Wollastonite

Low and High aspect ratio

WOLLSILL- HAR
High Aspect ratio Accicular Wollastonite

Color	**White**
Brightness	**85-93**
PH	**9.9**
Particle Shape	Needles (L/D = 3 – 20:1) See images for shape
Hardness	4-5 Mohs
Oil Absorption	15 – 45 g/100g
Density	2,94 g/cm3
Bulk Density	0,90 –0,25 g/cm3
Ref Index	1,63

Different grades of HAR Wollastonite is available in alternative surface treatments to optimize their performance with different polymers. HAR wollastonite can be used as reinforcement filler in:

Thermoplastics:
- Polyamides
(Nylon 6 and Nylon 6.6)
- Polyolefins
- Polycarbonate
- Polybutylene terephthalate

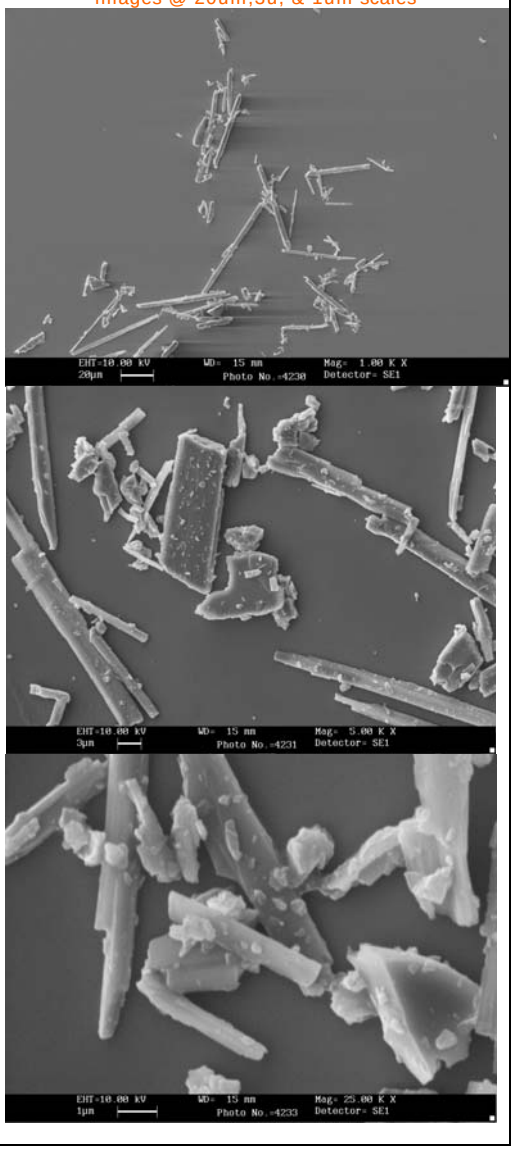
Thermosets
- Polyurethanes
- Epoxies
- Phenolics

Elastomers
- Non-black elastomers

Wollastonite is ideal filler for plastic compounding in many ways. The physical properties, such as acicular shape of the particles, very fine particle size, Surface treated or coated wollastnite renders unique technical properties for thermoplastic compounds, thermosets and elastomers such as:

* Increased Stiffness
* Excellent Impact Resistance
* Increased HDT
* Dimensional Stability
* Lower CLTE
* Increased Scratch and Mar Resistance
* Excellent Surface Appearance
* Increased Tensile Strength & Modulus
* Lower Costs compared to fibre glass

Wollastonite HAR Particle size and shape images @ 20um,3u, & 1um scales



MEDIUM AND LOW ASPECT RATIO WOLLSILL FBRS & LL GRADES FOR CERAMIC WALL TILE, METALLURGI -- CAL, PLASTICS & ABRASIVE Etc APPLICATIONS.

Contents	Wollsill-FBRS	Wollsill-LL
SiO2	52.25-62	54-66
Al2O3	02.66	01-4.5
TiO2	00.30	-------
CaO	25-35	19.7-32
MgO	01.58	04.9-6
K2O	------	00.79
Na2O	------	00.34
Li2O	NIL	
Fe2O3	00.3-01.58	00.35- 1.5
L.O.I.	1-4%	4-6%
Micro Nature	Fibrous	Semi-Fbrs

WOLLSILL-FBRS IMAGES @ 3UM SCALE

ZIROX™
smart materials • industrial minerals

Mineral Techniqa

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Applications of Wollastonite

Why Wollastonite?

