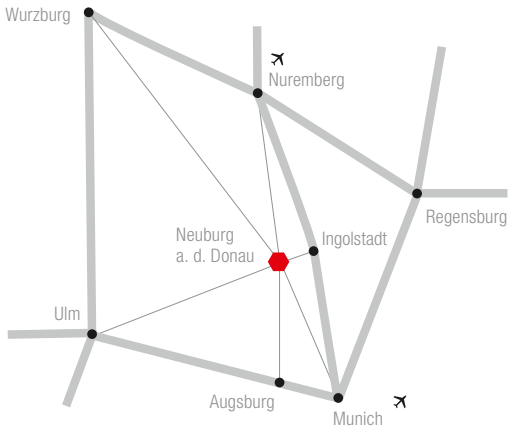
Functional fillers

Neuburg Siliceous Earth

Product information

HOFFMANN MINERAL®

We supply material for good ideas



Sillitin

Standard products (natural, untreated fillers). Differ in brightness and particle size distribution.

Puriss

Created by a downstream process. The extremely low residue > 40 µm particles is reduced even more and the dispersion properties are improved.

Aktisil

Surface-treated products. Neuburg Siliceous Earth treated with additives.

Silfit

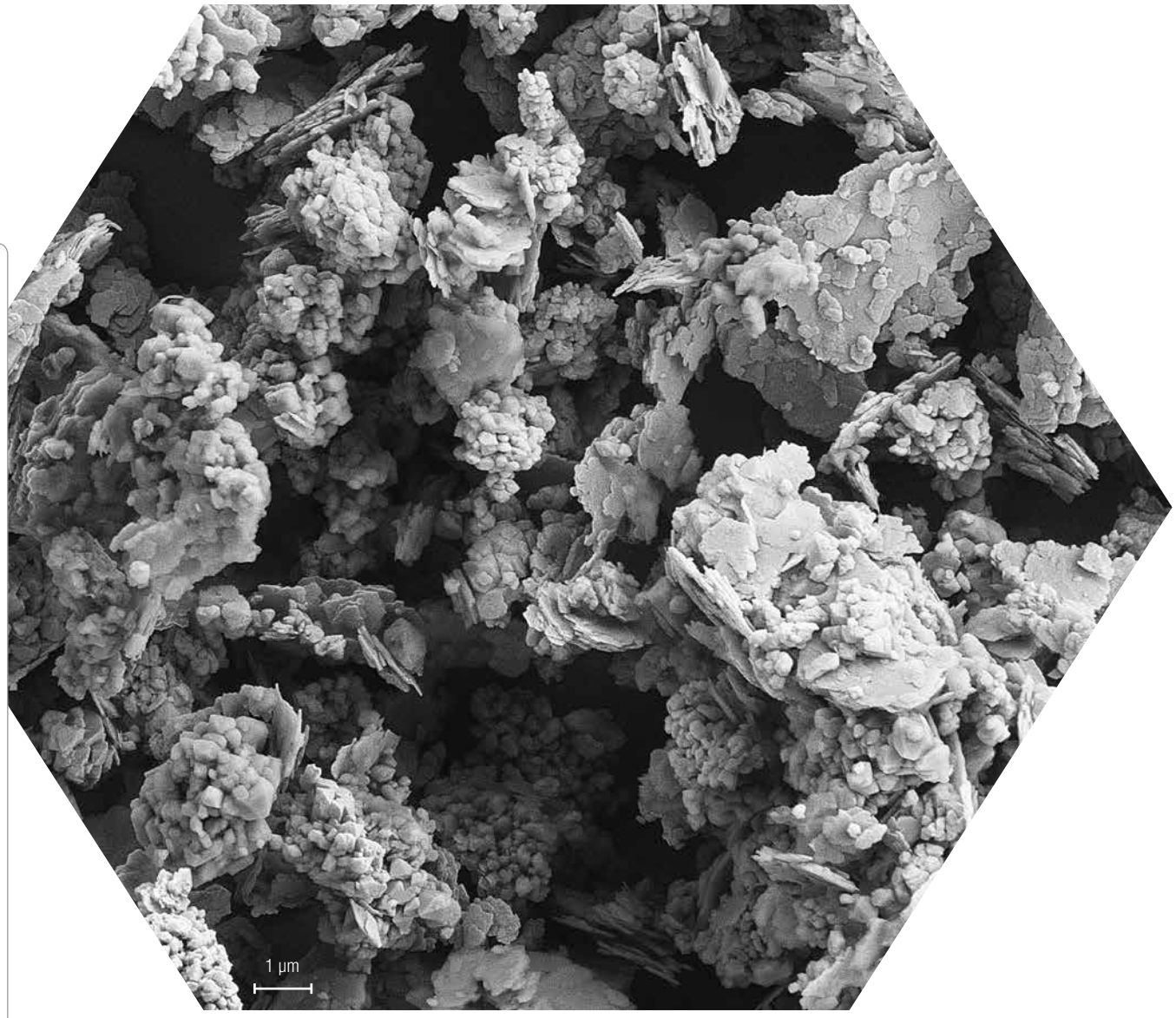
Calcined products based on Sillitin. A downstream thermal process gives the product additional application advantages as a functional filler.

Aktifit

An activated Silfit produced through surface treatment with special additives.

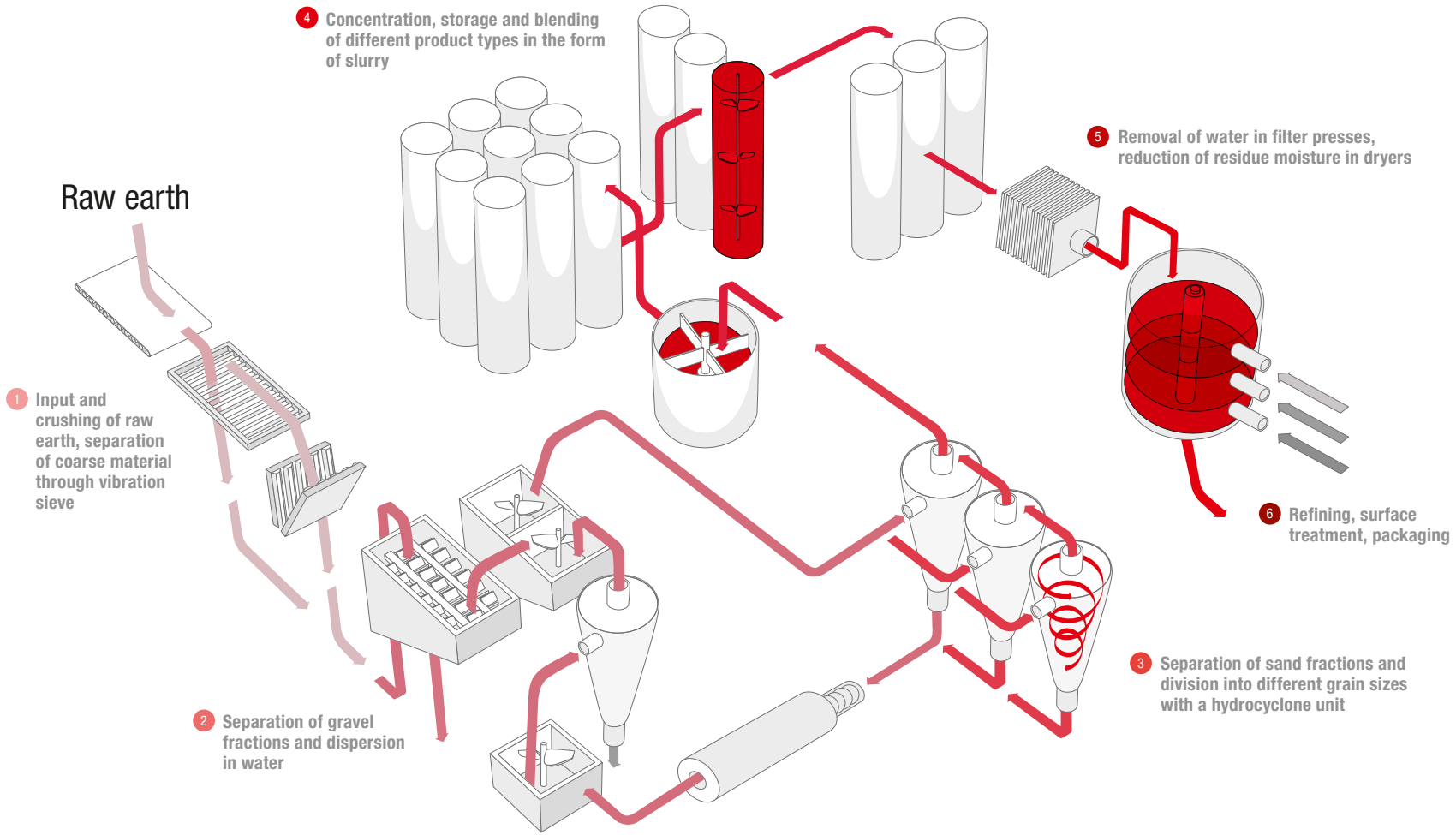
Gloxil matt SL

Gloxil matt SL is a 15% aqueous silica dispersion modified with special additives adapted to the matting agent and the intended application.



Classic Neuburg Siliceous Earth is a natural combination of corpuscular Neuburg Silica and lamellar kaolinite: a loose mixture impossible to separate by physical methods. As a result of natural aging, the silica portion exhibits a round grain shape and consists of aggregated cryptocristalline primary particles of about 200 nm diameter. Such a unique structure is responsible for a relatively high specific surface area and oil absorption, which result, besides rheological activity, also in a whole range of application properties.

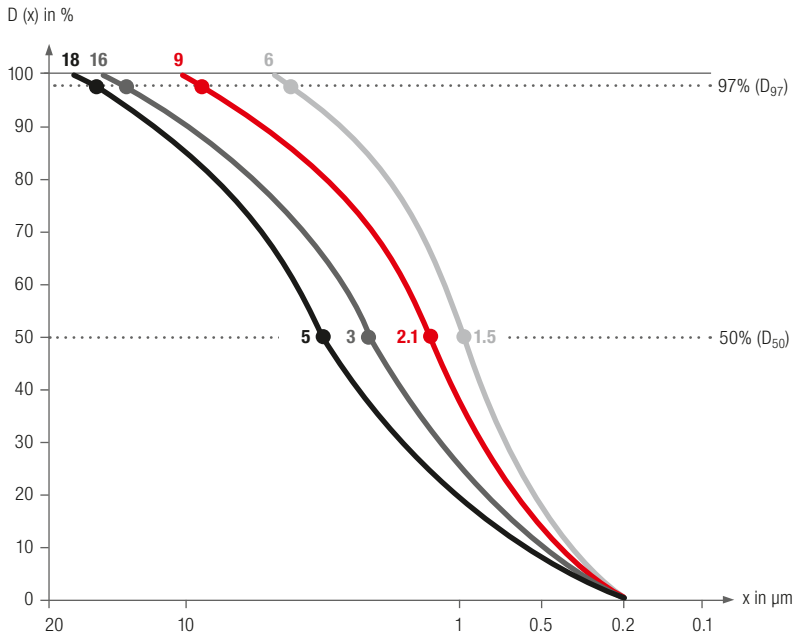
Our calcined products Silfit and Aktifit are based on the standard product Sillitin Z 86. A thermal process is used to expel the crystalline water in the kaolinite portion and new mineral phases are formed practically amorphous. The silica portion remains inert at the temperature used. The resulting products have an outstandingly high degree of white and color neutrality.



