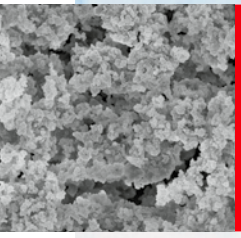


Soft-feel Additives

Creating haptic effects the easy way

Deuteron®
ADDITIVES TO YOUR SUCCESS

Soft feel-Additives

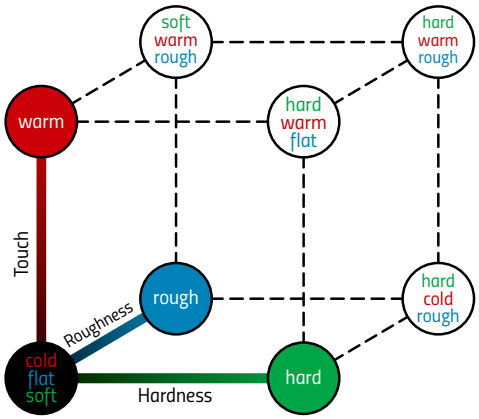
Creating haptic effects the easy way

Soft feel – a matter of definition

In our everyday life we touch a lot of different surfaces – many of them are coated with some kind of haptic or soft-feel coating. Prominent examples are furniture, car interiors, consumer electronics, magazines or high-quality packaging. Usually these applications rely on soft-touch coatings are used to give a comfortable feeling and implicate high quality and product value.

Today the term "soft-touch" covers a broad variety of different effects. The evaluation is highly subjective and mainly driven by individual decisions of brand owner's marketing departments. Thus, there is therefore no definition to clearly describe soft-touch effects in an objective manner. To address this lack of definition it is important to use clearly defined terms to describe haptic effects. This can be realized by using clear and simple terms such as rough - smooth, hard - soft, wet – dry, stickiness and the surface's thermal conductivity properties.

A soft effect can be described as a location in a 3-dimensional system based on the most important surface properties. Still, manual haptic control and comparison remain the most important measurements.



Looking at traditional soft-touch coatings with warm and sticky appearance and a slight roughness (close to a soft natural leather or dense velvet) there are two common ways to formulate such systems:

The classic approach utilizes the combination of a highly elastic, soft and sticky resin and a dry touch matting additive. Balancing the matting additive's roughness and the resin's softness is most important. This formulation route requires raw material knowledge and experience. Another way to formulate soft-feel systems is the use of specialized additives. Dedicated soft-feel additives utilize very soft and elastic particles to create the soft-touch effect on their own. Therefore, no specific resins are needed – almost every existing formulation can easily be turned into a soft-feel coating.

Possibilities	Flexible Binders	Flexible Fillers
Properties	The binders are very flexible / elastic types. Matting agents and fillers are needed to produce the desired velvety matt surfaces.	No special binders are required. The formulation scope for high mechanical and chemical resistance.
Differences	The range of binders is limited.	Comparatively high price level.
	Due to elastomer-like cross-linking, chemical and mechanical properties are often not at a sufficiently high level.	Usually higher application quantities required. Effect strength increases with application quantity. Often lower effect strength.
Suitable Products	Silicates, Mineral fillers	Soft polyurethane particles
Products of Deuteron	**Organic matting agents based on PMU (classic)**	**Bio-based polyester elastomer**
	Combinations are of course possible.	

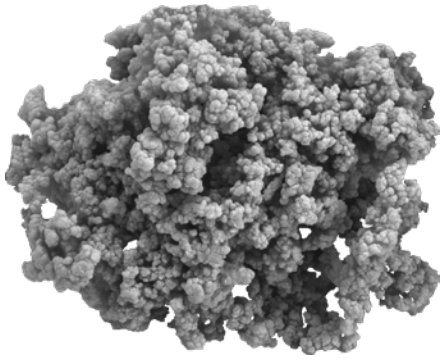
Deuteron MK / Pergopak products

Soft-touch and low-gloss are often closely connected. Apart from creating the soft-feel effect itself the systems need to withstand mechanical stress. Especially low-gloss systems can be sensitive to scratches or burnishing. The use of soft resins deteriorates the mechanical resistance further.

