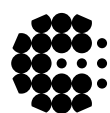




UV
Masterbatches



Global Colors



Smart
UV protection
for lasting
performance

UV masterbatches, extending the life of plastics.

Plastic products degrade when exposed to heat, light, and oxygen, leading to loss of mechanical and physical properties.

The primary cause of plastic degradation is ultraviolet (UV) radiation from sunlight. The high-energy UV rays initiate or accelerate chain chemical reactions within the polymer molecules, leading to chain scission (breaking of molecular chains) and/or cross-linking (formation of unwanted bonds between chains). These reactions result in the deterioration of the plastic's mechanical properties, ultimately making the material brittle and less functional over time.

To combat this, PLASTIKA KRITIS offers a full range of Kritilen® UV masterbatches designed for polyolefin applications. These masterbatches extend the life of plastics by incorporating carefully selected heat and light stabilizers.

Key Benefits of Kritilen® UV Masterbatches:

- Careful selection and balanced formulation of additives.
- Excellent dispersion in the base resin.
- Easy processing with no negative impact on final product properties.

GENERAL INFORMATION

There are three main classes of UV stabilizers

1. HALS (Hindered Amine Light Stabilizers)

HALS function primarily through free radical scavenging, interrupting the chain reactions initiated by UV exposure that lead to polymer degradation. Due to this function, HALS significantly slow the ageing process of plastics.

Main Types of HALS for Polyolefin Applications:

- Low Molecular Weight HALS (e.g., HALS I)
- High Molecular Weight HALS (e.g., HALS II, HALS III, HALS IV)
- NOR HALS
- High Molecular Weight HALS with Narrow Molecular Weight Distribution (e.g., HALS V)

UV Masterbatches for PE

KRITILEN®	Carrier Resin	UV-stabilizers	Antioxidants	Processing Stabilizer	Total Active Ingredients %	Shade	Greenhouse Films	Thick Unpigmented Films	Thin - Pigmented Films & Tapes	Thick Products	Food Approval*
UV 21	PE	Ni-Q+UVA	♦	♦	21	Y	1,5-10%				
UV 2109	PE	Ni-Q+UVA	♦	♦	25	Y	1,2-9%				
UV 210	PE	Ni-Q+UVA+HALS IV	♦	♦	21	Y	1,5-10%				
UV 10H	PE	HALS III+HALS II		♦	10,5			1,5-4%	1,5-6%	1,5-3%	♦
UV 106H	PE	HALS III+HALS II		♦	10			1,5-4%		1,5-3%	♦
UV 15H	PE	HALS III		♦	15,5			1-3%	1-4%	1-2%	♦
UV 17H	PE	HALS III+UVA		♦	15,5		2-13%	1,5-3,5%			♦
UV 20H	PE	HALS III		♦	20,5			0,75-2%	0,75-3%	0,75-2%	♦
UV 27H	PE	HALS III+HALS II		♦	20,5			0,75-2%		0,75-2%	♦
UV 120	PE	HALS IV+HALS II		♦	20,5				0,75-3%	0,75-2%	
UV 22H	PE	HALS III+HALS II		♦	20,5			0,75-2%	0,75-3%	0,75-2%	♦
UV 222H	PE	HALS II		♦	20,5			0,75-2%		0,75-2%	♦
UV 2222H	PE	HALS III+HALS II		♦				0,75-2%	0,75-3%		♦
UV 37	PE	HALS III+UVA+CS		♦	20,5	Y	2-9%				
UV 1111	PE	HALS IV+HALS II+UVA		♦	22,5		1,5-10%				
UV 1211	PE	NOR HALS+UVA	♦	♦	33		1,5-10%				
UV 1215	PE	NOR HALS+UVA	♦	♦	22		1,5-10%				
UV 1510	PE	NOR HALS	♦	♦	15,5		1-6%		1-6%		

HALS II, HALS III, HALS IV, HALS V High Molecular Weight HALS
 Ni-Q Ni-Quencher
 UVA UV-Absorber
 CS Co-stabilizer
 Y Greenish/Yellowish

* Food approval according to European legislation. Detailed regulatory statements including SML, limitations on use etc are available upon request.

