

## **K R I T I L E N® masterbatches**

### **ADDITIVES**

#### **TECHNICAL INFORMATION**

Kritilen® additive masterbatches are used as an easy and economic way to incorporate to plastic products special additives that facilitate processing or impart to the products various useful properties. They contain additives or combinations of additives of proven value, at concentration levels that suite each formulation, additive properties and final product or process requirements, perfectly dispersed in an appropriate carrier resin.

#### **PRODUCTS & APPLICATIONS**

a) *Slip masterbatches*

They are used to modify the coefficient of friction of plastic films. The addition level of slip masterbatches depends on film type, thickness and the required slip effect. The coefficient of friction rapidly decreases during the first day after extrusion and levels out to a constant value after 2-3 days. Erucamide is more stable so it should be preferred for processing temperatures above 220 °C (HDPE, PP, metallocenes) or if the film has to be stored for a long-time in hot climates. Effectiveness of slip agents is enhanced when in combination with anti-blocking additives. Maximum storage time is 6 months.

b) *Anti-block masterbatches*

They are used to prevent blocking of plastic films.

- AB 62 offers excellent anti-blocking effect without affecting film clarity.
- AB 72 also offers good anti-block properties without affecting transparency.
- AB 40 is an economic solution for relatively thick films when superior clarity is not critical.

c) *Antioxidant masterbatch*

It is used at 1-2 % addition when an improvement of the heat and processing stability of polyolefin products is needed, during shut-downs at up to 5 % addition, and when high amounts of recycled material is used, at 1-3 %.

d) *PA masterbatch*

At an addition rate of 1-2 %, this masterbatch eliminates surface defects (fish-eyes, shark skin, orange peels etc.), reduces power consumption, helps increasing the output and reduces plate-out on the die-surface. It is particularly useful for LLDPE reach blends, metallocene & HDPE films. Preconditioning of the die is necessary (please consult us).

e) Purging masterbatch

CL 530 is recommended for easy cleaning of plastics processing equipment.

f) Desiccant masterbatch

DC 500 is used to absorb humidity present in plastic materials. It is particularly useful when processing recycled materials. Please consult us if any other additives are used in the product, to check possible side effects.

g) Antistatic masterbatches

They are used to dissipate static electricity from the surface of plastic products, thus facilitating the production and conversion process and/or reducing dust accumulation.

- AT 5 is recommended for long term antistatic performance and is mostly suitable for HDPE films and PE or PP injection and blow-moulding.
- AT 11 is recommended for fast antistatic effect during processing and short-term performance (typically 1-2 months), for polyolefin film extrusion and moulded articles.
- AT 12 combines both a fast effect and long-term antistatic performance, which is enhanced by a synergistic action of the additives contained.
- AT PS711 provides a long term antistatic effect to GP & HI polystyrene as well as to styrenic copolymers (such as ABS).
- AT PS713 is the preferred antistatic agent for polystyrene and styrenic copolymers. Due to the fact that at required addition levels there is an effect on transparency, it is mostly recommended for opaque articles.

Notes :

- 1) The type of polymer as well as the presence of slip or other additives may influence the antistatic behavior.
- 2) Maximum storage time for AT masterbatches is 6 months but they should preferably be consumed within 3 months.

h) Clarifying masterbatch

NC 10 contains a highly effective clarifier for homopolymer or random PP copolymer products. This additive acts as a nucleating agent, by creating a large number of small size spherulites (<1 micron) during the cooling of the polypropylene melt, resulting to a dramatic improvement of the clarity of transparent PP articles. Its use also enhances stiffness and shortens cycle times during the molding process. Processing temperature should be in the range of 240°-260°, the optimum being 255°C

i) Blowing agent masterbatches

They are used in extrusion, injection and blow-moulding applications to reduce specific weight by creating a cellular structure with gas in the mass of plastic items.

- BA 10 contains a blowing agent which provides a coarse cell structure. It starts decomposing at 200-210 °C, it is therefore recommended mainly for moulding applications.

