General Properties

Chemical Structure  Isoindoline Yellow
Colour Index Part I  P.Y. 139
Colour Index Part II  56298
CAS Number  36888-99-0
Physical Form  Powder
Colour Shade  Yellow

Preparations

Euthylen™ Yellow 18-4105 C 4
Lufilen™ Yellow 18-4105 C 4
Luprofil™ Yellow 18-4105 C 4
Euvinyl® C Yellow 18-4102
Eupolen® Yellow 18-4101

(Other) preparations can be made on special request.

Colouristical Properties Org.

<table>
<thead>
<tr>
<th>Property</th>
<th>PVC 1/3 SD</th>
<th>PVC 1/9 SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hue Grade</td>
<td>76.8</td>
<td>79.7</td>
</tr>
<tr>
<td>Chroma</td>
<td>74.2</td>
<td>57.6</td>
</tr>
<tr>
<td>Red. Ratio</td>
<td>7.7</td>
<td>24.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Property</th>
<th>PE-LD 1/3 SD</th>
<th>PE-LD 1/9 SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hue Grade</td>
<td>76.5</td>
<td>78.9</td>
</tr>
<tr>
<td>Chroma</td>
<td>76.2</td>
<td>57</td>
</tr>
<tr>
<td>Red. Ratio</td>
<td>8.3</td>
<td>22.1</td>
</tr>
</tbody>
</table>

Ease of Dispersion  <10

Physical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>1.6 g/cm³</td>
</tr>
<tr>
<td>Bulk Density</td>
<td>0.3 g/cm³</td>
</tr>
<tr>
<td>Index of pH</td>
<td>5-6</td>
</tr>
<tr>
<td>Conductivity</td>
<td>90 µS/cm</td>
</tr>
<tr>
<td>Specific Surface</td>
<td>49 m²/g</td>
</tr>
</tbody>
</table>

Fastness properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat stability</td>
<td>240 °C</td>
</tr>
<tr>
<td>Light fastness</td>
<td>8</td>
</tr>
<tr>
<td>Weather fastness</td>
<td></td>
</tr>
</tbody>
</table>
Migration fastness 4-5
Infl. on warping of PE-HD Little

Fastness to chemicals:
- HCl conc. >6 Months
- HCl 10% >6 Months
- H2SO4 conc. >6 Months
- H2SO4 10% >6 Months
- HNO3 conc. Instable
- HNO3 10% >6 Months
- NaOH conc. >6 Months
- Na2CO3 sat. >6 Months

Criteria for the fastness to chemicals was a possible colour change of the coloured plastic material during the storage in the test medium.

### Recommendations for applications

<table>
<thead>
<tr>
<th>Plastic</th>
<th>Suitable</th>
<th>UCC</th>
<th>Not suitable</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC-p</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVC-u</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PUR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD-PE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD-PE</td>
<td>UCC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PP</td>
<td>UCC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PS</td>
<td>UCC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SB</td>
<td>Not suitable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAN</td>
<td>Not suitable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ABS/ASA</td>
<td>Not suitable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PMMA</td>
<td>Not suitable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PC</td>
<td>Not suitable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PA</td>
<td>Not suitable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PETP</td>
<td>Not suitable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CA/CAB</td>
<td>UCC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UP</td>
<td>Suitable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Restrictions for usage
Sensitive to alkalis

UCC: Under certain conditions

### Recommendations for food applications

<table>
<thead>
<tr>
<th>Country</th>
<th>Suitable</th>
<th>UCC</th>
<th>Suitable</th>
</tr>
</thead>
<tbody>
<tr>
<td>BgVV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FDA</td>
<td>UCC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>Suitable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

UCC: Under certain conditions
Product Specification - PALIOTOL™ YELLOW K 1841

PROPERTIES
Pigment type: Isoindoline yellow
Colour Index: Pigment Yellow 139
Application: Colourant for plastics
Physical form: Powder
Storage: practically unlimited shelf life
Food packaging: approved according to "Empfehlung IX des BgVV".

SPECIFICATION
Colour tolerances: $dH^* \pm 0.7; dC^* \pm 0.7; dL^* \pm 0.7; dE^* \leq 1.0$
$da^* \pm 0.7; db^* \pm 0.7$
Strength equivalence: 100 ± 5 %
Test method: BASF test method 11.3.1

Please note: The above data will be warranted by us. These data, however, as well as the properties of any product samples do not imply any legally binding assurance of certain properties or of suitability for a specific purpose so that any liability for damages cannot be derived therefrom.
Microscopy - PALIOTOL™ YELLOW K 1841
Reflection Curve
PALIOTOL™ YELLOW K 1841

Note: The program stores curve points (see table). The diagram shows approximations.

Test medium: PVC-p

All data is subject to the producer's disclaimer
LUCOLOR 2.0 - BASF Colourants for Plastics (Oct.1998) - Printed: 8/24/99
Particle Size Distribution
PALIOTOL™ YELLOW K 1841

Note: The program stores curve points (see table). The diagram shows approximations.