Deuteron's matting agents based on polymethylurea (PMU) are well known for their outstanding mechanical resistivity. Their unique chemistry and particle morphology offer a perfect counterbalance to traditional soft resins. Our Deuteron MK and Pergopak matting agents enable formulators to develop highly resistant soft-touch coatings with outstanding haptic effects.

Because of their different performance profile and properties our PMU-based organic matting agents cannot be compared to traditional silicas. Dispersibility, viscosity, stability, mechanical resistivity and surface feel can be improved – therefore it is highly recommended to carefully adjust formulations to make use of the unique performance of our PMU-based matting agents.

- Good matting efficiency
- Excellent mechanical resistance (scratches / polishing)
- Approx. 0.25 % hydroxyl content – crosslinking with NCO is possible
- No melting point (duromeric) – durable up to 200 °C
- Short term durability up to 300 °C
- Approx. 3.5 Mohs hardness (comparably hard plastic)
- Low influence on the viscosity
- Dry touch – great counterbalance to soft resins



Deuteron SO products

If elastic and sticky resins are not durable enough, the use of soft and flexible particles can be an alternative option.

Our Deuteron SO product-line is based on finely ground polyester elastomer particles with a high renewable content. Deuteron's SO soft-feel technology is a perfect match for a wide formulation latitude and contributes to an easier development of high performing soft-feel systems.

Because of the unique properties almost any given system can easily be tuned into a soft-touch version - without the need for special raw materials or in-depth knowledge. Combinations of "standard" resins and our Deuteron SO products typically lead to increased durability and superior performance compared to "traditional" soft-touch systems.

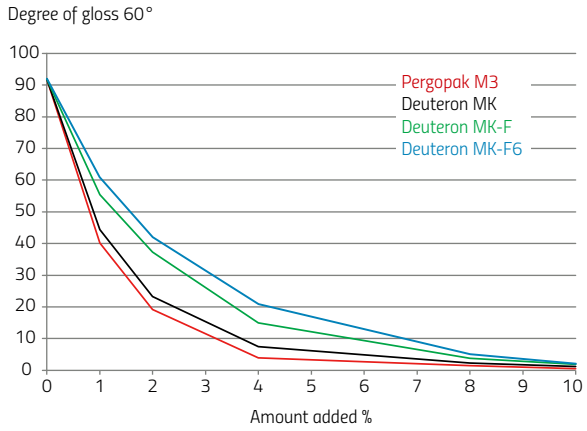
The typical addition level for Deuteron SO products may vary depending on the desired effects. Everything from a starting point of 10 % up to 80 % for extreme effects is possible. To further boost mechanical and chemical resistance crosslinking with isocyanates can be done.

Easy modification of existing formulations possible – no need for special raw material knowledge.

Soft-feel effects independent on the formulation and resins.

Combinations with other matting agents and fillers is possible.

Gloss comparison between different matting additives and Deuteron SO products. Test results based on similar active-content and dry film thickness (approx. 25 µm). Three different coating systems were used.

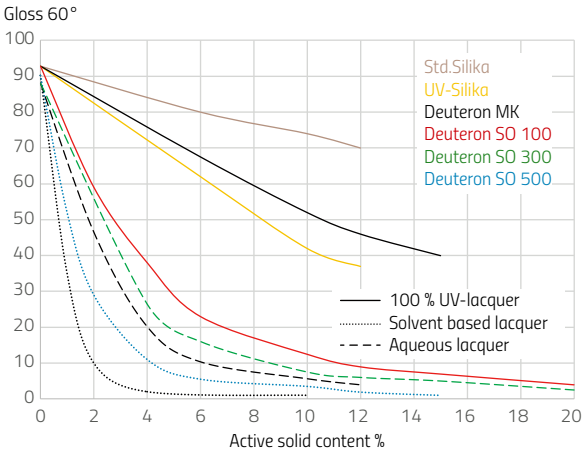


Gloss levels of our PMU based matting agents in a s/b 2pack PU (acrylic) system

Deuteron SO 100 performs excellently in a difficult to matt 100 % UV-curing system – even high addition levels above 60 % (supply form) are possible.

