

TAILORED FILLER SOLUTIONS

TOLL MANUFACTURING

HOFFMANN
MINERAL®

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HOFFMANN MINERAL GmbH
Münchener Straße 75
DE-86633 Neuburg an der Donau

Telefon: +49 (0) 84 31 53-0

E-Mail: info@hoffmann-mineral.com
www.hoffmann-mineral.com

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HOFFMANN
MINERAL®

HOFFMANN MINERAL EXPANDS ITS RANGE

HOFFMANN MINERAL is known worldwide through its activities in the distribution of Neuburg Siliceous Earth. The products SILLITIN and AKTISIL, and the calcined versions SILFIT and AKTIFIT, are well known to our customers and are used as functional fillers.

The TAILORED FILLER SOLUTIONS are now expanding this portfolio in order to give customers the opportunity to differentiate themselves from the competition with tailored products in existing applications.

We at Hoffmann Mineral will continue to invest our entire expertise also in the new business division to be able to offer our customers the best possible product on the best possible terms. We will use our know-how of Neuburg Siliceous Earth and transfer it to new base materials, combined with innovative modifications for further improvement.

In close cooperation with our Research & Development and Application Technology, products are being developed that the market needs and which give our customers a lead over the competition.



TAILORED FILLER SOLUTIONS

GLOXIL®

GLOXIL iM16k A

Based on hollow glass microspheres from 3M, this product brings further improvements in plastics where weight reduction is an important issue thanks to its surface modification.

GLOXIL SF 91 A

The hybrid filler made of fiber and Neuburg Siliceous Earth with subsequent modification produces very good properties in plastics where a good mix of rigidity and flexibility is required.

GLOXIL WW SL

The aqueous dispersion-based on modified silica for use in matt water-based coatings, improves incorporation, transparency and resistance.

struktoSIL®

HOFFMANN MINERAL launches high-performance, modified talc products.

STRUKTOSIL 45 AM

The fine talc grade for use in elastomers. It improves in particular the barrier effect.

STRUKTOSIL 45 MAM

The methacryl-functionalized talc is particularly suitable for reducing compression set in elastomer compounds.

GLOXIL® iM16k A

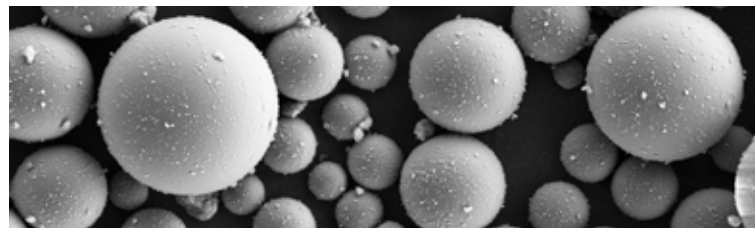
PRODUCT CHARACTERISTICS

HOFFMANN MINERAL has been working in cooperation with 3M for years to develop products based on hollow glass microspheres. The product is based on the iM16k, modified with an amino function. The main field of application is the production of thermoplastics with demands for low density and low weight of the finished product. The functionalization allows a better integration of the lightweight filler, leading to an improvement in the strength of the finished product.

Thanks to the exclusive cooperation with 3M, it is also possible to use other grades (size and stability) of 3M's hollow glass microspheres. Different functional groups such as vinyl, alkyl, etc. can be applied to the base material for surface modification.

Characteristics	unit	GLOXIL iM16k A
Particle size, D ₅₀	µm	22
Particle size, D ₉₇	µm	45
BET-Surface	m ² /g	approx. 2
Floatation rate	%	96
True density	g/cm ³	0.46
Bulk density	g/cm ³	0.19
Air-jet screening > 125 µm	%	0.2
Color value L*		98
pH-value		10
Volatile matter at 105 °C RT 20 °C / RH 50 %	%	0.3

The values shown in the table are to be considered as guidelines only. Material specifications for each product are binding and are available on our website www.hoffmann-mineral.com.