Key Advantages of High Molecular Weight HALS:

- Enhanced compatibility with polyolefins
- Lower volatility and migration
- Superior resistance to extraction
- Improved contribution to heat stability

HALS are widely recognized for their exceptional efficiency in most outdoor and UV-exposed applications. However, their performance can be compromised in the presence of sulfur or halogen-containing organic compounds (e.g., pesticides, flame retardants, pigments etc), which may chemically interact with HALS and diminish their effectiveness, potentially leading to premature failure.

NOR HALS is a type of HALS with improved resistance to chemicals. It can offer effective protection to plastic products in contact with sulfur, halogens or other acidic substances, as in the case of greenhouses where sulfur is used for crop protection and stadium-seats with halogenated flame retardants.

2. UV-Absorbers

UV-Absorbers work by absorbing harmful UV radiation and converting it into harmless thermal energy, thereby preventing the UV light from reaching and degrading the polymer chains. UV absorbers are most effective in thick and unpigmented plastic products while their performance is significantly enhanced when used in combination with HALS or nickel quenchers, creating a synergistic stabilization effect. In pigmented plastics, their efficiency is reduced since many pigments already reflect or absorb UV radiation. However, in some cases, UV-absorbers can still be valuable for protecting pigments from fading due to prolonged UV exposure.

3. Nickel Quenchers (Ni-Quenchers)

Ni-Quenchers are nickel organic complexes that act mainly by deactivating excited polymer states and dissipating the energy in harmless forms. Ni-quiners impart a greenish shade to the products they stabilize, which can be undesirable for pigmented articles. Ni-Quenchers have proven to be efficient UV-stabilizers for LDPE greenhouse films, their main advantage being that they are not affected by sulfur.

APPLICATIONS

Recommendations for selection and use of Kritilen® UV masterbatches are given for a number of polyolefin applications in the following tables, with indicative addition rates that should be considered a general guideline only.

Exact addition level for each product depends on its characteristics (resin, color, thickness, other additives used etc.), the geographical area, the conditions of use and the desired lifetime.

This document presents the standard range of Kritilen® UV masterbatches. Modified versions or tailor-made products can be produced upon request, e.g. with another base resin or containing different combinations and/or amounts of UV-stabilizers, antioxidants, processing stabilizers and other additives such as anti-fogging, IR & anti-static compounds.

UV Masterbatches for PP, PET, PS & ABS

KRITILEN®	Carrier Resin	UV-stabilizers	Total Active Ingredients %	Processing Stabilizer	PP Films & Tapes	PP / PS / ABS Thick Articles Pet Containers	PP Fibers	Food Approval*
UV PP911H	PPH	HALS I+HALS III	10,5	♦ 2-4%	1-3%			
UV PP915H	PPH	HALS I	15		1,5-3%	0,7-2%		
UV PP919H	PPH	HALS I+HALS III	20,5	♦ 1,5-2,5%	0,75-2%			
UV PP920H	PPH	HALS III	20,5	♦ 1,5-3%	0,8-2,5%	1,5-3%	♦	
UV PP921H	PPH	HALS I	20		1-2%	0,5-1,5%		
UV PP941H	PPH	HALS I	40	♦ 0,5-1%				
UV PP922H	PPH	HALS I+HALS II	20,5	♦ 1,5-3%	0,8-2,5%	1,5-3%	♦	
UV PP926H	PPH	HALS II	20,5	♦ 1,5-3%	0,8-2,5%	1,5-3%	♦	
UV PP948H	PPH	HALS V	40,5	♦ 0,6-1,2%		0,6-1,2%	♦	
UV PP957H	PPH	HALS III	50,5	♦ 0,6-1,2%		0,6-1,2%	♦	
UV PP958H	PPH	HALS V	50,5	♦ 0,5-1,2%		0,5-1,2%	♦	
UV PP9352H	PPH	HALS IV+HALS II	52,5	0,6-1,2%		0,6-1,2%		
UV PT2330	PET	Special UV absorber 1	20			1-2%		♦
UV PT2320	PET	Special UV absorber 2	15			2-4%		♦
UV PS7202H	PS-GP	Special HALS for Styrenics	20			3-5%		♦

HALS I Low Molecular Weight HALS
 HALS II, HALS III, HALS IV, HALS V High Molecular Weight HALS
 UVP UV-Absorber special for PS & ABS

* Food approval according to European legislation. Detailed regulatory statements including SML, limitations on use etc are available upon request.



