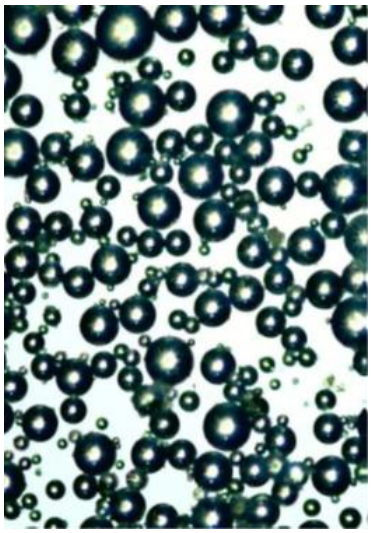
Techpolymer

surface effects for coating systems

General description



Techpolymers are spherical, polymeric beads for matting and for the modification of surface properties of different paints and coatings.
Techpolymer beads are non-porous, without a hollow core and crosslinked. Thus they are resistant to solvents and only slightly increase the viscosity of a formulation. They are primarily used to obtain surfaces with optimal chemical (furniture and automotive requirements) and mechanical resistance (against abrasion, polishing).

Techpolymer is available in various particle sizes, degrees of crosslinking, refractive indices and degrees of hardness. Besides matting effects there are various types of surface effects, you can achieve.

1) Light diffusion (frosted or natural wood look)
2) Techpolymer for texturing
3) Surface resistance
4) Anti slip – Soft touch

Range of use

Techpolymer can be incorporated optimally in all common binder systems under constant stirring using a dissolver:

- Water-based coatings (1pack/2pack)
- Solvent-based coatings (1pack/2pack)
- UV-coatings (100%, water-, solvent-based)

Applications

- Parquet varnishes
  Floor care products
- Furniture coating/foils
- Foil coatings
- (artificial) leather-topcoats
- Light diffusion
- Plastic part coatings
- Wall paints
- Glass coatings
- Packing inks
- Wood varnishes, lacquers

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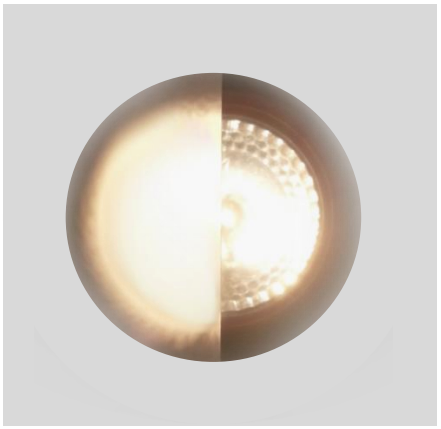
1) Light diffusion (frosted/ natural wood look)

By using different refractive indexes of binder and additive you can create a frosted look or a natural wood look in the transparent top coat. Decisive criteria are a big variety of refractive indexes that are also well defined. All this can be provided by Techpolymer.

Techpolymer	Type
MFX	Acrylic copolymer
MBX	Crosslinked PMMA
MSX	Acrylic-styrene-copolymer
SMX	Acrylic-styrene-copolymer
SBX	Crosslinked polystyrine

