SIL TECH

Everyday life with innovative silicone specialties

Siltech is a privately owned business, managed and operated by its owners for more than 30 years. We hope and believe that the pride we feel in this company channels its way through each of our employees and to every customer. Siltech is a place where someone answers the phone when you call. It is a place where we feel passionate about the quality of our products and realize that our livelihood depends on satisfying you, our customer. Siltech is a place where you can source products with confidence.

Siltech develops and manufactures a full line of organo-functional silicone compounds and related specialties for a wide range of industrial and personal care applications, using our patented and otherwise proprietary technologies. Our expertise in specialized organo-modified silicone polymers has resulted in more than 40 patents. We always strive to create new materials with unique performance properties that are as yet unavailable.

Siltech owns and operates two manufacturing plants in the Greater Toronto Area. These plants are equipped with efficient, large-scale, high-temperature and pressure reactors, thin film evaporators and other modern equipment required in such unit processes as equilibration, hydrosylilation, quaternization, amidation, phosphation, esterification and homogenization. Siltech is ISO 9001:2015 certified.

Siltech serves a wide range of industries, such as personal care, urethane foam, inks and coatings, plastics and polymers, car care, textiles, automotive, oil and gas, HI&I, water treatment, leather, mining and composites. Change is truly the only constant in business, and Siltech understands and embraces the need to ride this wave of change.

While these existing silicone-using industries evolve, and additional uses are identified and developed, newer industries to silicones, such as 3D printing, smart coatings, and oil and gas, are finding that many problems can be solved with creative new silicones. Siltech's philosophy is to constantly innovate and create new products that provide you with enabling solutions to your problems. Siltech invests a substantial portion of our resources into R&D and new-product development.

Our R&D and technical service laboratories are modernly equipped and staffed by chemists with many decades of experience in diverse segments of the chemical processing industry. In addition, we have efficient pilot plant facilities available to produce special products for your experimental needs.

Siltech's commercial products are approved for use in most global jurisdictions. Siltech is committed to such compliance, and we have dedicated personnel to ensure this. We have pre-registered our current commercial products with European REACH legislation, develop and issue the Globally Harmonized System of safety data sheets, and continue to work with our suppliers and customers to meet implementation deadlines.

We are proud of the quality of the products described in this brochure. Most are available from stock on short notice. However, we will gladly manufacture other homologues to minimum order. Many problems, old and new, can be solved with new silicone specialties. We welcome the opportunity to partner with customers, as we believe that this results in the most creative formulator-friendly and cost-effective silicone specialties possible.

SILTECH COMMERCIAL AND SUPPORT STAFF

PERSONAL CARE TEAM

INDUSTRIAL TEAM

Innovative Silicone Specialties

SILTECH

About Siltech

Siltech Industry Applications

WE ALL USE SILICONES EVERY DAY

Silicone literally surrounds you

When thinking about silicone items in your home, you would probably first look in the kitchen.

Popular items such as non-stick cooking pans, spatulas, cupcake holders and an endless number of baking utensils and accessories typically contain silicones.

There are many other items in your home that you're probably not aware also contain silicones or silicone additives.

All of them help improve our everyday lives.

You're probably touching it or looking at it right now!

Silicone plays a huge part in the electronics industry, as every electronic device contains integrated circuits made of silicon chips called "wafers."

You can also find silicone everywhere in electronic systems to help seal, bond, coat and encapsulate components, enabling them to perform reliably under challenging conditions. Laptops, computers, flat screen TVs, stereo equipment and components, and cell phones all contain silicones.

Silicones are prevalent in your refrigerator, stove and many other appliances, as they have unique properties that make them suitable in these applications. Silicones have no odour and can go from the freezer to the oven, microwave or dishwasher without affecting the quality of the product or the food they touch.

The household cleaners and polishers you use to clean your appliances and furniture contain silicones to protect, enhance shine and help you apply them with ease.

Silicone – It's hard to imagine everyday life without this incredibly abundant and versatile resource. In its original form, silica, better known as quartz, is a common component of everyday sand. Science has discovered how to alter its molecular structure, in many different ways, to create a variety of customizable polymers as synthetic solutions used in so many everyday consumer and commercial products. **Let's explore some of the possibilities.**

You could even be wearing it!

Silicone is used in a variety of makeups, cleansers, shampoos, haircare and hair dye products, and a multitude of personal care items.

In addition, you can find silicones in a variety of textiles, clothing, outerwear, sports accessories, leather products, and even your running shoes.

As finishes, silicones help fabrics retain shape, texture, and resistance to abrasion, extreme weather conditions and water resistance. They are used to help achieve longevity, uniformity and provide brilliance of colour.

Silicones enable new techniques to help design sportswear that is lightweight, durable, water repellent and high performing, while allowing fabric to maintain breathability and look great.

Do you drive a car?

Silicone adhesives and coatings ensure that your vehicle's exterior is more resistant to rain, wind, salt, abrasion, UV radiation and road chemicals.

Engine parts, drive trains and tires last longer, and overall maintenance is less costly when silicones are used.

Even windshield wiper fluids, oils and lubricants contain silicones.

Your dashboard, car seats and upholstery are made with the help of specialized silicones, allowing them to retain shape as well as increase years of durability and comfort.

Without silicones, your vehicle would not look as good, last as long or run efficiently.

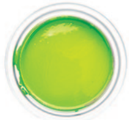
Your roof and everything under it

Building and construction materials such as concrete, glass, granite, steel, plastics and even bricks contain silicones, enabling them to work better and last longer.

Your hardwood floors, beautiful furniture, area rugs, insulation and backyard cedar patio can endure weather, time and everyday traffic with the help of silicones. Silicones help you retain the value of your home and everything in it. In fact, most of the raw materials used to build and protect your house or office contain silicones.

The silicones in your shingles help keep everything under your roof dry, repelling natural elements like extreme temperatures, corrosion, sunlight, UV radiation, pollution and many other damaging influences that promote wear and tear.

Innovative Silicone Specialties



Most of your stuff looks better because of it!

Look around your home or where you work and you'll be hard pressed to find an item that isn't covered with paint or some type of protective coating. That's because we all want our stuff to look great and last a long time.

Silicones in paint and protective coatings help to achieve a mirror-like application that is super smooth and uniform with perfect paint coverage, creating a beautiful finish with rich, vibrant colours — seen on appliances, cars, machinery, road signs and even the road itself.

Silicone additives in paints and protective coatings provide a slew of enhanced properties.

The ability to seal out water, to offer protection against heat and extreme weather conditions, and to provide scratch resistance and many other features are all possible with the help of silicones.

RESPONSIBILITY FOR SUSTAINABLE GROWTH

Siltech advocates and follows the three pillars of sustainability: Environmental, Social and Economic.

Sustainability pervades our decisions, both strategically and tactically

We believe that every person and every company needs to consider their impact on our planet. Everything we do has implications for all other people, and for all of the animals and plants that also call Earth home.

While it is unrealistic to completely mitigate all actions potentially negatively impacting our environment, we need to control our actions thereby reducing our impact.

In fact, today's consumers are very concerned about how the chemicals they use potentially impact the environment. This includes the impact on the environment during the manufacturing of chemicals, during the use of those chemicals, and any residual effects arising from the disposal of the finished products.

Of critical importance are the chemicals' effects on the environment and the time it takes for them to degrade. Siltech's commitment to the environment is strong. As a Canadian corporation, we adhere to and go beyond the highly stringent requirements of the Canadian Environmental Protection Act.

We strive to continually invest in modernizing our facilities to achieve the most efficient manufacturing and waste stream management processes possible.

Siltech is acutely aware of our consumption of energy, water and other resources. Improving efficiencies and reducing our inputs while increasing our outputs is something that drives our production every day.

We also strive to develop processes that use few, if any, harmful raw materials. And we have developed sophisticated methods for capturing any harmful byproducts to make sure they are not released into the environment.

Siltech also considers the downstream implications of our silicones. There are two main reasons the environmental impact is minimal when silicones are used: first, low concentrations of silicones are usually required to achieve the desired properties; second, during soil contact, silicones readily degrade via hydrolysis into silica, carbon dioxide and water.

