New Basonat® Polyisocyanate for Faster Handling

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BASF polyisocyanates for 2k waterborne coatings

2k waterborne coating

Polyol + Polyisocyanate = Coating

**A-Component**
- Polyol

**Crosslinker**
- Polyisocyanate

**Properties**
- Large influence by polyol, since main component
- Plays decisive role in overall performance by complementing properties of dispersion
- E.g. hardness, dry speed, resistance, appearance, influenced by both components
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Polyisocyanate building blocks

Diisocyanate

OCN—R—NCO

High Vapor Pressure
Toxicity

HDI – Hexamethylene diisocyanate

IPDI – Isophorone Diisocyanate

BASONAT®
Aliphatic Polyisocyanate

Functionality
Stability

HDI Trimer

Viscosity, Chemical Drying
Hardness

IPDI Trimer

Hardness, Physical Drying
Viscosity
Technical Solution: PIC modification via reaction with a reactive emulsifier

Chemistry

$\text{H} \quad \text{Emulsifier} \quad \rightarrow \quad \begin{array}{c} \text{NCO} \\ \text{OCN} \end{array} \quad \begin{array}{c} \text{NH-CO} \\ \text{Emulsifier} \end{array} \quad \begin{array}{c} \text{NCO} \\ \text{OCN} \end{array}$

Dispersibility

Emulsifier acts as:
- a surfactant
- a protecting layer

Dispersible via mechanical or hand mixing

„Pot-life“ of several hours

Aqueous system

Dispersible via mechanical or hand mixing

„Pot-life“ of several hours
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Playing with the toolbox...

- Ionic
- Non-ionic
- Chemically Incorporated
- Physical Mixture

⇒ Selection of building blocks to fulfill a multitude of demands

- Monomers: HDI and IPDI
- Various types of oligomers
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... to meet diverse requirements

From Waterborne “Standard”...

Basonat® HW 100

NH-CO – Emulsifier

OCN

NCO

Basonat® LR 9056

Handling

Better incorporation
Less foam

Basonat® LR 9080

Hardness & drying time

Basonat® LR 9056

Basonat HW 100

Basonat LR 9056

Basonat LR 9080
# BASF Polyisocyanates for 2k waterborne coatings

## Water Emulsifiable Basonates

<table>
<thead>
<tr>
<th>Basonat®</th>
<th>HW 100</th>
<th>HW 180 PC</th>
<th>LR 9056</th>
<th>LR 9080*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solids Content [DIN EN ISO 3251]</td>
<td>100 %</td>
<td>79-81%</td>
<td>100 %</td>
<td>79-81%</td>
</tr>
<tr>
<td>NCO (%) [DIN EN ISO 11909]</td>
<td>16,5 – 17,5</td>
<td>13,0 – 14,0</td>
<td>17,5 – 18,5</td>
<td>11,5 – 12,5</td>
</tr>
<tr>
<td>Viscosity (mPas, 23°C) [DIN EN ISO 3219]</td>
<td>2000 – 6000</td>
<td>450 - 850</td>
<td>1500 – 3000</td>
<td>500 - 900 (~80%)</td>
</tr>
<tr>
<td>Platinum cobalt color (Hazen) [DIN ISO 6271]</td>
<td>&lt; 100</td>
<td>&lt; 40</td>
<td>&lt; 40</td>
<td></td>
</tr>
<tr>
<td>Key Properties</td>
<td>Excellent potlife</td>
<td>Excellent potlife, better incorporation</td>
<td>Simplified Incorporation, low foaming</td>
<td>Fast drying, excellent hardness</td>
</tr>
</tbody>
</table>

* Preliminary values
## BASF Polyisocyanates for 2k waterborne coatings

### Recommended combinations with BASF Polyols for 2K wb applications

<table>
<thead>
<tr>
<th>Resin</th>
<th>Description</th>
<th>MFT [°C]</th>
<th>pH</th>
<th>Solids Content [%]</th>
<th>OH (solids) [mg KOH/kg]</th>
<th>Acid value (solids) [mg KOH/kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luhydran® S938T</td>
<td>APEO-free, good resistance to chemicals, water, blocking, good potlife</td>
<td>60</td>
<td>2.0</td>
<td>45</td>
<td>100</td>
<td>n.a.</td>
</tr>
<tr>
<td>Luhydran® S945T</td>
<td>APEO-free, good resistance to chalking, chemicals; colour brightness stability; broad compatibility</td>
<td>25</td>
<td>2.0</td>
<td>45</td>
<td>100</td>
<td>n.a.</td>
</tr>
<tr>
<td>Joncryl® OH 8311</td>
<td>Good adhesion and outdoor durability</td>
<td>50</td>
<td>7.6</td>
<td>42</td>
<td>120</td>
<td>30</td>
</tr>
<tr>
<td>Joncryl® OH 8312</td>
<td>Long potlife, low solvent levels, good chemicals, scratch and block resistance</td>
<td>48</td>
<td>2.7</td>
<td>45</td>
<td>100</td>
<td>9</td>
</tr>
</tbody>
</table>
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Basonat® LR 9080

Faster handling with long potlife and high final hardness

Basonat HW 100
Basonat LR 9056
Basonat LR 9080

Based on comparisons in
Luhydran® S 938 T
Joncryl® OH 8311
Joncryl® OH 8312
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Basonat® LR 9080 – Improved drying speed

Luhydran® S 938 T
Index: 100, r.t.

Joncryl OH® 8312
Index: 100, r.t.

Fast Surface Drying
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**Basonat® LR 9080 – Hardness Development**

Luhydran® S 938 T
Index: 100, r.t.

Joncryl OH® 8311
Index: 100, r.t.

Early Hardness for Early Handling
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Basonat® LR 9080 – Potlife Increase

Luhydran® S 938 T
Index: 100, r.t.

Joncryl OH® 8311
Index: 100, r.t.

Long Potlife

30.03.2011  Potlife determination: Drawdowns in 1h intervals after formulation; Curing: 1h, 60°C; MEK double rubs after 1d at r.t.
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Basonat® LR 9080 – Keep the gloss high...

Keeping the gloss high...

<table>
<thead>
<tr>
<th>Product</th>
<th>Gloss at 60° on b/w card</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luhydran S 938 T</td>
<td>100</td>
</tr>
<tr>
<td>Joncryl OH 8311</td>
<td>100</td>
</tr>
<tr>
<td>Joncryl OH 8312</td>
<td>100</td>
</tr>
<tr>
<td>Basonat HW 100</td>
<td>100</td>
</tr>
<tr>
<td>Basonat LR 9056</td>
<td>100</td>
</tr>
<tr>
<td>Basonat LR 9080</td>
<td>96</td>
</tr>
</tbody>
</table>

30.03.2011
BASF Polyisocyanates for 2k waterborne coatings

Basonat® LR 9080 – …and the hardness up

Luhydran® S 938 T
Index: 100, r.t.

Joncryl OH® 8312
Index: 100, r.t.

...and the hardness up
Please meet us in Hall # 7A, Booth # 411

For further questions and details please ask our technical marketing team:

Daniel Flojhar
Inge Krämer
Rainer Erhardt
Leendert Berkhout
Linda Guitman
Tunja Jung

Basonat® LR 9080

Further Information

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