ELASTOMERS, PLASTICS & COMPOSITES

CREATING TOMORROW’S SOLUTIONS
Elastomers, Plastics & Composites: Many of the applications we encounter daily are only possible thanks to the availability of highly efficient elastomers, plastics and composites. And these materials owe their quality, productivity and economy more than ever to efficient additives and processing auxiliaries – which have become essential to the commercial success of the end product.
Contents

Composites

RTV-2 Silicone Rubber for Moldmaking

RTV-2 Silicone Rubber for Pad Printing

LR Liquid Silicone Rubbers

Diverse Applications for HCR and LR Silicone Rubbers

Additives for Silicone Rubbers

Processing Auxiliaries & Polymer Modification

WACKER at a Glance

See also: www.wacker.com ➤ Products & Markets ➤ Elastomers, Plastics & Composites
Composite Applications
Complex requirements require integrated solutions. That is particularly true in growth markets such as the composites industry. You can benefit from the pooled expertise of our composite experts and from new technologies for challenging composites applications. Whatever your needs – be they immaculate surfaces combined with zero shrinkage and high mechanical strength; control of the flow behavior of laminating resins and gel coats; or you want scratchproof composite stone, or effective control over curing – the correct additives will ensure you achieve just what you want. WACKER offers you a high-performance portfolio for optimum combinations whatever the application – bulk molding compound, pultrusion, resin transfer molding, sheet molding compound and hand lay-up or spray-up.

Composite Products
WACKER acetylacetone is used as a cooperator to maximize the quality and yield of complex curing processes. ELASTOSIL® C permits innovative silicone system solutions – such as dimensionally accurate production of reusable vacuum bags. They can achieve huge savings compared to disposable vacuum film. In challenging materials such as composite stone, GENIOSIL® silanes act as coupling agents, enabling the organic resin to chemically bond to the inorganic mineral. For hand lay-up of composites, HDK® pyrogenic silica provides expert control of flow behavior. VINNAPAS® solid resins are low-profile additives for composite parts providing a constant high product quality with first-class smooth and glossy surfaces and no shrinkage.

Products
Acetylacetone, ELASTOSIL® C, GENIOSIL®, HDK®, VINNAPAS®

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Functional Competence Network
Concrete Castings
Concrete castings that remain permanently elegant and robust must be cast using moldmaking materials that are alkali resistant with long-term stability, and can faithfully reproduce even and uneven surfaces and undercuts. Molds made with addition-curing ELASTOSIL® M silicones from WACKER are ideal for a wide range of applications – figurines and statues as well as the industrial production of composite-stone facings.

Moldmaking for Food Contact
The prime consideration regarding moldmaking materials for foodstuffs is that they comply with legal requirements. Other important concerns are neutral taste, permanent stability and imparting a faithfully reproducible shape to the most diverse of food products. These advantages are exhibited by special addition-curing ELASTOSIL® M molding compounds, which can be used for the lifelike replication of foods.

For Architectural Design and Decoration
In architecture, a striking, integrated idea is created through a skilful combination of structural design, materials and visual effects. This makes tough demands on the reproduction technology. Success depends more than ever on faithful replication of the original model – not to mention molds with good long-term stability and resistance to different molding materials. ELASTOSIL® M moldmaking compounds do all this, while also offering architects many other product advantages for the customized reproduction of classical elements or special effects.

Whether for individual works of craftsmanship, functional prototyping or industrial mass production – first-class results in modern moldmaking demand faithful reproduction, outstanding release properties and high resistance.
Design
While there are potentially infinite design possibilities, there are serious constraints on the reproduction of design elements – unless you use the right products, of course. With ELASTOSIL® M condensation-curing RTV-2 silicone rubber grades, molds can be produced quickly and easily. Their functional properties allow the original to be replicated in faithful detail, and they offer the added benefit of excellent resistance to different reproduction materials.

Industrial Production
Industrial mass production requires materials with extremely high product reliability, permanent durability and efficient processability – all these requirements are met by ELASTOSIL® M moldmaking compounds. WACKER’s RTV-2 silicone rubber grades exhibit excellent mechanical properties such as tear resistance and tensile strength. They are also available in different hardnesses, ensuring that every mold has just the right flexibility.