RI ~1.45

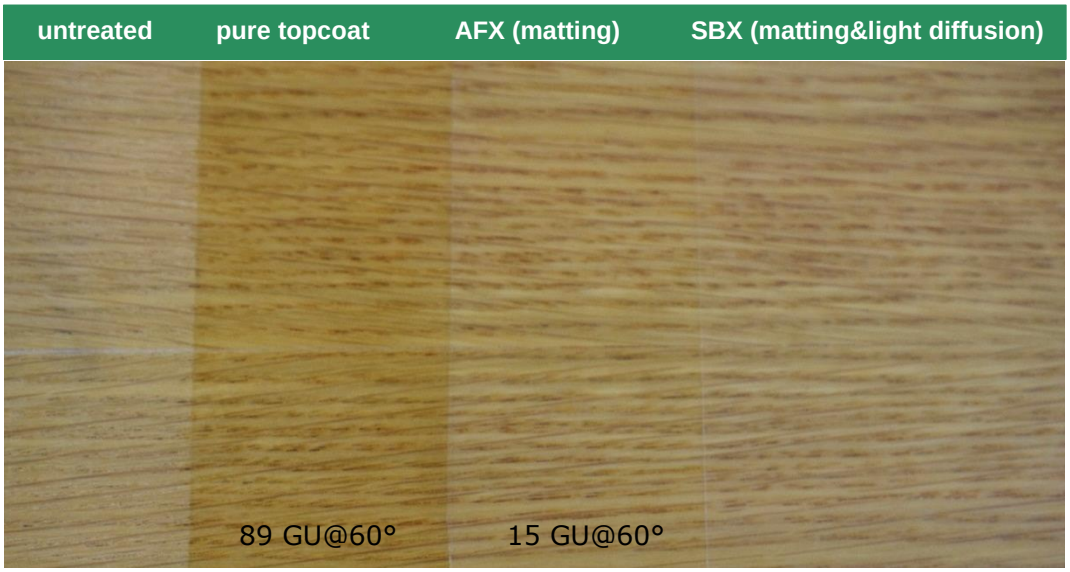
RI ~1.59



coating with light diffusion in front of a halogen spotlight

Not only in a translucent application light diffusion coatings are possible. Here is an example of SBX Techpolymer added to an acrylic-PU parquet varnish.

The untreated wooden panel is light brown and dull matt. With the pure coating a very glossy, unnatural look appears. The gloss level can be reduced by a suitable matting agent (here: **AFX** Techpolymer), but only with **SBX** and its high refractive index the natural look can be obtained.



Further information on refractive indices is available upon request.

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2) Techpolymer for texturing

To adjust the surface structure of coatings and paints, FINMA offers a selection of powdered texturing agent. The product range includes powders with different primary particle sizes to meet the demands of a variety of applications; weather the film thickness is high or low.

By using our texturing agents, different surface effects can be achieved:

- Finely textured surfaces with silky to slightly rough feel
- Coarsely textured surfaces with increased grip
- Rubbery surfaces with strong retention (Anti-slip)

Techpolymer	average particle size	recommended layer thickness [µm]
MBX – hard PMMA-beads		
EXM-20	14 – 20 µm	< 20 µm
MBX-30	25 – 31 µm	20-40 µm
MBX-40	36 – 44 µm	30-50 µm
MBX-50	44 – 56 µm	40-60 µm
MBX-60	52 – 67 µm	50-70 µm
MBX-80	68 – 89 µm	80-100 µm
AFX – very soft, flexible with high recovery properties		
AFX-15	12 – 18 µm	< 40 µm
AFX-30	26 – 34 µm	40-60 µm

Following example shows a 1 pack acrylic-PU dispersion, for plastic parts, modified with 10% by weight of texturing agents(Techpolymer). The application properties are listed in this tables.

texturing agent	viscosity of dispersion (Brookfield, 30 RPM) [mPas]	applied dry film thickness [µm]	surface properties		
pure dispersion	19	43	fine soft	●○○○○○○ ●●●○○○○	rough hard
EXM-20	66	18	fine soft	●●○○○○○ ●●●●○○○	rough hard
MBX-30	72	33	fine soft	●●○○○○○ ●●●○○○○	rough hard
MBX-40	58	43	fine soft	●●●●●○○ ●●●●●○○	rough hard
MBX-50	62	43	fine soft	●●●●●●○ ●●●●○○○	rough hard
MBX-60	70	43	fine soft	●●●●●●●○ ●●●●●○○	rough hard
MBX-80	72	43	fine soft	●●●●●●●● ●●●●●●○	rough hard
AFX-15	59	33	fine soft	●●○○○○○ ●●○○○○○	rough hard
AFX-30	59	33	fine soft	●●●●○○○ ●●○○○○○	rough hard

texturing agent	transparency [%] (90° transmitted light)	gloss unit (60° und 85° angle)
pure dispersion	100	159E/60°, 107E/85°
EXM-20	42	20E/60°, 4E/85°
MBX-30	46	20E/60°, 4E/85°
MBX-40	44	19E/60°, 5E/85°
MBX-50	38	19E/60°, 3E/85°
MBX-60	36	19E/60°, 3E/85°
MBX-80	47	25E/60°, 2E/85°
AFX-30	54	27E/60°, 5E/85°