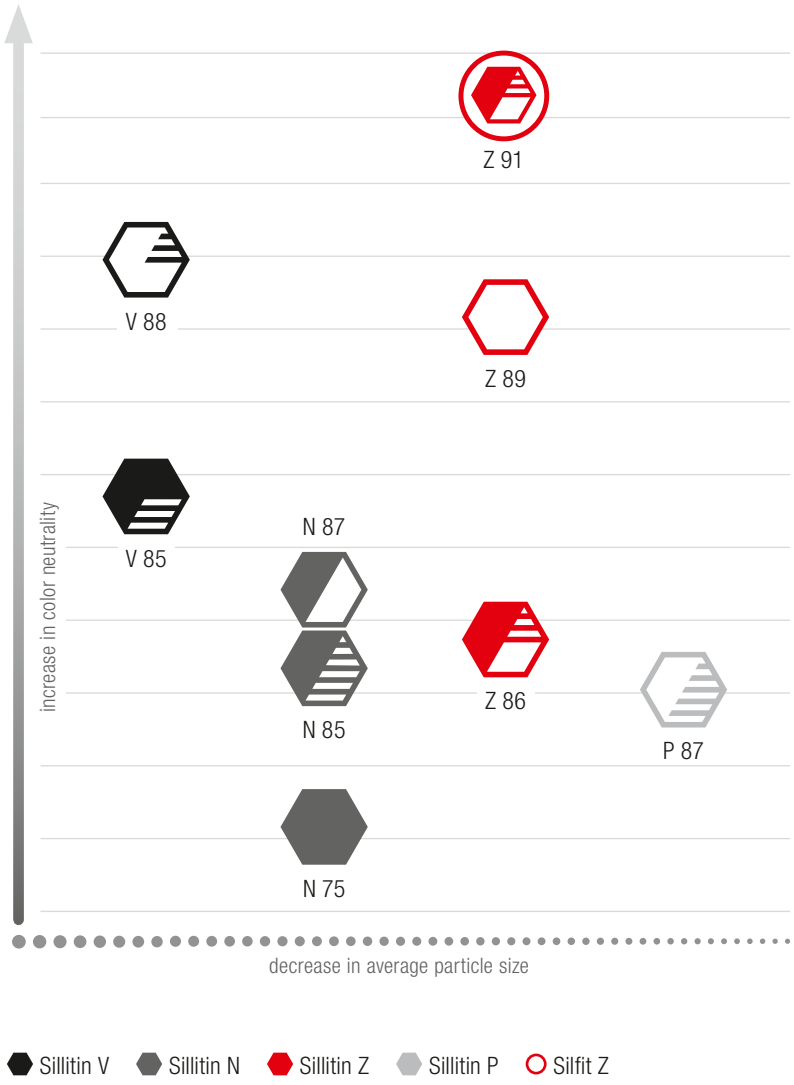
Basically speaking, our entire production process is a process of separation – only about 30% of the raw earth extracted is a usable fine product.
A particularly structure-conserving process separates the fine product from sand, sundry stones and rocks. In the first step, the raw material is dispersed in water and thus separated from gravel fractions. This is followed by the hydrocyclone unit which separates the sand fractions and divides the fine particles into different particle sizes. The slurry obtained is then concentrated and the water removed in filter presses. Finally, the natural gas powered turbine dryers remove the remaining moisture. The material is then pulverized and stored for further processing.

The particle size distribution, color value graphs and overview tables on the following pages show the physical properties and chemical composition of Neuburg Siliceous Earth. The most significant differentiating characteristics are particle size distribution and color neutrality.

Neuburg Siliceous Earth is available in four different particle fractions, identified by the letters V, N, Z and P.



In addition, classic Neuburg Siliceous Earth is available in different shades and colors ranging from yellow to off-white to white depending on the particle size distribution. This color neutrality is expressed in numbers.



Sillitin

Product characteristic		Unit	**Sillitin** V 85	**Sillitin** V 88	**Sillitin** N 75	**Sillitin** N 85	**Sillitin** N 87	**Sillitin** Z 86	**Sillitin** Z 89	**Sillitin** P 87
Color values	L*		93.5	95.0	88.0	93.5	94.0	94.0	96.1	94.5
	a*		1.0	0.5	4.5	1.0	1.0	1.0	0.2	0.9
	b*		9.0	5.0	20.0	9.0	9.0	9.5	4.2	9.0
Particle size	D_{50}	µm	5.0	5.0	3.0	3.5	3.5	2.1	2.1	1.5
	D_{97}	µm	18	18	16	17	17	9.5	9.5	6.5
Residue	> 40 µm	mg/kg	30	30	25	25	25	20	20	20
Volatile matter at 105 °C		%	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Electrical conductivity		µS/cm	80	80	80	80	80	80	80	80
pH value			8.7	8.7	8.5	8.7	8.7	8.7	8.7	8.7
Density		g/cm³	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Bulk density		g/cm³	0.35	0.35	0.30	0.30	0.30	0.25	0.25	0.25
Tamped density		g/cm³	0.60	0.60	0.50	0.50	0.50	0.40	0.40	0.40
Spec. surface area (BET)		m²/g	10	9	12	11	11	13	11	14
Oil absorption		g/100 g	45	45	45	45	45	55	55	55
Hardness silica/kaolinite			7/2.5	7/2.5	7/2.5	7/2.5	7/2.5	7/2.5	7/2.5	7/2.5
Abrasivity		mg	40	40	40	35	35	30	30	25
Refractive index n			1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55
Water solubility		%	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Acid solubility		%	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chemical analysis:										
SiO_2		%	87	88	83	84	84	82	82	80
Al_2O_3		%	8	8	10	10	10	12	12	14
Fe_2O_3		%	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1
Mineralogical composition:										
Neuburg Silica		%	70	70	60	65	65	60	60	55
Kaolinite		%	17	17	25	20	20	25	25	30
Amorphous mineral phases		%	8	8	10	10	10	10	10	10
Other minerals		%	5	5	5	5	5	5	5	5

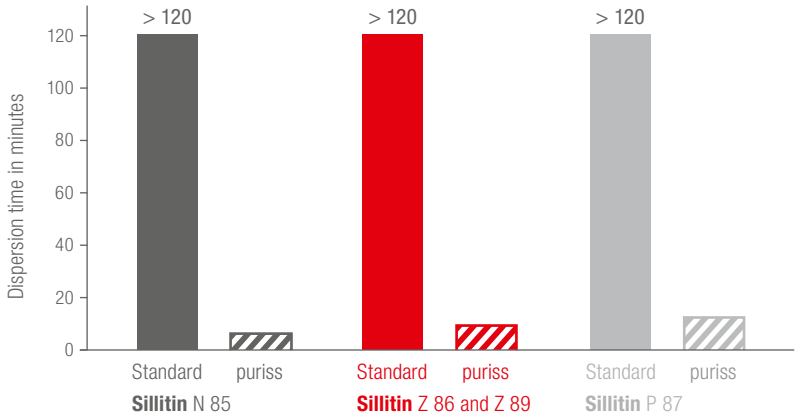
The values shown in the table are to be considered as guide values only.
Material specifications for each product are binding and are available on our website **www.hoffmann-mineral.com.**

EINECS no.: 310-127-6
CAS no.: 1020665-14-8 (Siliceous Earth)
CAS no.: 7631-86-9 (silica), 1318-74-7 (kaolinite)
TSCA no.: 7631-86-9 (silica), 1318-74-7 (kaolinite)

Puriss

- The extremely low residue of > 40 µm is significantly reduced even more
- Reduction of wear when processing through optimum dispersion in low viscosity compounds
- puriss products are the #1 choice for extremely high requirements in terms of dispersion performance and surface quality for application in elastomers and thermoplastic elastomers:
  – low viscosity compounds with high dose of plasticizer
  – extremely thin-walled products like membranes
  – printing roller coverings, printing stencils, offset printing blankets
  – low durometer automotive profiles with Class A surface quality

Stirred with blade mixer 1200 rpm, 20% filler concentration, grain size (Hegman gauge) ≤ 20 µm.



Product characteristic	Unit	Sillitin N85 puriss	Sillitin Z86 puriss	Sillitin Z89 puriss	Sillitin P 87 puriss
Color values L*		93.5	94.0	96.1	94.5
a*		1.0	1.0	0.2	0.9
b*		9.0	9.5	4.2	9.0
Particle size D_{50}	µm	3.0	1.9	2.1	1.5
D_{97}	µm	16	9	9.5	6
Residue > 40 µm	mg/kg	8	8	8	8
Volatile matter at 105 °C	%	0.5	0.5	0.5	0.5
Electrical conductivity	µS/cm	80	80	80	80
pH value		8.7	8.7	8.7	8.7
Density	g/cm³	2.6	2.6	2.6	2.6
Bulk density	g/cm³	0.28	0.23	0.20	0.20
Tamped density	g/cm³	0.48	0.37	0.34	0.34
Oil absorption	g/100 g	45	55	55	55
Hardness silica/kaolinite		7/2.5	7/2.5	7/2.5	7/2.5
Abrasivity	mg	35	30	30	20
Refractive index n		1.55	1.55	1.55	1.55
Water solubility	%	< 0.5	< 0.5	< 0.5	< 0.5
Acid solubility	%	< 1	< 1	< 1	< 1
Dispersion time in ester plasticizer	min	3	7	7	8
Chemical analysis:					
SiO_2	%	84	82	82	80
Al_2O_3	%	10	12	12	14
Fe_2O_3	%	< 1	< 1	< 1	< 1
Mineralogical composition:					
Neuburg Silica	%	65	60	60	55
Kaolinite	%	20	25	25	30
Amorphous mineral phases	%	10	10	10	10
Other minerals	%	5	5	5	5

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

Aktisil

These special fillers are made by treating the surface of Neuburg Siliceous Earth with additives.

Product characteristic	Unit	**Aktisil** AM	**Aktisil** MAM	**Aktisil** PF 216	**Aktisil** PF 777	**Aktisil** Q	**Aktisil** VM 56	**Aktisil** VM 56/89
Basic material Sillitin		Z 86	V 88	Z 86	Z 86	V 90[1]	Z 86	Z 89
Functionalization		Amino	Methacrylic	Tetrasulfane	Alkyl	Methacrylic	Vinyl	Vinyl
Color values L*		94.0	94.9	94.0	93.8	94.5	94.0	96.0
a*		1.0	–0.2	1.0	1.0	0.3	1.0	0.2
b*		10.0	4.0	10.0	10.0	4.0	10.0	3.7
Particle size D_{50}	µm	2.4	4.5	2.4	2.4	5.0	2.4	2.4
D_{97}	µm	12	18	12	12	18	12	12
Residue > 40 µm	mg/kg	30	20	15	20	25	15	15
Volatile matter at 105 °C	%	0.3	0.2	0.3	0.3	0.3	0.5	0.5
Density	g/cm³	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Bulk density	g/cm³	0.22	0.45	0.25	0.25	0.45	0.25	0.25
Spec. surface area (BET)	m²/g	10	7	10	9	6	9	8
Oil absorption	g/100 g	60	45	60	40	43	45	45
Water absorption	ml/g	not specified	0.9	≤ 0.1	≤ 0.1	0.5	not specified	not specified
Reactive		✓	✓	✓		✓	✓	✓
Hydrophobic				✓	✓			

