

# THE GLOBAL COLORS NEWSLETTER



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## POINTS OF INTEREST:

- Oxo-degradable masterbatch offers solutions in supermarket shopping bags
- New fancy and special effect colors increase value of plastic articles
- Special combi-masterbatches enhance the properties of recycled polyolefins
- The protection of bottled milk is achieved with new generation Kritilen® masterbatches

## NEW OXO-DEGRADABLE MASTERBATCH AVAILABLE FOR SHOPPING BAGS

Plastika Kritis has launched its new oxo-degradable masterbatch, called Kritilen® FTD523. It is mainly proposed for use in polyethylene carrier or shopping bags (e.g. for supermarkets). It is added at addition rates 1%-2% in the end product recipe and, under the influence of oxygen, heat and light, degrades the polymer chain of the plastic bag.

This masterbatch contains selected pro-degradants, which contribute in the reduction of the polymer molecular weight, introducing oxygen into its structure. This process transforms the polymer chain from long strands to much smaller lengths. By reducing the chain length of the polymer the material loses its physical strength and elongation properties making it brittle and none 'plastic'. Then, these low molecular weight fractures can, under certain environmental conditions, be converted by bacteria into biomass, CO<sub>2</sub> and H<sub>2</sub>O in an aerobic environment, or in the case of an anaerobic environment, into CH<sub>4</sub>. Plastika Kritis has tested, before commercialization, this product in both its lab and also an external specialized institute. Films of 20mic, containing a mixture of HDPE and LLDPE with 1% FTD523 and 10% Filler 5804 (80% calcium carbonate in a polyethylene carrier), were produced and evaluated. The test protocol applied in

the external institute included the following:

- Mechanical properties of non exposed samples
- Oven aging at 40°, 60° and 80°C according to BS8472:2011
- UV exposure based on ISO4892-3
- Mechanical properties of exposed samples

In order to declare a film as degradable, its retained mechanical properties (e.g. elongation) after UV and heat aging must be <5% of the initial properties before exposure. After the above tests, the film samples were degraded (<5% of retained elongation) under the following conditions:

- Heat aging at 40°C: After 97 days
- Heat aging at 60°C: After 10 days
- Heat aging at 80°C: After less than 10 days
- UV aging: After 168hr (approximately corresponding to 3.5 months of real life in Central Europe)

The raw materials used in the formulation of FTD523 comply with the requirements of Regulation 10/2011/EC and subsequent amendments. They also

comply with the relevant paragraphs of FDA chapter 21 parts 175-178. Detailed food contact Declaration is available upon request.

As the degree and speed of degradation is dependent on the antioxidant package contained in the basic polymer of the end application, the product thickness, the ambient temperature and humidity and the degree to which the end product is exposed to UV radiation, we suggest that the customer should verify the suitability of the product and determine the appropriate let-down ratio under the actual conditions of applications.



Picture 1: The Kritilen® oxo-degradable masterbatches are used in well-know supermarket polyethylene shopping bags

## NEW SPECIALTY BLACK AND WHITE MASTERBATCHES

Plastika Kritis has developed and launched two special masterbatches, proposed for use in engineering plastics applications. These new masterbatches are:

**Kritilen® Black PA230P:** It is a black masterbatch based on a polyamide carrier. The polyamide carrier is a PA6 polyamide with melting temperature at 220°C. Black PA230P contains a premium

P type carbon black grade in this recipe of 30%. As polyamide is hydrophilic, this masterbatch is packed in aluminum laminated bags. This product is mainly proposed for injection molding or film applications.

**Kritilen® White PC260:** It is a white masterbatch based on a polycarbonate carrier. It also contains 70% of a premium rutile TiO<sub>2</sub>. It is

proposed mainly for injection molding or extrusion end applications.

As excellent dispersion and homogenization of carbon black and TiO<sub>2</sub> is achieved during their production, these masterbatches are ideal solutions for the coloration of polyamide and polycarbonate end products, respectively.

## NEW PRODUCT LINE FOR TRANSLUCENT COLORS USED IN HOUSEWARE

Plastika Kritis is the preferred masterbatch supplier of many manufacturers of houseware items.