Wollastonite, a mineral bestowed with many unique characteristics, is one of the most versatile functional filler and reinforcement agent. Wollastonite increases the performance of products like polymers, plastics, paints and coatings, construction materials, friction, ceramic and metallurgical applications.

Wollastonite is an industrial mineral comprised of calcium, silicon and oxygen. Molecular formula of wollastonite is $CaSiO_3$ and theoretically it consists 48.28% CaO and 51.72% SiO_2. Natural wollastonite may contain trace or minor amounts of various metal ions such as aluminum, iron, magnesium, potassium and sodium. Wollastonite is rarely found in pure form and generally contains other minerals like calcite, garnet and dropsied as gangue minerals or impurities those removed during processing.

Optimum performance van be created by properly matching suitable coupling agent at the appropriate concentration level to the polymer formulations. Surface modified wollastonite improves physical properties, improved processing & improved dispersion of the resin.

Plastics: In plastics, acicular needle like structure of wollastonite improves the durability of the composites. Acicular wollastonite enhances electrical insulating properties, imparts fire resistance & improves dimensional stability. Ultra fine and fine wollastonite improves scratch and impact resistance compared to other materials. The application of surface treatments like silanes on the wollastonite substrate changes it from utilitarian filler to a functional component of a polymer composite. This saline coating of wollastonite in turn adds performance values which the base resin does not possess. Overall, the benefits of a surface modified /coated wollastonite are improved physical properties, improved processing along with improved dispersion of the resin.

Construction: Wollastonite has been established as a substitute of asbestos in fire-resistant building products used in the construction. As a functional additive, wollastonite improves flexural and impact strengths. Wollastonite's low thermal conductivity and high aspect ratio structure also makes wollastonite an attractive addition where fire resistance is must. Wollastonite is applied in interior/exterior construction boards, roof tiles, shaped insulation products, sheets, panels and sidings.

Paints and Coatings: In coatings, fine acicular wollastonite particles act as flattening agent and allow paint to settle out after application to produce dry film of uniform thickness. Wollastonite's interlocking particles properties improve toughness and durability of the coating with excellent tint retention, scrub, and weather resistance. High brightness and whiteness of wollastonite reduce pigment load and typically very low oil absorption, reduces the volume of binder required and contributes to lower pigment input costs. Wollastonite also act as a pH buffer for improved in-can paint stability over long period. The acicular structure and alkaline nature of wollastonite also make it an ideal auxiliary pigment in industrial coatings and primers for better corrosion resistance.

Metallurgical: In metallurgy wollastonite is honored due to its low water solubility, low loss on ignition & its Ca–Si ratio. Wollastonite is commonly added into formulated powders for steel casting and welding. CaO/SiO_2 ratio of 1 easily absorbs Al_2O_3 that is determining to finished steels. Wollastonite addition to metallurgical fluxes provides ready fusibility, good insulating and low viscosity properties. As wollastonite is a natural, low temperature flux wollastonite is accepted in fluxing formulations for the continuous casting of steel. Wollastonite formulated casting powder is applied when molten steel is poured continuously from a ladle or tundish, to maintain surface defects, prevention of oxidation of steel, lubricates the mold wall and absorbs harmful intrusions.

Ceramics: Wollastonite is used in a line of ceramic applications including ceramic glazes and bodies, enamels, frits, fluxes and in sanitaryware. Wollastonite is a source of CaO to alkaline glaze to improve the strength. Some grades of Wollastonite has low LOI (< 1%) which reduces gas evolution during firing and attributes in smooth surface with diminished pin hole problems. Wollastonite's acicular structure improves green strength and reduces crazing and checking especially during rapid heating and cooling of wall and flour tiles. Wollastonite has a low sintering temperature (approximately 991-1196°C), comparable to that of most natural frits.

Friction: Due to its physical structure and non-hazardous properties, wollastonite is used as a reinforcing additive in many friction applications. Wollastonite has partially or at some places fully replaced asbestoses, milled fibers chopped glass and synthetic fibers. Wollastonite is applied in semi-metallic and non asbestos formulations for brake assemblies for truck blocks, drum linings, disc pads and friction paper. Due to Wollastonite' use in friction applications, physical & mechanical properties are improved, cracking is eliminated or reduced, pre-form strength & friction stability are improved, noise levels are reduced and cost of input is slashed