- BA 11 and BA 70 contain an endothermic foaming agent which provides a fine cellular structure. It is best suited for polyolefin extrusion and moulding. To achieve optimum decomposition a working temperature of 190-230 °C is necessary.

j) AF for food packaging

This masterbatch is used to eliminate water droplets from the internal surface of food packaging, particularly deep freeze films, at an addition rate of 4-6%.

k) Antimicrobial masterbatches

- AM PS7100 (for PS products) & AM PP9100 (for PP products) contain a long lasting broad spectrum antimicrobial agent against gram-positive and gram-negative bacteria as well as mold and yeasts. This antimicrobial is of high purity and conforms to US Pharmacopeia.

- DM 50 is a PE based masterbatch containing a very effective additive that protects plastic products from the growth of a wide spectrum of bacteria, molds, mildew, fungi and algae.

l) Flame retardant masterbatches

- FR 300 is designed for PP products, particularly stadium seats and other furniture. It is based on a combination of a bromine compound and antimony trioxide (Sb<sub>2</sub>O<sub>3</sub>). Recommended addition rate is 8-12 % for V2 classification (UL94) and 25-30 % for V0 classification.

- FR 305 is also intended for PP products and is based on a combination of a bromine compound and antimony trioxide. It is more economic than FR 300 and is recommended for V2 classification at an addition rate of about 12 %.

- FR 400 contains a synergistic combination of an organic bromine complex and antimony trioxide in LDPE base. The product is intended for polyethylene extrusion products (e.g. films, pipes) provided that the processing temperature does not exceed 210 °C. Recommended addition rates for LDPE is 10-12 % while for HDPE it is 12-15 %, to achieve UL94 V2 (at 1/16" thickness).

- FR210 is mainly intended for polyolefin fibers. It contains a special halogen free flame retardant which combines flame retardancy with UV and thermal stabilization. Recommended addition rate to comply with NFPA 701 is 2-3 % in PP fibers and 5 % in PP and LDPE films (50 µm).

- FR 500 contains a selected bromine compound in PS carrier. Its main application is expandable PS sheets, at a 4-6 % addition.

m) Opacifier masterbatch

KRITILEN DIFFUSER 557 provides an opacifying effect combined with increased haze/diffusion when used in polyolefin films, without affecting the product's color.

n) Anti-slip masterbatch

KRITILEN ANTISLIP 570 provides a "rough" surface when used in polyolefin films/sacks, which results to anti-slip properties.

<b>KRITILEN®</b>	<b>CARRIER RESIN</b>	<b>ADDITIVES (%)</b>	<b>ADDITIVE TYPES</b>	<b>RECOMMENDED ADDITION (%)</b>	<b>FOOD APPROVAL</b>
SLIP 60	PE	6	Combination of erucamide and oleamide slip agents	0,5-2	Yes
SLIP 66	PE	5	Oleamide slip agent	0,5-2	Yes
SLIP 67	PE	5	Erucamide slip agent	0,5-2	Yes
SLIP PP960	PPH	6	Combination of erucamide and oleamide slip agents	0,5-2	Yes
SLIP PP967	PPH	5	Erucamide slip agent	0,5-2	Yes
SLIP/AB 61	PE	25	Combination of inorganic anti-blocking additive & oleamide	1-2	Yes
SLIP/AB 63	PE	15	Combination of synthetic silica and erucamide slip	1-2	Yes
SLIP/AB 69	PE	20	Combination of synthetic silica and erucamide slip	1-2	Yes
SLIP/AB 70	PE	50	Combination of natural silica, erucamide & oleamide	1-2	Yes
AB 40	PE	40	Inorganic anti-blocking additive	1-2	Yes
AB 62	PE	15	Synthetic silica	1-2	Yes
AB 72	PE	20	Natural silica	2-3	Yes
AO 10	PE	10	Combination of heat and processing stabilisers	1-5	Yes
PA 90	PE	2	Polymer processing aid	1-2	Yes
CL 530	PE	55	Combination of inorganic and organic purging agents	10-15	No
DC 500	PE	50	Inorganic desiccant	0,5-2	No
DIFFUSER 557	PE	50	Fine particle size inorganic additive	5-10	Yes
ANTISLIP 570	PE	70	Coarse particle size inorganic additive	5-10	Yes

