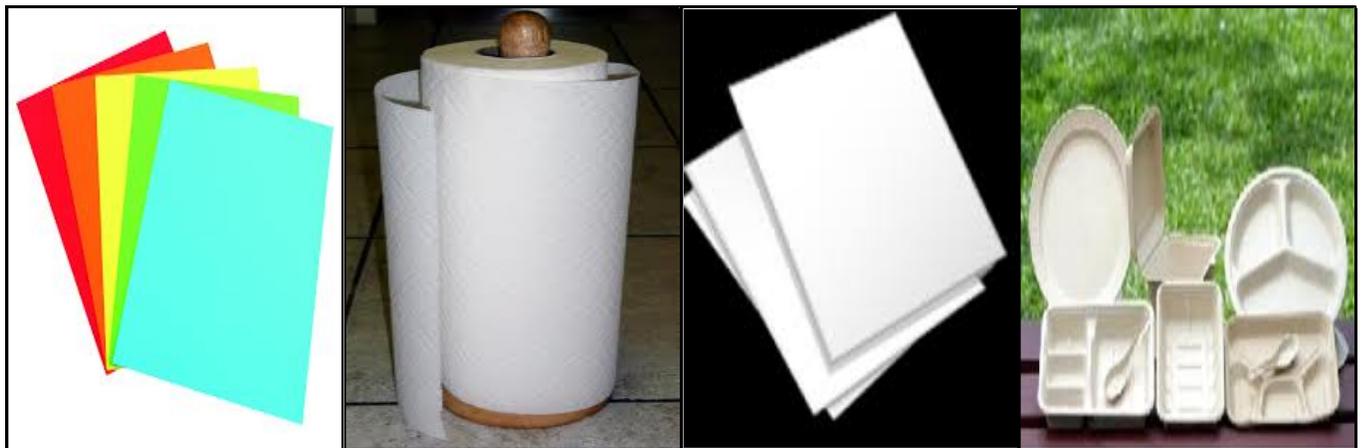
MEDICAL

11. Pulp and Paper processing:

ABROSIL Synthetic Amorphous silica finds its use as a thickening and suspending agent, to prevent set off and to heighten brilliance. ABROSIL Synthetic Amorphous silica ensures extremely good humidity protection of processed paper due to its hygroscopic nature & absorption property.

The non-slip surface created by Amorphous silica can increase the slide angles of board and paper for easier processing and stacking. This can result in faster line speeds and easier handling of the finished product.

The creation of a porous coating that readily accepts water based inks is a benefit for not only inkjet and photo applications, but also for packaging. Printed images are crisp and clear helping to upgrade the look of your packaging material.



12. Adsorbents:

ABROSIL Synthetic Amorphous silica is extremely good absorbent due to its amorphous nature. It makes most liquids into powders. It finds its application as Oil Spill Absorbent also.



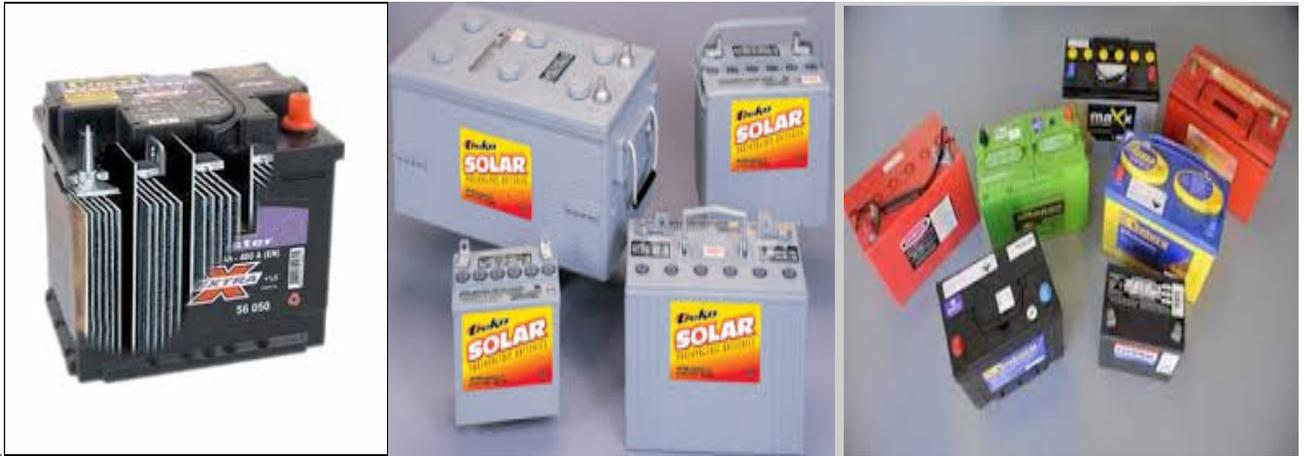
13. Anti-caking agent for packing:

ABROSIL Synthetic Amorphous silica acts as anti-caking agent & ensures extremely good humidity protection due to its hygroscopic nature. Good for Packaging of many commodities & Chemical substances.



