The Lumina® Royal Family at a glance

- Mica-based interference pigments with best chromaticity of all competitive products
- Improved particle size distribution

Lumina® Royal Blue: Most chromatic, reddish-blue

Lumina® Royal Aqua: Most chromatic, greenish-blue with high lightness

Lumina® Royal Indigo: Shade between Pyrisma® Indigo and Violet

Lumina® Royal Copper: Highest chroma in semi-transparent effect pigments

Lumina® Royal Magenta: Shade between Pyrisma® Magenta and Violet
Lumina® Royal Blue

- Most chromatic blue interference pigment based on mica
- Flat, uniform surfaces for high brilliancy
- Prevailed already into Automotive shades
Coloristic properties

Lumina® Royal Exterior Blue 6803H

<table>
<thead>
<tr>
<th>Test system</th>
<th>h</th>
<th>C*</th>
<th>L*</th>
<th>DH*</th>
<th>DC*</th>
<th>DL*</th>
<th>DE*</th>
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<td>Lumina® Exterior Red Blue 6303D</td>
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Coloristic properties

Lumina® Royal Blue 9680H

Test system
90:10 black reduction in a solvent-borne binder (polyester/CAB, medium solid)

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<th>DH*</th>
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<td>Lumina® Red Blue 9B30D</td>
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Coloristic properties

Lumina® Royal Exterior Blue 6803H
In combination with blue organic pigments

Test system
50 parts P.B.60 / Heliogen
45 parts blue interference pigment
5 parts black pigment FW 200
In a solvent-borne CAB/polyester
Coloristic properties

Lumina® Royal Exterior Blue 6803H
Impact on a mid-blue metallic styling

Mid-blue metallic styling
40 parts blue mica (6803H or 6303Z or Pyrisma® Blue)
10 parts aluminum
37.2 parts P.B.60
9.9 parts Heliogen® Blue L 6950
1.2 parts Cinquasia® L 4540
1.7 parts Cromophtal® D 5800
Coloristic properties

*Lumina® Royal Exterior Blue 6803H*
Impact on a deep reddish-blue styling

- Styling with Lumina® Royal Exterior Blue
- Styling with Exterior Mearlin® Super Blue 6303Z
- Styling with best competitive, blue interference pigment

**Reddish-blue styling**
- 20 parts blue mica (6803H or 6303Z or Pyrisma® Blue)
- 20 parts Mearlin® Super Violet 5303Z
- 50 parts P.B.60
- 8 parts Heliogen® Blue L 7081D
- 2 parts Carbon Black FW 200
Summary

Lumina® Royal Exterior Blue 6803H and Lumina® Royal Blue 9680H

- Lumina® Royal Blue is a highly chromatic reddish-blue (Note: The greenish-blue side is covered by Lumina® Royal Aqua)
- Lumina® Royal Blue shows extreme chroma in combination with P.B.60, alpha-CuPc (15:1, 15:2) and epsilon-CuPc (P.B., 15:6)
- For combination with greenish-blues (beta-Blue, 15:3, 15:4), Lumina® Royal Aqua is the best choice
- Brilliant and smooth appearance thanks to optimized particle size distribution
Particle size distribution
H vs. D-fraction

