

**LUVOBATCH®**

Customized masterbatches

**LUVOBATCH®  
Film Additives**

for clear advantages  
in film production



Lehmann & Voss & Co.



## LUVOBATCH® film additives for individual functions of your film

Modern and advanced film applications require innovative solutions to achieve their goals, which cannot be realised via the film structures alone. In order to reach the desired properties, functional additives are used for the finishing and customised optimisation of the base polymers such as PE, PP, PS, PET or PA. In order for these to achieve their full effect, exact dosing and complete dispersion of the additives in the polymer is necessary. In addition to the exact addition of sometimes very small quantities, the handling of unfamiliar delivery forms such as liquids, pastes or powders also means considerable effort for film producers and involves possible sources of errors. Masterbatches are used to reduce this. These can contain individually adjusted and optimally dispersed additives and are therefore far more reliable and often also more economical in film production.

LUVOBATCH® masterbatches give you the flexibility you need to achieve your film goals. In addition to the standards such as anti-block, slip agent, UV and thermostabilisation, there are also functional masterbatches such as anti-fog, PaperLike, flame retardants, blowing agents, odour absorbers as well as additive combinations and customer-specific additive compositions.

In our technical centre, we offer the perfect know-how to develop the individually suitable solution in close cooperation with our customers.



**The products mentioned in this brochure reflect only an extract of our portfolio. We specialise in products according to your requirements.**

## Anti-Block from LUVOBATCH®

Anti-block is one of the standards in film production. However, the selection of the right active ingredients is also important here in order to achieve an optimal match to your application and needs. Depending on the production process, anti-block requires a finely tuned composition of the right particle sizes. Special requirements can also be taken into account. For example, we have developed LUVOBATCH® EV AB 9864 to achieve an “easy opening” effect. When the highest standards of speed, reliability and economic feasibility are required, we can offer a solution for packaging production in the form of LUVOBATCH® PA AB 9886 B. Its optimal anti-block properties guarantee smooth production and stable extrusion processes, especially for BOPA films.

LUVOBATCH®	Application in	Dosage	Applications
PA AB 5381	PA6, PA66	1 – 3 %	BOPA, cast, blown film, high transparency
PA AB 9886 B	PA6, PA66	1 – 5 %	Cast, blown film, high transparency, improved function
PA AB 9706	PA6, PA66	1 – 3 %	Cast, blown film, high transparency
PA AB 5563	PA6, PA66	1 – 3 %	BOPA, cast, blown film, high light transmission, clarity, reduced haze, improved printability
PP AB 9643	PP	1 – 5 %	Cast, blown film, good transparency
PP AB 5561	PP	0.5 – 5 %	BOPP, high light transmission, clarity, less haze
PET AB 5544*	PET	1 – 3 %	BOPET, very high transparency, good printability
PE AB 9016	PE	0.5 – 5 %	Cast, blown film, very good optical properties (transparency, gloss, haze), for particularly high demands
PE AB 9325	PE	0.5 – 5 %	Cast, blown film, good optical properties (transparency, gloss, haze), highly loaded
PE AB 9882	PE	0.5 – 5 %	Cast, blown film, soft AB, no scratching, transparent films with slightly higher haze
PE AB 5337	PE	0.5 – 2 %	Blown film, very good anti-blocking effect, no special optical properties

\* = also available as crystallised variant

# Slip Agents from LUVOBATCH®

## Migrating Slip Agents

High friction values can negatively influence an normally optimal and quick process. To enable you to work smoothly, LUVOBATCH® slip agents lower the coefficient of friction (CoF). One possibility is to use a migrating slip agent. These additives do not bond with the polymer, resulting in an optimisation of the external (tribological) sliding quality. They are transported to the outside by migration and create an invisible, yet permanent “lubricating film”.

LUVOBATCH®	Application in	Dosage	Applications
PA SA 5232	PA	0.5 – 10 %	BOPA, cast
PP SA 0029	PP	8 – 10 %	BOPP, cast, blown film, fast migrating, high slip effect
PE SA 9034	PE	1 – 5 %	Blown film, cast, classic slip
PE SA 5330	PE	0.5 – 2 %	Blown film, cast, good transparency, low haze, high gloss

## Non-Migrating Slip Agents

Non-migrating slip agents are another option. These remain in the polymer and, as an ultra-high molecular weight siloxane masterbatch to form a non-migrating slip agent. In this way, a controlled coefficient of friction (CoF) can be achieved without negatively affecting post-processing such as printing and welding.

