TECHNICAL PRODUCT INFORMATION

®Vinnolit K 707 E | Vinnolit K 707 E GreenVin®
in Color Masterbatch for PVC

Advantages in rigid formulations at a glance

Using ®Vinnolit K 707 E as a base polymer in color master batch will result in

- Better impact strength
- Higher gloss
- More stable heat deflection temperature
- Reduction of pigment dosage (up to 20% possible)
- No change of lubrication behavior compared to other base materials like flexible PVC or non-PVC plastics/waxes

Detailed Description

A color master batch is widely used in the PVC industry as a way to enhance a product. The master batch normally contains highly concentrated pigments plus a liquid, wax or other polymeric carrier. It is typically added on line at the extruder, injection molder or in the final mixing stage. The carrier holds the color pigments together to avoid dust development while assisting with an even distribution of color throughout the plastic. The master batch allows the processor to be precise in the dosage while maintaining a clean work environment.

The action and efficiency of the pigments depend heavily on proper distribution in the master batch. The carrier must allow an effective release of the pigment in the mix cycle and later in the finished article.

Common carriers for PVC color master batch processing, apart from liquids and waxes are flexible PVC (PVC plus plasticizer) or EVA (ethylene-vinyl acetate). In rigid applications, and especially in rigid extrusion these carriers have some disadvantages:

- Waxes impact the lubrification and can influence the extrusion behavior in an unwanted way. Like plasticizers they also have a negative impact on the heat deflection/distortion temperature
- EVA decreases the gloss of extruded profiles
- Plasticizers in flexible PVC impact the properties in the finished profiles, especially the heat deflection temperature

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Advantages for ®Vinnolit K 707 E as a polymer base in color master batch

®Vinnolit K 707 E is a grafted co-polymer containing 50% acrylic rubber grafted with 50% PVC.

- There are no plasticizers present, that lower the heat deflection temperature
- The high melt viscosity of ®Vinnolit K 707 E allows a perfect dispersion of the pigment in the color master batch as well as in the finished articles. Depending on the kind of pigment a reduction of up 20% of the dosage is possible
- The acrylic rubber also works as impact modifier and can improve the impact strength
- Long term weathering data confirms excellent weathering stability of ®Vinnolit K 707 E
- There is no negative impact on gloss or heat deflection temperature

The effects are shown in the table below.

Formulation	Reference TiO_2 - white	Standard standard color batch	Enhanced color batch Vinnolit K 707 E
®Vinnolit S 3268 (S-PVC)	95	95	95
®Vinnolit K 707 E (Impact modifier)	10	10	10
Bäropan R 90901 Stabilizer	3,6	3,6	3,6
Kronos 2220 Titaniumdioxid	4	-	-
Hydrocarb 95T (Filler)	8	8	8
Standard color batch (based on EVA)	-	6	-
High performance color batch based on ®Vinnolit K 707 E	-	-	6
Test results			
Impact strength [kJ/m²] DIN ISO 179-1	24,38	17,28	102,4
Impact strength [kJ/m²] RAL 716-1, 23°C	53	25,1	55,2
Gloss 60°C [scale divisions] DIN ISO 67530	50,9	35,2	50,6
Heat deflection Vicat A [°C] DIN EN ISO 306	89	87,5	88,6

A standard formulation with no color (only titanium dioxide and filler) is compared to a formulation containing standard color master batch based on EVA and a high performance color master batch based on ®Vinnolit K 707 E.

Standard color master batch (based on EVA)

- negative influence on the impact strength (loss of 30 to 50% of performance)
- lower gloss (35.2 instead of 50.9 scale divisions)

Significantly better performance is achieved with the color master batch containing ®Vinnolit K 707 E. The ®Vinnolit K 707 E is not only the base carrier for the color master batch, it also acts as an impact modifier by lifting the finished product into the range of high impact strength.

- No loss, but gain in impact strength (102.4 instead of 24.38 kJ/m2)
- Gloss stays on the original level of around 50 scale divisions.

More examples are referenced in:

International patent application PCT/EP2018/082584 or WO/2019/102004 (German)

Vinnolit K 707 E GreenVin® is produced with 100% renewable electricity (GOs).
See GreenVin® info sheet.

Further information and recommendations for processing can be obtained from our technical support staff and sales representatives.

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