Lumina® Royal Blue 6803H and 9680H

The H fraction has an optimized d90 value
## Technical data

### Lumina® Royal  Exterior Blue 6803H

<table>
<thead>
<tr>
<th>Chemical composition</th>
<th>mica</th>
<th>53.7 % by weight</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>TiO₂ (Rutile)</td>
<td>27.4 % by weight</td>
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<tr>
<td></td>
<td>SnO₂</td>
<td>1.6 % by weight</td>
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<tr>
<td></td>
<td>SiO₂ (amorphous)</td>
<td>14.8 % by weight</td>
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<td>Surface treatment</td>
<td>Polymer</td>
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<td>Physical form</td>
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<td>white powder</td>
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<td>Physical data*</td>
<td>pH</td>
<td>7.7 (10 % aq. suspension)</td>
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<tr>
<td></td>
<td>Conductivity</td>
<td>31.6 µS/cm (10 % aq. suspension)</td>
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<tr>
<td></td>
<td>Bulk volume</td>
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<tr>
<td></td>
<td>Density</td>
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<td>Total solids</td>
<td>&gt; 99.5 % by weight</td>
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<td>Particle size distribution**</td>
<td>d₁₀</td>
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<tr>
<td></td>
<td>d₅₀</td>
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<td></td>
<td>d₉₀</td>
<td>34 µm</td>
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<tr>
<td>Fastness to solvents</td>
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<td>practically insoluble in all solvents</td>
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<tr>
<td>Chemical resistance</td>
<td>HCl (2%)</td>
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<tr>
<td>(in coatings)</td>
<td>NaOH (2%)</td>
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<tr>
<td>Heat stability</td>
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<tr>
<td>Weathering data***</td>
<td>2 years Florida</td>
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<td>accelerated 4000 h</td>
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<td>Humidity resistance****</td>
<td>24 h, 70°C</td>
<td>no whitening</td>
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<tr>
<td></td>
<td>10 d, 40°C</td>
<td>gloss and DOI after 24 h 100 % cross hatch after 1 h 0</td>
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* Physical data determined at lot 207553
** Particle size distribution (Vol %) determined with Mastersizer 2000 Ver 5.12G (Malvern Instruments)
*** test in a black reduction (pigmentation 90 pts. EH 402 + 10 pts. FW 200) acc. DIN EN ISO 4892-2
**** test in a black reduction (pigmentation 90 pts. EH 402 + 10 pts. FW 200, solventborne basecoat/clearcoat)
# Technical data

## Lumina® Royal Blue 9680H

<table>
<thead>
<tr>
<th>Chemical composition</th>
<th>mica</th>
<th>55.1% by weight</th>
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<tbody>
<tr>
<td>TiO₂ (Rutile)</td>
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<td>SnO₂</td>
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<td>SiO₂ (amorphous)</td>
<td>15.2% by weight</td>
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**Physical data**
- pH: 9.2 (10% aq. suspension)
- Conductivity: 29 µS/cm (10% aq. suspension)
- Bulk volume: 2.95 l/kg
- Density: 2.88 g/cm³
- Total solids: > 99.5% by weight

**Particle size distribution**
- \( d_{10} \): 10 µm
- \( d_{50} \): 19 µm
- \( d_{90} \): 34 µm

**Fastness to solvents**
- Practically insoluble in all solvents

**Chemical resistance**
- HCl (2%): no change
- NaOH (2%): no change

**Heat stability**
- > 200 °C

**FDA-approval**
- Yes

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* Physical data determined at lot 207468
** Particle size distribution (Vol %) determined with Mastersizer 2000 Ver 5.12G (Malvern Instruments)
Lumina® Royal Aqua

- Most chromatic effect pigment
- Greenish-blue with high lightness
Coloristic properties

Lumina® Royal Exterior Aqua 7803H
Higher lightness and higher chroma

Test system
Solvent-borne base coat / solvent-borne clear coat
90 parts blue interference pigment
10 parts Pigment Black 7
Coloristic properties

Lumina® Royal Aqua 9780H
Higher lightness and higher chroma

Test system
Solvent-borne base coat / solvent-borne clear coat
90 parts blue interference pigment
10 parts Pigment Black 7
## Coloristic data

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### Test system

90:10 black reduction in a solvent-borne binder (polyester/CAB, medium solid)
Lumina® Royal vs. best competitive interference pigments

**Test system**
90:10 black reduction in a solvent-borne, medium-solid system (polyester/CAB)
Particle size distribution

Lumina® Exterior Aqua 7303H vs. Lumina® Royal Exterior Aqua 7803H

- Lumina® Exterior Aqua 7303D
  - $d_{10} \approx 12 \, \mu m$
  - $d_{50} \approx 22 \, \mu m$
  - $d_{90} \approx 44 \, \mu m$
  - $d_{100} \approx 73 \, \mu m$

- Lumina® Royal Exterior Aqua 7803H
  - $d_{10} \approx 9 \, \mu m$
  - $d_{50} \approx 18 \, \mu m$
  - $d_{90} \approx 33 \, \mu m$
  - $d_{100} \approx 60 \, \mu m$