3) Surface resistance

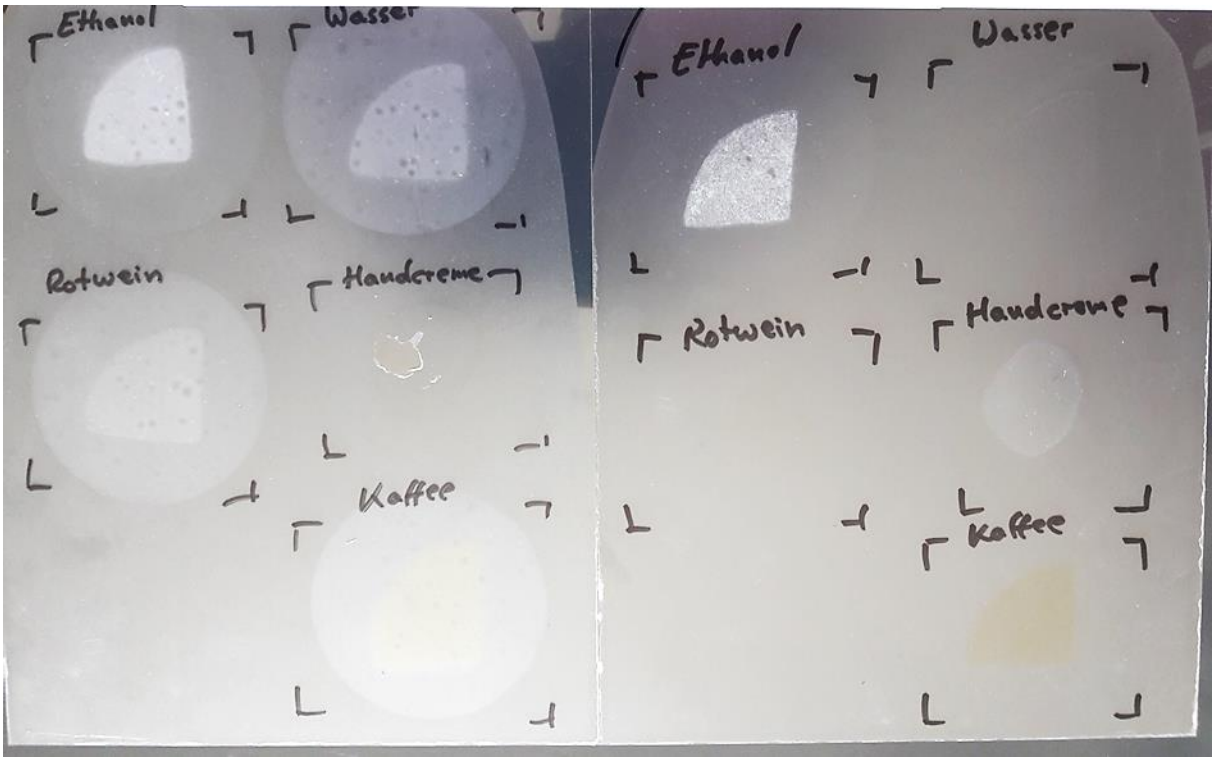
Weather you chose to use just Techpolymer or with a combination of other matting agents like silica or waxes, the non-porous, spherical particle shape of Techpolymer provides an excellent surface resistance.

application example 1 – **Chemical resistance 1 pack furniture-topcoat (acrylic-PU)**

Techpolymer	average particle size	gloss unit
pure topcoat	-	141E/60°, 86E/85°
3% silica	8 µm	16E/60°, 23E/85°
3% EXM-8	8 µm	65E/60°, 60E/85°
10% EXM-8	8 µm	20E/60°, 25E/85°

The furniture varnish was applied on foil with 50 µm dry film thickness. With an increased amount of 10% EXM-8 in this case you can easily get a matting efficiency as by using silica. Though by adding Techpolymer the negative effect on the chemical resistance is much lower.

3% silica 10% EXM-8



chemical resistance test with soaked cotton pads (Ethanol 1h, others 16h)

application example 2 – **Abrasion resistance of self-matting, water-born 2 pack parquet varnish**

Self-matting coating systems tend to be quite simple in their formulation and also easy to handle, but they often struggle with angle dependency of the gloss level (sheen).

For this application test the parquet varnish was modified with 6% Techpolymer and applied in different film thicknesses onto wooden panels. For each layer thickness was picked the right particle size. After 48h of drying the gloss level and the abrasive resistance (taber abraser) was tested.

In this case, engaging Techpolymer the gloss level has been reduced and the mechanical resistance has been significantly increased.