Rapid Prototyping
When prototypes are needed, a mold must be produced quickly. This requires moldmaking materials with outstanding inherent release properties, excellent flow and good transparency. WACKER’s ELASTOSIL® M addition-curing RTV-2 silicone rubber grades ensure success in these challenging applications, and permit functional as well as economic advantages in this application field.

See also: www.wacker.com ▶ Products & Markets ▶ Elastomers, Plastics & Composites ▶ RTV-2 Silicone Rubber Moldmaking Compounds
Pad Printing
Pad printing is currently the most important process for printing modern plastic articles. Efficient products of the ELASTOSIL® RT-line, in some cases with antistatic properties, offer outstanding flowability, good self-deaeration and high reactivity for rapid demolding in the manufacture of printing pads – even when the rubber contains large amounts of silicone fluid. Mechanical properties that stay impressively constant in the long term and excellent tear resistance make our addition- and condensation-curing silicone rubber grades indispensable for the many and varied challenges of pad printing.

Products
ELASTOSIL® RT

Striking Results
For toys, CDs, model railroads or screw caps – the right additive helps with the optimum transfer of printing inks, yielding strikingly clear printed images.
Injection Molding
With ELASTOSIL® LR liquid silicone rubbers, you benefit from lower unit costs without compromising on excellent properties. These high temperature vulcanizing rubber grades have an especially low viscosity and can be processed fully automatically on state-of-the-art injection molding machines with no need for secondary processing. The outstanding physical and chemical properties of ELASTOSIL® LR make it the ideal choice for diverse applications – including those requiring special properties such as self-adhesion and oil bleeding.

Applications

Automotive
Baby articles & toys
Health care
Food contact
Safety applications
Technical molded parts
Water contact

Applications from A to Z:
For more details, see pages 14 – 17 and online at www.wacker.com/Products

Products

ELASTOSIL® LR, SILPURAN®
See also: www.wacker.com ▶ Products & Markets ▶ Elastomers, Plastics & Composites ▶ LR Liquid Silicone Rubber for Injection Molding
Versatile, Efficient and Economical

SILMIX® - Compounded Excellence: SILMIX® silicone rubber compounds are developed and produced to customers’ specifications, and supplied as ready-to-process compounds. SILMIX® products provide a direct and reliable way of manufacturing a wide range of silicone rubber articles by the common processes of compression, transfer and injection molding, and extrusion – while minimizing production outlay and the time involved.
Molding & Extrusion

Peroxide-induced crosslinking ELASTOSIL® R and platinum-catalyzed addition-curing ELASTOSIL® Rplus products offer extreme mechanical and chemical resistance for a wide range of extrusion and molding applications. Rapid-curing HCR solid silicone rubber grades from WACKER are excellent for either efficient molding with very fast cycles or for economic extrusion of cables, wires, sheets and profiles.

Applications

Automotive
Baby articles & toys
Health care
Cable extrusion
Calendering
Food contact
Safety applications
Technical molded parts
Water contact

Applications from A to Z:
For more details, see pages 14 – 17 and online at www.wacker.com/Products

Products

ELASTOSIL® R, ELASTOSIL® Rplus,
SILMIX®, SILPURAN®
With their excellent biocompatibility, silicones are playing ever more important roles in healthcare. The sensitive and optimized formulations based on silicones are tailored completely to the needs of the healthcare industry – while also meeting the market’s requirements for the manufacture of the end product. WACKER SILPURAN® silicone elastomers offer a comprehensive breadth of performance for the most varied of demands: from very soft gels for external mammary prostheses or wound dressings, through soft rubber for catheters or masks, to hard elastomers for sturdy tubing.

HCR solid silicone rubber and LR liquid silicone rubber grades are ideal for producing moldings for the automotive sector, where they ensure stable production processes and perfectly functioning end products. Preferred applications include membranes, weather-resistant and contamination-resistant parts, spark-plug boots, molded seals, vibration dampers, exhaust pipe mounts and turbocharger and radiator hoses. Self-adhesive and oil-bleeding grades are only two examples of how WACKER is meeting the special demands of this industry.