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AT 5	PE	5	Slow migration antistatic agent	2-4	Yes (up to 3 %)
AT 11	PE	10	Fast migration antistatic agent	1-2	Yes
AT 12	PE	10	Combination of fast and slow action antistatic agents	1-2	Yes (up to 3 %)
AT PS711	PS-GP	10	Slow action antistatic agent	3-5	Yes
AT PS713	PS-GP	10	Selected antistatic agent	5-10	Yes
NC 10	PE	10	Nucleating agent	1,5-2	Yes (up to 3 %)
BA 10	PE	20	Chemical blowing agent	1-3	Yes
BA 11	PE	20	Selected chemical blowing agent	2-5	Yes
BA 70	PE	50	Endothermic chemical blowing agent	0.5-2	Yes
AF 76	PE	20	Selected anti-fogging agent for food packaging	5-7,5	Yes
AM PS7100	PS-GP	10	Antimicrobial & antibacterial agent	2-4	Yes
AM PP9100	PPH	10	Antimicrobial & antibacterial agent	2-4	Yes
DM 50	PE	7.5	Selected antimicrobial, anti-bacterial, antifungal, antialgae	5-6	No
FR 300	PPH	33	Combination of bromine compound & antimony trioxide	8-12 (V2) 25-30 (V0)	No
FR 305	PPH	33	Combination of bromine compound & antimony trioxide	10-12 (V2)	No
FR 400	PE	72	Combination of bromine compound & antimony trioxide	10-15	No
FR 500	PS-GP	50	Bromine compound	4-6	No
FR 210	PE	20	Selected halogen free flame retardant	2-5	No

Other additive masterbatches can be produced upon request, with different types/content of additives or with a different polymer carrier or combinations of additives, UV-stabilizers and colors for specific applications.

## SPECIAL ADDITIVES FOR AGRICULTURAL FILMS

These additives are used in agricultural films (for greenhouses, low-tunnels, mulching) to provide them special features, such as thermic, anti-drip, anti-dust, anti-virus and photosensitive properties.

KRITILEN	CARRIER RESIN	ADDITIVES (%)	ADDITIVE TYPES	RECOMMENDED ADDITION (%)
UV 23	PE	15	Special UV-absorber	2-3
IR 550	PE	50	Inorganic Infra-Red absorber	5-15
HT 555	PE	30	Special Infra-Red absorber	2-4
AF 61	PE	25	Anti-dripping agent	6-12
AF 62	PE	25	Anti- dripping agent	6-12
AS 40	EVA	40	Anti-sticking & anti-dust agent	1-4
DIFFUSER 557	PE	50	Special inorganic diffuser	5-10
BROWN 70964	PE		Pigments and Infra-Red absorber	20 (*)
BROWN 70869	PE		Pigments	20 (*)
YELLOW 10975	PE		Pigments	5-6 (1-layer) 20 (bicolor)
SILVER 80100	PE		Pigments	2-3 (*)
GREEN 51311	PE		Pigments	1-1.5
GREEN 51670	PE		Pigments	15 (*)

(\*) for 20-30 mic. films

Exact addition rates depend on area of use, film type, structure, thickness and required specifications.

Other additive masterbatches for agricultural films can be offered upon request, containing different types, amounts or combinations of additives and colors.

Presentation : in regular pellet form, in bags, on pallets.

## PRODUCTS & APPLICATIONS

### 1. Disease control masterbatch

UV 23 strongly absorbs UV-radiation up to 390 nm. It can be used to help reducing the population of insects, the sporulation of certain fungi, the development of viruses as well as the blackening of rose petals. Recommended addition is 2-3 %.

