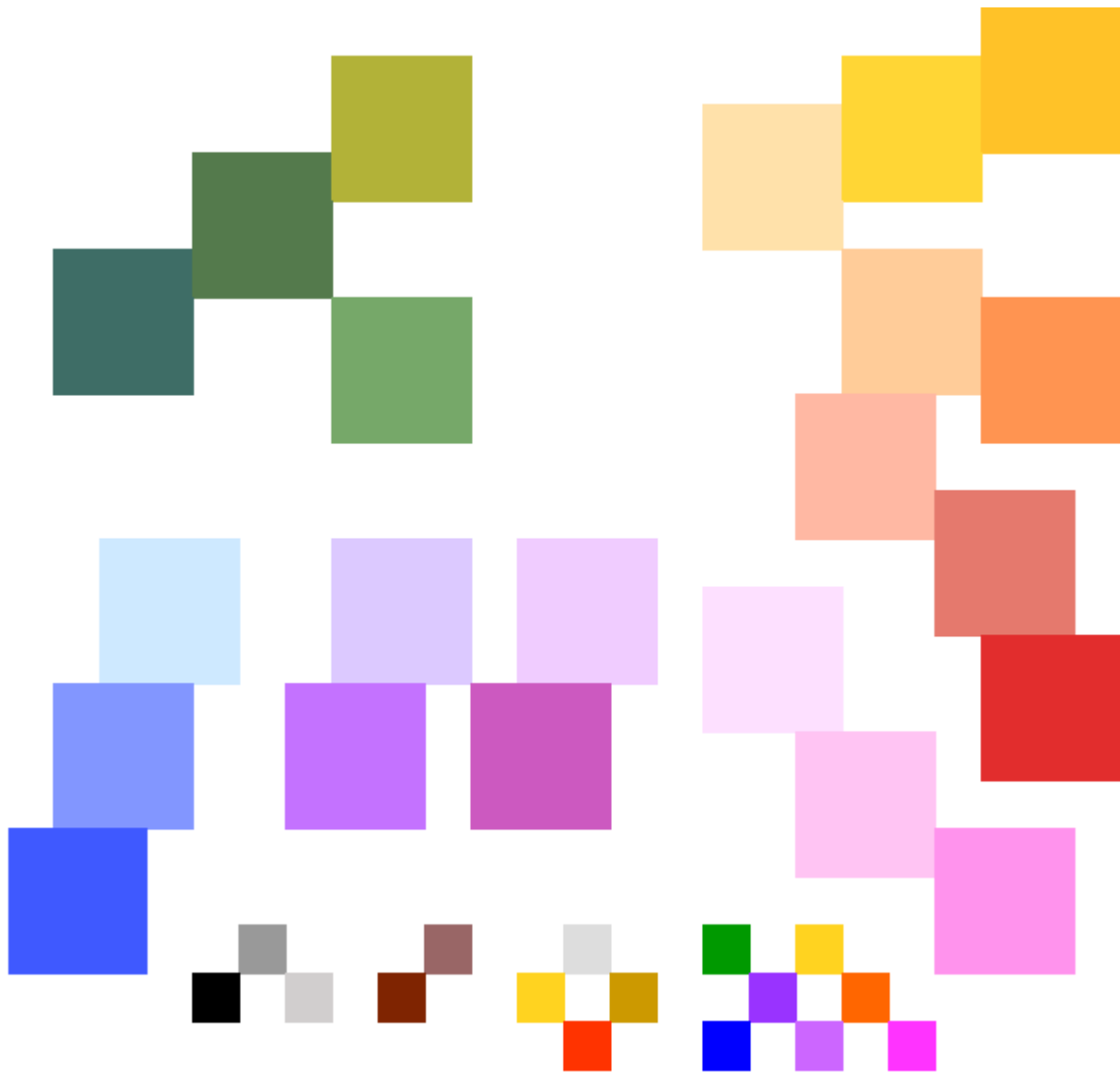


CAPROWAX P™

Masterbatches for Bioplastics/Biocomposites/Blends: PLA, PBS, PHA, PCL, CAPROWAX P™/Blends/BioMineralComposite, Bio-NFC/WPC, Casein, PVOH, Polysaccharides/Derivates, PVAc/Blends, Bio-TPE/UPR, NIPU.

As colourants are used biobased, bio-mineral and/or harmless, inorganic pigments. The carrier material is compostable and waterproof.