ELASTOSIL® silicone grades are ideal for direct and indirect food contact because they have inorganic characteristics. They are heat resistant, easy to clean and meet all current food regulations. Since our silicones consist of just a few defined ingredients, they are clean, plasticizer-free, flexible plastics for any application where reliability and convenience are demanded.
Water Contact
ELASTOSIL® silicone grades are water repellent and have an inorganic backbone. They therefore offer little opportunity for algal and bacterial growth, and are extremely resistant to hot water and fatigue. The weathering resistance of ELASTOSIL® silicones is so good that they can be used in the open air with no loss of effectiveness. Their high resistance to detergents and cleaning agents also makes them outstanding processing auxiliaries in all drinking-water and sanitary applications.

Technical Molded Parts
ELASTOSIL® silicone elastomers are high-performance materials with outstanding chemical and thermal resistance, very good general mechanical properties and excellent compression set. With their superb low-temperature flexibility, they retain their properties unchanged, even under extreme conditions – unlike other flexible plastics. They are also easy to process and cure rapidly.

Safety Applications
Silicone elastomers from WACKER are extremely reliable and safe to use. Emitting no toxic fumes or halogens in a fire, they are the perfect materials for safety-critical applications – e.g. in airplanes, rail cars or shipbuilding. Some ELASTOSIL® grades also contain flame retardants to make them fire resistant.
Bonding without pressure or priming: An innovative technology allows excellent bonding to many different materials, including thermoplastics, steel and aluminum, during injection molding.
Baby Articles & Toys
Plasticizer-free, hypoallergenic, flexible and tough: ELASTOSIL® silicone elastomers offer the best conditions for safe toys, as well as baby bottles, teats, teething rings, pacifiers and the like. Our silicones are made of a few defined ingredients, meet all the relevant standards, such as EN 71 and EN 1400, and are therefore ideal for all applications where the comfort and safety of infants is concerned.

Extruded Cable Articles
WACKER silicone rubber materials are excellent insulators for cables and wires. Where high requirements are set for electrical, mechanical and chemical properties, ELASTOSIL® is a guarantee of perfect functionality: for example, in automotive applications, household appliances, medical products, ships, aircraft, instrumentation and control, and general electrical installations.

Calendering
ELASTOSIL® R solid silicone rubber can be calendered into sheet or used to coat fabrics or other materials. WACKER offers a comprehensive range especially for these applications, including specialty grades characterized by excellent green strength.
Premium Quality Additives

Primers and Adhesives
High-performance ELASTOSIL® products and silicone-rubber additives ensure that the various silicones bond reliably to different substrates, such as metals, plastic or glass. WACKER offers you a comprehensive range of additives and develops efficient product solutions tailored to your specific processes, for various application processes, such as spraying, dipping, brushing or bead application.

Color Masterbatches for LR
ELASTOSIL® Pigment Pastes FL for liquid silicone are based on ELASTOSIL® LR polymers. As a result they offer extremely high yield and are opaque even in very low doses of 1% with low wall thicknesses. For perfect compatibility and breathtakingly brilliant colors, the concentrated pigments have been extensively tested for use in silicone.

Whether you’re in pigmenting or bonding – a top-quality result is always based on perfectly matched ingredients. WACKER supplies you with an extensively tested product portfolio for this.
Color Masterbatches for HCR
PT Color Masterbatches excel with ELASTOSIL® polymers. That ensures high yield and excellent opacity even at very low doses of 1% and low wall thicknesses. The concentrated pigments are precisely matched to the particular requirement, thus ensuring impressive color results.

Stabilizers
Optimally matched and tested, high-performance ELASTOSIL® stabilizers and stabilizing pigment pastes improve solid and liquid silicones’ heat, oil and reversion resistance, as well as their compression set. The stabilizers are used in a dose between 1 and 3% and are extremely efficient: for example, their remarkable performance profile allow hot-air resistance to be increased by up to 50°C.
Plastics Modified to Measure
Additives for Plastics
Thermoplastics manufacturers now face tougher demands than ever on productivity, quality, and efficiency. They require novel additives for modifying desirable properties, such as flowability and scratch resistance, or improving the mechanical properties of plastic compounds. GENIOPLAST® products are excellent processing aids and modifiers for silicone-based thermoplastics, and have a proven track record as additives and processing aids for both standard thermoplastics and engineering plastics.