This is supported by numerous studies that have concluded that the degradation of polydimethylsiloxanes (which are the backbone of Siltech's surfactants) is ecologically inert and does not inhibit the biological process by which wastewater is treated.

We have done extensive research on how to minimize the use of silicones in personal care products to meet that industry's desire for using more naturally derived products.

Our work shows that small percentages of special silicones can make natural oils feel like volatile silicone oils such as cyclosiloxanes.

This has allowed our customers to reformulate their products by eliminating cyclosiloxanes, without losing any performance attributes.

Recent papers from our R&D team discuss how regulations have driven rather than hindered innovation at Siltech over the years and across markets.

Additives that reduce VOC and synergistic fluorosil polymers, which reduce the need for fluoroalkyl groups, are specific examples cited therein.

In many cases, silicones are a greener alternative to commonly used petroleum-based products due to their ultra-low use levels and higher efficiencies.

Also, unlike many chemicals that use starting materials that come from plants that are used to produce food such as coconut, palm or soybean oil, our food sources are not compromised during the production of silicones.

In multitudes of industrial processes, silicone-based antifoam products are used at ppm use levels to minimize foam, thereby allowing for faster output, less energy usage and less spillage.

And while humans develop alternative energies and chemical sources, silicones are being increasingly used in the oil and gas industry to better collect, transport and process the petroleum, thereby allowing us to make the most efficient use of this non-renewable resource and extending the time until alternatives become available.

Siltech continuously strives to improve our processes to protect the environment.

Siltech's Environmental Policy

Siltech is committed to our planet. We believe that every person and every company needs to consider their impact on our planet. As a manufacturer of chemical products, Siltech is acutely aware of our consumption of energy, water and other resources.

We will endeavour to produce goods more efficiently, using less energy and water, and using fewer harmful chemicals by investing a large proportion of our profits each year into modernizing our facilities to achieve the most efficient manufacturing and waste stream management processes possible; developing processes that use few, if any, harmful raw materials; and using sophisticated methods to capture any harmful byproducts to make sure they are not released into the environment.

Siltech strives to create products that can be used by our customers in producing more environmentally friendly end products. This is achieved by creating new silicones that our customers can use to make new environmentally friendly products, enabling customers to reduce their use of harmful chemicals either by replacing them with our silicones or by improving their manufacturing process.

Whenever possible, Siltech will strive to minimize pollution and waste, conserve energy and water, protect habitat, support renewable energy resources, buy environmentally friendly products, and encourage environmentally preferable transportation. Specifically, when economically feasible, we will identify and purchase environmentally preferable supplies and services for all our daily operational needs and for company events, and encourage contractors and suppliers serving or otherwise acting on behalf of the organization to meet our standards of environmental performance.

Employee understanding and involvement are essential to the implementation of the policy; therefore, all employees will receive a copy of this policy and be educated about our company's efforts to improve our environmental performance. Employees at all levels of the company will be involved in supporting our goals.

As our customers' and consumers' needs change and there is an increasing demand for more environmentally safe and efficient products, Siltech will continue to lead the way with the introduction of additional products and technologies to meet these needs. This is good not only for Siltech, but for everyone who calls Earth home.

Everyone claims to be innovative and to like to partner. The difference is we actually do it every day. It's our norm!

Siltech is an innovation company

We have built our business and reputation on creating new silicones for new customers with new applications. Our R&D, Technical Service and Process R&D laboratories are modern, well-equipped, co-located with our manufacturing facilities, and staffed with first-class chemists and engineers.

These scientists have years of experience in synthesis and key applications such as personal care, polyurethane foam stabilization, inks and coatings, and silicone gel formulation. Our first-rate analytical labs support the quality of our manufactured products as well as new-product development and technical service.

Our track record of innovation and outside-the-box problem solving is demonstrated by our broad portfolio of product types. Our early history as an organic surfactant company gives us a different perspective from the other silicone manufacturers and results in classic organic surfactant derivations to silicone, such as our Silamine®, Silphos® and Silquat® products. All are commercial grades.

We are continually adding chemists and the latest equipment to make sure our R&D capabilities support all of your needs. Our typical approach is to develop products directly with our customers.

We are very willing to work closely with your chemists to develop structure property understandings.

Our commercial reactors are engineered to give the same product irrespective of the required scale, so we have relatively small minimum volume requirement limitations to commercialize a new variation. In fact, over 25% of our production today is used for single-customer products, further demonstrating our commitment to partnership.

Siltech's silicones are manufactured in Ontario, Canada. Each of our state-of-the-art facilities is equipped with dedicated large-scale reactors utilizing our novel hydrosilation manufacturing process technology. To ensure the consistent production of the highest-quality products, we employ advanced in-process controls to prevent variations.

RESEARCH-INTENSIVE SILICONE TECHNOLOGY

A proven track record of innovative, creative problem solving, offering a diverse product portfolio.

World-class manufacturing

At Siltech's manufacturing sites, our pilot plant facilities also produce experimental specialty silicone products in smaller quantities to meet customers' unique requirements. Our 15,000 m^2 of manufacturing floor space is divided among our two modern plants, bracketing the city of Toronto. Our Mississauga plant was purchased in 2010 to accommodate growth and has since been further modernized to the standards of our Toronto plant.

New control systems have been installed in our Toronto plant to bring it up to the standards of our Mississauga plant. We combined the best of both locations. With reactors ranging in size from 20 kg to 30,000 kg, we have the flexibility to support our growth strategy of introducing new innovative products and the capacity to address your needs. Our highly skilled and experienced manufacturing teams take great pride in the quality and purity of our products. We make sure they are the best in the industry.

We also have an advanced analytical laboratory, which features the latest instrumentation. Finally, our technical service laboratory is equipped to completely evaluate the performance of our products in various end-use applications. We are proud of Siltech's extensive product range as well as our capability to supply products that are specifically tailored to our customers' needs. We are enthusiastic about our ability to provide knowledgeable technical service and to remain in the forefront of silicone technology. By working closely with our customers, Siltech has also created many products that are unique and exclusively used by these customers.

As the industry continues to evolve, new applications and improvements are continuously needed to meet and exceed customers' expectations. In addition to our products offered, Siltech also welcomes the opportunity to work with customers to develop unique silicones for specific applications.

Oil & Gas

RELIABLE SOLUTIONS FOR EXTREME ENVIRONMENTAL CHALLENGES

For a full list of additives, go to siltech.com/application/oil-and-gas.

Drilling and lubrication

Siltech offers a diverse product line of proven liquid and lubricating additives engineered to improve oil and gas drilling efficiency, and profitability.

Choosing the right additives for drilling processes is critical to maintain efficient, maintenance-free production and reduced, expensive downtime.

Siltech has developed an extensive line of innovative silicone additives that improve insulation issues; coating and sealing of mechanized gears and parts; and electrical components and lubrication of rig valves, all of which assist and improve production and drilling efficiency.

Effectively formulated additives can dramatically elevate the performance of drilling equipment, by protecting machinery, reducing damaging vibrations, preventing bonding and anti-damping. In extreme and unpredictable environmental conditions associated with drilling, silicone additives provide the additional protection oil and gas processors require 24 hours a day.

Production and refining

The process of separating and refining crude oil is challenging and complex and needs to be done efficiently, cost-effectively and as quickly as possible for market availability. Refining production processes requires a multitude of chemicals, including customized silicone formulations, which must work seamlessly with a variety of other chemistries during the production process.

Production-ready high-performance fluids, demulsifiers, surfactants, silanes, PDMS (polydimethyl siloxane) fluids, proppant process aids, resin modifiers and fluorosilicones are essential throughout the refining process, if maximum efficiency and continued production are maintained. Siltech's versatile additives were specifically created to address all of your production refining needs, and are customizable for a variety of crude blends.

To ensure maximum production output, our product portfolio is continually expanding with outstanding formulations that adhere to environmental and current regulatory criteria. Siltech continues to be a market leader in diverse customizable additive solutions for oil and gas.

REDEFINING REFINERY AND DRILLING ADDITIVES

Oil and gas are vital to many industries and are critical resources for the entire globe.

High-grade well drilling cement additives

Cementing is necessary to long-term performance and critical to maintain continued structural integrity for every oil and gas well. Silicone additives play an important role in the installation and maintenance of downhole cementing.

Siltech has developed several effective solutions engineered to meet and exceed the performance needs of downhole cement requirements.