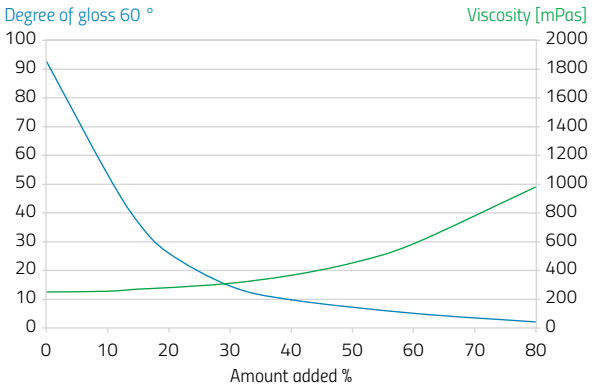
In a water-based system Deuteron SO 300's matting performance comes close to Deuteron MK.

In a solvent-based system Deuteron SO 500 shows a comparably lower matting efficiency than Deuteron MK – its efficiency in conventional coatings (volume shrinkage) is still sufficient.



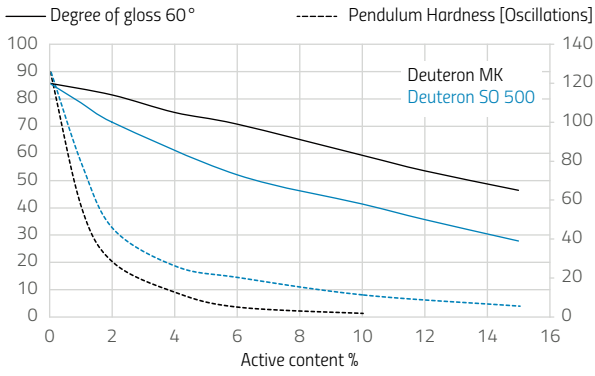
*Gloss comparison between different matting additives and Deuteron SO products. Test results based on similar **active-content** and **dry film thickness** (approx. 25 µm). Three different coating systems were used.*

Deuteron's SO products tend to have only minor influence on the overall viscosity. As an example: 20 % of Deuteron SO 100 adds approx. 6 % solid elastomer to the system – the result is a minor viscosity increase. Even extreme active-contents of up to 24 % (approx. 80 % Deuteron SO 100) are possible – something not possible when traditional matting agents are used.



Gloss level vs. viscosity of Deuteron SO 100 in a 100 % UV-curing system

Comparing the pendulum hardness of Deuteron MK (traditional soft-feel approach) and Deuteron SO 500 in a "standard" coating film clearly shows the influence of the elastic particles. The elastomer particle's "softness" dampens the pendulum – the resin matrix itself remains unchanged. Deuteron MK's hard PMU-particles do not show this effect – the surface feels smooth or like dry velvet.



Gloss level and pendulum hardness of Deuteron SO 500 vs. Deuteron MK compared in a s/b 2pack PU (acrylic) system.

Additives to your Success.

PMU-based matting agents for soft-feel applications

For decades Deuteron MK and Pergopak M3 are being used as standard additives in "traditional" soft-feel coatings.

Combined with suitable resins (typically highly elastic, soft and even sticky) Deuteron's matting agents lead to highly scratch and abrasion resistant coatings with great soft-feel effects and warm haptics.

Pergopak M3
Coarsest grade with highest matting efficiency and roughness.

Deuteron MK
Standard grade with medium particle size. Excellent starting point for formulation trials. Offers well balanced properties between haptics and matting effect.

Deuteron MK-F, MK-F6
Finer grades that are especially suitable for thin film applications. Lead to smoother films and haptics - comparable to wax additives.

Soft elastomer particles for soft-feel applications

Deuteron SO products create soft-feel effects without the need for specific formulations or resin systems. As simple drop-in solution these additives combine soft-feel and matting performance in one single product. Deuteron SO products can be used as stand-alone solution or in combination with other particle-based additives.