These manufacturers design and produce among others, polypropylene products for house use, such as tableware, small boxes for food, storage boxes, hangers for cloths, etc.

Furthermore, they have developed long-term partnerships with top Greek or international supermarket chains and many retail stores in Germany, Greece, Cyprus and the Balkans (Albania, Skopje, Serbia).

All of these manufacturers of plastic houseware products try to differentiate by launching brilliant, translucent and modern design items.

Plastika Kritis has collaborated with a major producers of such goods, in the development of unique color masterbatches that will color the new product line. Initially, the customer was using colorants in powder form, in order to color these products. Plastika Kritis has contacted the design department of this customer and explained the advantages of replacing

powder colorants with masterbatches.

As a next step, Plastika Kritis has developed a product line of brilliant and translucent color masterbatches such as Yellow 11114, Orange 21601, Violet 35746, Violet 35748, Violet 35758, Blue 40944, Green 50672 etc, which were tested and approved.

The Plastika Kritis color specialists are able to develop and offer such tailor-made color proposals that allow end manufacturers to differentiate from their competitors.



Picture 2:  
Fancy semi-transparent Kritilen® colors give value to modern style houseware items

## ROMBEST® FILLER HD5605: THE NEW PROPOSAL FOR PAPER-LIKE FILM

A papermatch masterbatch imparts to film paper-like feel, qualities and printability, including increased stiffness and maximum dead-fold properties.

Various types of papermatch masterbatches can be used in blown or cast film applications. A papermatch film is used as a replacement of paper in various applications from food packaging to envelopes.

These applications include banners, book covers, maps, labels, standup pouches, lumber wrap and house wrap.

Romcolor has developed Rombest® Filler HD5605, a masterbatch that has been produced in large scale and is used by film producers in 10MT batches. This product has an excellent performance during its use in the end product manufacturing

and due to its price/performance ratio, it will have the preferred product as many of the Romcolor's customers have reported.

Filler HD5605 is used at a 40% loading in the HDPE film formulation. Cheaper alternatives can be combinations of e.g. 20% Filler HD5605 + 20% Filler 5801 (standard filler masterbatch based on a polyethylene carrier) in HDPE.

*"Romcolor has developed Rombest® Filler HD5605, a masterbatch that has been produced in large scale and is used by film producers in 10MT batches. This product has an excellent performance during its use in the end product manufacturing and due to its price/performance ratio, it will have the preferred product as many of the Romcolor's customers have reported."*

## PLASTIC TOOL BOX IS COLORED BY A SPECIAL KRITILEN® MASTERBATCH

A major Plastika Kritis customer in Germany, came up with an inquiry for developing a specific blue shade for a tool boxes product line.

Such tool boxes are made of ABS, using injection molding. As the parts design was not simple, an optimized melt rheology was required, in order to have a uniform melt distribution in the mold and avoid color differences or flow lines. Furthermore, the customer has required for the masterbatch a heat resistance of min 260°C, lightfastness of 8 and weatherfastness of 5.

Plastika Kritis has developed Blue PS40939, which has the following characteristics:

- Carrier is PS-GP, which is fully compatible with ABS
- A selection of appropriate pigments was used, in order to achieve excellent weathering and increased heat resistance properties.
- In order to adjust the product rheology and reduce friction, a special additive was used. This

additive is compatible with styrenic polymers.

- The overall pigments concentration in the masterbatch recipe was optimized, in order to achieve the required opacity, while keeping the cost at reasonable levels.

Blue PS40939 was approved by the customer. Color masterbatches of various shades based on the same design philosophy are available upon customer request.



Picture 3:  
Kritilen® Blue PS40939 is the preferred masterbatch for the coloration of a well-known plastic tool box

## SPECIAL EFFECT COLOR MASTERBATCHES ENRICH THE GLOBAL COLOR PRODUCT PORTFOLIO

The Plastika Kritis R&D Department wants to react proactively and proposes new color ideas to customers, before they come and ask themselves. Based on input that is given by suppliers (new pigments development) but also taking advantage of our colormatching experience, the Plastika Kritis colorists have developed an interesting new product line of special effect masterbatches, mainly suitable for styrenic polymers or polyolefins.