These silicone-based materials are excellent for defoaming cementitious materials, as well as enhancing the physical performance of cement properties, providing improved integrity and long-term durability of the cement materials.

Effective fluid additives provide the cementing process with reduced foam generation and air inclusion, enhanced hardening properties, stronger integrity and long-term durability.

Siltech also offers a wide range of products that can improve the overall performance of cement by improving hydrophobicity and bulk physical properties.

Adaptable foam control management

The oil and gas extraction process uses an abundance of drilling fluids to help drill holes through the ground and rock. Drilling fluids helps lubricate expensive drilling bits as well as sends crushed mineral debris to the surface, where it is then removed. An unwanted side effect of the process is that once debris reaches the surface, it reacts with air and creates foam.

Siltech foam control additives are used in drilling fluids to reduce surface tension, add lubricity, reduce oxygen content in the fluids and, in turn, reduce foam formation. Silicone formulations are used to lower this surface tension and introduce lubricity into the mud, thus defoaming and eliminating air in the drilling fluid.

Siltech foam control solutions are critical to your process and profitability, as well as enhanced safety, drilling efficiency, reduced waste and energy consumption. Silicones provide particularly efficient foam control properties that enhance productivity and process reliability, preventing cavitations (bubbles or liquids that cause harmful implosions in pump parts) and therefore contribute to reducing wear and tear, costly maintenance and production downtime.

Effective defoamers are available in various forms and address a variety of environmental factors, including temperature and moisture variants, and are used in treatments for gas and oil separators, water treatment, desalting, distillation, dehydration and more.

Silicone enhanced rubber

Silicone additives are essential ingredients in all phases of oil and gas extraction and production; however, other materials created with various silicone properties are also an important and critical component of the oil and gas industry. Silicone rubber products are essential to a continual production stream and are found everywhere throughout all phases from drilling to refining.

Silicone rubber has many appealing properties and features that make it perfect for the oil and gas industry, including flexible features and high resistance to extreme environmental conditions, such as moisture, heat and cold.

Silicone additives in rubber allow for an impressive stability and longevity and can be moulded to accommodate a variety of shapes and sizes. This highly inert substance doesn't react with most chemicals and is resistant to UV light and ozone deterioration.

The prolific use of rubber gaskets provides cushioning by preventing metal-on-metal contact, reduced damage risk by minimizing movement from vibrations, and flexible sealing properties in high-performance applications for extreme pressure seals, o-rings, gaskets and machinery closures.

Silicone additive technology, partnered with the abundance of unique rubber properties, translates to longer, maintenance-free, cost-effective production.

ENRICHED FORMULATIONS FOR INDUSTRIAL AND HOME

Siltech provides your business and home with proven innovative cleaning solutions.

Even your laundry basket needs silicone additives

Consumers are relentless in their search for improved cleaning features and optimal performance in their laundry soaps and fresheners.

They seek properties such as convenience of use, garment protection, extended life cycle, pleasant scent, comfortable feel and time saving features, which translate into a better finished product to get the job done. High-performance products that are convenient to use allow more time for additional household chores.

Innovative formulations that include marketable features can help drive consumer growth for all of your products. Improved cleaning power, scented finish, static free, fabric softener, allergy free, fabric protection and environmentally friendly are a few features that can appeal to consumer wants.

Siltech's expertise in providing formulation improvements for laundry care detergents, conditioners, fabric care and fragrance features helps make products stand out on a crowded shelf among competitive offerings.

Ensuring appropriate cleaning of fabrics is a priority, but consumers also seek multifunctional features, such as soft, fresh-smelling clothes, durability and comfortable feel, and long-lasting robust colours.

Improving industrial and institutional cleaning solutions

Siltech's industrial cleaning additive solutions are customized for a variety of product applications. The development of effective cleaning products is imperative when commercial applications demand high-performance innovative products that need to perform in a variety of working environments.

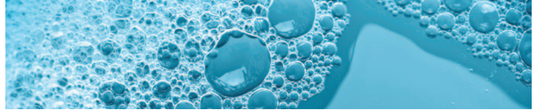
Industrial cleaning solutions are also scrutinized by rigid compliance regulations, so formulations must also follow specific and current industry standards.

Siltech offers optimum performance solutions for a diverse range of cleaning products for challenging environments, such as manufacturing, hospitality, institutional and educational facilities, and airports.

Siltech formulators also develop solutions for facility and manufacturing equipment cleaning, for demanding industrial and a variety of commercial or institutional applications.

The challenges of commercial and institutional cleaning are diverse and thus require specific formulations with effective features with outstanding results that reduce cleaning times, equipment wear and tear, and maintenance.

Siltech offers the right solution for numerous industrial and institutional needs.



Silicones are widely used as defoamers and antifoams in a variety of household and commercial products. Paper products, paints and coatings, water treatment, cleaning fluids for your home and many industrial applications benefit from silicone defoamer technology. Siltech offers a range of defoamers, which include basic emulsions of hydrophobized silica as well as specialized silicone polyethers that are effective in many demanding and also sensitive applications.

For a full list of additives, go to siltech.com/application/household-and-industrial.

Defoamers and antifoams for diverse applications

Consumers are often critical of the quality of a detergent based on the foam it generates. That's why Siltech formulators offer the right antifoam customized solution for each of your applications. Siltech offers antifoam compounds, emulsions and powders for powder detergents and various liquid detergent formulations, and antifoam systems. Each solution is tailored to control foam properties and provide additional benefits for all your applications.

Siltech's solutions offer a wide range of low, medium and high foaming surfactants that are also designed to improve cleaning performance and are created to provide multifunctional properties in one product. Foam control additives are also used extensively in industrial as well as manufacturing environments. Some of the more common processes are food processing, chemical manufacturing, fermentation, textile, adhesive manufacturing, printing inks, paints, coating and resins, and wastewater management.

Most of the objects that surround us in our daily lives would not be here without the use of foam control during manufacturing. Siltech offers a diverse product line of surfactants, as well as customizable high-performance additives for a wide range of end-user formulations. The product mix offering includes cleaners and polishes for hard surfaces, and hand and automated soap additive solutions for industrial, institutional and household product applications.

Siltech provides a long list of effective additives for household surface care. Every flat area in our home requires cleaning, surface treatment or polish to protect and maintain its durability and enhance an appealing finish.

From leather, plastic, metal surfaces, wood finishes and glass to a variety of stone work or ceramics, each surface is unique and demands specific customized treatments for longevity and a great look.

Consumers equate attractive finishes with high quality, so product surfaces require visually appealing finishes and robust, lasting protection.

An effectively formulated silicone-based additive for cleaners and polishes provides protection, conditioning and cleaning properties, and is user friendly to implement. Some specialized silicones even prevent dirt and dust, and have antistatic capabilities.

Siltech can provide the expertise and customizable formulations required for a multitude of systems.

ADAPTABLE, VERSATILE POLYURETHANE FOAM

It's where we live and work, and even in what we drive. Polyurethane foam protects, supports and cushions us for an easier life!

Wearable solutions that go the distance

It wasn't too long ago that scientists discovered that polyurethanes could be made into fine threads and then combined with nylon to give garments incredibly light weight and stretchability.

Over the years, polyurethanes have been improved and developed into spandex fibres, polyurethane coatings for fabrics, and thermoplastic elastomers. Elastomers can be spun into high-tech fibres and produced into flexible materials used to make sock tops, brassieres, swimsuits, support hose and other athletic apparel. In addition, polyurethane coated fabrics are incredibly durable and abrasion-resistant, yet soft, light and breathable.

These are used to create more comfortable and sophisticated weatherproof clothing, such as parkas and lightweight rain clothes. Because of today's advances in polyurethane techniques, manufacturers can make a broad range of apparel, including skins and leathers, garments, sports clothes and a variety of accessories.

Keeping it cool with Siltech chemistry

Polyurethanes are an important component in major appliances that consumers and businesses use every day. The most common use for polyurethanes in major appliances is rigid foams for refrigerator and freezer thermal insulation systems.

The robust thermal insulating properties of rigid polyurethane foams result from the combination of a fine, closed-cell foam structure and cell gases that are poor heat conductors.