[1] internal product quality

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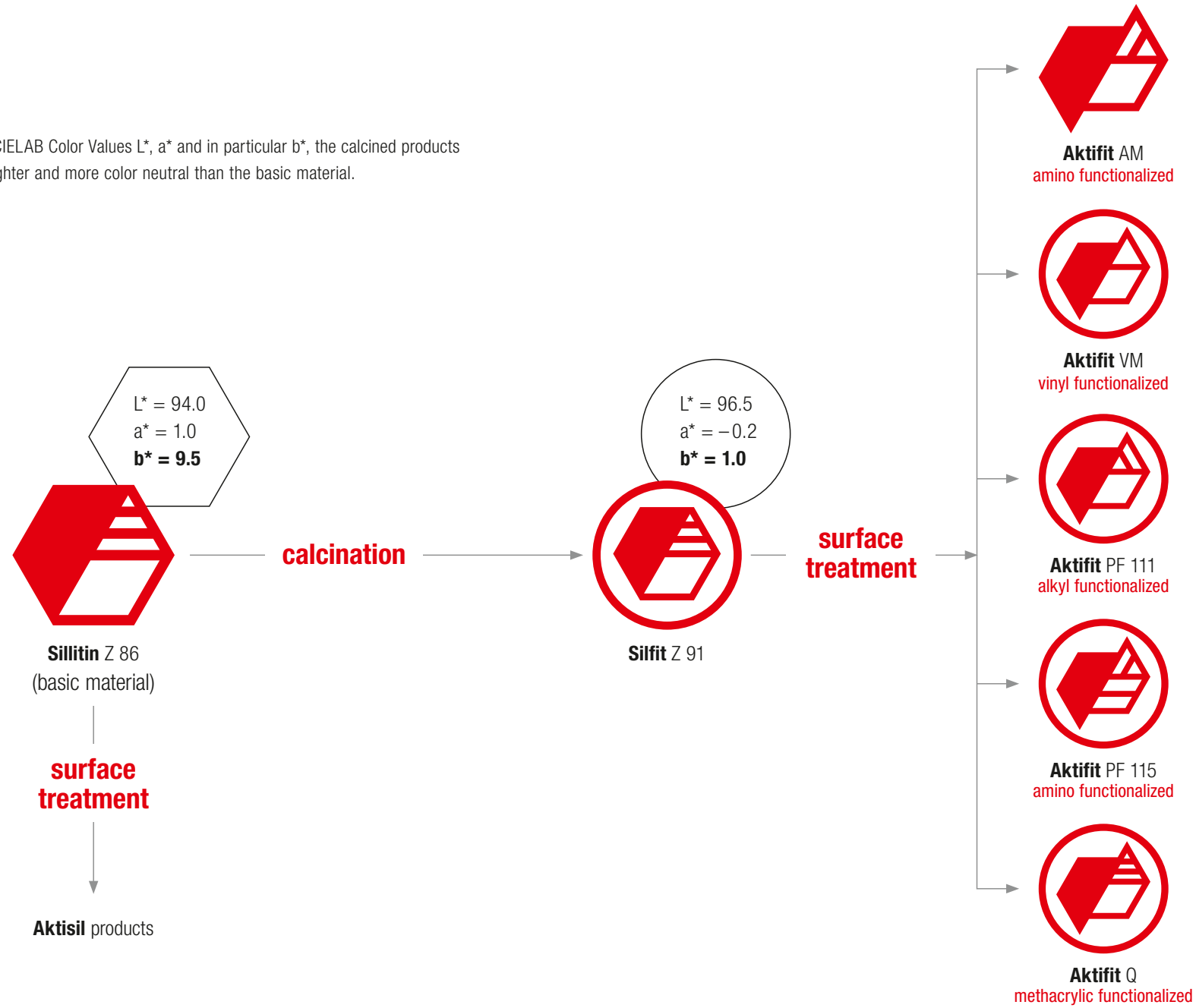
With regard to the CIELAB Color Values L*, a* and in particular b*, the calcined products are significantly brighter and more color neutral than the basic material.



Product characteristic	Unit	**Silfit** Z 91	**Aktifit** AM	**Aktifit** PF 111	**Aktifit** PF 115	**Aktifit** Q	**Aktifit** VM
Basic material		Sillitin Z 86	Silfit Z 91	Silfit Z 91	Silfit Z 91	Silfit Z 91	Silfit Z 91
Functionalization		–	Amino	Alkyl	Amino	Methacrylic	Vinyl
Color values L*		96.5	96.3	96.3	95.7	96.3	96.3
a*		−0.2	−0.1	−0.1	0	−0.1	−0.1
b*		1.0	1.1	1.0	1.0	1.1	1.0
Particle size D_{50}	µm	2.1	2.3	2.3	2.3	2.3	2.3
D_{97}	µm	9.5	11	11	11	11	11
Residue > 40 µm	mg/kg	10	10	10	10	20	10
Volatile matter at 105 °C	%	0.2	0.2	0.2	0.1	0.2	0.1
Electrical conductivity	µS/cm	20	60	not applicable	not applicable	not applicable	not applicable
Density	g/cm³	2.6	2.6	2.6	2.6	2.6	2.6
Bulk density	g/cm³	0.3	0.31	0.35	0.35	0.35	0.37
Tamped density	g/cm³	0.55	0.55	0.65	0.7	0.6	0.7
Spec. surface area (BET)	m²/g	10	9	9	9	8	10
Oil absorption	g/100 g	65	65	55	60	65	65
Silica hardness/calcined kaolinite		7/4.5	7/4.5	7/4.5	7/4.5	7/4.5	7/4.5
Refractive index n		1.55	1.55	1.55	1.55	1.55	1.55
Water solubility	%	< 0.5	< 0.5	not applicable	not applicable	not applicable	not applicable
Acid solubility	%	< 1	< 1	not applicable	< 1	not applicable	not applicable
pH value		6.5	not applicable	not applicable	not applicable	not applicable	not applicable
Water absorption	ml/g	not specified	not specified	≦ 0.1	≦ 0.1	≦ 0.1	≦ 0.1
Chemical analysis: SiO_2	%	86	86	86	86	86	86
Al_2O_3	%	13	13	13	13	13	13
Fe_2O_3	%	< 1	< 1	< 1	< 1	< 1	< 1
Mineralogical composition:							
Neuburg Silica	%	60	60	60	60	60	60
Calcined kaolinite	%	40	40	40	40	40	40
Equilibrium moisture content at 25 °C							
and 50% relative humidity	%	0.12	0.11	0.07	0.04	0.04	0.05
and 80% relative humidity	%	0.22	0.29	0.10	0.06	0.06	0.07
and 90% relative humidity	%	0.54	0.55	0.13	0.07	0.07	0.08
Reactive			✓		✓	✓	✓
Hydrophobic				✓	✓	✓	✓

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

EINECS no.: 310-127-6
TSCA no.: 7631-86-9 (silica), 92704-41-1 (kaolin, calcined)

CAS no.: 1214268-39-9 (Siliceous Earth, calcined)
CAS no.: 7631-86-9 (silica), 92704-41-1 (kaolin, calcined)

Gloxil matt SL

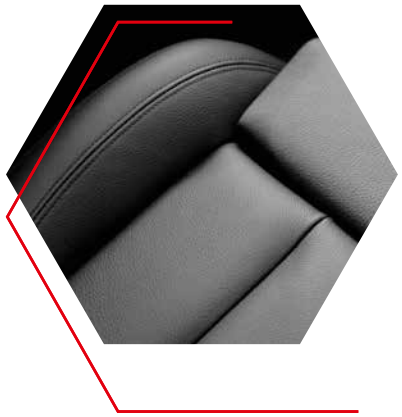
Gloxil matt SL is the first functional filler from the Tailored Filler Solutions product line. It's a 15% aqueous silica dispersion modified with special additives adapted to the matting agent and the intended application. The formation of films from the dispersion improves the incorporation of the matting agent particles. This results in films with good water and stain resistance as well as excellent matting properties.

Product characteristic	Unit	**Gloxil** matt SL
Particle size D_{50}	µm	8–11
pH value		6–7.5
Residue > 40 µm	mg/kg	< 5
Silica content	%	15
Appearance		white, pasty

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

Applications of Gloxil matt SL

- 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



Advantages for users

- > 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)

Product	Paper bag	EVA-bag	Big Bag Type 1/ Type 2/Type 3	Bulk
Sillitin				
Sillitin V 85	25 kg	10 to 25 kg	≤ 750/850/1200 kg	≤ 25 t
Sillitin V 88	25 kg	10 to 25 kg	≤ 750/850/1200 kg	≤ 25 t
Sillitin N 75	25 kg	10 to 25 kg	≤ 750/850/1200 kg	≤ 25 t
Sillitin N 85	25 kg	10 to 25 kg	≤ 750/850/1200 kg	≤ 25 t
Sillitin N 87	25 kg	10 to 25 kg	≤ 750/850/1200 kg	≤ 25 t
Sillitin Z 86	25 kg	10 to 20 kg	≤ 600/750/1000 kg	≤ 22 t
Sillitin Z 89	25 kg	10 to 20 kg	≤ 550/700/900 kg	≤ 22 t
Sillitin P 87	25 kg	10 to 20 kg	≤ 550/700/900 kg	≤ 22 t
Puriss				
Sillitin puriss	25 kg	–	–	–
Sillitin P 87 puriss	20 kg	–	–	–
Aktisil				
Aktisil AM	25 kg	10 to 20 kg	≤ 550/700/900 kg	–
Aktisil MAM-	25 kg	10 to 25 kg	≤ 550/700/900 kg	–
Aktisil PF 216	25 kg	10 to 20 kg	≤ 550/700/900 kg	–
Aktisil PF 777	25 kg	10 to 20 kg	≤ 550/700/900 kg	–
Aktisil Q	25 kg	10 to 25 kg	≤ 550/700/900 kg	–
Aktisil VM 56	25 kg	10 to 20 kg	≤ 550/700/900 kg	≤ 24 t
Aktisil VM 56/89	25 kg	10 to 20 kg	≤ 550/700/900 kg	–

Product	Paper bag	EVA-bag	Big Bag Type 1/ Type 2/Type 3	Bulk
Silfit				
Silfit Z 91	25 kg	10 to 20 kg	≤ 600/750/900 kg	on request
Aktifit				
Aktifit AM	25 kg	on request	≤ 600/750/900 kg	on request
Aktifit PF 111	25 kg	on request	on request	–
Aktifit PF 115	25 kg	on request	on request	–
Aktifit Q	25 kg	on request	on request	–
Aktifit VM	25 kg	on request	≤ 550/900/– kg	–
Gloxil				
Gloxil matt SL	on request			

Special packaging and sizes are available on request.

Product characteristic		Testing method
Color values	L* a* b*	acc. to CIELAB
Particle size	D_{50} D_{97}	acc. to ISO 13320
Residue	> 40 µm	acc. to DIN EN ISO 787 part 18
Volatile matter at 105 °C		acc. to DIN EN ISO 787 part 2
Density Bulk density Tamped density		acc. to DIN EN ISO 787 part 10 acc. to DIN ISO 903-1976 acc. to DIN EN ISO 787 part 11
Spec. surface area (BET) Oil absorption		acc. to DIN ISO 9277 acc. to DIN EN ISO 787 part 5
Water absorption		acc. to Baumann
Hardness silica/kaolinite Abrasivity		acc. to Mohs acc. to Einlehner
Refractive index n		sin α/sin β
Water solubility Acid solubility		acc. to DIN EN ISO 787 part 3 acc. to DIN 53 770 (0.1 N HCl)
pH value		acc. to DIN EN ISO 787 part 9
Chemical analysis:	SiO_2 Al_2O_3 Fe_2O_3	acc. to DIN 51001 (RFA)
Mineralogical composition:	Corpuscular silica Amorphous mineral phases Kaolinite and other minerals	based on X-ray diffraction pattern analysis combined with Rietveld
Equilibrium moisture content at 25 °C and 50% relative humidity and 80% relative humidity and 90% relative humidity		following DIN 66138
Dispersion time in ester plasticizer		UGR-PV/PT/67

To find out more about the applications, close the brochure now and turn it so that the application section is in front of you.