14. Battery Gelling:

In a lead acid battery, ABROSIL Synthetic Amorphous Colloidal Silica dispersions find its use to **gel** the sulfuric acid to obtain a solid electrolyte. ABROSIL synthetic amorphous silica is the most efficient means available to achieve the gel matrix for high performance, gelled, valve regulated, lead acid batteries (VRLA). It is the most cost-efficient, easiest-to-use, and environmentally sound option. As a liquid, ABROSIL synthetic Amorphous silica is easy to handle and can be added directly to the acid immediately prior to filling the battery



15. TEXTILES(CLOTH FABRIC):

Improved touch for the things that touch us



ABROSIL synthetic amorphous silica finds its use as a vital component in formulations. One of the most well known areas is formulations for fiber treatment. Used alone or in combination with other additives, Amorphous silica can provide frictionizing benefits hence stabilising the weave structure and improving the seam slippage. There are also additionally improvements the dry hand and to control fabric sheen,(ABROSIL synthetic amorphous Colloidal silica can also be used to modify).

ABROSIL synthetic amorphous silica gives special finishing effects to blends and to fabrics made of cotton, wool, synthetic fibers and filaments. Textile finishers achieve outstanding results in dyeing and finishing using ABROSIL synthetic amorphous silica solutions

"ABROSIL"

IN

CEMENT,

CEMENT CONCRETE

&

CEMENT PRODUCTS

CEMENT MANUFACTURING & CEMENT CONCRETES & CEMENT

PRODUCTS:

ABROSIL synthetic amorphous silica is a very good super-pozzolan. ABROSIL is Organic Silica and is a carbon neutral green product, with silica content of above 80% having particle size below 25 microns. Our product can be used as admixture in a big way to make special concrete mixes and refractory products. There is a growing demand for fine amorphous silica in the production of special cement and concrete mixes. This market is currently filled by silica fume or micro silica, being imported from Norway, China and also from Burma & only few other countries. Due to limited supply of silica fumes and the demand being high we are emerging as a strong substitute. This is the product which is substantially used in western countries in various construction jobs as well as in the production of cement based products. Further Amorphous Silica possesses a small particle size which lowers the porosity of concrete and is a highly reactive pozzolan. However, previous experience has shown that silica fume decreases the initial set time of concrete and increases the amount of shrinkage in the mix. Amorphous Silica does not possess these undesired characteristics. Furthermore, Amorphous Silica has a greater amount of surface area per unit weight than silica fume, helping to increase the overall strength of the mix. Therefore it was chosen to replace silica fume.

The particle size of the cement is about 35 microns. There may be formation of void in the concrete mixes, if curing is not done properly; this reduces the strength and quality of the concrete. Our product which is rich in reactive silica is finer than cement having most particles size of 25 microns and below, so much so that it fills the interstices in between the cement in the aggregate. That is where the strength and density comes from. And that is why it can reduce the amount of cement in the concrete mix besides improving strength and quality of concrete.

Application Areas:

- High performance Cements & High performance concrete.
- High strength, low permeability Concrete.
- Concrete in marine environments.
- Industrial flooring.
- Water tanks and sumps.
- Chemical storage tanks.
- Basements and sewerage pipelines.
- Refractory mixes & products etc.
- Ceramic glaze
- Fire proofing & weight reduction
- Oil spill absorbent
- Lightweight Concrete Aggregate



ADVANTAGE OF USING "ABROSIL" IN CEMENT MANUFACTURING & CEMENT CONCRETE:

- **For Strength & Finish:**

ABROSIL finds its use in place of silica fumes or micro silica at a much lower cost, without compromising on the quality aspect. Adding ABROSIL to the concrete mix even in low replacement (10% of Cement by 2.5% of Amorphous Silica) will dramatically enhance the workability, strength and impermeability of concrete mixes, while making the concrete durable to chemical attacks, abrasion and reinforcement corrosion, increasing the compressive strength by 10% - 20%.

ABROSIL can be mixed during final grinding of cement manufacturing at a much lower cost, without compromising on the quality aspect. Adding ABROSIL to the cement even in low percentage (@3% ABROSIL by weight) will dramatically enhance the workability, strength and impermeability of concrete mixes made of this cement. With having same advantages as mixing in concrete mixes. It provides better smooth finish in pre-cast structures.



- **For fire proofing & weight reduction:**

ABROSIL has excellent fire resistance properties & Light weight and is used in concrete mixes to give amazing results. It increases fire resistance & reduces the weight of the concrete mix for better handling convenience.

- **For cement products:**

Such as in manufacturing precast cement pipes and blocks as well as various other cement products, when only small percentage of Amorphous Silica is mixed it can reduce the use of cement equivalent to nearly four times the material added which can bring in substantial economy and added value such as water & chemical resistance, fire proof, light weight and better smooth finish.