- Constant CoF
- Improved processing
- Scratch resistance, abrasion resistance

LUVOBATCH®	Application in	Dosage	Applications
EverGlide MB 450	PE	0.5 – 8 %	Blown film, cast
EverGlide MB 125	PP	1 – 8 %	BOPP, blown film, cast
EverGlide MB 125-11 Ultra	PP	2 – 8 %	BOPP, blown film, cast, low CoF, improved film handling
EverGlide MB 1550	PET	0.5 – 8 %	BOPET, blown film, cast
EverGlide MB 1950	PA	0.5 – 8 %	BOPA, blown film, cast

## Slip / Anti-Block from LUVOBATCH®

Whenever a combination of migrating slip agent and anti-blocking effect is desired, our combination masterbatches can help. They combine the properties of both individual masterbatches. They are available for a wide processing field and on different carrier systems.

LUVOBATCH®	Application in	Dosage	Applications
<b>PET SA / AB 5501*</b>	PET	1 – 3 %	Cast, good transparency, good printability, good for thermoforming applications
<b>PETG SA / AB 5514</b>	PETG	1 – 3 %	Blown film, cast, good transparency
<b>PETG SA / AB 5515</b>	PETG	2 – 3 %	Blown film, cast, very good transparency
<b>PP SA / AB 5562</b>	PP	0.5 – 5 %	BOPP, high light transmission, clarity, low haze
<b>PE SA / AB 9788</b>	PE	1 – 5 %	Blown film, cast, good optical properties (transparency, gloss, haze), good surface quality
<b>PE SA / AB 5331</b>	PE	0.5 – 3 %	Blown film, cast, medium transparency, lower haze, medium gloss
<b>PE SA / AB 5332</b>	PE	0.5 – 3 %	Blown film, medium transparency, medium haze, glossy
<b>EV AB 9092</b>	EVA/PE	1 – 3 %	Blown film, cast, transparent films with increased haze
<b>EV AB 9282</b>	EVA/PE	6 – 10 %	Blown film, cast, highly filled, cost effective
<b>EV AB 9864</b>	EVA/PE	1 – 6 %	Blown film, cast, transparent films, "easy opening"
<b>EV AB 9476</b>	EVA/PE	6 – 10 %	Blown film, cast, highly filled

\* = also available as crystallised variant



## Anti-Static Agents from LUVOBATCH®

As electrical insulators, plastics tend to become electrostatically charged and attract dust. To prevent this effect, LUVOBATCH® offers various solutions. These include hydrophilic additives. These migrate independently to the surface and bind water molecules to form a film that wets the plastic surface. This process produces an anti-static effect, which is effective, for example, on films and plastic packaging.

LUVOBATCH®	Application in	Dosage	Effect	Ohm	Comment
<b>PE AS 9218</b>	PE/PP	0.5 – 3 %	Fast/ long-time	Up to $10^{10} \Omega$	AS with fast and long-term effect
<b>PE AS 4001</b>	PE/PP	0.5 – 3 %	Long-time	Up to $10^{10} \Omega$	AS with long-term effect
<b>PE AS 9768</b>	PE/PP	0.5 – 5 %	Long-time	Up to $10^{11} \Omega$	Simple AS with low transparency
<b>PE AS 9217</b>	PE	0.5 – 3 %	Fast/ long-time	Up to $10^{11} \Omega$	Amine-free AS
<b>PET AS 5519</b>	PET	5 – 10 %	Fast/ long-time	Up to $10^9 \Omega$	Contact transparent
<b>EV AS 5411</b>	EVA	1 – 5 %	Fast/ long-time	Up to $10^{11} \Omega$	Especially for EVA

## Antioxidants / Thermostabilisers from LUVOBATCH®

Damage caused by heat is a problem for many plastic applications. To counteract this, the thermostabilising masterbatches were developed. LUVOBATCH® restricts the chain reaction caused by “free radicals”, thus impressively preventing damage to the polymer chains. With the help of radical scavengers and antioxidants, loss of gloss, discolouration and functional limitations such as chalking are warded off. Our portfolio includes processing and long-term thermostabilisation.