Polyurethane foam is cost-effective material needed to achieve energy efficient ratings in consumer and commercial refrigerators and freezers. It helps to simply and efficiently maintain the temperature you need. Refrigerators and freezers are constructed with a sheet metal outer casing, painted or popular stainless steel, and an inner liner made of polystyrene. In between these layers is a layer of rigid cured polyurethane foam that acts as both a structural and an insulating material.

The adhesive properties of polyurethanes ensure a firm bond between the inner and outer walls and help prevent heat exchange between the interior and exterior. Polyurethane-based coatings are also used to paint appliances to achieve the aesthetic appeal consumers desire and to protect appliances from rust and heat. Siltech provides a diverse range of polyurethane foam solutions for all of your rigid or flexible polyurethane requirements.

Polyurethane packaging solutions keep it safe

At some point we've all opened up a newly delivered shipping parcel with our order inside, safely surrounded by perfectly fitted protective polyurethane foam.

Polyurethane packaging foam provides cost-effective, custom, form-fitting cushioning to uniquely and securely protect items that need to stay safely in place during transit.

One particular process begins as a two-component liquid, which, after being mixed and poured into a bag or box, slowly expands into a rigid foam to surround and secure the shipment.

The foam can be injected with dispensing equipment or hand poured into open containers or moulded forms.

Polyurethane packing foam is widely used to help safely protect and transport a variety of items, from electronic and medical diagnostic equipment to delicate glassware and even large industrial parts.

Foam peanuts are polyurethane products that are flowable and are often packed loosely around some items in their shipping box. The box is closed to tighten the pack.

These versatile on-site solutions solve many packaging challenges, as polyurethane foam packaging products can save time and money by providing various levels of protection for every shipment.

For a full list of additives, go to siltech.com/application/polyurethane.

Innovative comfort, proven protection

Today's homes and commercial buildings demand high-performance, versatile materials that are strong, lightweight, durable and easy to install. Building material quality and performance must be exceptionally reliable, which is why polyurethane products are an excellent choice for builders and consumers.

Polyurethane rigid foam has unique insulating properties that make it ideal for walls and roofs for new homes and when remodelling an existing home. With heating and cooling costs amounting to over half of the energy used in the average home, polyurethane foam can save money while maintaining uniform temperature and, at the same time, reduce noise levels.

The insulating quality, and value, of rigid polyurethane foam is high, and it helps builders make walls thinner, reduces sound, retains winter and summer inside temperatures, reduces construction costs, and ultimately creates more living or working space. Polyurethane insulating products are also often structurally self-supporting and can be attached to a wide range of substrates while requiring no additional adhesive.

Sprayed polyurethane foam provides weatherproof sealants, forms a seamless layer of insulation, fills gaps and seams during application, reduces drafts, covers irregular, hard-to-insulate shapes, and forms an air and moisture barrier.

Polyurethanes perform well as external weather and moisture barriers when combined with the proper materials. High-performance polyurethane foam insulation can be spray-applied to various substrates or moulded to special shapes in large sizes.

In addition to their practical uses, polyurethane building materials add design flexibility to commercial, new-home and remodelling projects.

SILTECH

RESHAPING POLYURETHANE FOAM DEMANDS

You're probably sitting on it now! Polyurethane, mostly in the form of flexible polyurethane foam, is one of the most popular materials used in home furnishings.

Used widely as cushioning in upholstery, flexible foam offers several important features to furniture manufacturers and consumers: comfort, durability, support, health and safety.

While this type of foam may appear to be a simple product, it's actually very complex, and can be produced in an almost infinite variety of properties and forms.

Flexible polyurethane foam technology has proven its durability and flexibility. It can recover almost all of its original shape and firmness after being compressed for extended periods.

Unlike any other cushioning material, flexible foam's many qualities can be measured and easily modified during manufacturing. Density, surface firmness, deep-down firmness, support, surface feel, handling strength, height and firmness retention can be measurably altered.

No other cushioning material's performance specifications can be so closely identified and maintained.

Siltech offers a diverse portfolio of customizable polyurethane additive solutions for all of your specific manufacturing needs.

EXTREME ENVIRONMENTS REQUIRE ADAPTIVE SOLUTIONS

Siltech silicone additives are the perfect choice for aircraft and aerospace applications as they exhibit resistance to extreme temperature ranges, varying humidity, UV rays, abrasion, water tightness and ozone.

Siltech has customizable solutions for a wide range of materials used in aircraft component sealing and in electrical and mechanical components — from the cargo area through to the cockpit.

For a full list of additives, go to siltech.com/application/automotive.

Protect your vehicle with Siltech formulations

As the automotive industry continues to evolve, consumers and businesses are continually looking for features such as improved performance, power and reduced maintenance in their vehicles. Siltech offers a variety of customized additive formulations designed to enhance manufacturing processes for superior finished products and automotive maintenance.

Silicone additives extend a vehicle's service life and can be found under the hood of every vehicle, including in engines, drive trains, electronics and electrical systems, interiors and even bodywork. With help from silicone additives, exteriors are more resistant to rain, wind, salt, abrasion, UV radiation and chemicals. Joints and pretty much anything that moves will incur less wear and last longer when silicones are employed.

Overall vehicle maintenance is less frequent and less costly as a result of creative formulating with silicone additives. These additives protect against aggressive substances, even in intense heat, and act as seals, adding protection to vibration dampers, conductors and insulators, engine gaskets, headlamps, hydraulic bearings, ignition cables, radiator hoses, shock absorbers, spark plug boots and more.

Powerful additives, providing value to your end products

Polyurethane foam is an incredibly diverse material used in automotive manufacturing. In addition to the foam that makes car seats comfortable, it can be found in virtually every vehicle part, including bumpers, interior sections, the car body, spoilers, doors and windows. Polyurethanes also enable manufacturers to provide drivers and passengers reduced weight, increased fuel economy and comfort, corrosion resistance, insulation and sound absorption.

Automobile designers and manufacturers enjoy the means to produce seating that can be easily assembled, disassembled and recycled due to the robustness of polyurethane foam. It also meets the highest performance specifications over a wide range of firmness without added weight. Over many years of service, and even under heavy use, polyurethane foam retains its original firmness, shape and resiliency. Armrests, headrests, cushioned instrument panels and other parts of your car's interior are made with polyurethane foams. Siltech develops a variety of customizable surfactants that are a must for improved processing, performance and quality of numerous polyurethane foam products.

Until recently, metal alloys were used for automobile exterior parts. Alloys are much more susceptible to stone chips, dings, dents and corrosion than popular polyurethane alternatives made by reaction injection moulding (RIM). The automotive industry is the largest user of RIM polyurethane parts.

Polyurethane sealants and adhesives are also used in the production of headlights, signal lights and tail lights and are often used to bond bumpers onto the vehicle. Bond strength, durability, heat and UV resistance, combined with ease of application, make polyurethane adhesives by far one of the best choices for many automotive parts and components.

MOVING FORWARD WITH SILTECH CHEMISTRY

The automotive industry is constantly innovating and demanding new high-performance applications, for both under the hood and elsewhere in the vehicle. Siltech maintains a diverse portfolio of formulations.

Tested formulations for automotive applications

The reliability and stability of silicone additives make them ideal for use in many critical areas, from gaskets to hoses, windshield linings, power train sealing, cables, ignition, airbags, electrical coatings and more. In many ways, silicone formulations provide vehicles with more comfort, safety and reliability then ever before. Lubricants enhance performance and increase the durability of engines; they can be formulated to achieve the best balance between wear resistance and continuous high temperatures with the help of silicones.

Silicones are also used upstream for a variety of car care and maintenance products. These are available for the consumer, including as moisture repellants for glass, lubrication protection and stability for a wide range of critical parts as well as interior and exterior cleaning and polishing applications.

Siltech's organically modified solutions

Virtually every automotive paint on the market contains silicone additives that provide powerful marketable features.

Siltech's organo-modified silicones are developed to optimize a variety of automotive paint processes as well as enhance finish for the final product.

Reduced surface tension, excellent wetting and levelling agents, and consistent smooth, uniform application, are just a few of the benefits that silicones can provide.

Rich colours and a beautiful finish result when silicone technology is put to work to help disperse pigments yielding beautiful uniform flow and colour.