FIELDS OF APPLICATION

Thermoplastics

- Polyamides (PA)
- Aliphatic polyketones (PK)
- PP (after addition of PP-g-MAH)
- ABS, PPS, TPU, PE/EVA

Thermosetting plastics

- Epoxy resins
- Polyurethanes

Elastomers

- FKM
- HNBR
- ACM, AEM

BENEFITS

- Reduced density
- Reduced weight
- Reduced costs per unit volume
- Resistance to chemicals
- Water resistance

Compared with base material:

Polyamide (PA):

- Increase of
- tensile strength¹
 - elongation at break
 - flexural strength¹
 - flexural strain²
 - impact resistance

Polypropylene (PP)³:

- Increase of
- tensile strength⁴
 - yield stress⁴
 - elongation
 - flexural strength⁵
 - impact resistance
 - notched impact strength

¹ up to the comparable level for PA6 without hollow glass microspheres possible

² increase even compared with PA6 without hollow glass microspheres possible

³ tested with 5% PP-g MAH as compatibilizer

⁴ up to the comparable level for PP copolymer without hollow glass microspheres possible

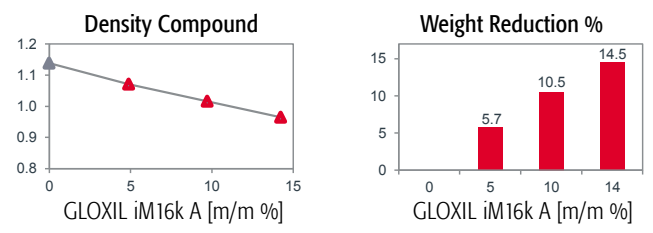
⁵ increase even compared with PP copolymer without hollow glass microspheres possible

GLOXIL® iM16k A

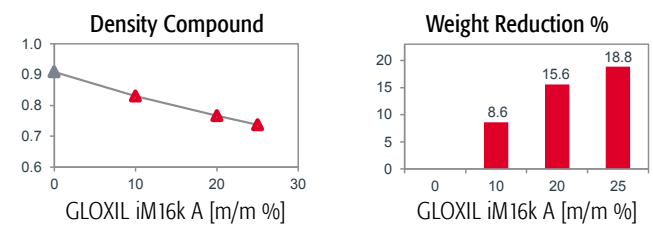
TECHNICAL RESULTS

GLOXIL iM16k A was tested in a PA6 and a PP copolymer formulation and compared with the base grade and the unfilled compound.

PA6, dry as molded
(Ultramid® B3K)

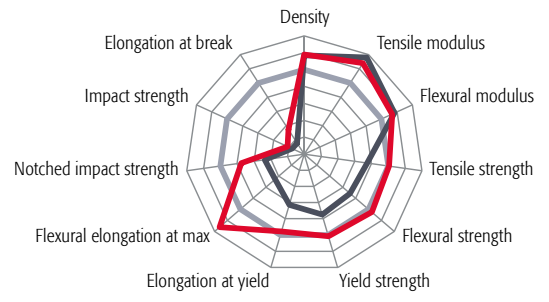


PP-Copolymer (Bormod™ BF970MO, GLOXIL iM16k A compounds contain 5 % PP-g-MAH, Scona TPPP 2112 GA)



OVERALL PERFORMANCE

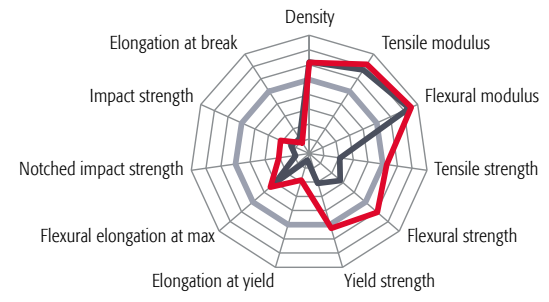
Performance Index, PA without GB = 1, higher = better



Hollow Glass Bubbles 14 % m/m = 29 % V/V

OVERALL PERFORMANCE

Performance Index, PA without GB = 1, higher = better



Hollow Glass Bubbles 25 % m/m = 40 % V/V

Data determined by 3M™ Advanced Materials Division, Specialty Additives Laboratory.

GLOXIL[®] SF 91 A

PRODUCT CHARACTERISTICS

Composites have long become standard in industry. Also in the fillers sector, they are already present in some cases, but often only as custom products. Hoffmann Mineral is now launching its first hybrid filler with **GLOXIL SF 91 A**.

Applications for the mixture of fiber and Neuburg Siliceous Earth with amino functionality lie in the field of thermoplastics. It excels in particular in applications where the mixture is required to achieve rigidity, good toughness, scratch resistance and good processing of the compound.