Neuburg
Siliceous Earth
Product information

Paints and varnishes
Reactive resins
Adhesives and sealants
Applications

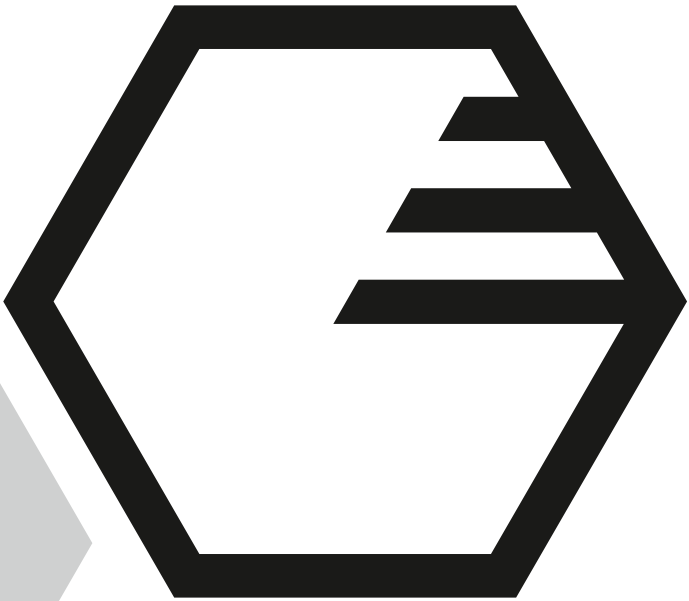
HOFFMANN MINERAL®

We supply material for good ideas

Functional fillers

Paints and varnishes
Reactive resins
Adhesives and sealants

Applications



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Topcoat ACE	15	Copyright (c) 2020 bogdanhoda/ Shutterstock
Powder coatings	16	Wiski – Fotolia
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www.hoffmann-mineral.com

Properties of Neuburg Siliceous Earth	**Advantages for users**
easy and rapid incorporation, excellent dispersion properties (especially puriss products)	> improved processability and faster paint production
very low sedimentation, no hard sediment	> enhanced product handling
good pigment dispersion (spacer effect)	> improved dispersion and pigment distribution possible, thereby potential for cost reduction
good rheological properties (shear thinning, thixotropic)	> adjustable rheology, individually possible depending on product selection
good transparency in clear coatings	> cost reduction due to lower binder demand, prerequisite for improvement in abrasion resistance and matting
adjustable matting effect or degree of gloss	> depending on product selection, degree of gloss or matting can be individually chosen
very fast drying	> improved and faster processability, reduction of working time on site
easy and rapid sanding	> effective post-processing, cost optimization
very low electrical conductivity, no buffer effect	> no disturbing salts/electrolytes, thereby good stability of aqueous formulations and pigment pastes for electrophoresis applications
excellent edge covering	> more efficient coating in corrosion protection, cost optimization
excellent stone-chipping resistance	> high durability
good mechanical properties	> high durability
excellent scratch resistance, abrasion resistance	> high durability

Properties of Neuburg Siliceous Earth	**Advantages for users**
good chemical resistance	> high resistance to aggressive media
good corrosion protection/weather resistance	> extended resistance to environmental influences
surface treatment possible	> good integration into the polymer matrix, adjustable rheology control
high purity	> also suitable for food contact including drinking water applications
very low carbon footprint	> significant reduction of the carbon footprint of paints and varnishes

Properties of Calcined Neuburg Siliceous Earth	**Advantages for users**
low moisture, low moisture absorption	> also usable for moisture-curing systems, good stability
very high brightness and color neutrality	> allows for transparent or white products without yellowing, increase in hiding power or reduction of the pigment content
outstanding dispersion properties (like puriss products)	> simple and fast paint production possible
reduced influence on certain curing reactions	> fast reaction start, quick and complete reaction, less catalyst required
reduced interaction of filler particles	> lower viscosity, good leveling

Aktisil | Aktifit

These special fillers are based on Neuburg Siliceous Earth, the surface of which is treated with additives.

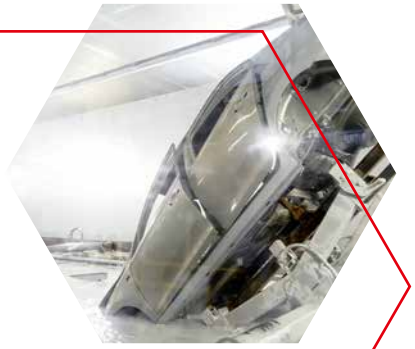
The Aktisil and Aktifit products have largely functional groups that enable covalent bonds or intensive interaction with the polymer matrix and thereby achieve control and improvement of the thin-film coating properties.

Following properties can be significantly influenced through functionalization: wetting, viscosity, yield point, leveling, gloss, reaction rate, hardness, adhesion, abrasion resistance, water absorption, water resistance, transparency, corrosion protection, chemical resistance.

Product name	Application
Aktisil AM	primers, clear and pigmented coatings with low requirements for color neutrality, powder coatings (functional epoxies, FBE), OEM primer-surfacer water-based, anti-corrosion coatings, also water-based, black direct-to-metal (DTM)
Aktisil MAM	dispersion paints with outstanding cleanability, primers, clear and pigmented coatings with high requirements for color neutrality, very easily dispersible, good leveling in mat powder coatings, very good matting effect and abrasion resistance, radically cured systems like UV wood coatings etc.
Aktisil PF 777	rheology control, strongly shear thinning, thixotropic, high yield point/ stability/non-sagging, very good adhesion; anti-corrosion coatings, adhesion primer (also water-based), generally hydrophobic coatings
Aktisil VM 56	primers, clear and pigmented coatings with low requirements for color neutrality, radically cured systems like UV coatings etc.
Aktisil VM 56/89	same as VM 56, but for higher color neutrality requirements and slightly improved dispersion

Product name	Application
Aktifit AM	similar to Aktisil AM, but with highest color neutrality and improved dispersion performance, often with lower viscosity; coil coatings (primer, back coat, top coats), OEM primer-surfacer water-based, powder coatings, anti-corrosion coatings (primers and top coats), clear coatings
Aktifit PF 111	similar to PF 777, but with highest color neutrality and improved dispersion performance, better leveling, very low moisture content with no increase in humid climatic conditions; moisture-curing coatings like 1K PU, anti-corrosion coatings and adhesion primers (also water-based), Cathodic Electrodeposition (CED), generally hydrophobic coatings
Aktifit PF 115	similar to Aktifit AM, but hydrophobic, very low moisture content without increase under humid climatic conditions; often higher viscosity at low shear rates, black Cathodic Electrodeposition (CED), also water-based anti-corrosion coatings, powder coatings polyester/primid
Aktifit Q	similar to MAM, but with higher gloss and highest color neutrality, improved dispersion properties, hydrophobic, very low moisture content without increase under humid climatic conditions; moisture-curing coatings like 1K PU, radically cured systems; like clear and pigmented UV coatings, 3D printing, etc., dispersion-based clear wood coatings and coatings for concrete with good water resistance, water-based anti-corrosion coatings based on acrylates as single layer direct-to-metal (DTM) coating
Aktifit VM	similar to VM 56 and VM 56/89, but with highest color neutrality and improved dispersion performance, hydrophobic, very low moisture content with no increase in humid climatic condition; often with lower viscosity; moisture-curing coatings like 1K PU, radically curing systems like clear and pigmented UV coatings etc., dispersion-based clear coatings for wood and concrete coatings with good water resistance

Metal coatings



Electrophoretic coatings

Advantages:

- small particle size
- low grit content (oversized particles)
- excellent dispersion properties
- very low sedimentation, no hard sediment
- very low electrical conductivity, no disturbing electrolytes
- good flexibility (Erichsen cupping, impact)
- potential for decreasing the titanium dioxide concentration, especially in low-density systems

	Sillitin Z 86	Sillitin P 87	Sillitin Z 89	Silfit Z 91	Aktisil PF 777	Aktifit PF 111	Aktifit PF 115
Dispersion	●●●	●●●	●●●	●●●	●●	●●●	●●●
Stability of the pigment paste, even at higher storage temperature[1)]	●●●	●●●	●●●	●●	●●●●	●●●●	●●●●
Sedimentation stability	●●●	●●●●	●●●	●●●	●●●	●●●	●●●
Leveling	●●●	●●●	●●●	●●●	●●●	●●●●	●●●
Gloss	●●●	●●●●	●●●	●●●	●●●	●●●	●●
Color neutrality in light/ white formulations	●●	●●	●●●	●●●●	●●	●●●●	●●●●
Edge covering	●●●	●●●●	●●●	●●●	●●●	●●●	●●●
Edge covering and edge corrosion protection[1)]	●●●	●●●●	●●●	●●●●	●●●	●●●	●●●
Flexibility (Impact Test)	●●●	●●●	●●●	●●●●	●●●	●●●	●●●●
Flexibility (Impact Test)[1)]	●●	●●	●●	●●●●	●●	●●	●●●●
Flexibility (Low-temperature Impact Test)	●●●	●●●	●●●	●●●	●●●●	●●●	●●●

[1)] typical in formulations for black cathodic electrodeposition (CED)

low ● high ●●●● optimum

Coil Coating

Advantages:

- small particle size
- excellent dispersion properties
- low sedimentation
- good leveling
- good adhesion
- good scratch resistance
- retention of good weathering resistance
- retention of good flexibility
- slight matting effect (depending on formulation and dosage)
- improved hiding power/opacity or partial replacement of titanium dioxide (top coats)
- partial replacement of corrosion protection pigments (primers and back coats)

Top coats:	Silfit Z 91	Aktifit AM
Titanium dioxide extender/retention of hiding power	●●●●	●●●●
Hardness	●●●	●●●●
Scratch resistance	●●●	●●●●

Primers and back coats:	Silfit Z 91[1)]	Aktifit AM[1)]
deaeration and leveling/suitability for the direct roller coating process	●●●	●●●●
Moisture resistance	●●●	●●●●

[1)] up to 50% replacement of the corrosion protection pigment possible

Metal coatings

Primer-surfacer

Advantages:

- small particle size
- low grit content (oversized particles)
- excellent dispersion properties
- very low electrical conductivity, no disturbing electrolytes
- good sanding, low visibility of sanding marks
- improved appearance of subsequent coating layers
- good corrosion protection
- excellent stone-chipping resistance
- gloss at high volume solids
- good storage and sedimentation stability
- potential to reduce the anti-corrosive pigments

Generally:	Sillitin Z 86	Sillitin Z 89	Silfit Z 91
Bright coatings/color neutrality	••	•••	••••

Solvent-based and car repair:	Sillitin P 87	Sillitin P 87 puriss
Dispersion	••	••••
Sedimentation stability	••••	••••
Reduction of sanding marks	••••	••••

Water-based systems and automotive OEM:	Aktisil AM	Aktifit AM
Gloss at high volume solids content[1)]	••••	••••
Stone chip impact resistance	••••	••••
Bright coatings/color neutrality	••	••••

[1)] especially in combination with Disperbyk 111

Water based systems for train and industry:	Aktisil AM[1)]	Aktifit AM[1)]
Viscosity	••••	••
Storage stability	••••	••••
Sedimentation stability	••••	•••
Bright coatings/color neutrality	••	••••
Wet adhesion	••••	••
Reduced blistering at salt spray test	••••	••••
Corrosion protection	••••	••••
Manual sandability	••••	•••
Sandability for machine grinding at high rotation speed	•••	••••

[1)] good corrosion protection even without any active anti-corrosion pigments

low • high •••• optimum

Metal coatings

Corrosion protection coatings

Advantages:

- excellent dispersion properties
- good rheological properties
- very low sedimentation
- low abrasivity
- fast drying
- good weathering resistance
- good corrosion protection
- good chemical resistance, especially against acids
- excellent abrasion resistance
- potential for reducing the corrosion protection pigment

Generally in corrosion protection coatings and polyaspartic systems:	Sillitin V 85	Sillitin Z 86	Sillitin Z 89	Aktisil PF 777	Aktifit PF 111
Viscosity	•	••	••	•••	•••
Sag resistance on vertical surfaces	•	••	••	••••	••••
Gloss	••••[1]	•••	•••	•••	•••
Adhesion	•••	•••	•••	••••[2]	••••
Corrosion protection/salt spray test	•••	••••[1]	••••[1]	••••	••••
Corrosion protection/humidity test	••	•••	•••	••••[2]	••••
Chemical resistance	•••	•••	•••	••••	••••
Bright coatings/color neutrality	••	••	•••	••	••••