UV-STABILIZATION OF GREENHOUSE FILMS

PLASTIKA KRITIS is a recognized leader in the UV stabilization of agricultural films, an application that requires high performance and durability under harsh environmental conditions. To support continuous innovation, the company operates its own experimental greenhouses, specifically designed to test new UV-stabilizer formulations under real-life conditions. This enables PLASTIKA KRITIS to offer practical, field-proven guidance and technical support tailored to the unique demands of agricultural applications. For this sector, the company proposes distinct classes of Kritilen® UV masterbatches, each optimized to meet different performance requirements and environmental conditions.

a) Based on Ni Quencher and UV absorbers

UV 21 & UV 2109 (a more concentrated version of UV 21) are suitable for 1-5 season films depending on area and addition rate films. The carrier resin of UV 21 and UV 2109 is a low MFI LDPE, resulting to higher mechanical properties of the film and better bubble stability, especially if a high addition rate of masterbatch is required. Films stabilized with above products have a yellow/greenish shade and are resistant to interactions with sulfur and sulfur containing pesticides.

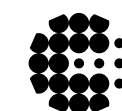
UV 210 delivers equivalent UV stabilization performance to UV 21. However, UV 210 has been specifically developed to address issues that arise when polymer films are in direct contact with metal frames—a situation that can often lead to premature degradation.

b) Based on HALS and UV absorbers

UV 1111 and UV 1112 contain a combination of a special selected HALS with UV absorber, offering improved resistance against normal use of pesticides. UV 37 is designed for multi season agricultural films -mostly recommended for 2-5 seasons films with a thickness of 120-200 microns. Its formulation includes a co-stabilizer, which plays a crucial role in protecting the HALS components from degradation caused by agrochemicals, particularly sulfur and chlorine containing pesticides. It also contains a yellow/green pigment to imitate the shade of films stabilized with Ni quencher.

c) Based on NOR Hals and UV absorbers

UV 1211 is a masterbatch designed for greenhouse films. It combines a NOR HALS with a UV absorber, enhanced by a proprietary blend of special additives. This synergistic formulation provides exceptional protection and durability in environments where films are exposed to high levels of sulfur and/or aggressive pesticides. UV 1211 is used in diffusing films while UV 1215 is a version designed for clear films.



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you can trust



UV-STABILIZATION OF THICK UNPIGMENTED PE FILMS

For the UV-stabilization of pallet covers, heavy duty bags etc., with thickness above 120 microns and life expectancy of 9-18 months, it is recommended to use masterbatches based on HALS or HALS + UV-Absorber, such as UV 10H, UV 106H, UV 15H, UV 17H, UV 20H, UV 22H, UV 27H, UV222H and UV 2222H. For applications involving sealing, it is advisable to use masterbatches containing HALS II or the HALS III + HALS II combination.



UV-STABILIZATION OF THIN AND PIGMENTED PE FILMS & TAPES

For the UV-stabilization of polyethylene films for packaging or agricultural uses, transparent or pigmented with thickness below 100 mic., as well as of pigmented films above 100 mic. (e.g. silage films and nursery films) and PE tapes it is advisable to use HALS based masterbatches, such as UV 10H, UV 15H, UV 20H, UV 120, UV 22H and UV 2222H. For agricultural uses, UV 120 offers improved resistance against normal use of chemicals.

UV 10H, UV 22H, UV 120 & UV 2222H should be preferred in applications involving heat-sealing. In such applications, UV 15H & UV 20H should be used after trials.

For agricultural applications involving extensive contact with pesticides (e.g. mulching films) it is recommended to use UV 120 (at an addition of 1,5-6 %) or, preferably, UV 1510 (at 1-6%). UV 1510 contains NOR HALS and offers maximum safety when there is excessive use of pesticides or sulfur. For colored films where the pigments used contain metals (e.g. yellow, brown or silver) it is recommended to increase the addition of UV-masterbatch relative to the amount used in non-pigmented films of the same type.