Characteristics	unit	GLOXIL SF 91 A
Particle size, D ₅₀	µm	3
Particle size, D ₉₇	µm	20
Volatile matter at 105 °C, RT 20 °C/RH 50 %	%	0.3
Surface area BET	m ² /g	9
True density	g/cm ³	2.4
Bulk density	g/cm ³	0.19
Sieve residue > 40 µm	%	< 0.1
Color value L*		97.7
Color value a*		0
Color value b*		1.2
Loss on ignition (625 °C)	%	approx. 14
Oil absorption	g/100 g	110

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FIELDS OF APPLICATION

Applications

- Visible parts and covers with good surface finish and very high scratch resistance
- 3D printing
- Wood plastic composites (WPC)
- Films as functional fillers and matting agents

Polymers

- Polyamides (PA)
- Aliphatic polyketones (PK)
- ABS
- PP
- TPU, PE/EVA

Please note:

Maximum melt temperature 260 °C

BENEFITS

Compared with unfilled polymer:

- Reduced warpage
- Better dimensional stability with fluctuating humidity (PA)
- Increase of
 - hardness
 - scratch resistance
 - rigidity
 - tensile strength
 - flexural strength
 - heat resistance
 - thermal conductivity

Compared with other mineral fillers:

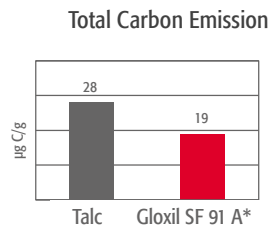
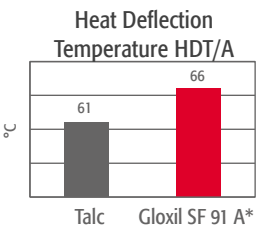
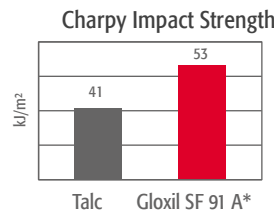
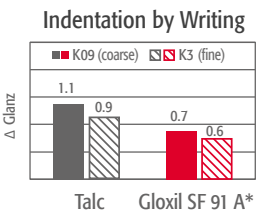
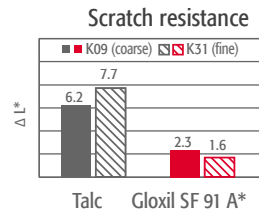
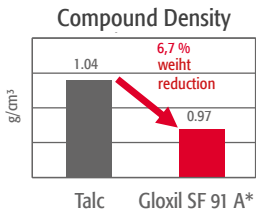
- Good wetting and dispersion behavior
- High melt flowability
- No cross-linking in polyketone
- Relatively low warpage
- High surface finish quality
- Very high scratch resistance
- No graying with black pigmented compounds
- Increased rigidity
- Relatively high elongation at break
- Relatively high impact resistance, even at low temperatures
- Increased heat resistance
- Matting (in films)

GLOXIL® SF 91 A

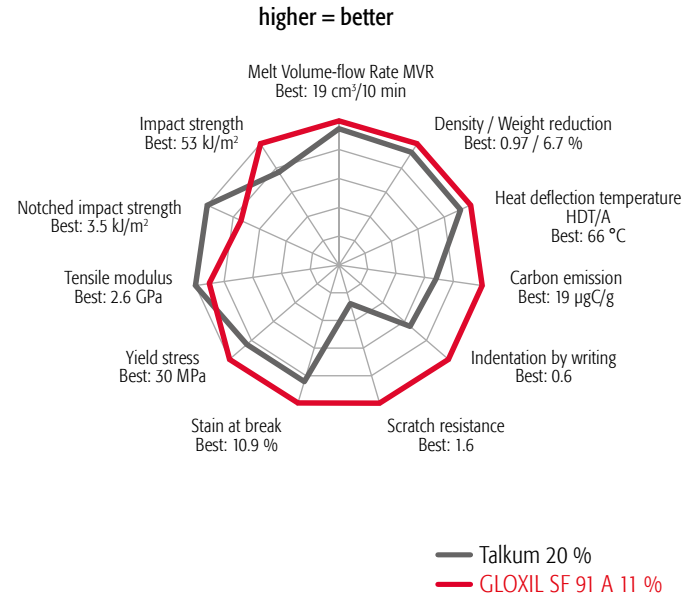
TECHNICAL RESULTS

GLOXIL SF 91 A was tested in a PP copolymer compound by comparison with an ultra-fine premium talcum.