Techpolymer	average particle size	dry film	gloss level	loss through abrasion
pure parquet varnish	-	20 µm	11E/60°, 45E/85°	27 mg
EXM-20	8 µm	20 µm	10E/60°, 3E/85°	18 mg
MBX-30	6-10 µm	35 µm	10E/60°, 5E/85°	10 mg
MBX-50	6-10 µm	50 µm	10E/60°, 2E/85°	19 mg

application example 3 – **Metal marking and cleanability of furniture varnishes**

Mechanical stressed surfaces require a high performance coat, which increases the durability and reduces the need for renovation.
Especially light colored doors need a surface with high metal marking resistance. Simply using the keys can cause unpleasant markings, when you scuff next to the door lock.

testing system:
5% Techpolymer were added to a white 2 pack acrylic-dispersion. In order to achieve 50-60 µm dry-film, 120 µm had to be applied with doctor blade on foil. Afterward the foils were put in the oven for 16h at 60°C.

Techpolymer	average particle size	gloss unit
pure lacquer	-	28E/60°, 63E/85°
MBX-2H	2-3 µm	9E/60°, 32E/85°
EXM-5	3-7 µm	8E/60°, 15E/85°
EXM-8	6-10 µm	8E/60°, 8E/85°

All of the tested Techpolymer types helped matting the lacquer. The requested gloss level especially at 85° angle and the surface feel can be precisely controlled by different particle sizes of various Techpolymer types.

metal marking:

The surface was stressed with a metal ring that caused 1.16 N.
A microscope camera helped taking pictures of the surface.

Non-modified 2 pack acrylic lacquer with metal marking

cleanability:
The cleanability and removing the marks with a wet piece of cloth was significantly improved by adding Techpolymer to the formulation.

2 pack acrylic lacquer *(removed by wet piece of cloth)*	

EXM-8

EXM-5

MBX-2H

4) Anti-slip und soft-touch

A crucial factor for safely stepping on floorings, anti-slip properties and surefootedness is of high importance. The use of matting/surface agents should have only a little effect on the coefficient of friction, even if a dull matt look is required.

The following application example shows a 1 pack waterborne floor-coat matted with different Techpolymer types. By choosing the matching particle size and hardness to the binder system the anti-slip effect could remain unchanged.

The modified floor-coat was applied by doctor blade with a resulting dry film thickness of 20 µm on a cardboard. The frictional resistance was measured after 7 days by a spring instrument.

Techpolymer	average particle size	gloss unit	coefficient of friction μ_H
pure floor-coat	-	13E/60°, 28E/85°	0,68
AFX-8	6 – 10 µm	4E/60°, 8E/85°	0,86
MBX-12	10 – 14 µm	4E/60°, 4E/85°	0,81
AFX-15	12 – 18 µm	4E/60°, 4E/85°	0,81
EXM-20	14 – 20 µm	9E/60°, 32E/85°	0,78
AFX-30	26 – 34 µm	9E/60°, 32E/85°	0,44

In each case the dull matt appearance could be achieved by adding Techpolymer. Compared to the untreated lacquer the gloss level of 85° angle has been reduced and the anti-slip effect has been improved. Techpolymer AFX-30 didn't show any improvement, because the surface had a too rough touch and due to that not enough contact area to support the anti-slip effect. AFX-30 will be suitable, when it comes to applications with film thicknesses over 50 µm.

Fine surface texture generates anti-slip effect

Techpolymer MBX – hard, cross-linked polymethylmethacrylate beads

Residual water: ≤ 3%
Residual monomer: < 1%
Heat resistance: 250-270 °C

Techpolymer	average particle size	crosslinking degree
EXM-8	6 – 10 µm	standard
MBX-12	10 – 14 µm	standard
EXM-20	14 – 20 µm	standard
MBX-30	25 – 31 µm	standard
MBX-40	36 – 44 µm	standard

Anti-slip and soft-touch properties with soft beads

Techpolymer AFX – Cross-linked acrylic ester copolymer, very soft, flexible, with high recovery properties

Residual water: ≤ 3%
Residual monomer: < 1%
Heat resistance: 220-240 °C

Techpolymer	average particle size	crosslinking degree
AFX-8	6 – 10 µm	low
AFX-15	12 – 18 µm	low
AFX-30	26 – 34 µm	low

Techpolymer ARX – soft, flexible beads

Residual water: ≤ 3%
Residual monomer: < 1%
Heat resistance: 230-250 °C

Techpolymer	average particle size	crosslinking degree
ARX-806	6 – 10 µm	standard
ARX-15	12 – 18 µm	standard

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Contact

Customer-specific requirements need individual solutions.
Therefore, please contact us in any case so that we can offer both advice and support before commencing any development work.

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