Colourations of bioplastics comply the specifications of DIN EN 13432.



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> COLOURATION <

After successful tests of Masterbatches with your bioplastics or composites your request will be coordinated with toll manufacturer.















Translucent to transparent, pearlescent or full covering colouration:
 Injection- / Vacuum- / Blow- and Compression-Moulding,
 Mono-/Multifilaments, Foils/Sheets, Hotmelts, NF-BioComposites,
 Thermoplastic Plasticine, Foams and Coating.

Pigments are biobased, biomineral or calcined pigmentlike Kaolin and/or of inorganic, synthetic production. They are harmless, light-fast, non-migratory, temperature stable, insoluble in water, comparable with natural, mineral pigments and already mineralised. They are low-dusty incorporated in compostable carrier material and masterbatch pellets are added to different bioplastics in a range of 0,5-6%. Processing at 90-200°C, short time up 220°C. In coloured final products content of each separate pigment is $\leq 1\%$. Colouration of bioplastics comply the specifications of DIN EN 13432.

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Masterbatches for translucent colouration

| CAPROWAX P™ | Shades | CAPROWAX P™ | Shades |
|--|---|----------------|---|
| Red 114 T |  | Red Y 121 T |  |
| Yellow 310 T |  | Green 413 T |  |
| Green 426 T |  | Green 427 T |  |
| Green AR 430 T |  | Blue G 511 T |  |
| Blue R 516 T |  | Blue AR 530 T |  |
| Violet B 616 T |  | Violet R 617 T |  |
| Violet B 630 T |  | Violet R 635 T |  |
| T: translucently Y: yellowish G: greenish B: bluish R: reddish AR: Acid resistant LP: Laboratory prototype | | | |

Addition of CAPROWAX P - Masterbatches to different bioplastics: 0,5-4%
 Injection- /Vacuum- /Blow- and Compression-Moulding, Filaments,
 Foils/Sheets, Hotmelts, Thermoplastic Plasticine, Foams and Coating.
 All shades of colour are comparable or similar to the product colours.

Application projects with pearlescent pigments

For customer testing: Masterbatches with pearlescent pigments
 Test material (LP): 50g Flakes

| CAPROWAX P™ | Shade | CAPROWAX P™ | Shade |
|-------------|---|-------------|---|
| Gold 9301 |  | Gold 9302 |  |
| Silver 9001 |  | Bronze 9701 |  |
| Rot 9101 |  | | |

Addition of Pearlescent-Masterbatches to different bioplastics: 0,5-6%
 Harmless, pearlescent pigments: Mica coated with TiO₂ and/or Fe₂O₃
 Preferably pearlescent masterbatch Silver 9001 is additive combinable with
 translucent CAPROWAX P - Masterbatches to yield diverse pearlescent
 colouration preferably in a proportion of 2:1.

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Masterbatches for chromatic, covering colouration

| CAPROWAX P™ | Shade chromatic | CAPROWAX P™ | Shade chromatic |
|------------------------|-----------------|-------------------------------|-----------------|
| Red 111 | | Red 112 | |
| Red FK 111 | LP | Red FK 112 | LP |
| Red 117 | | Red 115 | |
| Red FK 117 | LP | Red 115 BM ww | |
| | | Red 116 | |
| Orange 205 | | Orange 203 | |
| Orange FK 205 | LP | Orange 203 BM ww | LP |
| | | Orange 204 | |
| Yellow 312 | | Yellow 306 | |
| Yellow FK 312 | LP | Yellow 306 BM ww | |
| | | Yellow 307 | |
| Green 412 | | Green 416 ww | |
| Green 417 ww | | Green 418 ww | |
| Green FK 440 | LP | Green AR 433 ww | LP |
| Green FK 441 | LP | Green AR 435 ww | LP |
| Green 444 BM ww | LP | | |

BM: Biomineral, natural Calciumcarbonate **ww: TiO2 free**
FK: Kaolin, calcined **LP: Laboratory prototype**

Continuation next page >>>>>>>




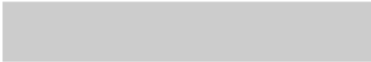









Addition of CAPROWAX P - Masterbatches to different bioplastics: 0,5-4%
 Step by step the palette of Masterbatches will be expanded or adjusted to the ecofriendly, calcined pigmentlike Kaolin (FK) as white pigment.