PP copolymer compounds, light weight and enhanced scratch resistance



OVERALL PERFORMANCE



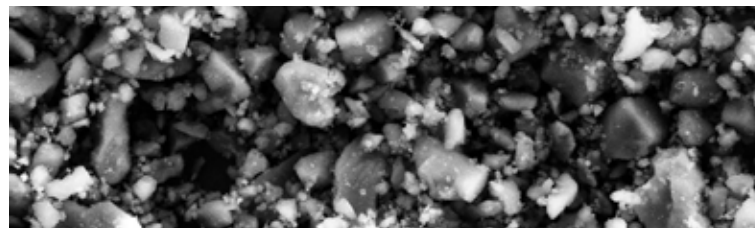
The properties marked with * were determined on a precursor product of similar composition to GLOXIL SF 91 A.

GLOXIL® WW SL

PRODUCT CHARACTERISTICS

With GLOXIL WW SL, Hoffmann Mineral has developed the first functional filler that is not based on Neuburg Siliceous Earth. The product is a 15% aqueous silica dispersion modified with special additives adapted to the matting agent and the intended application. The formation of films from the dispersion improves the incorporation of the matting agent particles. This results in films with good water and stain resistance as well as excellent matting properties.

Characteristics	unit	GLOXIL WW SL
Particle size, D ₅₀	µm	8 - 11
pH-value		6 - 7.5
Sieve residue > 40 µm	mg/kg	< 5
Silica content	%	15
Appearance		white, pasty



APPLICATIONS

- Matt dispersion-based coating, primarily clear wood varnishes, especially acrylic-based varnishes
- Substitution of matting agents for improved handling as well as water, alcohol and stain resistance

BENEFITS

- No dust formation
- Significantly improved dosing and incorporation
- Faster and easier incorporation without high shear forces
- Foam inhibiting effect
- Improved early blocking resistance
- Very high transparency without color cast and good long-term stability
- Strong matting effect
- Good wood grain, especially on dark wood
- Outstanding early water and stain resistance
- Subsequent addition to modify the degree of matting possible without loss of performance or problems
- Excellent metal marking resistance (ring resistance)

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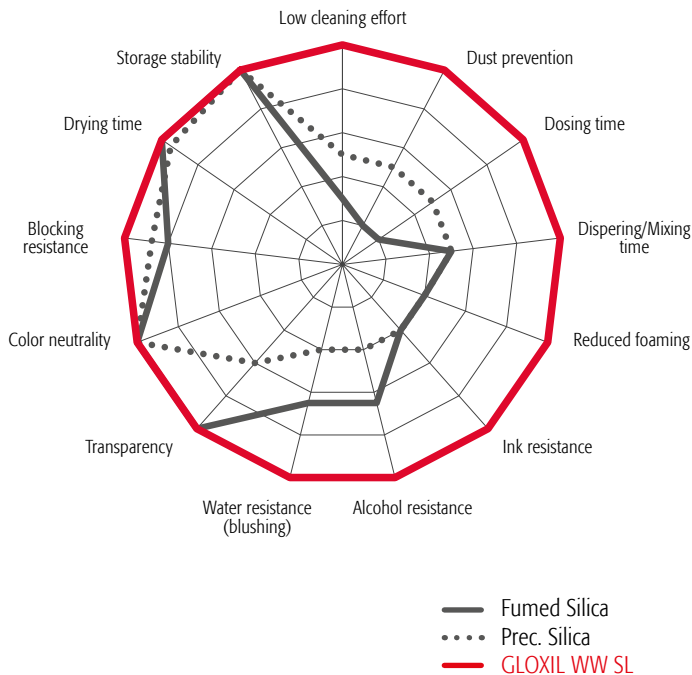
GLOXIL® WW SL

TECHNICAL RESULTS

GLOXIL WW SL was tested in an aqueous clear coat formulation against common matting agents. The results were compared with those of a fumed and a precipitated silica.

OVERALL PERFORMANCE

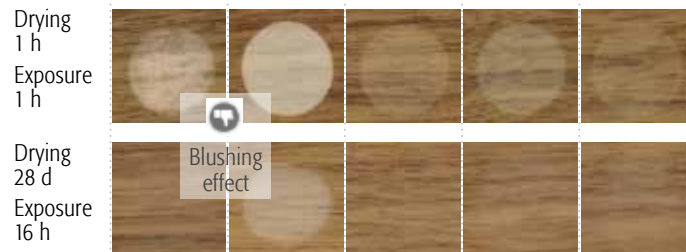
Performance at gloss 60° ~ 10 units
 15.4 GT = 14.3 % GLOXIL WW SL
 higher = better