[1] only in polyaspartic systems
[2] also on non-blasted steel

low • high •••• optimum

Epoxy systems, solvent-based:	Sillitin Z 86	Aktisil AM[1]	Aktisil PF 777[2]	Aktifit PF 111
Dispersion	•••	•••	•••	••••
Sedimentation stability	•••	•••	••••	••••
Leveling	••••	••••	••	•••
Sag resistance/stability	•••	•••	••••	••••
Bright coatings/color neutrality	••	••	••	••••
Hardness (König pendulum)	••	•••	••••	••••
Adhesion	•••	••••[1]	••••[2]	••••
Corrosion protection	•••	••••[1]	••••[2]	••••
Chemical resistance	•••	••••	••••	••••

[1] optimum corrosion protection and adhesion on non-blasted steel even by reduced zinc phosphate concentration with the addition of amino silane
[2] good corrosion protection and adhesion on non-blasted steel even by reduced zinc phosphate concentration with the addition of amino silane

Water-based primers, acrylate based with active anti-corrosion pigment (Alberdingk):	Aktifit PF 111	Aktifit PF 115
Viscosity stability during storage	••••	••••
Leveling	••••	••••
Adhesion at non-blasted steel	••••	••••
Avoidance of blistering in the condensation water test	••••	••••
Wet and intercoat adhesion	•••	••••
Corrosion protection/salt spray test, minimal delamination and rust creep at the scribe	•••	••••
Efficiency in thin and single-layer applications	•••	••••

Water-based direct-to-metal (DTM) single-layer coatings on hydrophobic acrylate dispersion base (Alberdingk), with corrosion inhibitor:	Sillitin Z 89	Aktifit Q[1]
Cost optimization	••••	••
Adhesion	••••	••••
Bright coatings/color neutrality	•••	••••
Corrosion protection	•••	••••

[1] optimal barrier properties, as it is hydrophobic

Metal coatings

Corrosion protection coatings

Direct-to-metal (DTM) single-layer coating, white based on acrylic dispersion (Covestro), without anti-corrosion pigment or inhibitor:	TP 2022060 [1]
Gloss after partial replacement of titanium dioxide and without anti-corrosion pigment	••••
Adhesion	••••
Wet and dry adhesion, salt spray test, and humidity test	••••
Corrosion protection, salt spray test, and humidity test	••••

[1] optimum barrier properties, due to hydrophobicity

Water-based, black direct-to-metal (DTM) one-coat acrylic dispersion-based coatings:	Aktisil AM
Rheological storage stable filler pastes	••••
Sedimentation stability	••••
Adhesion	••••
Corrosion protection	••••

Specially for epoxy, water-based, primer grey, e.g., for trains of the Deutsche Bahn AG:	Sillitin V 85	Aktisil AM
Homogeneity during storage	•••	••••
Sedimentation stability	••••	••••
Rheology/shear thinning	••	••••
Adhesion	••••	••••
Flexibility/Erichsen cupping	••••	•••
Corrosion protection	••••	••••

Water-based epoxy system, clear coat without corrosion protection pigments:	Sillitin Z 89	Silfit Z 91	Aktisil AM	TP 2008037
Bright coatings/color neutrality	•••	••••	••	•••
Reduction/avoiding of milky-white blushing after humidity test	••	••••	••	••
Corrosion protection salt spray test, reduction of delamination at the scribe	•••	•••	••••	••••

low • high •••• optimum

Topcoat, Polyurethane, high solid, white

Advantages:

- good rheological properties
- good chemical resistance
- very low sedimentation
- improved hiding power or partial replacement of titanium dioxide
- retention of good weathering resistance

	Aktifit PF 111
Rheological balance, good leveling, and sedimentation stability	••••

Metal coatings

Powder coatings

Advantages:

- excellent dispersion properties
- low abrasivity
- good edge covering
- good corrosion protection, especially low delamination and rust creep
- scratch resistance
- abrasion resistance
- flexibility (Erichsen cupping, impact)
- good chemical resistance, especially against hot water
- improved hiding power or partial replacement of titanium dioxide

Polyester/TGIC and Hybrid (Epoxy-Polyester):	Silfit Z 91
Titanium dioxide extender	••••
Increase in productivity	••••
Scratch resistance	•••
Leveling	•••
Corrosion protection, reduction of blistering and delamination at the scribe[1)]	••••
Weathering resistance[1)]	•••

[1)] in polyester/TGIC

Epoxy (FBE):	Sillitin N 75	Sillitin Z 86	Sillitin Z 89	puriss variants	Aktisil AM
Bright coatings/ color neutrality	•	••	•••	depending on the product	••
Abrasivity	•••	••	••	•	••
Hot water resistance	•••	•••	•••	•••	••••

UV-cured: powder coatings according to requirements:	Silfit Z 91	Sillitin V 88	Aktisil MAM	Aktifit Q
Gloss	•••	••	••	•••
Matting	••	•••	•••	••
Abrasion resistance	•••	•••	••••	••••
Color neutrality	••••	•••	•••	••••

Polyester/HAA (Primid):	Silfit Z 91	Sillitin V 88	Aktifit PF 115
Gloss	•••	•	••••
Gloss haze/haze	•••	••••	•
Flexibility/direct impact	••••	••••	••••
Flexibility/reverse impact	••••	•••	••••
Stain resistance/water spot resistance	••••	••••	••••
Corrosion protection salt spray test, reduction of delamination at the scribe	••••	••••	••••
Weathering resistance	•••	•••	•••

low • high •••• optimum

Wood and film coatings

UV/excimer curing coatings and clear coatings for wood and films

Advantages:

- adjustable rheology through choice of product
- low sedimentation
- no hard sediment
- low abrasivity
- scratch resistance
- abrasion resistance
- very good transparency
- matting effect
- no effect on UV-curing

	Silitin V 88	Silitin Z 89	Silitin Z 89 puriss	Aktisil VM 56/89	Aktisil MAM	Silfit Z 91	Aktifit VM	Aktifit Q
Dispersion	●●●	●●	●●●●	●●	●●●	●●●●	●●●●	●●●●
Viscosity	●	●●●	●●●	●●●	●	●●	●	●
Sedimentation stability	●	●●●●	●●●●	●●●●	●	●●	●●	●●
Abrasion resistance	●●●	●●	●●	●●●	●●●●	●●●	●●●●	●●●●
Matting	●●●●	●●	●●	●●	●●●●	●●	●●	●●
Gloss	●	●●●	●●●	●●●	●	●●●	●●●	●●●
Color neutrality	●●●●	●●●	●●●	●●●	●●●●	●●●●	●●●●	●●●●
Transparency	●●●●	●●●	●●●	●●●	●●●●	●●	●●	●●
Hiding power[1]							●●●●	●●●●
Suitable for excimer	●●●●				●●●●			●●●●
Excimer, Martindale test, homogeneity of matting	●●●●				●●●●			●●●●

[1] improvement of hiding power in white-pigmented topcoats and at the same time good curing/UV curing

low ● high ●●●● optimum

Dispersion-based clear wood coatings

Advantages:

- easy dosing and incorporation, hardly any dust formation
- excellent dispersion properties
- little to no foam formation
- better sanding after shorter drying time
- improved abrasion resistance
- anti-blocking effect
- good transparency
- excellent matting effect
- resistance to water and stains
- good appearance on dark woods, wood grain enhancement

	Silitin V 88	Silitin Z 89	Aktisil MAM	Silfit Z 91[1]	Aktifit Q[1]	Gloxil matt SL[2]
Dispersion	●●●●	●●●	●●	●●●●	●●	
Sedimentation stability	●●	●●●●	●●	●●●	●●●	●●●●
Anti blocking	●●●●	●●●	●●●●	●●●	●●●	●●●●
Sanding	●●●●	●●●●	●●●	●●●	●●●	●●
Abrasion resistance	●●●	●●●	●●●●	●●●	●●●●	●●●
Matting	●●●●	●●●	●●●●	●●●	●●●	●●●●
Gloss	●	●●●	●	●●	●●	●
Color neutrality	●●●	●●●	●●●	●●●●	●●●●	●●●●
Transparency	●●●●	●●●●	●●●●	●●●	●●●	●●●●
Water/stain resistance	●●	●●	●●●●	●●	●●●●	●●●●
Metal marking resistance	●	●●	●●	●●	●●	●●●●

[1] not glazed white, for pigmented paints

[2] The liquid slurry offers dust-free processing and a reduction in mixing time and thus production time. There is also the possibility of subsequent matting.

Exterior top coats and breathable primers

Advantages:

- excellent dispersion properties
- balanced rheology
- very low sedimentation
- fast drying
- water vapor permeability

	Sillitin Z 89	Sillitin Z 89 puriss
Dispersion[1]	●●●	●●●●

[1] especially in solvent-borne systems

low ● high ●●●● optimum

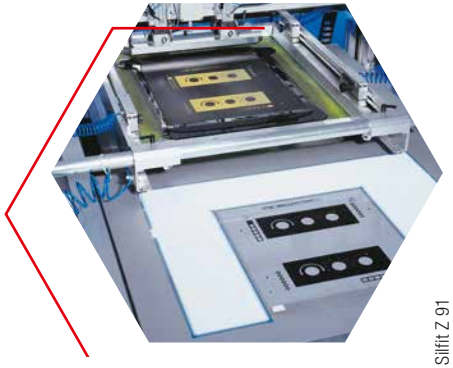
Plastic topcoats

Advantages:

- low sedimentation
- good/improved hiding power/opacity
- partial titanium dioxide replacement
- excellent dispersion properties
- very high brightness and color neutrality
- potential for saving formulation costs
- high gloss retention, very low haze

	Silfit Z 91	Aktifit PF 111[1]
Dispersion	●●●	●●●
Bright coatings/color neutrality	●●●●	●●●●
Reduction of sagging/stability[1]	●●●	●●●●
Titanium dioxide extender	●●●●	●●●●

[1] possible replacement of rheological additive, advantage of very low haze



Screen printing inks

Advantages:

- excellent dispersion properties
- good rheological properties, improved ink transfer
- very good edge definition with high resolution printing

	Silfit Z 91	Aktifit PF 111[1]
Dispersion	●●●●	●●●●
Bright coatings/color neutrality	●●●●	●●●●
Reduction of sagging/stability[1]	●●●	●●●●
Ink transfer and edge definition	●●●	●●●●

[1] possible replacement of rheological additives

Plastic coatings

Soft-feel coatings

Advantages:

- low sedimentation
- excellent matting
- extended retention of the soft-feel effect
- good chemical resistance
- good abrasion resistance
- good transparency
- good adhesion

	Sillitin V 85	Sillitin V 88	Sillitin Z 86	Sillitin Z 89	Aktifit PF 115
Matting	••••	••••	••	••	•
Bright coatings/color neutrality	••	•••	••	•••	••••
Sedimentation stability	•	•	•••	•••	••
Surface roughness	•••	•••	•	•	•
Transparency	•••	•••	•••	•••	••••
Adhesion	••	••	••	••	•••
Resistances (e.g. suntan cream)	••	••	••	••	•••
Partial replacement of matting agent	••	••	•	•	•••

low • high •••• optimum

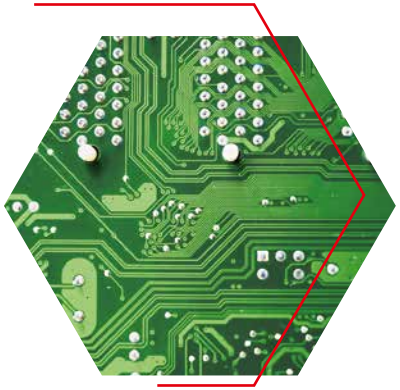
Plastic primers

Advantages:

- very low sedimentation
- balanced rheology with only minimal sagging and good leveling
- good adhesion

	Sillitin Z 86	Aktisil PF 777 [1]	Aktifit PF 111 [1]
Dispersion	•••	•••	••••
Bright coatings/color neutrality	•••	•••	••••
Reduction of sagging/stability [1]	••	••••	••••
Adhesion to plastics	•••	••••	••••
Leveling	••••	••	•••

[1] possible replacement of rheological additives



Solder resist inks

Advantages:

- particle size spectrum meeting requirements
- no disturbing electrolytes
- excellent dispersion properties
- low sedimentation
- balanced rheology
- good edge covering
- no effect on UV-curing
- superior chemical resistance

	Sillitin Z 89 puriss	Sillitin P 87	Sillitin P 87 puriss	Aktisil AM	Aktisil MAM
Dispersion	••••	••	••••	••	•••
Viscosity at low shear rates	•••	••••	••••	••	•••
Especially suitable for thin layers	•••	•••	••••	•••	••
Adhesion	•••	•••	•••	••••	•••
Low-viscosity UV-curing systems	•••	•••	•••	•••	••••

Road marking paints

Advantages:

- very low sedimentation
- fast drying
- improved hiding power (opacity) or partial replacement of titanium dioxide
- abrasion resistance
- night visibility/improved anchoring of reflecting glass beads
- improved early rain resistance

	Sillitin V 88	Sillitin Z 89	Silfit Z 91	Sillitin N 75 [1]	TP 2023032 [2]
Viscosity	••	•••	••		
Bright coatings/color neutrality	•••	•••	••••		
Titanium dioxide extender	••	•••	••••		
Yellow marking paints [1]				••••	••••

[1] Sillitin N 75 is well suited as a filler in yellow marking paints.
[2] TP 2023032 is suitable as an extender for yellow pigments.