Measured with Masterizer 2000 Version 5.12G
S/N: MAL101491
Malvern Instruments Ltd.
**Particle size distribution**

**Lumina® Aqua 9A30D vs. Lumina® Royal Aqua 9780H**

- **9A30D**
  - $d_{10} \sim 12 \, \mu m$
  - $d_{50} \sim 22 \, \mu m$
  - $d_{90} \sim 44 \, \mu m$
  - $d_{100} \sim 73 \, \mu m$

- **9780H**
  - $d_{10} \sim 9 \, \mu m$
  - $d_{50} \sim 18 \, \mu m$
  - $d_{90} \sim 33 \, \mu m$
  - $d_{100} \sim 60 \, \mu m$

Measured with Masterizer 2000 Version 5.12G
S/N:MAL101491
Malvern Instruments Ltd.
Summary

Lumina® Royal Exterior Aqua 7803H and Lumina® Royal Aqua 9780H

- Greenish-blue interference pigments with highest chroma and lightness
- Improved particle size distribution
- Both are standardized
- Production process under control with high-quality consistency
Lumina® Royal Indigo

- High chroma pigment
- Shade between Pyrisma Indigo and Violet
Majestic effects with Lumina® Royal

Lumina® Royal Exterior Violet 5803H
vs. the state of the art in a 90:10 black reduction (PE/CAB-MS)

Lumina® Royal Exterior Indigo is designed for extremely chromatic shades in combination with transparent organic pigments such as Paliogen Blue or Cinquasia Violet.
Particle size distribution of Lumina® Royal Exterior Indigo 5803H vs. Mearlin® Exterior Super Violet 5303Z

**Lumina® Royal Exterior Indigo 5803H**
- $d_{10} \sim 9 \mu m$
- $d_{50} \sim 18 \mu m$
- $d_{90} \sim 33 \mu m$
- $d_{100} \sim 60 \mu m$

**Mearlin® Super Violet 5303Z**
- $d_{10} \sim 9 \mu m$
- $d_{50} \sim 19 \mu m$
- $d_{90} \sim 37 \mu m$
- $d_{100} \sim 73 \mu m$

Measured with Mastersizer 2000 Version 5.12G
S/N: MAL 101491
Malvern Instruments Ltd.
Lumina® Royal Copper

- Highest chroma in semi-transparent effect pigments
- Extraordinary sparkle behavior
Lumina® Royal Copper

Lumina® Royal effect pigments benefits

- Better color purity, strength, and brilliancy and sparkle compared to pigments of the same class
- New, extremely high chroma shades can now be created
- Extension of color space for new styling options and greater formulation flexibility
- The option to use reduced levels in standard effect shade formulations

Areas of application

- Exterior grades: e.g. aerospace, automotive OEM and refinish coatings, consumer electronics, building and construction
- Standard grades: e.g. consumer electronics, kitchen and major appliances, household goods, sporting goods, cosmetic and personal care packaging, print packaging, powder and coil coatings, wall coverings, and specialty applications
# Lumina® Royal Copper Benefits

## Primary properties
- Higher chroma
- Pronounced sparkle
- Narrower particle size distribution
  - $d_{90}$ less than 35 µm

## Properties in application
- Extension of color space
  - Highest chroma
  - Strong sparkle
- Higher impact on resulting shade through higher color intensity
- Luxurious browns and warm metal tones

## Customer benefits
- New modern styling options to differentiate from competitors
- Greater formulation flexibility to optimize formulations
- Reduction of pigment load to gain flexibility
- Benefit in printing and packaging applications
Coloristic properties

Lumina® Royal Copper vs. state of the art

- 45 parts Lumina® Royal Copper
  50 parts Paliogen® Red L 3885
  5 parts FW 200

- 45 parts Lumina® Copper
  50 parts Paliogen® Red L 3885
  5 parts FW 200

- 90 parts Lumina® Royal Copper
  10 parts FW 200

- 90 parts Lumina® Copper
  10 parts FW 200
Lumina® Royal Copper
Sparkle characteristics

Total sparkle grade of Lumina® Royal Copper vs. state of the art

Lumina® Royal Copper has about 60% stronger sparkle effect than Lumina® Copper
Lumina® Royal Magenta