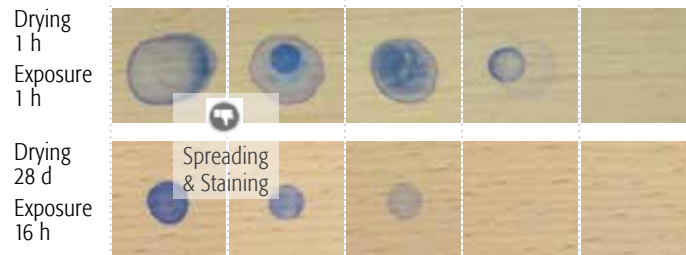
DOSSAGE AND VOLUME



WATER RESISTANCE



INK RESISTANCE

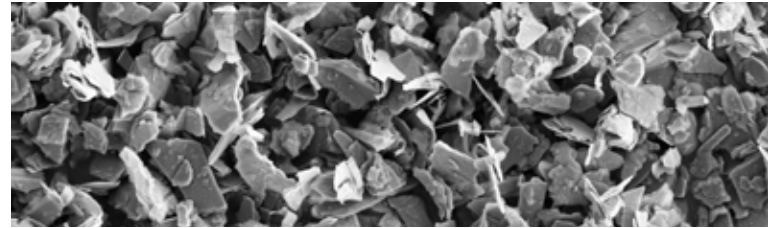


Although Neuburg Siliceous Earth is most commonly used in elastomers, there are applications where other products have to be used. This includes products where the gas or water vapor permeability has to be as low as possible. With the new **STRUKTOSIL 45 AM**, a talc with amino functionality, HOFFMANN MINERAL is now offering a functional filler to improve the barrier effect in elastomers while maintaining a good compression set.

Different functional groups such as vinyl, alkyl, etc. can be applied to the base material for surface modification. It is also possible to use other grades as base material.

Characteristics	unit	STRUKTOSIL 45 AM
Particle size, D ₅₀	µm	4
Particle size, D ₉₇	µm	11
Oil absorption	g/100 g	55
BET-Surface	m ² /g	9
Bulk density	g/cm ³	0.21
Color value L*		98
Color value a*		0
Color value b*		0.6
Volatile matter at 105 °C, RT 20 °C / RH 50 %	%	0.2
pH-value		9.5
Air-jet screening > 125 µm	%	0
Density	g/cm ³	2.95

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FIELDS OF APPLICATION

Elastomers

- All common rubber grades and cross-linking methods, preferably sulfur crosslinking

Thermoplastics

- Polyamides (PA)
- Aliphatic polyketones (PK)
- Polypropylene (PP); particularly after addition of PP-g-MAH
- ABS, PPS, TPU, PE/EVA

Paints and lacquers

- Corrosion protection
- Epoxy resins and polyurethane

Thermosetting plastics, reaction resins, adhesives

- Epoxy resin
- Polyurethane

BENEFITS

Compared with Mistrobond R10C:

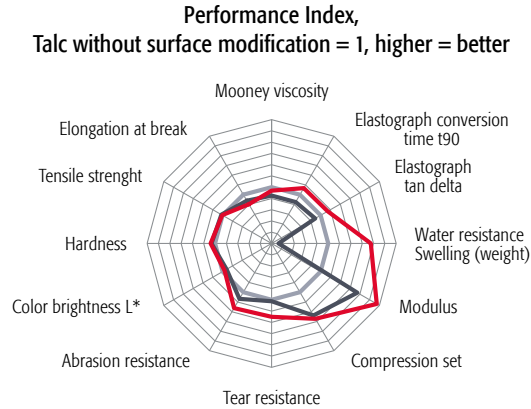
- Lower viscosity
- Shorter conversion time t₉₀ = faster vulcanization with sulfur cross-linking
- Higher stress value
- Higher tear propagation resistance
- Significantly lower water absorption during storage in hot water

struktoSil® 45 AM

TECHNICAL RESULTS

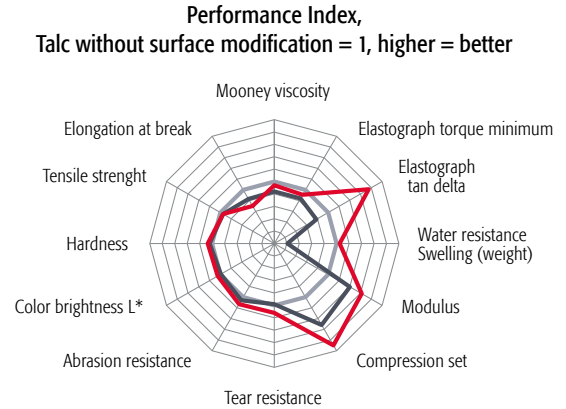
STRUKTOSIL 45 AM was tested in an EPDM formulation for molded parts, 120 phr filler, and compared with the base material and with a Mistrobond R10C.