UV-STABILIZATION OF THICK POLYETHYLENE PRODUCTS

For thick PE articles the preferred choices are UV 15H (pigmented articles) and UV 17H (non-pigmented articles). Kritilen® UV 10H, UV 106H, UV27H, UV 20H, UV 120, UV 22H, UV 222H & UV 2222H can also be used.

Kritilen® UV 106H and UV 27H contain anti-block agent while offering similar performance with UV 10H and UV 22H respectively.



UV-STABILIZATION OF THICK POLYPROPYLENE PRODUCTS

UV masterbatches based on HALS I, such as UV PP915H & UV PP921H are the preferred choice for thick PP products. For black or dark items where improved thermal protection is necessary as well as in cases requiring very long lifetime and therefore very high amounts of HALS, combinations of HALS I + HALS III (UV PP911H, UV PP919H) offer better results. For items requiring food approval, HALS III or combinations of HALS III + HALS II are used (UV PP920H, UV PP922H), at addition rates higher than those of HALS I for obtaining the same lifetime.



UV-STABILIZATION OF POLYPROPYLENE TAPES

The most efficient UV masterbatches for PP tapes are those containing HALS I, such as UV PP915H, UV PP921H & UV PP941H. For applications requiring improved thermal stability, especially in dark-colored or black tapes exposed to sunlight, HALS II or synergistic blends of HALS I + HALS III are recommended. In these cases use of UV PP911H, UV PP926H and UVPP919H is the preferred solution. When the application involves extremely low thickness, and /or extended lifetime, higher loading of UV stabilizers (typically >0.3–0.4% active content) is required.

In such cases, HALS I + HALS III combinations ensure superior performance compared to HALS I alone based masterbatches. For applications requiring food contact approval, the use of masterbatches containing HALS II and /or HALS III is recommended. Generally, addition rate of masterbatches like UV PP920H and UV PP926H should be higher than those of HALS I for the same life expectancy. Additional advantages of using HALS II and HALS III are their enhanced contribution to thermal stability as well as improved process ability due to lower water carry-over. For applications where halogen additives are involved or increased chemical resistance is required, the use of UV PP9592H is suggested.

UV-STABILIZATION OF POLYPROPYLENE FIBERS

Due to the high surface area-to-volume ratio of fibers, stabilizer systems must exhibit low volatility and high extraction resistance. These requirements are best met by HALS III and HALS V as well as synergistic combinations of HALS III + HALS II, which also enhance thermal stability during end-use. The most suitable masterbatches for this application are UV PP920H & UV PP922H. UV PP948H, UV PP958H & UV PP957H – due to their very high content of active ingredients – can be used at very low addition rates and ensure the minimum adverse effect on mechanical properties of the fiber. Additionally, UV PP948H and UV PP958H are proposed for highly pigmented tapes and fibers ensuring minimum interaction with pigments and optimum flow control. The correct use of these highly concentrated masterbatches requires accurate feeding by gravimetric systems as well as perfect homogenization during fibers extrusion.