Customizable silicone resins also provide many sought after features, such as resistance to high temperatures, the ability to seal out water, scratch and mar resistance, and weathering.

Resistance to extreme heat is a required property for the production of many other heat-sensitive automotive and motorcycle parts and components.

Reliable, stable mould release coatings

Versatile mould release coatings are a necessity in tire manufacturing as they help remove tires out of their tight moulds. Silicone additives are also used in tire rubber during production as they provide reduced friction, long wear life and superior traction.

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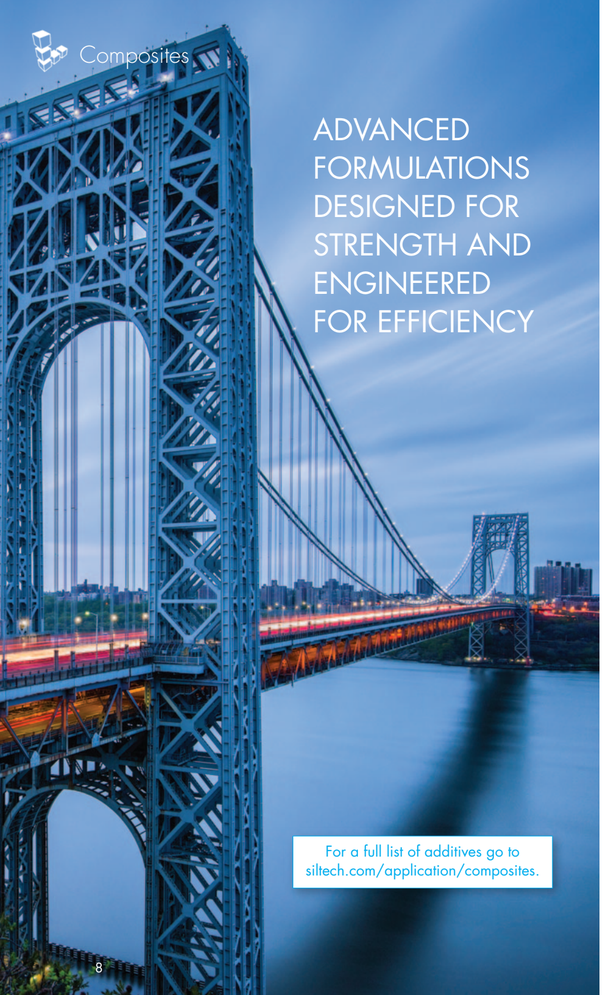


ADVANCED FORMULATIONS DESIGNED FOR STRENGTH AND ENGINEERED FOR EFFICIENCY

For a full list of additives go to siltech.com/application/composites.

Lightweight, durable, corrosion-resistant technology

The addition of silicone additives to composites has resulted in new and improved features. These improvements include more robust strength and chemical resistant properties that are useful across many applications.

Many harsh and corrosive manufacturing environments, including oil and gas, pulp and paper, and even coastal and marine environments, are rethinking the advantages of composites for their manufacturing needs.

The use of corrosion-resistant materials made of a variety of silicone composites is becoming increasingly practical and more cost-effective in chemical manufacturing, as these materials prolong component life and maintenance. Composites with customizable silicone additives provide a diverse selection of material options, with excellent chemical resistance and flexible design features that outperform their metal alternatives.

Siltech provides a range of customizable formulations for all of your composite requirements.

Consumer, high quality recreational goods

Manufacturers of recreational consumer goods depend on a variety composites with effective silicone additive formulations.

Composites with specialized silicone additives are used every day in materials for many consumer products, such as snowboards, skis, tennis rackets, golf clubs, paddle boards and protective gear.

Quality is always a priority as consumer expectations for these products is extremely high, making superior additive formulations the only choice for precision and quality control during every phase of the manufacturing process.

THE FUTURE OF SILICONE COMPOSITE FORMULATION

Siltech's composite technology exceeds industry standards, developing next-generation formulations.

Composites are transforming today's infrastructures

Composites were first used 70 years ago in the aircraft industry to help reduce overall component weight while retaining strength and durability. Twenty or so years later, technology-formulated silicone additives for composites were introduced to the construction industry.

Composites are used all over the world to help construct and repair a variety of applications, from infrastructure (including bridges, roads and railways) to commercial and residential construction. This inventive chemistry has rapidly revolutionized the construction industry with its unique and versatile features. Virtually no other material offers so many diverse possibilities.

Composite materials are becoming increasingly popular, especially for new-bridge construction and renovations, as they provide impressive strength-to-weight ratios and contain advantageous features such as non-corrosive properties, prefabrication capabilities and design flexibility.

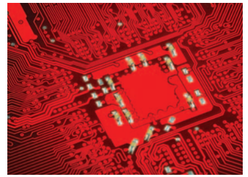
Silicone-formulated composites bond with most materials from concrete, glass, granite and marble to aluminum, steel and even plastics.

They are extremely durable and can resist decay caused by rough weather conditions, moisture or sunlight and provide a number of application advantages compared to traditional materials such as steel, wood and concrete.

Longevity and maintenance costs are critical considerations when manufacturers build components for support structures such as waterfront retainers, bridge structures, electrical and utility components, and even rebar for concrete.

Unlike traditional infrastructure materials, composites provide sustainability and extended life span, as they don't deteriorate, corrode or rust. Civil engineers and governments are leveraging these amazing features of composites and realize they are a practical choice for reinforcing materials, repair and retrofitting.

Siltech's composite formulations provide valuable benefits to manufacturing processes, including reduced maintenance costs, longer life span, reduced delivery expense, installation time and costs, lightweight, and refabrication flexibility.



SILTECH FORMULATION FLEXIBILITY

Electrical composite materials applications

Composite materials, typically designed for structural uses, have found their way into the electronic component industry with incredible success. Manufacturers of electrical equipment and electronics components rely on the unique properties of electrical composite materials for optimum performance.

Silicone composite electronics and electrical materials have the ability to withstand common electrical conditions like extreme heat and even electrical arcing, unlike parts moulded from plastic, which can carbonize or melt.

Underperforming traditional components are susceptible to damage and system failure of electrical equipment, rendering potentially unsafe conditions and reduced production performance, translating into lost profits. Composite components ensure greater reliability and longevity.

The use of electrical composites in electronics and electrical manufacturing is growing, and the demand for high-performance electrical components and equipment is accelerating every year.

Effective formulated composite materials need to address equipment functionality and inherent manufacturing challenges that include constant exposure to heat, friction, constant temperature fluctuations and, of course, safety.

Every year, products and manufacturing processes need to evolve as technology advances. Silicone-formulated additives for electronic composite applications will also expand in every industry as requirements become more sophisticated. Electronic composites will need to be better quality, be more cost-effective, and address challenging new technical requirements.

Agriculture & Life Sciences

SILICONE TECHNOLOGIES INSPIRE FUTURE AGRICULTURAL PRODUCTIVITY

For a full list of additives, go to siltech.com/application/agriculture.

The benefits of silicone for agriculture and plant nutrition

Science researchers have discovered that silicone formulated crop additives increase a plant's resistance to many diseases, such as mildew, septoria and eyespot, as well as a variety of insect pests.

Plants subjected to drought treated with effective formulations also maintain higher stomatal conductivity and relative water content. Treatment promotes the growth of larger and thicker leaves, thus limiting the loss of water through transpiration and reducing water consumption.

Continued use of silicone additives shows great influence on the development of plant roots, allowing better root resistance in dry soils and faster growth. Silicone additives used in agriculture are considered a modern farm technology, along with many pesticides, fertilizers and herbicides.

Customized formulations for fungicides, insecticides, antifoams and wetting agents are a necessity for healthy crops, as well as for maximizing yields while reducing crop and environmental risks.

Siltech has developed effective formulations designed to enhance wetting, penetration, improved spreadability, and performance of crop protection, as well as agricultural plant growth, foliar nutrients and health, fungicides, insecticides, and herbicide enhancement.

Crop formulations are essential for healthy growth

Siltech's wetting agents, also known as super-wetters, allow growers to enhance the performance and longevity of their herbicides by dramatically reducing the product's surface tension. This means that, in their delivery onto the plant, herbicides are better able to both spread out evenly over the targeted leaves and penetrate the leaves. This improved efficiency also enables the user to minimize the amount of chemicals needed.