SULFUR CURED



- Talc without surface modification
- Mistrobond R10C
- STRUKTOSIL 45 AM

PEROXIDE CURED



- Talc without surface modification
- Mistrobond R10C
- STRUKTOSIL 45 AM

struktoSil® 45 MAM

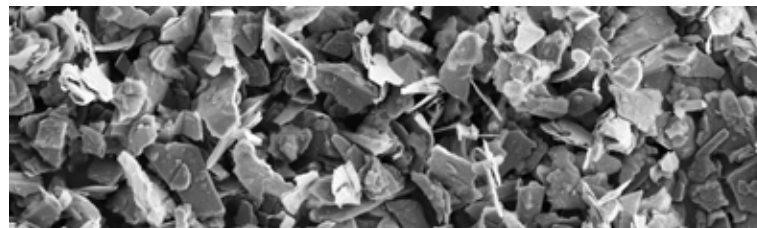
PRODUCT CHARACTERISTICS

STRUKTOSIL 45 MAM is a special activated talc, produced by modifying the surface with a methacrylic functional group. There is anchoring on the surface, and all released by-products are removed during the production process. In this way, the material improves its hydrophobic properties.

During compounding, the methacrylic groups of **STRUKTOSIL 45 MAM** provide good wetting and very good dispersion in the matrix polymer. During vulcanization in elastomers or crosslinking of unsaturated polymers, the methacrylic groups of **STRUKTOSIL 45 MAM** react with the polymer in the presence of radicals.

Characteristics	unit	STRUKTOSIL 45 MAM
Particle size, D ₅₀	µm	4
Particle size, D ₉₇	µm	11
Oil absorption	g/100 g	55
BET-Surface	m ² /g	9
Density	g/cm ³	2.9
Bulk density	g/cm ³	0.21
Air-jet screening > 125 µm	%	0
Color value L*		98
Color value a*		0
Color value b*		0.6
Volatile matter at 105 °C, RT 20 °C / RH 50 %	%	0.2
pH-value		9.5

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FIELDS OF APPLICATION

STRUKTOSIL 45 MAM is used in elastomers and thermoplastics as well as in paints and coatings, thermosets, reactive resins and adhesives.

Within elastomers, compounds for gaskets with very good compression set and very low swelling in hot water as well as very good barrier behavior to gases. Due to the modification with a methacrylic functional group, a better integration of the filler platelets into the polymer matrix is possible, which leads to an improvement of the compound properties.

Elastomers

- Preferably peroxide-cured compounds, e.g. EPDM, HNBR, etc.

Thermoplastics

- Polycarbonate (PC)
- PC blends
- Polybutylene terephthalate (PBT)
- in principle also other engineering thermoplastics and radically crosslinkable polymers such as PE, PE/EVA

Paints and varnishes

- Anti-corrosion coatings
- UV-curing varnishes

Thermosets, reactive resins, adhesives

- UP resins
- other unsaturated resins such as vinyl ester and acrylic resins

struktoSil[®] 45 MAM

TECHNICAL RESULTS

The **STRUKTOSIL 45 MAM** was tested in a peroxide cured EPDM formulation for molded parts, 120 phr filler, in blend with 25 % StruktoSil with 75 % ImerFlex[®]T10 and compared to 100 % ImerFlex[®]T10 and amino-functional talc of the competition.

BENEFITS

Of STRUKTOSIL 45 MAM in blend with ImerFlex[®]T10 (1 : 3) to 100 % ImerFlex[®]T10

Peroxide Cured:

- lower tangent delta at the end of vulcanization
- strongly increased moduli
- higher tensile strength
- strongly reduced compression set
- slightly increased tear resistance (Graves)

Of STRUKTOSIL 45 MAM in 25 % blend with ImerFlex[®]T10 (1 : 3) to 100 % Mistrobond R10C

Peroxide Cured:

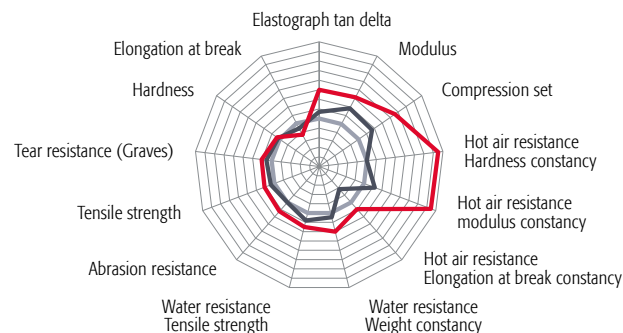
- lower tangent delta at the end of vulcanization
- higher moduli
- slightly higher tensile strength
- slightly higher tear resistance (Graves)

- improved abrasion resistance
- better hot-air resistance: lower increase in modulus and hardness, lower decrease in elongation at break
- better hot water resistance: lower water absorption

- significantly lower compression set
- improved abrasion resistance
- better hot air resistance: lower modulus and hardness increase, lower elongation at break decrease
- better hot water resistance: lower water absorption

OVERALL PERFORMANCE

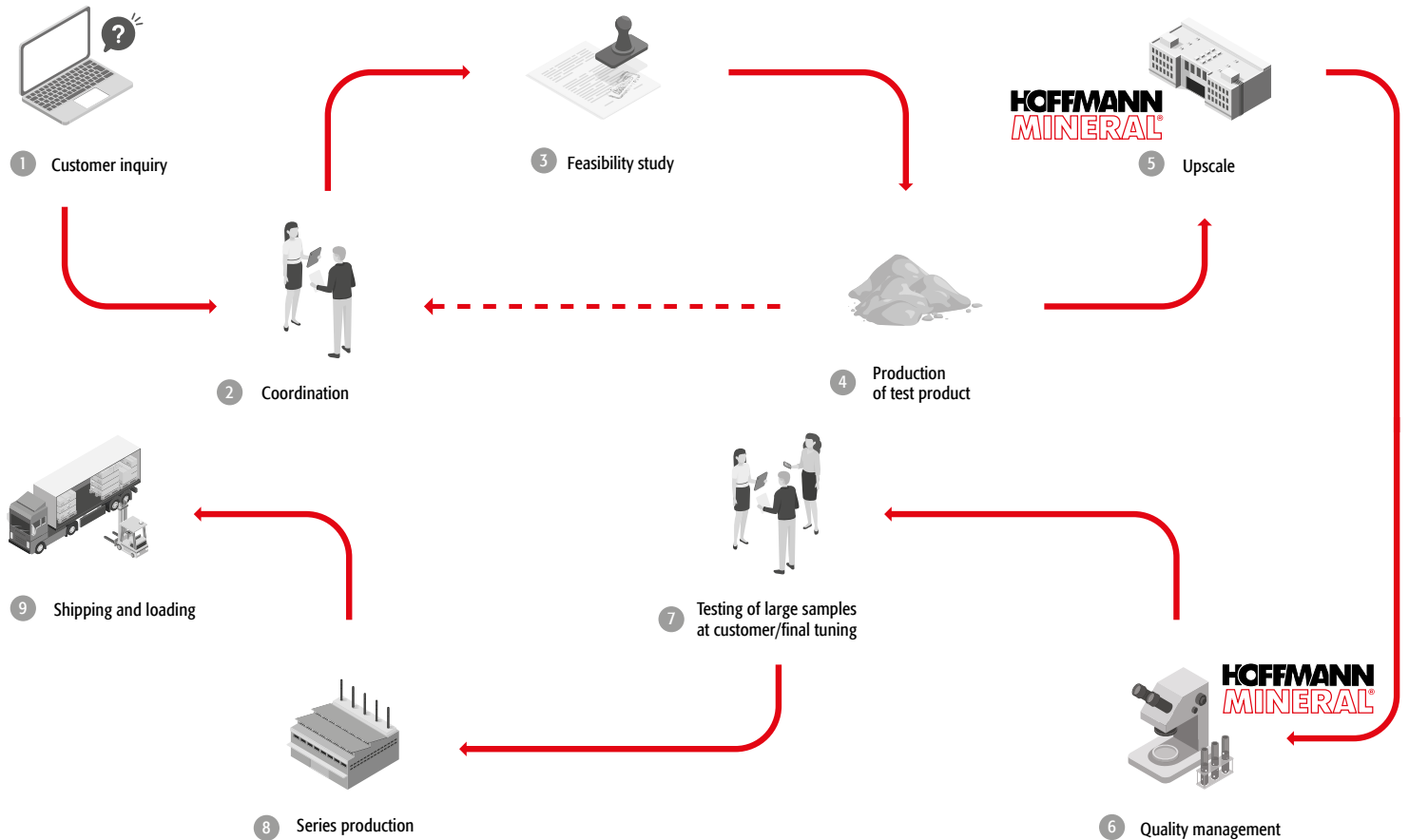
Performance Index, ImerFlex[®]T10 = Reference, higher = better