LUVOBATCH®	Application in	Dosage	Applications
PA HS 9611	PA6, PA66	1 – 3 %	Dark/coloured applications
PA AO 0043	PA6, PA66	2 – 4 %	Light colours
PA AO 9927	PA6, PA66	2 – 4 %	Light colours, for processes with high shear
PA AO 0036	PA6, PA66	0.5 – 5 %	Fibres/copper-free, carrier PA6
PA AO 5609	PA66	0.5 – 5 %	Fibres/copper-free, carrier PA66
PP AO 0077	PP	1 – 4 %	Heat stabilisation & antioxidant
PE AO 9050	PE	1 – 4 %	Heat stabilisation & antioxidant

## UV Stabilisers from LUVOBATCH®

Another problem for films is the stress caused by UV radiation. In order to be able to protect the films better, LUVOBATCH® offers various UV stabilisers. These help to prevent discolouration, promote lightfastness, have a low inherent colour and a low migration tendency. Due to the high energy value of UV radiation (also in combination with damaging environmental influences), polymers are destroyed. Their surface is then matt and they chalk out. This is followed by cracks and finally disintegration.

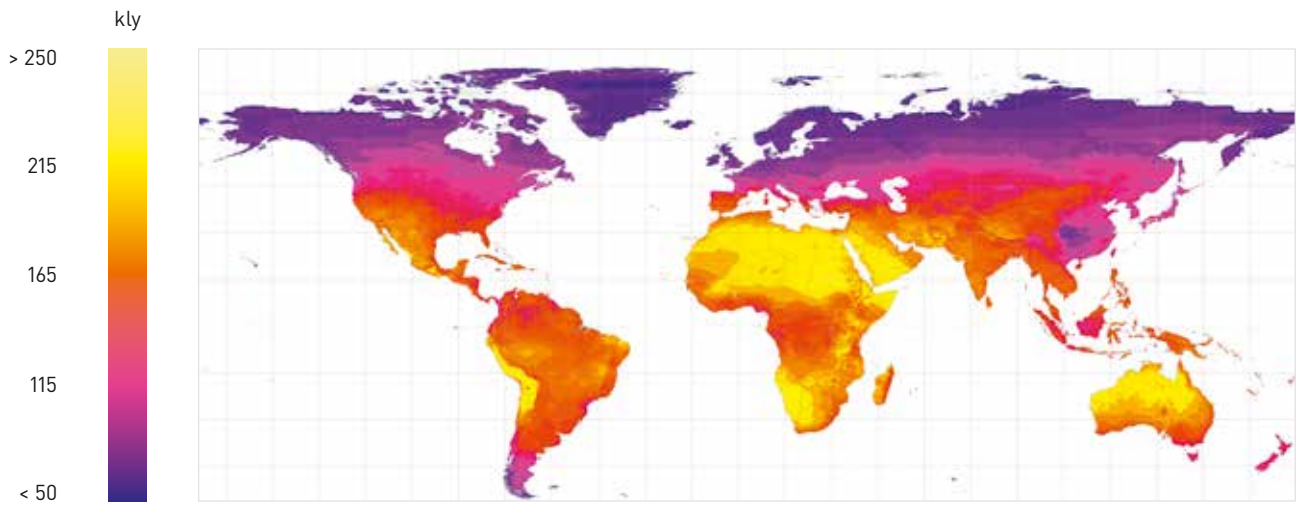
LUVOBATCH® masterbatches offer various coordinated solutions to protect your films. On the one hand UV absorbers, which filter out the damaging parts of the light and convert them into heat. On the other hand, HALS additives (Hindered-Amine-Light-Stabiliser), which prevent the reactions of photo-oxidation products such as peroxides and radicals on surfaces and in deeper layers. If films are to be equipped with both, the LUVOBATCH® portfolio offers combination masterbatches of UV absorbers and UV stabilisers.

Years of experience have led to the development of a comprehensive portfolio on the subject of “light resistance”.

LUVOBATCH®	Application in	Dosage	Absorber / Stabi	Comment
PE UV 5421	PE/PP	0.5 – 5 %	Stabi	For colourless applications
PE UV 5436	PE/PP	0.5 – 5 %	Stabi	For many polyolefin applications
PE UV 5462	PE/PP	1 – 5 %	Absorber + Stabi	Protects film and contents of packaging
PA UV 5164	PA	2 – 10 %	Stabi	Especially for the protection of PA
PP UV 5082	PP	0.5 – 5 %	Stabi	Highly loaded, for transparent applications
PP UV 5193	PP	1.5 – 7 %	Absorber + Stabi	Long term, outdoor application



Annual sum of horizontal global irradiation (GHI)