Applications

Plastics modification

Products
GENIOPLAST®

Polymer Modification
Conventional compounding or modern extrusion and coextrusion processes allow the properties of polymer surfaces to be selectively modified by means of silicone-based thermoplastics. A valuable help here is provided by WACKER’s line of GENIOMER® products. In the extrudate or coextrudate, they impart tailored silicone characteristics to the plastic surface, providing it with desirable properties such as release, hydrophobicity or tactile effects.

Applications

Polymer Modification

Products
GENIOMER®
Fillers
For perfect results, silicone elastomers and natural and synthetic rubber grades require suitable fillers. They are essential to obtain specific mechanical characteristics in various application fields. HDK® pyrogenic silica functions as an active filler here, providing the material with the required system properties. Hydrophobic HDK® grades provide the high filler contents combined with outstanding processability. The outstanding reinforcing effect of HDK® increases sag resistance, elongation at break and loading capacity of elastomers. In non-polar silicone rubber, HDK® can act as a reinforcing filler while at the same time being used as a rheological additive, ensuring that low-viscosity systems do not run off vertical construction elements. In silicone elastomers, hydrophilic HDK® is an effective reinforcing agent – together with low-molecular plasticizers, the system benefits from optimum processing.

Applications
Reinforcement of mechanical properties

Products
HDK®

HDK® pyrogenic silica from WACKER is extremely versatile as an active filler, providing outstanding properties:
High load-bearing strength, flexibility and reinforcement – together with efficient processability.
**Catalysis**
Automotive and mechanical engineering, packaging technology, building construction, the textiles, toy and cosmetics industries – hardly any modern industrial application would be conceivable without the use of polypropylene (PP). There are good reasons why, since PP provides plastics manufacturers with a wide range of properties. Important ingredients in the chemical conception of this polymer are donor silanes from WACKER. The production of PP by olefin polymerization is of enormous technical and economic importance. Donor silanes are used as cocatalysts in this case, ensuring a high content of isotactic polymer, controlling the molecular weight and determining the quality of the end polymer.

**Applications**
Polypropylene manufacture

**Products**
WACKER® Silane

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**Plastics Crosslinking**
The innovative technology of silane crosslinking converts inexpensive thermoplastic polymers into cured polymers, and is therefore ideal for producing cables and pipes from curable polyethylene. The necessary precursors for this are provided by GENIOSIL® vinyl silanes from WACKER. GENIOSIL® is preferably used for silane crosslinking and the production of curable polyolefin compounds. Here, formulating silanes together with processing auxiliaries creates a synergetic combination of the advantages of silane curing with those of silicones as polymer additives.

**Applications**
Cable and pipe manufacture

**Products**
GENIOSIL®
WACKER is one of the world’s leading and most research-intensive chemical companies. In 2008, its sales totaled € 4.3 billion. Products range from silicones, binders and polymer additives for diverse industrial sectors to bio-engineered pharmaceutical actives and hyperpure silicon for semiconductor and solar applications. As a technology leader focusing on sustainability, WACKER promotes products and ideas that offer a high value-added potential to ensure that current and future generations enjoy a better quality of life based on energy efficiency and protection of the climate and environment.

Spanning the globe via five business divisions, 27 production sites and over 100 subsidiaries and sales offices, we have established a presence in all key economic regions and growth markets. With a 15,900-strong workforce, WACKER sees itself as a reliable innovation partner that develops trailblazing solutions for, and in collaboration with, its customers. WACKER also helps them boost their own success. Our technical centers employ local specialists, who assist customers worldwide in the development of products tailored to regional demands, supporting them during every stage of their complex production processes, if required.

WACKER e-solutions are online services provided via our customer portal and as integrated process solutions. Our customers and business partners thus benefit from comprehensive information and reliable service to enable projects and orders to be handled fast, reliably and highly efficiently. Visit us anywhere, anytime around the world at: www.wacker.com

All figures are for 2008.
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