- **For water proofing:**

ABROSIL has excellent water resistance (impermeability) properties and is used in waterproofing compounds to give amazing results. It reduces the water penetration by as much as 60%.

- **For Better Concrete in Marine environment:**

Adding ABROSIL to concrete and paints helps to reduce the chloride ion penetration by as much as 50% into the structure, thus improving life of the building.



- **For Lower heat of Hydration:**

Adding ABROSIL to concrete lowers the heat of hydration by as much as 30% and prevents formation of cracks during casting.



- **Lightweight Concrete Aggregate:**

We offer ABROSIL for **light weight Concrete Aggregate manufacturing** which has loose Bulk Density -140 -160 kg/M³ Almost ten times light weight than normal concrete, **light weight Concrete Aggregate** now is the demand of **“GREEN BUILDING APPLICATION”** saving energy. **Application Method:** With cement 1:4 and 1:5 ratios, for more economical application. **Light weight Concrete Aggregate** is well maintained combination of perlite, vermiculite both are well accepted worldwide construction grade for Light weight Insulating aggregate, added with ABROSIL Amorphous Silica and fiber reinforcement Applicable for any roof surface.

Many architects and structural Engineers have taken best advantage in exploring above property for various applications such as roof insulation, interior Plastering, Penthouse insulation, corrugated sheet insulation, shrunk filling and to reduce dead load specially cantilever structure.

AN ECOLOGIST'S DREAM

TERI University Campus, Vasant Kunj

- High performance window glazing to minimize heat inside
- Windows completely shaded in summer

Centre for Environmental Science and Engineering, IIT Kanpur

- First GRIHA rated building in India - a model for green buildings in the country

ITC Green Centre, Gurgaon

- Brick and sandstone cladding
- Octagonal atrium which has a side light from the top to give glare-free light to interiors

ITC Royal Gardenia, Bengaluru

- 57% of roof area is green
- 100% reduction of potable water usage for landscaping by using treated waste water

Development Alternatives Delhi

- Maximum natural lighting and ventilation

Institute for Rural Research and Development, Gurgaon

- 35 kWp (kilowatt peak) photovoltaic solar panels
- Zero water runoff from site

“ABROSIL IS ORGANIC SILICA AND IS A CARBON NEUTRAL GREEN PRODUCT”

TECHNICAL SPECIFICATIONS
OF
"ABROSIL" FOR CEMENT USE

SiO₂ – Silica	>98%
Humidity	<3% Max.
Particle size (microns)	< 5-25
Colour	SNOW WHITE
Loss on ignition at 1000°C for 2 Hours	<5%
pH value	<6-7

GENERAL SPECIFICATIONS
OF
“ABROSIL” SYNTHETIC AMORPHOUS SILICA

<u>SPECIFICATION</u>	<u>RANGE</u>
01. Particle Size Microns	3-12
02. Surface Area M2 / gm	100-300
03. Moisture content at 105 ⁰ C, 1Hrs. Max%	6
04. Ignition loss at 1000 ⁰ C for 2 Hrs. Max%	5
05. Bulk density gm/cc	0.08-0.20
06. pH 5% Aqueous suspension	6.5-7.2
07. Water absorption%	175-300
08. Oil absorption Min %	240
09. Residue on 325 mesh, wet sieving max %	0.3
10. Soluble salt % max	1.5
11. SiO ₂ – Silica min-max %	80% min. - 98.5 max.
12. Specific gravity	1.95
13. Refractive index	1.46

Note:

The above specified values are meant for general description & are not to be taken as actual specification.

“Abro CHIMIQUE Pvt. Ltd.” Do not take any responsibility for incidental or consequential damages of any kind. It is the responsibility of user to determine the suitability of use.

OTHER PRODUCTS

OF

THE COMPANY

OTHER PRODUCTS OF ABRO CHIMIQUE PVT. LTD.

Activated carbon:

- Food and beverages (discoloring)
- Pharmaceuticals
- Water purification
- Sweetener
- Solvent recovery
- Air purification

Liquid Sodium Silicates:

Weight ratios of SiO₂ to Na₂O (from 1.6 to 3.3)

- Detergents and cleaning compounds
- Adhesives & cements
- Paints & coatings
- Pulp & Paper processing
- Ceramics & binders
- Water treatment
- Textile processing
- Mining & mineral processing
- Petrochemical processing

Sodium Silicate liquid both Neutral & Alkaline

We manufacture large range of Sodium Silicate both in Neutral and Alkaline grade of the typical qualities.

We also manufacture Sodium Silicate as per the customer's requirements and specification.

ABROSIL Sodium Silicates	Concentration	Mole Ratio	Baume
Alkaline	40 - 54 %	2.1 to 2.6	45 - 57
Neutral	27 - 39 %	3.0 to 3.5	30 - 41.5

Liquid Sodium Sulphate:

- Detergents and cleaning compounds.