Susp. Fluid: H2O
Disp. Agent: Tetronic
Mixer Time: 60 s
Median Size: 1.03 μ
CILAS
Heat Stability
PALIOTOL™ YELLOW K 1841

Test medium:
PE-HD (Lupolen 6031M)

According to DIN 53772

Note: The program stores curve points (see table). The diagram shows approximations.
Weather fastness
PALIOTOL™ YELLOW K 1841

Test medium:
PE-HD (Lupolen 6031M)
According to
DIN 53387, 54001
Light fastness
PALIOTOL™ YELLOW K 1841

Test medium:
PE-HD (Lupolen 6031M)
According to
DIN 53387, 54004

Steps blue wool scale

1:50 1:10 0.2% 0.05%
Name of product: PALIOTOL™ Yellow K 0961 HD

C.I. No. / Name: 56 300 / C.I. Pigment Yellow 138, Quinophthalone yellow
CAS No.: 30125-47-4
EINECS No.: 250-063-5

Name of product: PALIOTOL™ Yellow K 1841

C.I. No. / Name: 56 298 / C.I. Pigment Yellow 139, Isoindoline yellow
CAS No.: 36888-99-0
EINECS No.: 253-256-2

Chemical nature: One of these, a greenish yellow pigment based on C.I. Pigment Yellow 138, has a quinophthalone structure with eight chlorine atoms in the molecule. Another, C.I. Pigment Yellow 139, contains an isoindoline ring structure bonded to two symmetrical substituents by methine bridges.

Toxicology: The data for these pigments indicate that they do not have any acute toxic effects, nor do they irritate the skin and mucous membranes.

Ecology: Because they are chemically inert and practically insoluble in water, PALIOTOL™ pigments are not environmentally hazardous. They can be removed from waste water by mechanical means. PALIOTOL™ pigment waste should be disposed of in an incineration plant. In the case of the chlorine-containing pigment based on C.I. Pigment Yellow 138 this may result in the emission of hydrogen chloride, which must be removed from the flue gas by appropriate means.

Water hazard class: WGK 1 (slightly water hazardous according to German legislation - KBwS - group classification organic colours)

Labelling: The above listed products are not dangerous substances in the sense of the German Ordinance on Dangerous Substances or of corresponding EU regulations.

Classification as dangerous goods: The products are not classified as hazardous under transport regulations.

MAK value: The general threshold value for dust, i.e. 6 mg/m³, must be observed. (Proposal of the MAK commission for the alveolar passing dust fraction, i.e. 1.5 mg/m³, is not yet valid) (Germany)

Heavy metal content: PALIOTOL™ pigments do not contain any lead, cadmium, chromium(VI) and mercury compounds in their formulations. The sum of the total contents of these elements, according to tests on standard samples, is less than 100 mg/kg. It is thus below the limit in the EU packaging directives and the American CONEG model. The average values for the total contents of technically unavoidable impurities are as follows:
Antimony < 20 mg/kg  Chrome < 50 mg/kg
Arsenic < 20 mg/kg  Selenium < 20 mg/kg
Lead < 20 mg/kg  Mercury < 20 mg/kg
Cadmium < 30 mg/kg  Zinc < 20 mg/kg
Prim. aromatic amines < 100 mg/kg

The metal levels quoted are based on the detection limit of the analytical
determination method used (X-ray fluorescence spectroscopy). The actual
levels may lie well below these values.

**Halogen content**

**PALIOTOL™** Yellow K 0961 HD contains appr. 41 % organically combined
chlorine. Yellow K 1841 does not contain any chemically combined halogen.

**Food legislation**

According to tests on standard samples (Type 8081) the listed **PALIOTOL™**
 pigments conform to the demands on purity in the following food legislation
(see also "Heavy metal content"):

- **Europe:** Resolution AP (89)
- **Germany:** BgVV Empfehlung IX., 190. Mitteilung vom 1.6.1994
- **France:** Brochure No. 1227
- **Italy:** Decreto Ministeriale dated 21.3.1973
- **Spain:** Resolución del 4.11.82 de la Subsecretaría de Sanidad
- **USA:** **P**ALIOTOL™ Yellow K 0961 HD:
  - Listed on the FDA List (21.CFR, § 178.3297,
    max. level: 1 % in polymers).
  - **P**ALIOTOL™ Yellow K 1841: Not listed.
    Current use only on evidence of "non migration".

**Toys**

According to tests on standard samples (Type 8082), the listed **P**ALIOTOL™
 pigments conform to the demands on purity in the European standard on
 Tox.; i.e. EN 71, Part 3.

**Registration status**

The components of the products are listed in the chemical inventories of the
following countries: EU (EINECS), USA (TSCA), Canada (DSL), Japan
(MITI), Australia (AICS), Korea (ECL), Philippines (PICCS, Final Version
1995), and Switzerland (BAGT No. 612200, Class free).

**Other legislation on chemicals**

The products do not fall under the provisions of the agreement on chemical
wepons and do not contain any substances that are mentioned in the
German Ordinance on the Prohibition of Certain Chemicals
(ChemVerbotsV). They are produced without using substances that destroy
ozone (Montreal Agreement - Ozone Depleting Substances).

**TA Luft**

Para 3.1.3 - Total dust (Germany)

Further information can be found in our Material Safety Data Sheets, Technical Information Bulletins and
in the Product Safety Info No. 9 "Organic pigments containing chlorine in the heat of discussion". The
Product Safety Department in our Organic Pigments Division will gladly reply to your queries and can be
reached under the following address:

BASF AG  Dr Oberlinner  Tel. ++49 (0)621-60-99232
EFO/FS - J 550  Mrs Paymal  Tel. ++49 (0)621-60-40681
D-67056 Ludwigshafen, Germany  Mr Schwanse  Tel. ++49 (0)621-60-71503
Fax: ++49 (0)621-60-40673

The information submitted in this publication is based on our current knowledge and experience. It is the responsibility of those to whom we supply our products to ensure that any proprietary rights and existing laws and legislation are observed.