This product line is consisting of five interference shades (Kritilen FX7747, FX7737, FX7717, FX7767 and FX7757) and four colored pearlescent shades (Kritilen FX7760, FX7754, FX7755 and FX7753) with shades ranging from pearlescent gold to blue.

The silky effect of these interference colors makes them ideal for cosmetics packaging, shaving blades parts etc. The pearlescent masterbatches, on the other hand, exhibit brilliant

and intense shades, which are suitable for bottles, thermoforming containers or fancy injection molded articles.

These masterbatches have already been presented to international customers and received very positive feedback. Similar developments will be designed and proposed to other customers and for different end applications, on a regular basis in the future.



Picture 4: Impressive special effect masterbatches for a unique color effect

## NEW KRITILEN® MASTERBATCHES FOR RECYCLED POLYOLEFINS ARE LAUNCHED

The use of recycled polyolefins becomes more intense in times when the prices of virgin polymers rise. Processor seek for cheap recycled polymers, which, however, demonstrate quality instability and inferior performance versus the virgin ones.

Plastika Kritis offers a product line of masterbatches that aspire to improve the properties of recycled polyolefins and enable processors to use even some inferior recycled grades, that are found at very competitive prices. This product portfolio includes:

- **Kritilen® DC500 and DC451:** They are desiccant masterbatches used in recycled streams containing a lot of

moisture. The recommended let down ratio is 0.5% -2.0%, depending on the moisture level. DC451 is a cost efficient version, as it contains calcium carbonate in combination with the active ingredient.

- **Kritilen® DE0558:** It contains a selected grade of zeolite, which acts as an odor neutralizer. The recommended let down ratio is 3% -20%.
- **Kritilen® AO1105:** It contains a very strong package of primary and secondary antioxidants for preventing oxidation and crosslinking, an odor neutralizer and wax for decreasing the melt

viscosity. The recommended addition rate is 2.5%.

- **Kritilen® AO1205:** It contains a very strong package of primary and secondary antioxidants for preventing oxidation and crosslinking, an odor neutralizer and a special compatibilizer, which helps when the recycled polyethylene contains some proportions of polypropylene or polyamide. The recommended addition rate is 3%-5%.

All above products are based on a LLDPE carrier and are available for tests to recycled polymer producers or the end processors using recycled polyolefins.

**“Plastika Kritis offers a product line of masterbatches that aspire to improve the properties of recycled polyolefins and enable processors to use even some inferior recycled grades, that are found at very competitive prices.”**

## SPECIAL WHITE MASTERBATCHES PROTECT BOTTLED MILK QUALITY

Milk is a valuable and popular drink in Europe, where across the continent seven out of ten Europeans drink it regularly. But the packaging of milk is challenging because the product is very sensitive and easily destroyed by light, microbes and air. There have been used many packaging solutions for this sensitive product, such as multilayer HDPE bottles and carton packs for ESL (Extended Self Life) and UHT (Ultra High Temperature) milk, in order to decrease the production cost.

In warm climate countries like Spain, UHT milk is preferred due to high costs of refrigerated transportation and "inefficient cool cabinets". UHT is less popular in Northern Europe and Scandinavia, particularly in Denmark, Finland, Norway, Sweden, the United Kingdom and Ireland. It is also less popular in Greece, where fresh pasteurized milk is the most popular type of milk. In Greece though, ESL and UHT milk gains more and more market share. A recent development in milk packaging is the use of mono-layer PET bottles, which have helped the dairy to present an innovative, appealing and

environmentally-friendly packaging. The combination of PET and UHT technology has provided a long shelf life. PET has significant advantages compared with other milk bottling materials. It offers better protection from odors than HDPE. Special PET grades and additives allowed the production of a lighter, resilient and more cost effective than the traditional 1-litre HDPE bottle for UHT milk. Nevertheless, this was not possible to accomplish until recently, because no functional light barriers existed for mono-layer PET. Light causes photo-oxidation of riboflavins (B2 and B12 vitamins) and secondary auto-oxidation of milk fats. As a result, the nutritional value and the organoleptic properties

(odor and taste) of the milk deteriorate. It must be noted that even slight changes in odor and taste are not acceptable by the consumers. Recent studies have proved that the most harmful wavelengths are between 380nm and 550nm, but for optimum conservation, it is also important to hold light penetration between 500nm and 700nm below 2%.