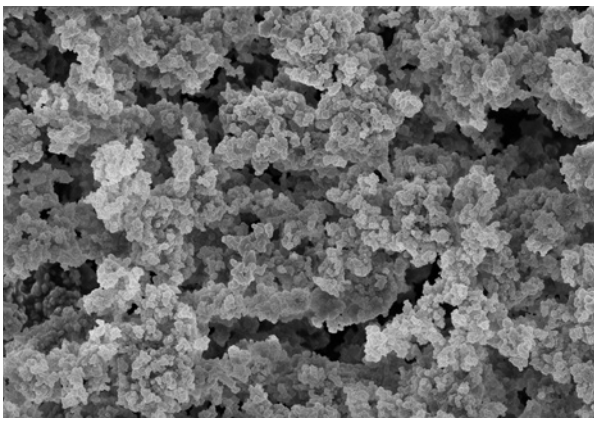
The Deuteron SO technology is available in preparations for water based, solvent based and UV curing systems.

Deuteron SO 500, SO 510
Solvent-based preparations in Ethyl acetate (SO 510) and Butyl acetate (SO 500) with an active content of 30 %.

Deuteron SO 100
Preparation of 30 % elastomer particles in DPGDA for UV-curable systems. Besides the soft-feel effect, Deuteron SO 100 offers great matting efficiency and low viscosity influence.

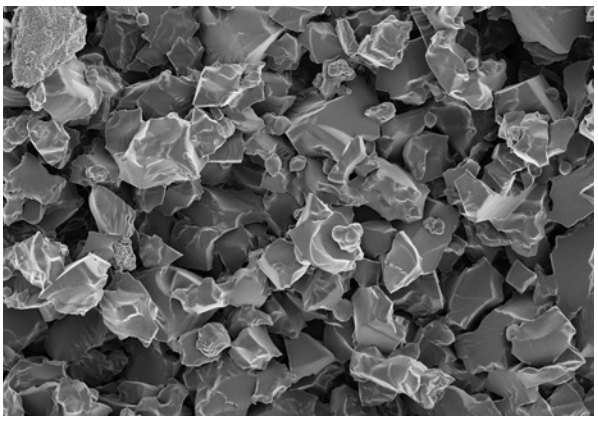
Deuteron SO 300
Water-based suspension with 45 % active content.

Deuteron SO 302
Coarse version of Deuteron SO 300 – especially designed as soft-texturing additive for water-based systems.



Deuteron MK particles

SEM scans



Deuteron SO particles

Soft feel-Additives

Creating haptic effects the easy way

Properties at a glance

Deuteron's organic matting agents (PMU-based)

- Soft effects are strongly supported
- "Pleasant" haptic – soft touch
- Good matting effect
- Little influence on viscosity / rheology
- Highly transparent in film
- High scratch resistance compared with SiO_2-matting agents and waxes
- High resistance to polishing
- Temperature resistant up to over 200 °C
- No melting point (thermoset)
- High chemical resistance
- Can be recoated and printed on
- Cross linkage via hydroxyl groups

Deuteron SO products

- Soft elastomer – pleasant haptic
- Additional matting effect, also in 100 % UV systems
- Cross linkage via hydroxyl groups
- Suitable for all types of binders
- No special soft-binders necessary (but possible)
- Highly transparent in film
- High scratch resistance compared with SiO_2-matting agents and waxes
- High resistance to polishing

Technical Data

	Supply form	Type	Solvent / Reaktive thinner	Active Content %	Particle sizes µm	
					d50	d90
Pergopak M3	Powder	Duromer	-	100	7	16
DEUTERON MK					6.3	13.8
DEUTERON MK-F					4.6	10.6
DEUTERON SO 100	Dispersion	Elastomer	DPGDA	30	7	15
DEUTERON SO 300			Water	45	8	18
DEUTERON SO 302					30	60
DEUTERON SO 500			Butyl acetate	30	7	15
DEUTERON SO 510			Ethyl acetate		7	15

Deuteron®
ADDITIVES TO YOUR SUCCESS

Deuteron: First-class products for the coating industry

Deuteron successfully develops and sells innovative additives since 1977. Our product range consists of matting agents, anti-static additives, texturing additives, thickeners and UV initiators. In the course of our company history we have become an important partner of the national and international paint, lacquer and coating industry with sales agencies around the globe.

Visit us on the Internet

Our documents such as product datasheets, safety datasheets, regulatory information and brochures are available in the download area of our website without registration.

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