Under certain conditions it has been observed that complete blocking of UV-radiation may result to unwanted side-effects (discoloration of egg-plants and some kinds of flowers/fruits, disturbance of bumble-bee activity). Please consult our R&D Dept for more information.

### 2. Infra-Red masterbatches

Infra-Red masterbatches contain additives that absorb heat emitted from the greenhouse or low-tunnel during the night, thus helping to maintain higher night temperatures, reduce fuel consumption for heating, prevent frost and temperature inversion.

- IR 550 is an effective inorganic Infra-Red absorber. Recommended addition in LDPE films is 5-15 % depending on film thickness and required "thermic effect". For LDPE/EVA co-extruded films, recommended addition is 2-10 % depending on film thickness, VA content of the film and required "thermic effect".

- HT 555 is a special IR-absorber that does not affect film clarity. For better results, it is recommended to combine it with EVA, at an addition of 2-4 %.

### 3. Anti-dripping masterbatches

Anti-dripping masterbatches prevent droplet formation in the internal surface of greenhouse films.

- AF 61 is a highly concentrated anti-dripping masterbatch suitable for LDPE and EVA with low VA content. Recommended addition is 6-12 % for an anti-fogging effect of 1-2 years.

- AF 62 is an anti-dripping masterbatch with fast and strong action, mainly recommended (at 6-12 % addition) for short-term exposure (4-8 months) on relatively flat structures or on the soil (e.g. asparagus mulch films).

Notes : a) due to the complex nature of anti-dripping effect and to the numerous parameters that affect its performance, PLASTIKA KRITIS does not provide any guarantee whatsoever on the effectiveness or duration of the anti-dripping effect b) on greenhouses covered with anti-dripping films there is often appearance of fog. It is recommended to eliminate this fog by ventilating and/or heating the greenhouse. For more information on this phenomenon and on solutions available, please consult us.

### 4. Anti-dust masterbatch

AS 40 can be used to reduce dust accumulation on the surface of greenhouse films. Recommended addition is 1 %. In multi-layer films, it is advisable to use AS 40 only in the layer of the film that faces outside, at 3 % addition.

### 5. Anti-sticking masterbatch

AS 40 is used to reduce sticking of EVA blown-films during extrusion and storage. Recommended addition level is 2-4 % depending on the VA content of the material, film thickness and production conditions.

## 6. Diffuser masterbatch

KRITILEN DIFFUSER 557 provides an opacifying effect combined with increased haze/diffusion when used in polyolefin films, without affecting the product's color.

## 7. Photoselective masterbatches for mulching films

- BROWN 70869 is used at an addition of 20 % (\*). It permits the heat to pass and warm-up the soil during daytime, while providing adequate opacity to prevent growth of weeds.
- BROWN 70964 is offering the same advantages as BROWN 70869, and in addition it contains an IR-absorber that reduces heat losses from the soil during night-time.
- GREEN 51670 is used at an addition of 15 % (\*) and permits heating-up of the soil while limiting considerably the growth of weeds.
- YELLOW 10975 is used at an addition of 5-6 % (\*) in mono-layer films and up to 20 % in multi-layer bicolor films. Its function is to attract certain insects (such as white fly) and reduce damage on the crops.
- SILVER 80100 is used at an addition of 2-3 % (\*) to reflect sun-rays and repel insects. It has a noticeable effect in reducing viruses and protecting plants.
- GREEN 51311 is used to produce films with the greenish shade of Ni-quencher. The usual addition rate is 1-1.5%.

(\*) Addition rates are indications for trials only, based on our experience, and refer to 20-30 mic. films. They have to be adjusted taking in account the required opacity and the exact thickness and structure of the film.

For extending the lifetime of the films beyond 2-4 months (depending on area) it is necessary to add UV-stabilizers (please consult our R&D Department for an advise). It should be noticed that certain pigments contained in the above masterbatches have a negative effect on UV-resistance, therefore an increased level of UV-stabilization is necessary relative to transparent films.

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### **LIMIT OF LIABILITY**

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