
Technical Information

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® = Registered trademark of BASF

Luwax® OA types

Luwax® OA 3 Powder
Luwax® OA 3 SK Powder
Luwax® OA 6 Powder

Emulsifiable polyethylene waxes of very high hardness and high molar mass

Nature and differentiation of the three products

Oxidized polyethylene waxes of high hardness and high molar mass.

Luwax® OA 3 is the standard product.

Luwax® OA 3 SK corresponds chemically to Luwax® OA 3 but has undergone aqueous cleaning as a last, additional process step. Luwax® OA 3 SK is recommended when short-chain impurities impair the effect or emulsifiability.

Luwax® OA 6 is less strongly oxidized than Luwax® OA 3. It therefore has a lower acid value and is of particular interest for applications where specific FDA requirements must be met.

PRD-Nos.*

30043745 Luwax® OA 3 Powder
30115369 Luwax® OA 3 SK Powder
30495763 Luwax® OA 6 Powder

* BASF's commercial product numbers.

Properties

Luwax® OA 3, OA 3 SK and OA 6 are white, coarse-grained, moist powders.

	Test methods		Luwax®		
	DIN	ASTM	OA 3	OA 3 SK	OA 6
Water content (%)	EN ISO 3251		approx. 10	approx. 10	approx. 10
Melting point (DSC) (°C)	51007	D-3418	126 – 133	126 – 133	126 – 133
Recrystallization point (DSC) (°C)	51007		115 – 119	115 – 119	114 – 119
Acid number (mg KOH/g)	EN ISO 2114	D-1386	20 – 24	20 – 24	17.5 – 19
Saponification number (mg KOH/g)	EN ISO 3681	D-1387	24 – 30	24 – 30	20 – 30
Density (23 °C) (g/cm ³)	EN ISO 1183-1	D-792	approx. 0.99	approx. 0.99	approx. 0.99

The above data represent the state of the art at the time of publication and are not all given in the product specifications.

The specified product properties are defined in the product specifications, which may be requested from local BASF sales offices.

Storage

When properly stored under dry conditions, Luwax® OA 3, OA 3 SK and OA 6 can be kept in the original containers for a practically unlimited period. However, prolonged storage may cause the water content to change. This may need to be checked before the product is used.

Solubility

At room temperature, Luwax® OA 3, OA 3 SK and OA 6 are insoluble, or only very slightly soluble, in all the usual organic solvents. Upon heating, however, they dissolve readily in THF and in aliphatic, aromatic and chlorinated hydrocarbons.

Application

Emulsification

Because of their high melting and setting points, Luwax® OA 3, OA 3 SK and OA 6 can only be emulsified under pressure in a closed system, i.e. in a low-pressure autoclave.

Nonionic-anionic emulsifier systems composed of fatty alcohol ethoxylates together with alkali hydroxide or amines have proved to be particularly effective.

Typical formulations are given in the following table.

Nonionic-anionic emulsification of Luwax® OA 3 or OA 3 SK:

Formulation No.	1	2
Luwax® OA 3 or OA 3 SK*	28.00	28.00
Lutensol® ON 70	7.00	7.00
KOH solid (85%)	0.60	0.50
Diethylethanolamine	–	0.40
Sodium metabisulphite (Na ₂ S ₂ O ₅)	0.20	0.20
Water I	26.20	25.90
Water II	38.00	38.00
Solids content %	35	35

Formulation No.	1
Luwax® OA 6*	29.20
Lutensol® AT 25	9.70
KOH solid (50%)	0.90
Sodium metabisulphite (Na ₂ S ₂ O ₅)	0.24
Water I	24.36
Water II	35.60

*Calculated as water-free, 100% product

Procedure

Introduce the Luwax® OA 3, OA 3 SK or OA 6 into the autoclave together with the emulsifier, alkali (KOH), (diethanolamine), sodium disulfite and water I at room temperature. Close the autoclave, heat to 150 °C while stirring, and maintain this temperature for approx. 30 minutes. Add the second quantity of water (temperature of water II approx. 95 °C) under pressure.

If this is not possible, briefly cool the mixture down to 95 °C and allow the pressure to equalize. Then add the second quantity of water at a temperature of at least 95 °C, close the autoclave and heat up to 150 °C again. However, this procedure requires that the amount of water I is increased by approx. 15% and the amount of water II is reduced by the same percentage.

Finally, cool down to room temperature as quickly as possible while stirring. If the emulsion is to be stored for an extended period, it should be preserved with the usual preservatives, e.g. BIT.

Fields of application

A major field of application for Luwax® OA 3, OA 3 SK and OA 6 is aqueous floor polishes that dry to a shine. The products result in extremely tough, mechanically resistant, i.e. hard-wearing and durable, films. Such dry-bright emulsions are generally manufactured from the above described emulsions in combination with polymer dispersions based on styrene and acrylate.

Particularly in combinations containing polymers, other auxiliaries are also necessary, such as ammonia-soluble wetting resins, permanent and temporary film-forming auxiliaries (Etingal® TP, Palatinol® C, methyl glycol or ethyl glycol), leveling agents (fluorosurfactants), antifoams (Etingal A, Degressal® types), surfactants (e.g. Lutensol® types), preservatives and odorants.

Other fields of application for Luwax® OA 3, OA 3 SK and OA 6 emulsions are:

- smoothing agents in textile finishing
- anti-abrasion agents in water-based paints
- water-repellents on surfaces and in hydrophilic media
- rubbing fastness improvers in aqueous printing inks
- rubbing fastness improvers in water-based coating varnishes
- mold release agents in plastic and cast-metal processing

Masterbatches

Luwax® OA 3, OA 3 SK and OA 6 are suitable as dispersing agents for polar pigments, especially when a very high-quality dispersion is required (as in the case of fiber and film masterbatches) or with very hard pigments or very high pigment loadings. Since Luwax® OA 3, OA 3 SK and OA 6 contain residual moisture, they can only be used in open systems or systems with a degassing device.

Safety

We know of no ill effects that could have resulted from using Luwax® OA 3, OA 3 SK and OA 6 for the purpose for which they are intended and from processing them in accordance with current practice.

According to the experience we have gained up to now and other information at our disposal, Luwax® OA 3, OA 3 SK and OA 6 do not exert any harmful effects on health, provided that they are used properly, due attention is given to the precautions necessary for handling chemicals, and the information and advice contained in our Safety Data Sheet are observed.

Note

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