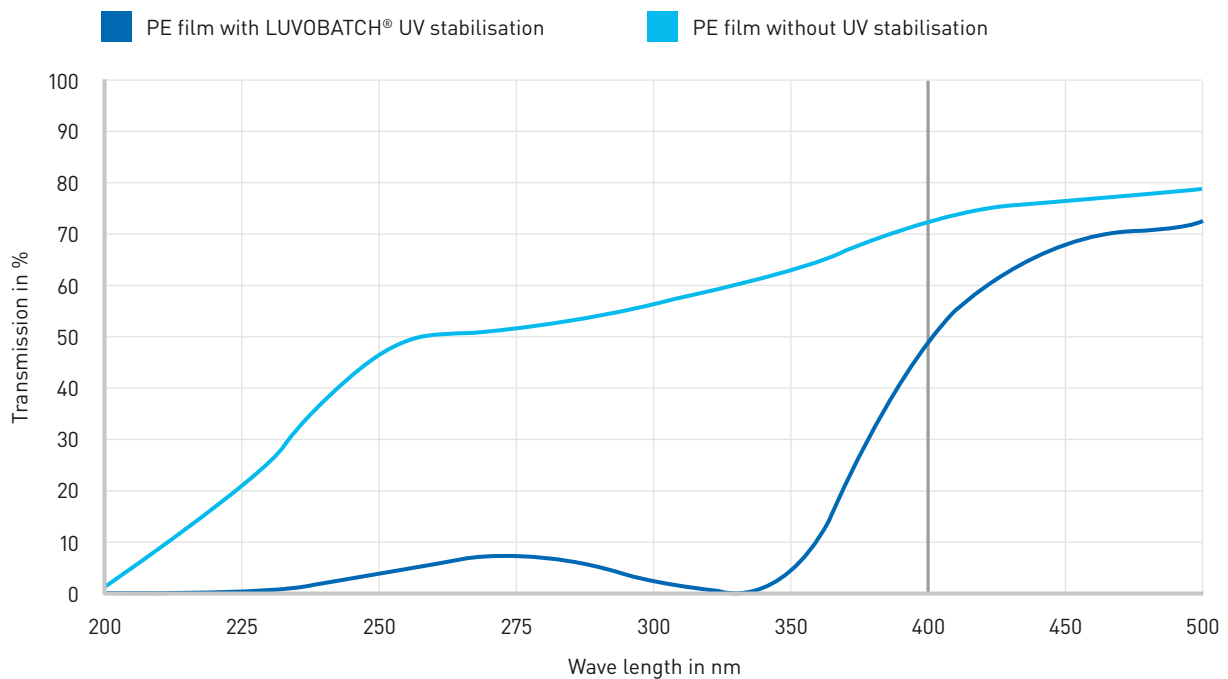


Source: Meteonorm 7.1.5; uncertainty 8 %  
 Period: 1991–2010; grid cell size 0.125°

meteonorm  
 September 2015



UV absorption LUVOBATCH® (6 % in 50 µm PE film)



Exemplary illustration

## Anti-Fog from LUVOBATCH®

Many food products are sold packaged, for example, for reasons of hygiene or to extend shelf life. End customers want to be able to inspect the food in the best possible way despite the packaging. Especially in the case of moist fresh products such as meat and fruit, fogged packaging, which makes it difficult to view the food and gives rise to doubts about freshness, is undesirable. To prevent this, LUVOBATCH® has developed anti-fog masterbatches. These ensure that a thin, transparent film of water is formed instead of individual drops of water (condensation). This means that the packaged food remains clearly recognisable. The LUVOBATCH® anti-fog masterbatches have been extensively tested and are suitable for applications with direct food contact.



- 1 PE unequipped
- 2 PE with LUVOBATCH® PE AF 5306

LUVOBATCH®	Application in	Dosage	Applications
PE AF 5306	PE	3 – 15 %	Fast and low dosage
PP AF 4306	PP	10 – 15 %	Effect < 6 h even at 1 °C
PP AF 5131	PP	8 – 15 %	Good effect within 24 h and low dosage

## Processing Aids from LUVOBATCH®

Processing aids as masterbatch create an easy-to-implement optimisation of the extrusion process. The contained additive adheres particularly well to the metallic surfaces in the extruder (walls, screw, nozzle) and applies a thin layer there. This layer acts like a sliding layer and brings various advantages.

- Increased output
- Lower energy consumption
- Faster and more evenly running melt
- Prevention of “shark-skin”
- Higher quality surface of the film
- Reduced deposits on the nozzle

For this effect, only a small dosage of the masterbatch is required. The following work steps such as printing, sealing and welding are not affected.

LUVOBATCH® offers a unique solution of a processing aid on an EVOH carrier especially for EVOH processing.