Specialized agricultural formulations are designed to meet and exceed crop challenges and provide innovative solutions for high-performance agrochemicals.

The right chemistry can improve crop science productivity, facilitate spreading and wetting performances on plants, and be used in a variety of agricultural applications.

Siltech's foam control additives are also used for damage defence and crop protection in crop fertilizers, plant growth nutrients, herbicides, insecticides and fungicides.

AGRICULTURE GROWTH-INSPIRED TECHNOLOGIES

Siltech formulations protect and improve your yield.

Antifoams and defoamers for optimum growth

Siltech's silicone foam control formulations help prevent, stop or regulate foaming in a wide variety of oil- or water-based formulated herbicides and pesticides, as well as larger tank-mix applications.

Successful crop production is dependent on effective agrochemicals that protect crops by enhancing pesticides, herbicides, fungicides, insecticides and plant nutrients such as fertilizers to promote healthy plant growth. Additives contribute to healthy crops by providing effective spreading and wetting performance on the plant. Most of these additive enhancements create various levels of foam during application, and must be controlled or eliminated with foam control in order for crop applications to be effective.

Siltech's antifoam agents are robust, safe for you and the environment, cost-effective and a proven, versatile solution that continually outperforms non-silicone alternatives. Our experience in agricultural foam control formulations will help you produce healthy crops with maximum yields.

Siltech is ready to meet with you to discuss your crop defence formulation requirements.

Targeted foam control applications

Siltech's crop foam control additive solutions are easy to administer, excellent in aqueous dispersions, highly efficient in low dose applications, effective in numerous industrial media, and compatible with wide pH latitude.

PERFORMANCE INSPIRED INGENUITY

Since 1989, Siltech has been actively developing materials for use in the personal care market. During this time, silicone compounds have become an increasingly important segment of products for creating innovative new technologies.

As formulations and products become more advanced, the understanding of the underlying properties of the increasing number of organo-functional silicones has become more difficult.

Selecting the proper silicone for a particular formulation starts with identifying the specific attributes that are desired. Once these attributes are defined, other formulation issues, such as solvent type, concentrations and interaction between ingredients, need to be determined. In order to facilitate these selections, Siltech's versatile salespeople, who understand the personal care industry, and technical support staff meet your needs by matching a chemistry to the benefits your require.

Siltech offers a line of standard personal care products, along with many formulations and technical presentations. Our chemists work jointly with customers to develop specific molecules and products for individual applications.

We also address customer problems that can only be solved by exploring new technologies. Such cooperative agreements have proven very useful in developing many new and innovative cosmetic applications.

As silicones continue to play an increasing role in the formulation of new and novel personal care products, Siltech remains committed to lead the development of unique products with the benefits required by this growing industry.

COSMETIC FORMULATING EXPERTISE

The future of silicone technology in the cosmetics industry is looking brighter every year, as producers continually search for new and highly effective active ingredients.

New customizable silicones have revolutionized the application and longevity of an impressive long list of makeup products on the market today. Foundations, blushes, eyeshadows, liquid and pencil eyeliners all perform better than in the past, directly resulting from the enhancing characteristics offered by silicones.

Application consistency, robust colour, odour, enhanced water repellency, and soft feel on the skin are just a few features consumers look for in cosmetic applications.

Specialized solutions are critical to personal care product success. The cosmetics industry is geared to today's market trends, and continued research into new cosmetic technologies is never-ending. Market trends need to be followed, and acted on as quickly as possible to improve market share.

Siltech's experience and ingenuity provide excellent support for your formulation challenges. Let us help improve your formulations today!

For a full list of additives, go to siltech.com/application/personal-care.

SILTECH ENHANCING CONSUMER BEAUTY

You're protected with Siltech sunscreen technology

The sun is your best source of vitamin D, so getting enough sunlight is very important for maintaining your body's optimal vitamin levels.

Unfortunately, too much sunlight comes with its own health risks. Consumers are well aware of the risks and benefits of solar radiation and are always searching for effective solutions and safe practical products for skincare protection. Siltech offers skincare additive solutions for all of your market-oriented products, including lotions, creams and after sun skin protection.

Our products enhance optical properties, including shine and transparency, as well as ease of application and spreadability.

High-tech skincare applications

Silicone additives are becoming one of the most valued ingredient categories in numerous consumer skincare products today. Without silicones, bath cleansers and shower gels tend to leave skin dry and rough because they often remove natural oils and moisture from the skin's surface.

Consumers continue to seek out high-performance skincare formulations, giving their skin a moist, natural look and feel and never-before-seen glide, spreadability, ultra-smooth application and hours of protection.

Siltech's polyethers enhance and attract moisture to the skin, while our customizable elastomers help minimize the appearance of enlarged pores, lines and wrinkles, and provide reduced residue and irritancy, leaving skin feeling moisturized and refreshed.

Silicone waxes and various silicone and gum blends contribute to reduced water loss from skin and provide a smooth, long-lasting feel and wash-off resistance, emolliency, improved foam control, a long-lasting, superior foam effect, and reduced tackiness.

Siltech offers a comprehensive range of additive solutions for your entire product line for consumer liquid soaps, shower gels and numerous cleansing lotions.

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PERFORMANCE INSPIRED INGENUITY

Innovative formulations for haircare products

Silicones are considered essential for numerous haircare and conditioning products on the market today.

Innovative silicones have been developed and are capable of providing amazing new features to haircare products.

Consumers are eager to reach for products that contain these new qualities and key attributes, such as smooth and easy application with improved spreadability, non-greasy lubrication, compatibility and anti-static effects.

Silicones also provide long-lasting protection of hair from colour and heat, shine and gloss maximization, soft, smooth touch and silky feel.

These formulations are also capable of increasing hair volume, as well as repairing damaged hair by filling in those weak damaged surface areas and preventing further deterioration.

Siltech has developed an impressive list of effective solutions designed and customized for haircare products, with features that assist in protecting the hair from the elements, keeping it smooth and shiny by virtually waterproofing each strand.

These additives also provide a slippery when wet feel and a tangle-free consistency, which is well appreciated when constant brushing and blow drying are required.

SUPERIOR VALUE WITH LEATHER & TEXTILE ADDITIVES

For a full list of additives, go to siltech.com/application/leather.

How are silicones used in leather and textiles?

Silicone chemistry has now established itself within the textile industry and is used in the processing and final finishing of leather, technical textiles, fabrics and yarns. Silicone is used in textiles mainly for the lubrication of threads and fabrics and for foam control during processing.

Lubricants and emulsions are essential for providing improved gliding properties to thread and reducing the risk of damage and breaking during processing. They also provide the appearance of lustre and improve the overall resistance to extreme temperatures that can occur during production.

Silicones are also used to reduce foam created during textile processing. As antifoam, silicones contribute to optimizing production and maintaining peak processing.

During water treatment processes, silicone additives are admitted as wetting agents and help reduce surface tension, which increases production speed. Silicone additives are also used as softeners in the multiple aqueous phases of conventional textile finishing.

This specific and versatile chemistry provides textiles and fibres excellent smooth softness or creates a grabby texture to the textiles.

Physical properties, such as tear strength, abrasion, wrinkle resistance, stretch recovery, shrinkage reduction, water absorption or water repellency, are possible with the appropriate modifier additive chemistry.

With proven additives from Siltech, you can optimize your fibre manufacturing processes or the properties of your finished leather and textile fibres precisely to your specific requirements.

LEATHER SOLUTIONS PRESERVING THE BEAUTY OF NATURE

CHEMISTRY YOU CAN RELY ON

The perfect blend of technology and leather

Today's leather products are admired as luxury items and highly valued due to their elegance, robust properties, wearability, durability and, most importantly, natural textures. Consumers hunger for all of these improved leather properties, made possible with silicone added to the formulations.

Leather is used as a raw material by manufacturers for a variety of clothing applications, including shoe production, luxury leather accessories, and interiors for cars. Improved leather properties wouldn't be possible without the added chemistry of various silicone additives to transform this highly marketable and popular material into a high-performance end product.

Tanneries, leather goods manufacturers and shoemakers incorporate a variety of customizable silicone coatings during manufacturing that help saturate and treat the leather, making it more breathable and resistant to abrasion. Specific additives can also reduce the amount of water penetration that helps prevent tanning oils from migrating out of the leather, keeping those beautiful colours rich and long lasting.