Dispersion coatings for concrete for roofs and balconies

Advantages:

- balanced rheology
- fast drying, even with thick layers and humid climate
- abrasion resistance

	Sillitin Z 89	Silfit Z 91	Aktisil MAM	Aktifit Q [1]
Viscosity at low shear rates	•••	••	•	•
Sedimentation stability	••••	••	•	••
Matting	••	••	••••	••
Bright coatings/color neutrality	•••	••••	•••	••••
Water absorption	•••	••	•	•
Abrasion resistance	••	••	••••	••••

[1] hydrophobic

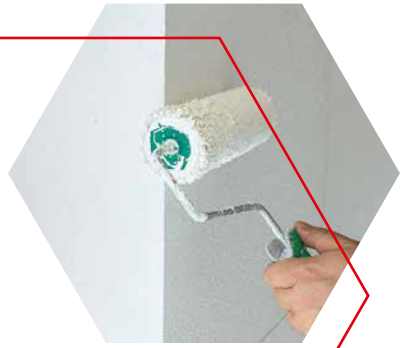
low • high •••• optimum

Construction coatings and decorative paints

Interior dispersion paints

Advantages:

- excellent dispersion properties
- matting
- no sedimentation
- improved hiding power or partial replacement of TiO_2/pigment
- good wet-scrub resistance



	Sillitin V 88	Sillitin Z 89	Silfit Z 91	Aktisil MAM	Sillitin N 75 [1]	TP 2023032 [2]
Matting	••••	••	••	••••		
Bright coatings/color neutrality	•••	•••	••••	•••		
Wet-scrub resistance	•••	••	••	••••		
Stain resistance	••	••	••	••••		
Titanium dioxide extender	••	•••	••••	••		
Water absorption	•••	•••	•••	•		
Colors in yellow to brown, earth tones [1, 2]					••••	•••

[1] Sillitin N 75 is well suited as a filler in yellow marking paints.
[2] TP 2023032 is suitable as an extender for yellow pigments.

low • high •••• optimum

Interior dispersion paints with special properties

Advantages:

- cleanability
- resistance against cleaning agents and disinfectants
- wet-scrub resistance
- good burnish resistance
- also suitable for transparent coatings

	Aktisil MAM	Aktifit Q [1]	Gloxil matt SL [2]
Matting	••••	••	••••
Gloss	•	•••	•
Bright coatings/color neutrality	•••	••••	••••
Burnish resistance	••••	•••	••••
Wet-scrub resistance	••••	•••	•••
Soiling resistance/cleanability	••••	•••	••••

[1] hydrophobic
[2] The liquid slurry offers a dust-free option for subsequent matting and specifically for reducing shrinkage cracks at high layer thicknesses in corners and on edges.

Construction coatings and decorative paints

Façade paints

Advantages:

- excellent dispersion properties
- very low sedimentation
- good abrasion resistance
- matting
- improved hiding power (opacity) or partial replacement of titanium dioxide
- water vapor permeability

	Sillitin V 88	Sillitin Z 89	Silfit Z 91	Aktisil MAM	Sillitin N 75 [1]	TP 2023032 [2]
Matting	••••	••	••	••••		
Bright coatings/color neutrality	•••	•••	••••	•••		
Titanium dioxide extender	••	•••	••••	••		
Water absorption	•••	•••	•••	•		
Colors in yellow to brown, earth tones [1), 2)]					••••	•••

[1)] Sillitin N 75 is well suited as a filler in yellow marking paints.
[2)] TP 2023032 is suitable as an extender for yellow pigments.

Silicate and dispersion silicate paints

Advantages:

- excellent dispersion properties
- high rheological stability
- very low or no sedimentation
- good abrasion resistance
- water vapor permeability
- silicifiable with alkali silicate solution
- improved hiding power (opacity) or partial replacement of titanium dioxide

	Sillitin V 88	Sillitin Z 89	Silfit Z 91
Viscosity	•	•••	•
Rheological stability	••••	•••	•••
Bright coatings/color neutrality	•••	•••	••••
Titanium dioxide extender	••	•••	••••
Water absorption	•	•••	•

low • high •••• optimum

Properties of Neuburg Siliceous Earth	**Advantages for users**
good and rapid incorporation, excellent dispersion properties (especially puriss products)	> better processability and faster production
very low sedimentation, no hard sediment	> improved product handling
good pigment dispersion (spacer effect)	> improved dispersion and pigment distribution possible, potential for cost reduction
good rheological properties (shear thinning, thixotropic)	> adjustable rheology, individually according to product selection
adjustable matting effect or gloss level	> depending on product selection, gloss level or matting can be chosen individually
very fast drying	> better and faster processability, reduction of working time on site
good mechanical properties	> excellent tensile strength, lap shear strength, and tear resistance
good chemical resistance	> high resistance to aggressive substances
good corrosion protection, weather stability	> extended resistance to environmental influences
surface treatment possible	> good interaction into the polymer matrix, adjustable rheology control
high purity	> also suitable for food contact including drinking water
very low CO_2-footprint	> significant reduction of the carbon footprint of reactive resins, adhesives and sealants

Properties of Calcined Neuburg Siliceous Earth	**Advantages for users**
low moisture content, low moisture absorption	> suitable for moisture-curing systems, good stability
very high brightness and color neutrality	> enables transparent or white products without yellow-tint, reduces pigment content
excellent dispersion properties (like puriss products)	> simple and fast production possible
reduced influence on certain curing reactions	> fast reaction start, quick and complete reaction, less catalyst required
reduced interaction between filler particles	> lower viscosity

Aktisil | Aktifit

These special fillers are based on Neuburg Siliceous Earth, the surface of which is treated with additives.

The Aktisil and Aktifit products have largely functional groups that enable covalent bonds or intensive interaction with the polymer matrix and thereby achieve control and improvement of the properties.

Product name	Application
Aktisil AM	2K PU applications with higher requirements for mechanical properties, abrasion resistance and chemical resistance, for example for roof and flooring membranes, concrete pipe seals, pipeline coating, sealing membranes, mortar and grouting with improved chemical resistance, adhesive tapes (in adhesive layer), plastisols
Aktisil MAM	radically curing reactive resins and UV-curing adhesives
Aktisil PF 216	polysulfide sealants, sealing compounds, adhesive tapes (in adhesive layer)
Aktisil PF 777	products requiring a hydrophobic filler to minimize water absorption or if a higher rheological activity of the filler is required; non-sagging 2K PU applications with improved water resistance, for example for roof and flooring membranes, pipe seals, 2K PU adhesives, mortar and grouting with improved water resistance, adhesives for wind turbine rotor blades, non-sagging 2K epoxy systems, MS and STP systems with improved water and acid resistance, plastisols
Aktisil VM 56	radically curing reactive resins and UV-curing adhesives, adhesive tapes (in adhesive layer), plastisols
Aktisil VM 56/89	as VM 56 but for higher color neutrality requirements and slightly improved dispersion performance

Following properties can be significantly influenced: wetting, viscosity, yield point, reaction time/catalyst requirement, tensile strength, tear resistance, compression set, hardness, adhesive strength, shear adhesion at high temperatures (SAFT), abrasion resistance, water absorption, water resistance, transparency, corrosion protection, chemical resistance.

Product name	Application
Aktifit AM	similar to Aktisil AM, but with highest color neutrality and improved dispersion performance, often with lower viscosity; moisture-curing STP adhesives for parquet, windscreens and general industrial applications, coatings for pipelines with drinking water contact, 2K PU roller coverings, 2K PU sealants, seals and sealing membranes
Aktifit PF 111	similar to PF 777, but with highest color neutrality and improved dispersion performance, very low moisture content with no increase in humid climatic conditions; gel coats with improved thixotropy, 1K and 2K PU applications, adhesive tapes (in adhesive layer), non-sagging moisture-curing STP adhesives and sealants for parquet, windscreens and general industrial applications with excellent hot water resistance and adhesive strength on aluminum, plastisols
Aktifit PF 115	similar to AKTIFIT AM, but hydrophobic, very low moisture content, 2K PU thick film coatings, e. g. pipelines, adhesives based on STP-U and 1K PU
Aktifit Q	similar to VM 56 and VM 56/89, but with highest color neutrality and improved dispersion properties, hydrophobic, very low moisture content without increase under humid climatic conditions, often lower viscosity; generally products that require an extremely hydrophobic filler for minimizing water absorption without higher rheological activity, humidity-sensitive systems that are manufactured without pre-drying of the filler, e. g. MS and STP systems, 1K and 2K PU applications, gel coats with improved water resistance, adhesive tapes (in adhesive layer), moisture-curing STP adhesives, 3D printing SLA
Aktifit VM	similar to VM 56 and VM 56/89, but with highest color neutrality and improved dispersion performance, hydrophobic, very low moisture content with no increase in humid climatic conditions, often with lower viscosity; generally products requiring an extreme hydrophobic filler to minimize water absorption without higher rheological activity, systems sensitive to moisture which are produced without pre-drying the filler, e. g. MS and STP systems, 1K and 2K PU applications, gel coats with improved water resistance, adhesive tapes (in adhesive layer), moisture-curing STP adhesives for parquet, car windscreens and general industrial applications with excellent hot water resistance and adhesive strength on aluminum

Reactive resins

Gel coats

Advantages:

- excellent dispersion properties
- improves pigment dispersion (spacer effect)
- low sedimentation
- balanced rheology (good deaeration/ non-sagging)
- good weathering resistance
- good chemical resistance
- good water resistance
- good flexibility
- abrasion resistance

	Silitin Z 89 puriss	Silfit Z 91	Aktifit VM[1]	Aktifit Q[2]	Aktifit PF 111[1]
Bright coatings/color neutrality	●●●	●●●●	●●●●	●●●●	●●●●
Fast reaction start	●●	●●●●	●●●●	●●●●	●●●●
Water resistance	●●●	●●●	●●●●	●●●●	●●●●
Rheological activity (higher viscosity at low shear rates, yield point)	●●●	●●	●●	●●	●●●●

[1] hydrophobic
[2] higher polarity and reactivity due to methacrylic groups

low ● high ●●●● optimum

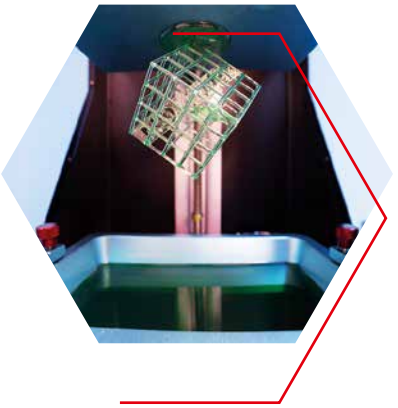
Acrylic sinks

Advantages:

- excellent dispersion properties
- low increase in viscosity
- high brightness
- high color neutrality
- improves pigment dispersion (spacer effect) and potential for partial pigment replacement
- thermal shock resistance
- scratch resistance
- abrasion resistance

	Silfit Z 91	Aktifit AM	Aktifit VM[1]	Aktifit Q[2]
Mechanics	●●●	●●●●	●●●●	●●●●
Scratch and abrasion resistance	●●●	●●●●	●●●●	●●●●
Stain resistance	●●●	●●●●	●●●	●●●

[1] hydrophobic
[2] higher polarity and reactivity due to methacrylic groups



3D-printing stereolithography (SLA), UV-curing

Advantages:

- despite fill level up to 20%:
- moderate increase in viscosity
- undisturbed UV crosslinking
- increase in stiffness and heat distortion temperature
- largely retention of tensile strength, elongation at break and impact strength

	Aktifit Q
Best combination of the mentioned properties	●●●●

Reactive resins

Industrial flooring

Advantages:

- very good dispersion properties
- good transparency in sealers
- anti-settlement additive for coarse fillers
- good processing properties, also with minimized additive content:
  - good leveling
  - good deaeration
  - good pigment stability
  - appearance of crossover-area of adjacent lines
- improved mechanical properties, also with minimized additive content:
  - tensile and compressive strength
  - tensile modulus
  - abrasion resistance
- good chemical resistance
- also suitable for food contact and drinking water applications (as per BfR and FDA regulations)

Self-levelling epoxy systems, solvent free and water-based:	Sillitin Z 86	Sillitin Z 89
Bright coatings/color neutrality	••	•••
Mechanics	•••	•••
Abrasion resistance	•••	•••

Transparent sealer (top coat) epoxy systems:	Sillitin Z 86 puriss	Sillitin Z 89 puriss	Silfit Z 91	Aktifit AM
Bright coatings/color neutrality	••	•••	••••	••••
Viscosity	•••	•••	••	••
Abrasion resistance	•••	•••	•••	••••

Self-leveling, polyaspartic, white:	Sillitin Z 89	Sillitin Z 89 puriss	Silfit Z 91	Aktifit AM
Dispersion	•••	••••	••••	••••
Viscosity	•••	•••	••	••
Rheological activity/thixotropy	•••	•••	••	••
Storage stability (sedimentation stability, homogeneity)	•••	•••	•••	•••
Brightness/color neutrality	•••	•••	••••	••••
Hiding power	••••	••••	••••	••••
Gloss	••••	••••	••••	••••
Haze	•	•	•	•
Abrasion resistance	••••	••••	••••	••••

low • high •••• optimum

Reactive resins

Mortar, grouting, coatings with the highest chemical resistance

Advantages:

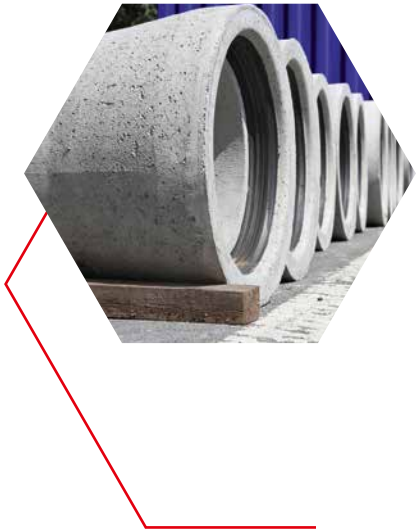
- selectable rheology (free-flowing to non-sagging)
- easy processing
- good mechanical properties (high strength)
- good chemical resistance
- also suitable for food contact and drinking water applications (as per BfR and FDA regulations)

	Sillitin Z 86	Sillitin Z 86 puriss	Silfit Z 91	Aktisil PF 777[1)]	Aktisil AM	Aktifit AM
Dispersion	●●●	●●●●	●●●●	●●●	●●●	●●●●
Bright coatings/color neutrality	●●	●●	●●●●	●●	●●	●●●●
Viscosity	●●●	●●●	●●	●●●	●●●	●●
Rheological activity (higher viscosity at low shear rates, yield point)	●●	●●	●●	●●●●	●●	●●
Acid resistance	●●●	●●●	●●●●	●●●	●●●	●●●●
Water resistance	●●●	●●●	●●●	●●●●	●●●	●●●
Chemical resistance	●●●	●●●	●●●	●●●	●●●●	●●●●

[1)] hydrophobic

low ● high ●●●● optimum

2K Polyurethane applications



Coatings, sealants, adhesives, tooling resins

Advantages:

- excellent dispersion properties
- selectable rheology (free-flowing to non-sagging)
- easy processing
- good mechanical properties:
  - tensile strength
  - tear resistance
  - elasticity/compression set
  - abrasion resistance
- good chemical resistance, especially against acids
- good water resistance
- also suitable for food contact and drinking water applications (as per BfR and FDA regulations)

Sports surfaces/sealers

Advantages:

- excellent dispersion properties
- easy processing
- good mechanical properties
- abrasion resistance
- transparency

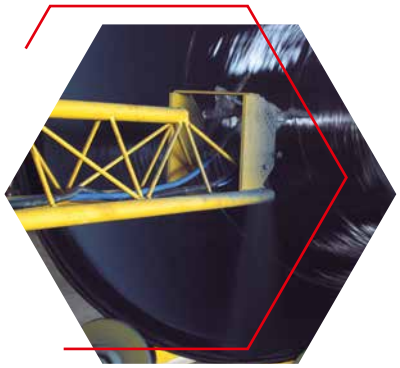
	Sillitin Z 86 or Z 89	Sillitin Z 86 puriss or Z 89 puriss	Silfit Z 91
Dispersion	●●●	●●●●	●●●●
Viscosity	●●●	●●●	●●
Bright and transparent/translucent coatings/color neutrality	●●/●●●	●●/●●●	●●●●
Crosslinking reactivity	●●●	●●●	●●●●

	Sillitin Z 86 or Z 89	Sillitin Z 86 puriss or Z 89 puriss	Sillitin P 87 puriss	Aktisil AM	Aktisil PF 777[1]	Silfit Z 91	Aktifit AM	Aktifit VM[1]	Aktifit Q[2]	Aktifit PF 111[1]	Aktifit PF 115[1]
Bright coatings/color neutrality	●●/●●●	●●/●●●	●●	●●	●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●
Dispersion	●●●	●●●●	●●●●	●●●	●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●
Viscosity	●●	●●	●●●	●●	●●	●	●	●	●	●	●
Rheological activity (higher viscosity at low shear rates, yield point)	●●	●●	●●	●●	●●●●	●	●	●	●	●●●●	●●●
Crosslinking reactivity	●●/●●●	●●/●●●	●●	●●●	●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●
Tensile strength	●●	●●●	●●●	●●●●	●●	●●●	●●●●	●●●	●●●	●●●	●●●●
Tear resistance	●●●	●●●	●●●●	●●●	●●●	●●	●●	●●	●●	●●	●●
Compression set	●●●	●●●	●●●	●	●●●	●●	●	●●	●●	●●	●
Abrasion resistance	●●●	●●●	●●●	●●●●	●●	●●●	●●●●	●●●	●●●	●●	●●●
Adhesion	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●
Chemical resistance	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●
Water resistance	●●●	●●●	●●●	●●●	●●●●	●●●	●●●	●●●●	●●●●	●●●●	●●●

[1] hydrophobic, low moisture absorption in humid climate
[2] increased polarity and reactivity due to methacrylic groups

low ● high ●●●● optimum

2K Polyurethane applications



Pipeline coating

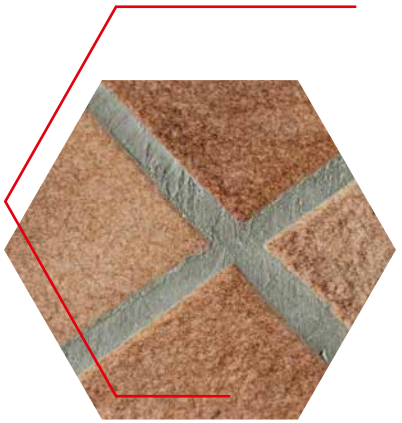
Advantages:

- excellent dispersion properties
- easy processing
- good mechanical properties
- abrasion resistance
- good corrosion protection properties
- good chemical resistance, especially against acids
- good water resistance
- also suitable for food contact and drinking water applications (as per BfR and FDA regulations)

	Sillitin Z 86 puriss	Silfit Z 91	Aktifit AM	Aktifit PF 115 [1]
Viscosity	••	••	••	••
Rheological activity (higher viscosity at low shear rates)	•	••	••	••••
Sedimentation stability	••••	•••	•••	••••
Bright coatings/color neutrality	••	••••	••••	••••
Tensile strength	••••	••••	••••	••••
Elongation at break	•••	••••	••••	••••
Impact strength	•••	•••	•••	••••
Abrasion resistance	•••	•••	••••	•••
Corrosion protection	•••	•••	••••	••••

[1] hydrophobic, therefore, low moisture absorption in humid climate

low • high •••• optimum



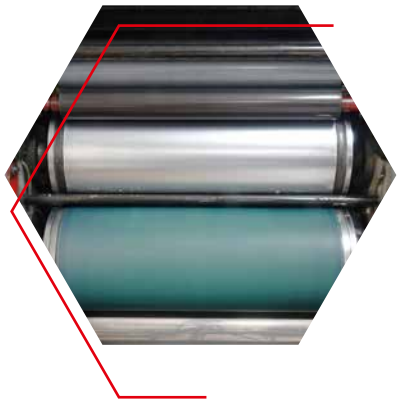
Sealants and membranes

Advantages:

- selectable rheology (free-flowing to non-sagging)
- good mechanical properties (high strength)
- good chemical resistance
- also suitable for food contact and drinking water applications (as per BfR and FDA regulations)

	Sillitin Z 86	Sillitin Z 86 puriss	Aktisil AM	Aktisil PF 777 [1]	Silfit Z 91	Aktifit AM	Aktifit PF 115 [1]	Aktifit VM [1]	Aktifit PF 111 [1]
Dispersion	•••	••••	•••	•••	••••	••••	••••	••••	••••
Viscosity	•••	•••	•••	•••	••	••	••	••	••
Rheological activity (higher Viscosity at low shear rates)	••	••	••	••••	••	••	•••	••	••••
Crosslinking reactivity	••	••	••••	•••	•••	••••	•••	•••	•••
Bright coatings/ color neutrality	••	••	••	••	••••	••••	••••	••••	••••
Tensile strength	•••	•••	••••	•••	•••	••••	••••	•••	•••
Abrasion resistance	•••	•••	••••	•••	•••	••••	••••	•••	•••
Adhesion	•••	•••	•••	•••	•••	•••	•••	•••	•••
Chemical resistance	•••	•••	•••	•••	•••	•••	•••	•••	•••
Water resistance	•••	•••	•••	••••	•••	•••	••••	••••	••••

[1] hydrophobic, therefore, low moisture absorption in humid climate



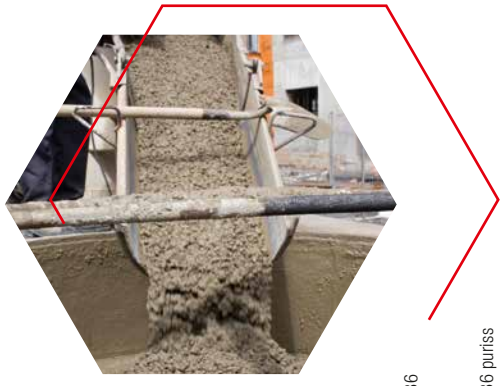
Roller coverings

Advantages:

- excellent dispersion properties
- balanced profile of properties for strength, abrasion resistance, low swelling, heat build-up and durability

	Sillitin Z 89 puriss	Silfit Z 91	Aktifit AM	Aktifit PF 115 [1]
Viscosity	●●●	●●	●●	●●●
Bright coatings/color neutrality	●●●	●●●●	●●●●	●●●●
Crosslinking reactivity	●●●	●●●	●●●●	●●●●
Abrasion resistance	●●●	●●●	●●●●	●●●●
Swelling resistance	●●●	●●●	●●●●	●●●●
Reduction of dynamic heat build-up	●●●	●●●	●●●●	●●●●

[1] hydrophobic, therefore, low moisture absorption in humid climate



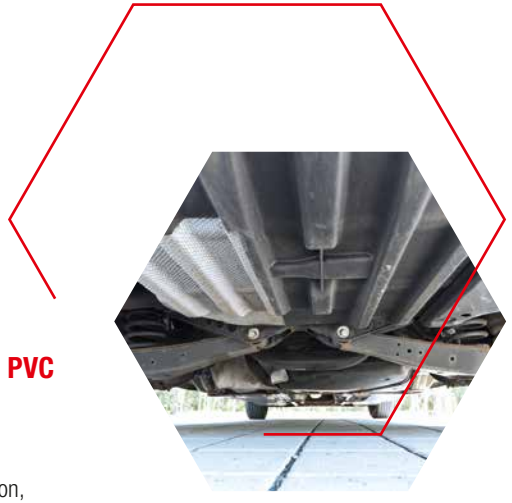
Moldmaking compounds and molds for precast concrete components

Advantages:

- good mechanical properties: tensile strength, tear resistance and abrasion resistance

	Sillitin Z 86	Sillitin Z 86 puriss
Dispersion	●●●	●●●●
Tensile strength	●●●	●●●●
Elongation at break	●●●	●●●●

low ● high ●●●● optimum



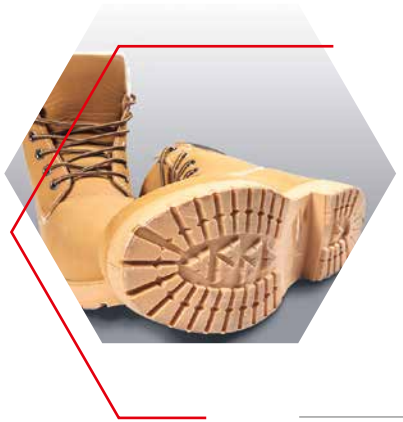
Coatings also based on PVC

Advantages:

- good adhesive strength
- mechanical resistance (abrasion, stone chipping)
- partial replacement of rheological additive silica

	Aktisil VM 56	Aktisil AM	Aktisil PF 777 [1,2]	Aktifit AM	Aktifit VM [1]	Aktifit PF 111 [1]	Aktifit PF 115 [1]
Viscosity	●●●	●●●	●●●	●●	●●	●●	●●
Rheological activity	●●●	●●●	●●●●	●●●	●●●	●●●	●●●
Partial replacement of rheological additive silica	●●●	●●●	●●●●	●●●	●●●	●●●●	●●●●
Bright coatings/color neutrality	●●	●●	●●	●●●●	●●●●	●●●●	●●●●
Adhesion	●●●●	●●●	●●●●	●●●	●●●	●●●	●●●
Stone chip impact resistance	●●●	●●●●	●●●	●●●●	●●●	●●●	●●●●
Moisture resistance	●●●	●●●	●●●●	●●●	●●●●	●●●●	●●●●

[1] hydrophobic
[2] partially reduced gelation temperature



Polychloroprene adhesives

Advantages:

- excellent dispersion properties
- selectable rheology (free-flowing to non-sagging)
- low sedimentation
- improved strength

	Sillitin Z 86 puriss	Aktisil PF 777 [1]	Aktifit PF 111 [1]
Rheological activity	●●●	●●●●	●●●●
Dispersion	●●●●	●●●	●●●●
Color neutrality	●●	●●	●●●●

[1] hydrophobic

Paper adhesives (dispersion-based)

Advantages:

- excellent dispersion properties
- low sedimentation
- good bond strength

	Sillitin Z 86	Sillitin Z 89
Bright coatings/color neutrality	●●	●●●

low ● high ●●●● optimum

Adhesives for wind turbine rotor blades

Advantages:

- excellent dispersion properties
- low sedimentation
- rheology/thixotropy
- high strength and elongation at break

	Sillitin Z 86 oder Z 89	Sillitin Z 86 oder Z 89 puriss	Aktisil PF 777 [1]	Silfit Z 91	Aktifit AM	Aktifit PF 111 [1]	Aktifit PF 115 [1]
Dispersion	●●●	●●●●	●●●	●●●●	●●●●	●●●●	●●●●
Rheological activity	●●●	●●●	●●●●	●●●	●●●	●●●●	●●●
Color neutrality	●●/●●●	●●/●●●	●●	●●●●	●●●●	●●●●	●●●●
Stability under moisture exposure	●●●	●●●	●●●●	●●●	●●●●	●●●●	●●●●
Tensile strength (free film/sample ISO 527)	●●●	●●●	●●●	●●●	●●●	●●●	●●●●
Elongation at break (free film/sample ISO 527)	●●●	●●●	●●●	●●●	●●●	●●●	●●●●
Impact strength (free film/sample ISO 179)	●●●	●●●	●●●	●●●●	●●●	●●●	●●●●

[1] hydrophobic

Adhesives

Structural epoxy adhesives, toughened

Advantages:

- rheology/thixotropy
- adjustable rheology through product selection
- excellent dispersing behavior
- improved adhesive properties
- high peel resistance (system-dependent)
- improved tensile shear strength

	Sillitin V 85	Sillitin Z 86 puriss	Aktisil PF 777[1]	Aktisil Q
Dispersion	●●●	●●●●	●●●	●●●
Viscosity at low shear rates	●●	●●●	●●●●	●
Rheological activity/thixotropy	●●	●●●	●●●●	●
Color neutrality	●●	●●	●●	●●●
Storage stability (sedimentation stability and rheological stability)	●●●●	●●●●	●●●●	●●●●
Lap shear strength[2]	●●*/●●●**	●*/●●●**	●●*/●●●●**	●●*/–
Peel resistance (T-Peel)[2]	●●●*/●●**	●●●*/●**	●●●●*/●**	●●●●*/–
Potential for saving costs	●●●●	●●●	●●	●●

[1] hydrophobic
[2] system-dependent
*toughness modifier epoxy-silicone block copolymer
**toughness modifier reactive liquid rubber (ATBN)

low ● high ●●●● optimum

Moisture-curing adhesives based on STP and PUR, e. g. for parquet, car windscreens, industrial applications

Advantages:

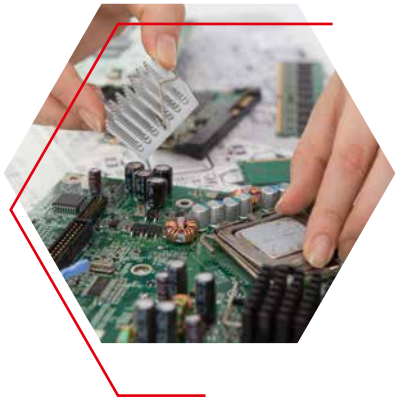
- selectable rheology (free-flowing to non-sagging)
- excellent strength properties, up to 2-fold or 3-fold of calcium carbonate (tensile strength and lap shear strength), mostly without reducing the ultimate elongation
- good water resistance and chemical resistance

STP-E and STP-U adhesives:	Sillitin V 85	Sillitin Z 86 puriss	Silfit Z 91	Aktifit AM[2]	Aktifit VM[1]	Aktifit PF 111[1]	Aktifit PF 115[1]
Viscosity	●●	●●●	●	●	●	●	●
Rheological activity	●●	●●●	●●	●●	●●●	●●●●	●●●
Tensile strength/lap shear strength	●●	●●●●	●●●●	●●●●	●●●●	●●●	●●●●
Color neutrality	●●	●●	●●●●	●●●●	●●●●	●●●●	●●●●
Hot water resistance	●●	●●	●●	●●	●●●●	●●●●	●●●●
Adhesive strength on aluminum	●●	●●	●●●	●●●	●●●●	●●●●	●●●●
Tear resistance in STP-U	●●	●●	●●	●●	●●	●●●●	●●
Lap shear strength in STP-U	●●	●●●	●●●	●●●	●●●	●●●	●●●●

[1] hydrophobic, low moisture without increase in humid climate conditions
[2] enables lower amino silane concentration in the formulation

1K PUR adhesives:	Aktifit VM[1]	Aktifit PF 111[1]	Aktifit PF 115[1]
Rheological activity	●●●	●●●●	●●●●
Tensile strength	●●●●	●●●●	●●●●
Lap shear strength	●●●●	●●●●	●●●●

[1] hydrophobic, low moisture without increase under humid climatic conditions



Adhesives for electronic components

Advantages:

- thermal shock resistance

	Sillitin Z 86	Sillitin Z 86 puriss
Dispersion	●●●	●●●●

Mounting adhesives (polyester/acrylic based)

Advantages:

- excellent dispersion properties
- selectable rheology (free-flowing to non-sagging)
- low sedimentation
- improved strength

	Sillitin V 85	Aktisil VM 56	Aktifit VM[1]	Aktifit Q[2]	Aktifit PF 111[1]
Dispersion	●●●	●●●	●●●●	●●●●	●●●●
Rheological activity	●●	●●●	●●●	●●●	●●●●
Strength	●●	●●●●	●●●●	●●●●	●●●●
Covalent bond	none	●●●●	●●●●	●●●●	●●●
Bright coatings/color neutrality	●●	●●	●●●●	●●●●	●●●●

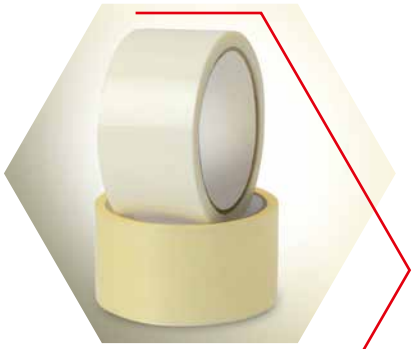
[1] hydrophobic
[2] higher polarity and reactivity due to methacrylic groups

low ● high ●●●● optimum

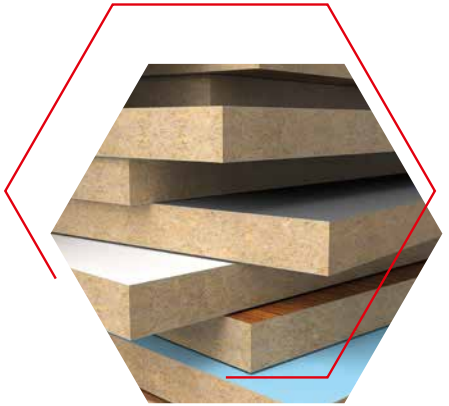
Adhesive tapes PSA (adhesive layer)

Advantages:

- improved bond strength through increased cohesion
- reduction/elimination of adhesive layer residues on the substrate after removing the adhesive tape
- improvement of the shear adhesion at high temperatures (SAFT)



	Sillitin Z 86	Aktisil AM/Aktisil VM 56/ Aktisil PF 216	Aktifit AM/Aktifit VM/ Aktifit Q	Aktifit PF 111
Viscosity	●●●	●●●	●	●
Rheological activity	●●●	●●●	●●●	●●●●
Bright coatings/color neutrality	●●	●●	●●●●	●●●●
Shear adhesion and SAFT	●●●	●●●●	●●●●	●●●●



Laminating adhesives (films on chipboards, dispersion-based)

Advantages:

- excellent dispersion properties
- low sedimentation
- good resistance and appearance of laminating films under exposure to warm and humid conditions

	Sillitin Z 89
Best combination of the mentioned advantages	●●●●