In some films, fluorinated ingredients are not desired. For these applications we can offer fluorine-free (PFAS-free) processing aids. They are based on a blend of customised and functionalised polysiloxanes.

LUVOBATCH®	Application in	Dosage	Applications
<b>EV PPA 5157</b>	EVOH	0.5 – 2 %	Especially for thin barrier layer of EVOH
<b>PA PPA 9659</b>	PA	0.5 – 2 %	Homogeneous layer thickness
<b>PE PPA 9118</b>	PE, PP	1 – 2 %	Fast effect, suitable for abrasive components
<b>PE PPA 9407</b>	PE, PP	0.5 – 2 %	Higher loading, fast action, suitable for abrasive components
<b>PE PPA 9350</b>	PE(HD), PP, EVA	1 – 2 %	Higher temperatures, suitable for abrasive components, especially suitable for preventing melt fracture, less interaction with chemical active ingredients
<b>PE PPA 9679</b>	PE, PP, EVA	0.5 – 2 %	Higher temperatures, suitable for abrasive components, especially suitable for preventing nozzle whiskers
<b>EverGlide PA45</b>	PE, PP, EVA	1 – 4 %	PFAS-free, also for higher temperatures
<b>EverGlide PA49</b>	PA6, PA66	1 – 4 %	PFAS-free
<b>EverGlide PA41</b>	PP	1 – 4 %	PFAS-free, especially for PP

## Odour Absorbers from LUVOBATCH®

These masterbatches contain a special active ingredient which, due to its porosity, absorbs odours and gas from polyolefines. They are particularly suitable for absorbing odours and gases that arise during the ripening process of fresh food and cause rotting. It thus protects against premature spoilage.

LUVOBATCH®	Application in	Dosage	Applications
PE FK 5596	PE, PP	1 – 5 %	Molecules up to 5 Å
PE FK 5597	PE, PP	1 – 5 %	Molecules up to 10 Å

## Drying Agents from LUVOBATCH®

In the extrusion of regenerated polymers and also moist virgin material, a special highly dispersed drying agent can improve the surface and the technical properties of the extrudate.

LUVOBATCH®	Application in	Dosage	Applications
PE DRY 5336	PE, PP	1 – 5 %	In regenerated polymers and moist virgin material

## Blowing Agents from LUVOBATCH®

In film applications, blowing agent masterbatches achieve a density reduction by foaming the plastic and save costs. Decorative effects can also be achieved in this way. The dosage is very simple and clean. Endothermic blowing agents are also approved for food contact applications.

LUVOBATCH®	Application in	Dosage	Applications
PE BA 9537	PE, PP, PET, PA	0.2 – 3 %	Blown and cast film
EA BA 5350	PE, PP, PET, ABS, ASA, TPO	0.5 – 2 %	Blown and cast film
UC BA 1006	PE, PP, PET, ABS, ASA, PA, TPO, etc.	0.2 – 3 %	Blown and cast film
PE BA 5823	PE, PP	0.5 – 3 %	Blown film, cast, particularly fine foam
PP BA 5390	PP	0.2 – 3 %	Blown and cast film
PE AB 9882	PE, PP	0.5 – 2 %	Nucleation for finer foam



More information can be found in the LUVOBATCH® blowing agent brochure.

## Flame Retardant from LUVOBATCH®

Flame retardant finishes are required in many film applications. LUVOBATCH® offers a wide range of halogen-free and halogen-containing flame retardant systems. We would be pleased to advise you on finding the right solution for your application.

LUVOBATCH®	Application in	Dosage*	Halogen-free	Applications
PE FR 1150	PE, PP	3 – 8 %	No	Blown and cast film
PP FR 4775	PE, PP	3 – 8 %	No	Blown film, cast, for films < 100 µm
PET FR 5499	PET	5 – 15 %	Yes	BOPET, cast
PE FR 4011	PE	1.5 – 5 %	Yes	BOPE, blown film, cast
EV FR 1106	EVA, PE	8 – 10 %	No	Blown and cast film

\* Dosage recommendation for film fire standard DIN 4102 B2 with 80 µm blown film



You can find more information in the LUVOBATCH® flame protection brochure.



## Modern development pilot plant

For successful development, we start on a small scale. To this end, we use a twin-screw extruder on a laboratory scale to produce our new formulations.



This is followed by processing trials and film production on our 3-layer blown film line.



In addition to the pilot plant, we can rely on our well-equipped laboratory with various testing possibilities.

For a small batch size for customer release we have two twin-screw extruders on a pilot scale at our disposal.

**We develop solutions that really fit your needs.**



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