With calcined Kaolin (FK) brightened colourations of different BioPlastics or BioComposites content max. 0,1 % natural TiO2. The biomineral, natural Calciumcarbonate, is used as a white pigment with gentle covering brightening.

All shades of colour are comparable or similar to the product colours.

Covering colouration: Injection-/ Vacuum-/ Blow-/ Compression-Moulding, Foils/Sheets, Hotmelts, NF-BioComposites, Plasticine, Film, Foams, Coating

Masterbatches for achromatic, covering colouration

| CAPROWAX P™ | Shade achromatic | Description |
|-----------------------------------|---|--|
| White 003 |  | Titandioxide |
| White C 004 BM ww |  | natural Carbonate |
| White FK 005 |  | Kaolin, calcined |
| Grey 820 |  | Titandioxide / Iron Oxide Black |
| Grey 821 BM ww |  | natural Carbonate / Iron Oxide Black |
| Grey V 825 BM bb ww |  | natural Carbonate / vegetable Carbon |
| Grey FK 822 |  | Kaolin, calcined / Iron Oxide Black |
| Grey FKV 823 bb |  | Kaolin calcined / vegetable Carbon |
| Grey FK 824 S |  | Kaolin calcined / Iron Oxide Black (S) |
| Black 801 |  | Iron Oxide Black |
| Black V 802 bb |  | vegetable Carbon (E 153) |
| Black 803 S |  | Iron Oxide Black (S) |
| Black V 804 bb |  | vegetable Carbon (technically) |

V: vegetable Carbon **bb: biobased** **BM: Biomineral, natural Calciumcarbonate**
FK: Kaolin, calcined **ww: TiO2 free**
LP: Laboratory prototype **S: heat stable up to 220°C**

Addition of CAPROWAX P - Masterbatches to different bioplastics: 0,5-4%
 Step by step the palette of Masterbatches will be expanded or adjusted to the ecofriendly, calcined pigmentlike Kaolin (FK) as white pigment.
 With calcined Kaolin (FK) brightened colourations of different BioPlastics or BioComposites content max. 0,1 % natural TiO2. The biomineral, natural Calciumcarbonate, is used as a white pigment with gentle covering brightening.

All shades of colour are comparable or similar to the product colours.
Covering colouration: Injection-/ Vacuum-/ Blow-/ Compression-Moulding, Foils/Sheets, Hotmelts, NF-BioComposites, Plasticine, Film, Foams, Coating

Your order of CAPROWAX P™ - Masterbatches

After a successful test with samples at customers your request will be manufactured batchwise by toll manufacturer.

CAPROWAX P™

COLOUR PALETTE

See colour palettes page 3-6: **Shades of colours + code**

Technical samples: Up to 4 samples a 50g pellets free of charge or more material on request/counting as well buttons of colouration with CAPROWAX P™ 6006 material.

| | |
|-------------------|--------------------------------------|
| Supply quantities | 100 kg |
| +/- 25 kg: | 200 kg |
| | 500 kg |
| | 25 kg PE-Bags in carton or on palett |

After your selection you will get an offer about location-based, direct delivery.

| | |
|---|-----------------------|
| Market area: | European Union |
| Prices: | According to offer |
| Payment conditions: | According to offer |
| Delivery date: | 6 - 7 weeks |
| Miscellaneous: | Product infos and SDS |
| Test material of new formulations (LP): | 50g Flakes |

Informations, quote requests and orders at

Albrecht Dinkelaker

Polymer and Product Development

Blumenweg 2

info@polyfea2.de

D 79669 Zell im Wiesental

Fon: ++49 7625 91 84 58

Banking details/Finance office: On request

VAT-No.: DE165 604 009

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Applications with CAPROWAX P™ materials

Injection moulding



Masterbatches
with compostable carrier material

Vacuum forming Foil / Sheets



Hotmelts
Thermoplastic plasticine

Monofilamente



Nature Fibres
BioComposites

Blow moulding



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Masterbatch

CAPROWAX P™ Blue G 510

Compostable carrier material: Bio-Dry-Blend CAPROWAX P 6006-C65 (Intermediate)