Silicone wetting agents ensure that coatings are uniformly applied on leather to make footwear look better, and easy to repeatedly polish and maintain. Siltech maintains a diverse portfolio of customizable formulations for all of your leather and textile requirements.

Performance solutions for your textiles and fibres

Today's demand for technical textiles and fibres is thriving as they are used in a long list of products.

From specialized commercial applications to a diverse range of consumer goods, silicones are the reason these textiles are more innovative and versatile today than ever before.

From sportswear textiles to automobile air bags, these products require specialized silicone additives to achieve maximum utility.

Manufacturers and chemists are continuously looking for newly enhanced, high-performance treatments for textiles to help improve and create new product applications. Silicone additive chemistry is improving every day and is becoming easier to incorporate into any textile manufacturing process.

Effective silicone formulations provide exciting new and improved features such as advanced tear and tensile strength, improved thermal capability, fire resistance, UV stability and resistance to abrasion.

They improve overall textile integrity and durability, waterproofing, anti-slip, colour and texture versatility, and increased comfort in wear and feel.

Customized foam control processing aids

Silicone additives for foam control are widely used in a number of manufacturing as well as textile processes. Controlling foam, especially in multiple aqueous processes, is critical to cost-effective and high-performance production.

Antifoam solutions are used vigorously to help clean or rinse textile fibres as they undergo several stages of production and finishing. Silicone antifoams, as process defoamers, can effectively reduce and control the formation of excessive foam.

Foam control additives also help reduce the amount of aqueous usage during production phases, thus reducing water waste and improving production efficiency.

ADVANCED COATING SOLUTIONS FOR THE LARGEST OF APPLICATIONS

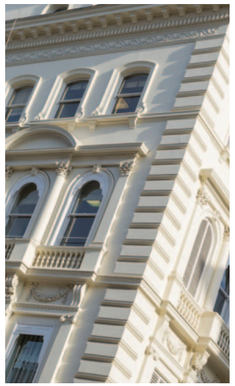
Silicone enhanced building, construction and commercial coatings

Silicones improve the performance and sustainability of cement-based building materials, such as mortars, concretes, paints and coatings. These multifunctional silicone formulations deliver exceptional performance and can reduce or eliminate construction materials processing issues. Silicone resins in protective coating formulations for building materials also significantly improve durability and resistance to moisture, corrosion, temperature extremes and weathering.

Plasters play an important role in the construction and design of architectural facades, including structural design, surface levelling and masonry protection to mention a few. Siltech offers a variety of customizable additives for synthetic resin and silicate plasters. Like architectural processes, industrial applications require metal protection. Siltech offers formulations for numerous coatings that help protect and preserve metal structural applications while providing a combination of aesthetics and functionality.

Silicone enhanced exterior coatings provide houses, commercial buildings, bridges, structural demands and even railway cars with flexibility, so they can withstand extreme temperature cycles without cracking. Thousands of kilometres of highways and road surfaces can withstand considerable corrosion, from gasoline and oil stain exposure to road salt and unpredictable weather environments when protected with specialized coatings.

An increase in home improvement activity has elevated an interest in industrial and architectural silicone coatings. Consumers have an infinite choice of colours and stains, which is a necessity when refurbishing the look of any home or office. Exterior finishes play an important role as well, especially when they require excellent weather resistance, long-term durability and UV protection, decreased cleaning and maintenance, and water repellency that reduces dirt and grease buildup and improves longevity.



BUILDING WITH SILTECH CHEMISTRY

PAINTS INKS, & COATINGS SILTECH HAS YOU COVERED

Providing a fresh, long-lasting look, with quality paint coatings

Silicone is essential in the formulation of numerous types of paints and lacquers. From heavy duty industrial coatings to interior and exterior architectural paints, silicone chemistry additives offer protection against moisture and harmful environmental influences, and provide an important element of design.

These types of modified silicones enhance the performance of paint by migrating to its surface, so it can spread evenly over metal and plastic surfaces. The result is a mirror-like, perfectly smooth and uniform coat of paint for our cars, trains, aircrafts and bridges.

These additives reduce surface tension, acting as wetting and levelling agents, so paint is applied smoothly and evenly. Furthermore, these silicones help disperse the pigments into paint to enhance flow and colour. The result is perfect coverage and beautiful finishes with rich colours. A variety of silicone resins also provide sought after properties for specialty paints and coatings, such as resistance to high temperatures and the ability to seal out water.

Heat resistance is an important property in paints, most obviously when they are applied to anything exposed to internal or external heat sources, such as barbecues, automotive engine parts, mufflers, and industrial and commercial exhausting systems.

Siltech's additives provide easy application and resistance to diverse temperatures and weather conditions.

For a full list of additives, go to siltech.com/application/inks-and-coatings.

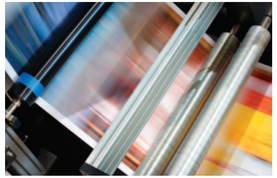
Print production additives

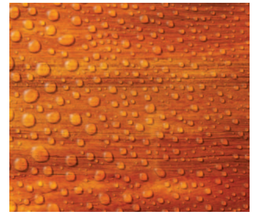
Printing is a major industry in every technologically advanced country. Newspapers, packaging and stationery, marketing and sales materials are the main products produced on a wide variety of printers and presses.

Commercial and consumer printing inks are composed of silicone additives, pigments and dyes, solvents and binders. The binders must be able to wet and envelop the colourant, transfer it to the printing plate and then to the substrate, yielding a high quality durable print.

Printing ink additives also include driers, which speed up the drying of inks; bodying agents for ink viscosity; specialized waxes to reduce printing defects; as well as great wetting agents for assorted substrates, superior surface protection, defoaming and optimum pigment stabilization.

Siltech offers silicone additives for letterpress, flexographic and offset print production as well as solutions for the printing of packaging materials made from plastics, paper, cardboard, paperboard and metallized packaging applications.





Preserving beautiful natural wood

Silicone additives provide endless coating possibilities, offering reliable and proven protection for all types of wood and composite surfaces.

Sustained beauty and protection from extreme weather conditions are only possible when specialized silicone chemistry is used to preserve the natural properties of this beautiful material.

Rain and moisture are wood's primary enemies and can lead to permanent damage. The best way to protect wood against moisture is to treat it with a water-repellent, impregnating agent or effective coating. A well formulated wood coating is easy to surface clean, is flexible, provides reduced bleeding, has smooth levelling and minimal air pockets, is scratch and UV resistant, and is pigment stable. Specialized silicone additives offer enhanced wood protection for commercial and consumer products for both indoor and outdoor applications.

INTELLIGENT FIBRE SOLUTIONS

For a full list of additives, go to siltech.com/application/pulp-and-paper.

Versatile digital imaging

Non-impact printing technology is the process of forming images without direct physical contact between the printing mechanism and the paper. Colour laser printers and production digital printers compete with the conventional printing process, and non-impact printing is a cost-effective alternative for on-demand, smaller production runs, that are typically more expensive when placed on a full colour offset printing press.

A variety of pre-packaged paper stocks, coated and non-coated finishes, and weights can be used on most digital printers, making this technology extremely popular for paper producers, commercial printers and consumers who have a colour laser printer in their office or graphic design studio.

Silicone additives are used to transfer toner to a fuser unit and then to the paper stock. When heat is applied, the toner penetrates the top layer of the paper stock, and is permanently affixed once it cools off. The silicone additives make sure toner is spread out evenly for a uniform, high quality image distribution.

As digital printing technology continues to improve, paper manufacturing companies will benefit from the increased performance offered by silicones, as paper consumption for this sector increases every year.

Coating release applications

Silicone-coated release liners are irreplaceable commercial and consumer tools with endless everyday applications.

Silicone enhanced solutions are applied to either one or both sides of a paper or film substrate to achieve a perfect, evenly distributed coating to help protect and prepare for pressure sensitive adhesive applications. These products can be modified with many features depending on the application required, including offering easy release, repositional features; or permanent to help to improve tack or reduce slippery surfaces.