- Shade between Pyrisma Magenta and Violet
**Lumina® Royal Magenta Benefits**

<table>
<thead>
<tr>
<th>Primary properties</th>
<th>Properties in application</th>
<th>Customer benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Magenta interference effect pigment</td>
<td>- Extension of color space</td>
<td>- New modern styling options to differentiate from competitors</td>
</tr>
<tr>
<td>- Extreme chroma</td>
<td>- Tinting in blue and red shades</td>
<td></td>
</tr>
<tr>
<td>- Narrower particle size distribution</td>
<td>- Blues go red</td>
<td></td>
</tr>
<tr>
<td>- d₉₀ less than 35 µm</td>
<td>- Reds go blue</td>
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<td></td>
<td>- Higher impact on resulting shade through higher color intensity</td>
<td>- Greater formulation flexibility to optimize formulations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Reduction of pigment load to gain flexibility and achieve more economical solutions</td>
</tr>
</tbody>
</table>
Lumina® Royal range vs. best competitive interference pigments

- Lumina® Exterior Royal Aqua 7803H
- Lumina® Royal Exterior Blue 6803H
- Lumina® Royal Exterior Indigo 5803H
- Lumina® Royal Exterior Magenta EH 5000 (4803H)
- State-of-the-art blue
- State-of-the-art indigo
- State-of-the-art violet
- State-of-the-art magenta

Test system
90 parts effect pigment
10 parts FW 200

Lumina® Royal is superior in chroma in all shade areas
Lumina® Royal Magenta completes the series of “Blue Royals” at the reddish end
**Coloristic properties**

**Lumina® Royal Exterior Magenta EH 5000 (4803H) vs. best competitive pigments**

- **Lumina® Royal Exterior Magenta EH 5000 (4803H) : FW 200**
  90 : 10

- **State-of-the-art violet : state-of-the-art magenta : FW 200**
  35 : 35 : 20

**Test system**
90 parts effect pigment
10 parts FW 200

Lumina® Royal Magenta exhibits the highest chroma in black reduction
Coloristic properties

Lumina® Royal Exterior Magenta EH 5000 (4803H)
In a magenta styling

Lumina® Royal Exterior Magenta EH 5000 (4803H) : L 4540 : FW 200 = 45 : 50 : 5

State-of-the-art violet : state-of-the-art magenta : L 4540 : FW 200 = 17.5 : 27.5 : 50 : 5

Test styling
45 parts effect pigment
50 parts Cinquasia® Magenta L 4540
5 parts FW 200

Lumina® Royal Magenta exhibits the highest chroma in pigment combinations
**Coloristic properties**

**Lumina® Royal Exterior Magenta EH 5000 (4803H)**
More chromatic than the state of the art

Hue matches based on combinations of Lumina® Royal Indigo with Lumina® Red have lower chroma
Hue matches based on combinations of state-of-the-art violet and magenta have lower chroma

**Test styling**
45 parts Lumina® Royal Exterior Magenta EH 5000
50 parts Cinquasia® Magenta L 4540
5 parts FW 200

Lumina® Royal Magenta unmatched by state-of-the-art effect pigments
Styling options

<table>
<thead>
<tr>
<th>Lumina® Red 4303D</th>
<th>Lumina® Royal Exterior Magenta EH 5000 (4803H)</th>
</tr>
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<tbody>
<tr>
<td>50 pts Paligen® Red L 3885</td>
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<tr>
<td>45 pts Lumina® Red 4303D</td>
<td>45 pts Lumina® Royal Ext. Magenta EH 5000 (4803H)</td>
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<tr>
<td>5 pts Carbon Black FW 200</td>
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<tr>
<td>50 pts Irgazin® Rubine L 4025 (TR)</td>
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<tr>
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<td>5 pts Carbon Black FW 200</td>
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<tr>
<td>50 pts Paligen® Blue L 6480</td>
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</tbody>
</table>

Lumina® Royal Magenta in combination with organic pigments leads to brilliant effect shades between Lumina® Red and Royal Indigo
Please get in touch with your local account manager

Marketing Pigments for Automotive Coatings
150 years

BASF
We create chemistry