- ImerFlex[®]T10
- Mistrobond R10C based on ImerFlex[®]T10
- STRUKTOSIL 45 MAM 25% in Blend with ImerFlex[®]T10 75%

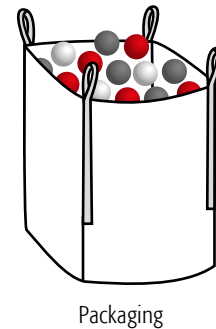
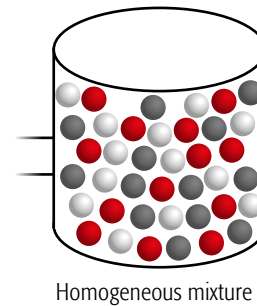
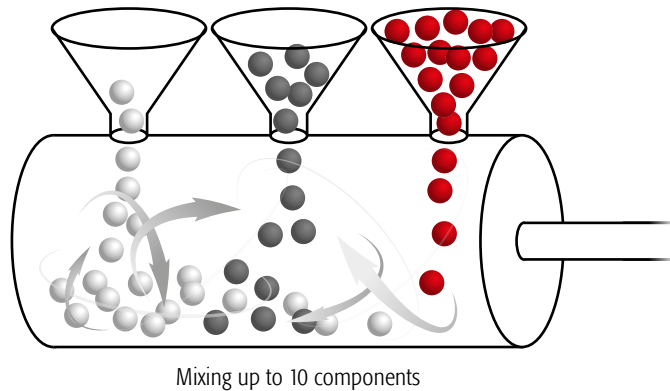
TOLL MANUFACTURING

The all-round service at HOFFMANN MINERAL is a special kind of service. Our range of services is state-of-the-art and leaves nothing to be desired.



MIXING AND HOMOGENIZING

Aggregates of various types and sizes are available. Different fractions of powder components can be mixed with special additives to form a homogeneous mixture.

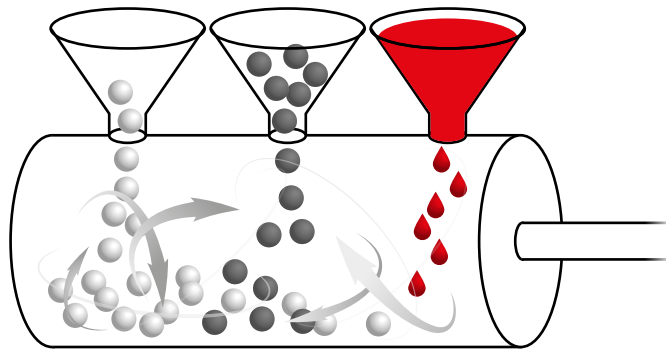


- Fast and homogenous distribution
- Reproducible
- Stable mixing results
- Dosage of powders ≥ 300 g
- Dosage of liquids ≥ 450 g
- Up to 10 powder components
- Non-mixable fluids possible according to the formulation
- Dry liquids based on different substrate materials

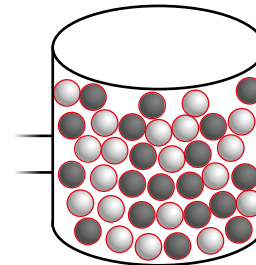


MICRO-COATING

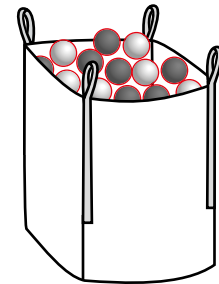
The properties of inorganic, powdered raw materials can be influenced by modifying the surfaces using the microcoating process. New property profiles can be created through functionalization: In addition to common additives, innovative, new and customized functions are developed in our research laboratories.



Modification of one or more components



Modified homogeneous mixture



Packaging

- Hydrophobizing and hydrophilization
- Improved flowability
- Reduced sensitivity to light
- Delayed active substance action
- Modified solution behavior



RE-PACKAGING

Whether silo, BigBag, paper, PE or EVA bag – we fill your powdered or granulated products into that container that best meets your requirements. Of course, we are also happy to take care of the labeling, marking and transport safety packaging of your goods.