Silicone release coatings can be found in every area of your home and business, including industrial adhesives for HVAC, metal work and piping, insulation, roofing and repair, baking papers, industrial stickers, retail labels, bar codes, diagnostic tools and medical instruments, healthcare, adhesive bandages, shipping and transportation, signage, adhesive weather stripping, and wrapping paper tapes.

The everyday use for these coatings is virtually endless, and without effective silicone additives for these products, many of these applications would be ineffective and would not exist today.

Siltech solutions provide high performance to your release coatings, while maintaining optimal release features in extreme naturally or industrially generated conditions.

POWERFUL FORMULATIONS FROM FIBRE TO CONSUMER

Specialized tissue formulations

Silicone additive formulations are used in paper towels, hygienic cleaning wipes, tissues, and specialized paper products with unique uses. These paper products require soft to the touch, strong, moisture absorbant and, in some products, odourless and scent-free properties.

Silicone additives are used in these products as an effective surface treatment to enhance performance in tissue manufacturing, including bath and toilet tissues, paper towels, napkins, wet and dry wipes as well as other disposable tissues. Silicone formulations help reduce the natural friction of a paper product, maintain wet strength, and reduce static, dust and lint properties while in use. The addition of specialized polyether additives can enhance moisture absorbency as well. Siltech has developed a variety of proven silicone formulations for these tissue applications and many others.

Paper and board coating

A wide variety of products is used in the paper and paperboard coating industry. Siltech can help create customizable coating formulations for a multitude of coated paper applications for offset and flexographic commercial printing. Millions of tons of printed materials are produced every year for packaging and sales and marketing usage.

Additives for high quality and specialized printed graphics are used in a variety of paperboard applications, including various visual marketing vehicles, from cereal boxes to specialty produced high end cosmetic cartons, bags and in-store point of sale materials.

With our proven formulations, Siltech can offer customized solutions that meet the high quality, strength and printing performance requirements for the paperboard and paper coating industries.

Pulp and paper processing additives

During the manufacture of paper products, silicones are used to improve various processes, from defoaming and drainage to better release. They are also used to improve the attributes of many final products by increasing their softness, absorbance or repellency.

Silicone additives provide smooth and reliable production in all processes of pulp and paper manufacturing, thanks to effective, specially tailored antifoam solutions.

Controlling over-foaming is a constant challenge in many areas of paper production. Effective silicone antifoam formulations improve and reduce typical foam-intensive production processes, including pulp-washing and bath bleaching.

The right formulations can dramatically reduce production times, maintenance costs, bleaching chemical usage and water consumption waste costs, and improve paper quality while maintaining environmental production.

Because each mill operates under its own unique conditions, Siltech will work collaboratively to formulate specific products for specific applications. Siltech chemists will work with you to ensure smooth, reliable processes in pulp production, thanks to antifoam agents specially tailored to your specific needs.

Making history, layer by layer

3D printing, also known as additive manufacturing, is a process that builds up components in layers by depositing materials in three dimensions. It's the opposite of traditional manufacturing processes and is more efficient as it creates less waste. 3D printing can produce finished materials directly based on computer-aided design models by using freedom of design without traditional manufacturing constraints.

Initially, 3D printing was used just to make small parts or rapid prototypes, which could then be visualized, submitted to stress tests, or fitted to other parts. The process is now increasingly being used for creating functional products and parts in small or limited series production. It's also used to create replacement components for older equipment when the original manufacturer no longer supplies spare parts.

Not only does 3D printing enable the prototyping and fabrication of new components and technology, it also widens the possibilities for the reuse and repair of older machines. It's more cost-effective, enhancing and accelerating design and engineering while contributing to greater sustainability.

The scope of applications for additive manufacturing is constantly growing, from micro parts for the electronics industry to test models for measuring wind resistance in the automotive or aerospace sectors, via on-demand spare parts for appliances and new designs and moulds for jewelry and accessories. Because of the biocompatibility of silicones, the use of 3D printing for medical applications is also increasing, in particular for prostheses and medical implants.

Silicone additives are essential for 3D printing, making this a powerful and versatile technology, capable of reproducing almost anything quickly and with incredible precision. The possibilities are endless.

The rise of 3D printing in fashion

In recent years, the use of 3D printing in the fashion industry has been increasing for prototyping and even production. 3D print manufacturing gives designers a wide range of possibilities for fashion. This technology has been increasingly accessible and now allows new creative experimentations, as well as a mass-customization solution. Designs can be produced that are complicated, even impossible, to manufacture, allowing innovation of technique and new ideas that can materialize within minutes. If designers fail with 3D printing, they can easily try again.

This technology has the potential to move us away from the era of mass production and bring us to a new reality of customizable, one-off production runs. With full 3D printed shoes, accessories or even a designer's entire collection, 3D printing is exploding in the fashion and apparel industry. Irrespective of the complexity of design, designers and manufacturers can prototype their new creations within hours.

3D printing allows the designer to quickly alter any component of the design with ease, with no extra cost to fit any requirement. Consumers can even try on the finished product, and produce it in any quantity required, on demand. The scope of 3D printing is endless, and there's almost no limit to what a 3D printer can create. The fashion and apparel industry is quickly discovering new ways to capitalize on this amazing and growing technology.

3D PRINTING TECHNOLOGY CONCEPT TO FORM

Siltech chemists will work with you to provide the right solution for all of your 3D print applications.

Revolutionizing medical applications and equipment

3D print technology will be used to replace human organ transplants in the near future. It speeds up surgical procedures, produces cheaper versions of surgical tools, and can improve the lives of those reliant on prosthetic limbs. Hundreds of thousands of prostheses are needed each year, yet with most priced from $5,000-$50,000, having one can almost be considered a luxury.

Creating traditional prostheses is very time-consuming and expensive, as multiple modifications, refitting and moulds are required for a perfect fit. Most moulds are expensive and are often discarded. 3D printing enables millions of people around the world to reap the benefits of the newly popularized manufacturing technology, offering a viable inexpensive solution for people living with limb loss.

Another application of 3D printing in the medical field is the creation of patient-specific organ replicas that surgeons can use to practice on before performing complicated operations that can speed up procedures and minimize trauma.

Sterile surgical instruments, such as forceps, hemostats, scalpel handles and clamps, can also be produced on 3D printers. Not only does 3D printing produce sterile surgical tools, it can yield specialized tools of any size, and with precise specifications.

These instruments can be used to operate on tiny areas without causing unnecessary additional damage to the patient. One of the main benefits of using 3D printing rather than traditional manufacturing methods to produce surgical instruments is the production costs are significantly lower.

The medical world, of which treatments, organs and devices are an integral part, stands to be revolutionized by the vast promises of 3D printing technology. With precision, speed and a major slash in cost, the way we treat and manage the health of our bodies and the future of medicine will never be the same.

Reshaping the automotive industry in 3D

3D printing technology can provide highly accurate, functional prototypes, modify parts to perfectly fit many automotive applications, as well as reduce costs.

Automotive engineers and designers now have the ability to improve and test designs quickly while cutting down the development process from months to a matter of days. They can discuss and review tangible designs or even test the prototype for market potential at a presentation or trade show. Knowing what will work before investing in expensive moulding tools prior to mass production is invaluable.

3D printing technology is proving vital in the automotive design studio and factory floor alike as a cost-effective solution for improving measurement, functional testing, vehicle customization, optimized design and rapid tooling. Adopting and optimizing 3D printing is critical for automotive engineers, plant workers and designers wanting to stay ahead of this competitive field.

With new applications being discovered, tested and implemented virtually every day, 3D printing technology's potential to impact the automotive industry is just beginning.

Redrawing the architectural landscape

Nothing compares to holding a real life model in your hands. Design and modify concept models within hours, and easily and cost-effectively change any textures, finishes and colours until you or the customer is satisfied with final result.

The use of 3D printing to produce scale models within architectural design and construction has steadily increased in popularity, as 3D technology has improved and 3D printers and new printing materials are becoming more available and affordable.

All of this creates faster turnaround for scale models and allows increased speed and accuracy when producing complicated and detailed projects. As this technology continues to advance, architectural and design firms will continue to dramatically improve their design processes.

In addition, the application of 3D printing to fabricate actual construction materials and components for entire buildings has been in development since the mid 90's, and is steadily gaining pace to improve the future of construction technology.

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