UV-STABILIZATION OF PS & ABS PRODUCTS

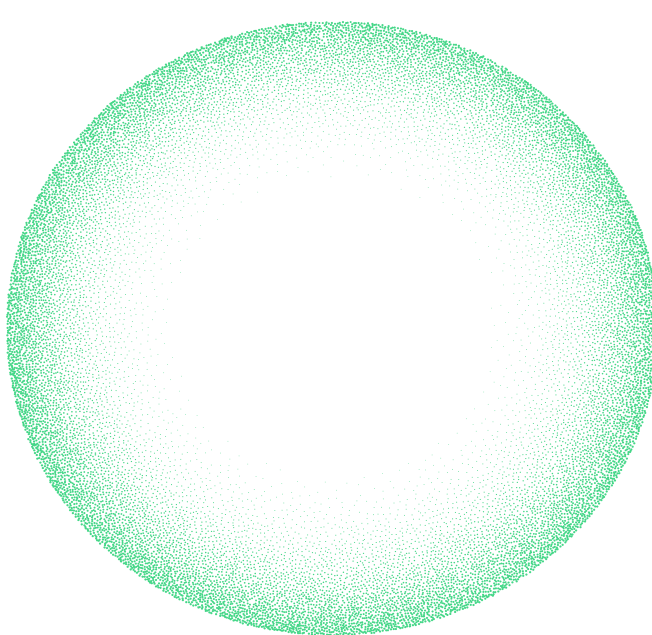
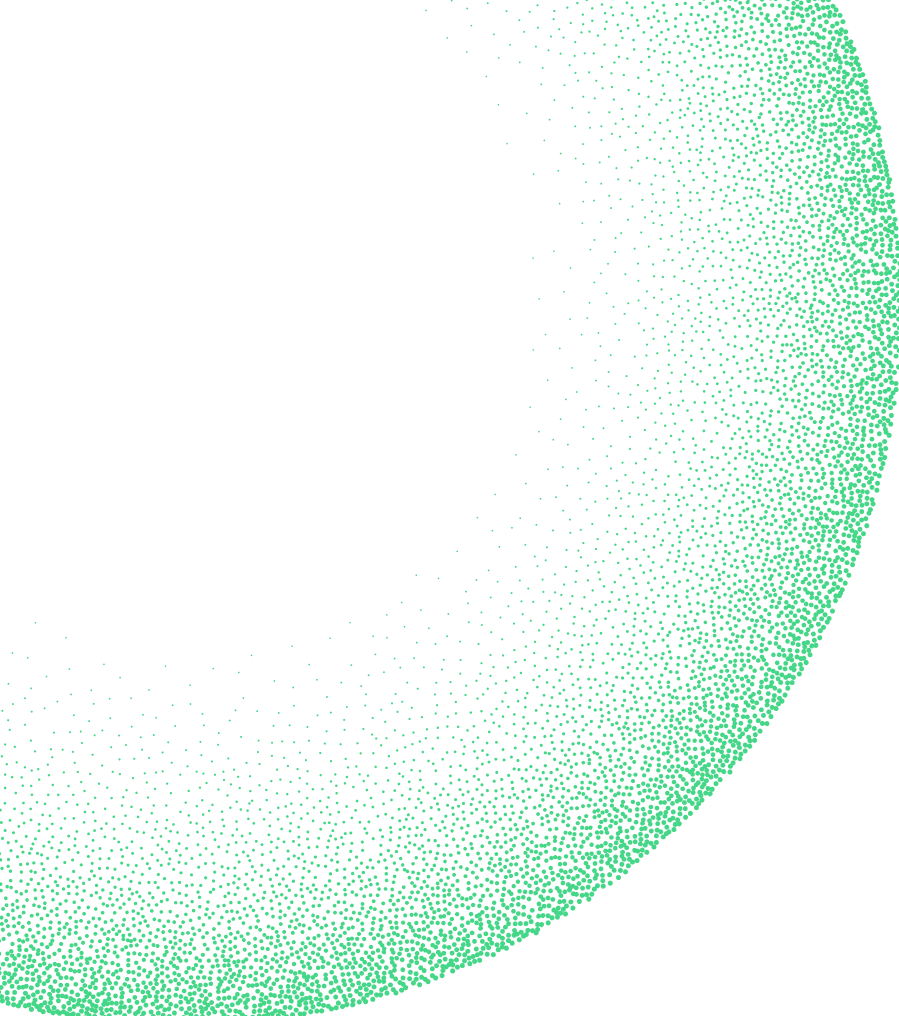
UV PS7202H is specially designed for PS & ABS products. As an indication for trials, an addition rate of 3.5 % for PS and 5 % for ABS is necessary for a 2 mm pigmented product to obtain a lifetime of 5 years in Mediterranean climate.

UV-STABILIZATION OF PET PRODUCTS

UV PT2320 (medium filter) and UV PT2330 (high filter) are specially designed for PET bottles and containers, in order to protect the content from UV degradation (i.e. change of color, nutritional value, taste e.t.c)

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