Sample material

Customs-Tariff-No.: 3907 99 90

Customer information

Fon: +49 7625 91 84 58

info@polyfea2.de

www.caprowax-p.eu

Product example

Albrecht Dinkelaker

Polymer- and Product Development

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Properties / Data / Description

| | | | | |
|-------------------------|-----------------|-------------------|----------------------------|--------------|
| Form | a) 36.08.PV.006 | mm | Pellets, Diameter:1,5-3,0/ | Size:2,0-3,5 |
| Content of pigments | b) | % | 25,0 | |
| Colour Index | PB 29 | | Ultramarine Blue | |
| Colour Index | PW 6 | | Titandioxide | |
| Colour description | c) | | blue, greenish, covering | |
| Lightfastness | d) | | 7-8 | |
| Bulk density | DIN EN ISO 60 | g/l | 754 | |
| Density | DIN EN ISO 1 | g/cm ³ | 1,21 | |
| Residual Humidity (LOD) | 105°C/1h | % | < 0,3 | |
| Softening beginning | DSC | °C | 57-63 | |
| Remark | | | sensitive to acids | |

a) internal test norm / b) Formulation with weighing protocol

c) 2% Masterbatch in CAPROWAX P 6006 / d) Data of pigment producer

Based on the biological sources different values of measurement could be occur

Description

CAPROWAX P™ Blue G 510, a masterbatch with harmless, light-fast, non-migratory, temperature stable, insoluble in water, inorganic pigments, which are comparable with mineral pigments. Low-dusty incorporated in a compostable carrier material. Coloured bioplastics comply the specifications of DIN EN 13432

Carrier material CAPROWAX P 6006-C65: *) calculated

83,7%* organic carbon from biobased resources

Total amount of organic carbon: 71,4%*

A compostable carrier material - as dry-blend-intermediate - is modified with additives in accordance to DIN EN 13432 and is comparable with the tested material at MFPA Weimar

MFPA Weimar Test certificate: P31/029-05

CAPROWAX P® 6006-00-000 (DIN EN 13432)

No food or feeding stuff Ecofriendly composition

GM-free, no content of starch or PLA

Without content of aromatic or nitrogenous substances

Biopolymers and use

Covering colouration of bioplastics/biocomposites/blends as PLA, PBS, PHA, PCL, CAPROWAX P™/Blends, Bio-NFC/-WPC Polysaccharides/Derivates, Casein, PVAc/Bioplastic-Blends, PVOH, Bio-TPE, Bio-UPR, NIPU. For use as colouring additive suited for products of agriculture, garden and environment.

Introduction to recipe Processing temperatures Drying pellets on demand

1-2% Masterbatch (MB) homogenous intermixing with pellets

90-200°C (194-392°F) / short time up to 220°C (428°F)

50°C (122°F)/12h Avoid heating melt >90°C over long time

Examples of application

Products of injection moulding, vacuum-/blowforming, foils, hotmelts, NF-BioComposites, support material, substrate, coating

Storage/Instruction

Avoid heat and moisture, storage in original containers only

B O W

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R A I N

S O I L

CAPROWAX P™ 6006-00-000

Bio-Dry-Blend **CAPROWAX P 6006-C65** is produced as a intermediate in powder form and as a compostable carrier material for masterbatches applications. Modified with additives in accordance with DIN EN 13432 and comparable with **CAPROWAX P™ 6006**, certified by MFPA, University Weimar
Test material: **CAPROWAX P® 6006**

Test certificate No.: P31029-05 / DIN EN 13432

83,7% content of organic carbon* from biobased resources

Total content* of organic carbon: 71,4% *) calculated

Portions of carrier material in masterbatches are 60-85%

Maximum range of thermal stability: 180-220°C (356-428°F)

Processing >150°C predrying at 48-50°C/12 h

Ecofriendly: "Free of aromatics and nitrogen, renewable raw materials without genetically modified growing". No content of starch or PLA. No content of food and feeding stuff. (12/2018)

Product surfaces of **CAPROWAX P™** - Material are self-cleaning with water or rain just like lotus flowers.

Quick degradation in compost or slow rotting in soil works into biomass, mixtures of soil-related, mineral, inorganic substances, carbon dioxide and water. In the course of composting the brown to black colour of compost or humus change over to the coloured bioplastic and the colourful appearance disappears. Under anoxic/denitrifying conditions degradation occurs fully.

Product information, quote request, order at:

Albrecht Dinkelaker

Polymer- and Product Development

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info@polyfea2.de

Ideas

increase to

pellets

www.caprowax-p.eu

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