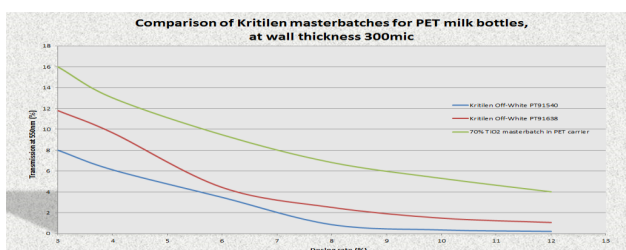
Plastika Kritis offers a special product line for the coloration of PET white milk bottles, consisting of the following masterbatches:

- **Kritilen® Off-White PT91540:** This masterbatch provides the necessary light barrier according to the re-

quirements mentioned above, for UHT mono-layer milk bottles at an addition rate of 7%-8% (see Picture 6). These addition rates assure that the light transmittance at 550nm is below 2% and, thus, riboflavins and milk fats are protected. Off-White PT91540 is also recommended to be used for ESL PET milk bottles at an addition rate of 3%-4%.

- **Kritilen® Off-White PT91638:** It can be used for both UHT (at addition rates 9%-10%) and ESP (at addition rates 5%-6%) PET milk bottles. It imparts a slightly different undertone than PT91540 to milk bottle.

Due to their special design, these masterbatches perform much better when used for the coloration of white PET bottle versus a typical 70% TiO<sub>2</sub> masterbatch based on a PET carrier, at the same addition rate. Especially, at addition rates of 7%-8%, PT91540 gives slightly lower transmittance than other well-know competition products.



Picture 5: Transmittance curves at 550nm at wall thickness of 300mic—Comparison of PET based Kritilen masterbatches versus a 70% TiO<sub>2</sub> PET based masterbatch

## CARBON BLACK FROM TIRES SCRAP IS USED IN A "GREEN" BLACK KRITILEN® MASTERBATCH

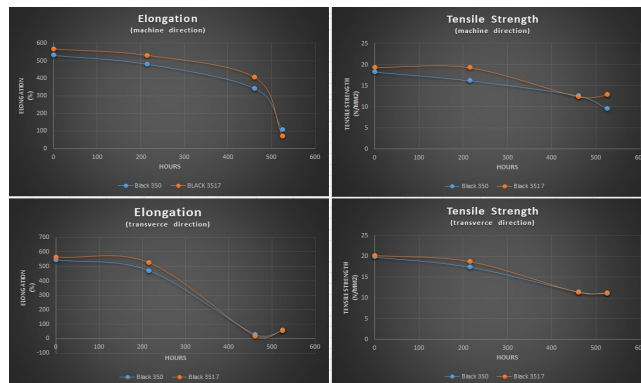
Plastika Kritis uses, among others, a recovered carbon black produced from post consumer rubber products, such as tires. This grade complies with EU 10/2011, according to the Fresenius Institute.

Plastika Kritis has developed a new masterbatch, called Kritilen® Black 3517 (containing this recovered carbon black grade in a polyethylene carrier) and has compared it with the well-known Kritilen® Black 350 (50% SRF carbon black in a polyethylene carrier). LDPE films with 6% Black 3517 and 6% Black 350 and thickness at 150mic were produced and placed in a Q-UV for aging.

Before and after the UV exposure, the films mechanical properties

were measured in order to compare the degree of degradation. Film samples were measured for mechanical properties after 215hr, 461 and 525hr of exposure.

The elongation and tensile strength are shown in below charts (for both machine and transverse direction):



Picture 6: Kritilen® Black 3517 contributes in reducing the use of natural recourses by using a carbon black grade recovered from tires.

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