Acronal® PRO & Joncryl®
Water based Resins for Metal Protection

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1. Introduction – Focus on anticorrosion primers

2. Overview of anticorrosion categories

3. Products with focus on anticorrosion primer

4. Products with focus on direct to metal
1. Introduction
Drivers for water based resins

**TREND**  Ongoing substitution of solvent based systems by water based systems

- More stringent environmental standards
  - VOC Regulations
  - Safety (low flammability)
  - Health (exposure to VOCs)

- New technology advances
  - Nanotechnology
  - Hybrid materials
  - Know-how on structure properties relationship

**Waterborne systems:** Acrylic dispersions, Alkyd Resins, Polyurethanes, 2K Epoxy ...
1. Key factors affecting film formation

- Binder system: Tg, Mw, morphology etc
- Drying conditions: RH, T, time, film thickness etc
- Optimize film formation &
- Avoid early failure of the coating
- Good substrate preparation
- Formulation: Coalescents, plasticizers, pigments etc
2. Overview anti-corrosion categories
EN ISO-12944-2

- **Low demand** 2-5 years no salt spray
  
  *Internal steel work:*
  Heated buildings passive atmospheres
  Unheated with possible condensation
  
  *External Steel*
  Rural, limited environmental factors

- **Medium demand** 5-15 years salt spray 120-480 h
  
  *Internal steel work:*
  Heated buildings with condensation
  Unheated with possible condensation
  
  *External Steel*
  Urban and industrial atmospheres
  Moderate SO₂ pollution

- **High demand** >15 years salt spray 1440 h
  
  Industrial and coastal environments
1. Introduction – Focus on anticorrosion primers

2. Overview of anticorrosion categories

3. Products with focus on anticorrosion primer

4. Products with focus on direct to metal
Application field: mid and low demand (air-drying) coatings for the maintenance, transportation and DIY segments.

Topcoat 80 µm

Aesthetics + better impermeability and weatherability

Intermediate Coat 80 µm

Barrier to moisture and aggressive chemicals + provide film thickness

Primer 80 µm

Active corrosion protection (barrier against oxygen, water and ions) + adhesion to metal surface

Steel
3. Product overview – application focus primer

c. 40 % **Binder Resin** (50% solids)

c. 45 % Pigments & Fillers (including mod. Zinc Phosphate as active Pigment)

Rest: Water and Additives (plasticizers, pigment dispersants, antifoaming agents, flash-rust inhibitor, solvents, thickeners...)

### 3. Product overview

**low demand primer, C1-C2 classification**

<table>
<thead>
<tr>
<th>Markets</th>
<th>Key Properties</th>
<th>Recommended Products</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Fast drying</td>
<td>Joncryl® 1532</td>
</tr>
<tr>
<td></td>
<td>• Economical</td>
<td>Joncryl® 1537</td>
</tr>
<tr>
<td></td>
<td>• Broad Spectrum Adhesion</td>
<td>Joncryl® 1555</td>
</tr>
<tr>
<td></td>
<td>• Sandability</td>
<td></td>
</tr>
</tbody>
</table>

**WORKHORSE**

**Joncryl® 1532**
- Fast drying, early water resistance
- Low amount of surfactant

**Joncryl® 1537**
- improved hardness and salt spray resistance

**Joncryl® 1555**
- very good block resistance, improved adhesion
3. Product overview
low demand, C1-C2 Classification

- Seed polymer dissolved in alkaline solution
- 2\textsuperscript{nd} stage polymerization

<table>
<thead>
<tr>
<th>Products</th>
<th>NVC %</th>
<th>MFT °C</th>
<th>pH</th>
<th>Tg °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joncryl® 1532</td>
<td>51</td>
<td>20</td>
<td>7.8</td>
<td>14</td>
</tr>
<tr>
<td>Joncryl® 1537</td>
<td>46</td>
<td>45</td>
<td>8.4</td>
<td>46</td>
</tr>
<tr>
<td>Joncryl® 1555</td>
<td>45</td>
<td>12</td>
<td>7.6</td>
<td>core-shell</td>
</tr>
</tbody>
</table>
### 3. Product overview
medium demand primer, C2-C3 classification

<table>
<thead>
<tr>
<th>Markets</th>
<th>Key Properties</th>
<th>Recommended Products</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• C2-C3</td>
<td>Acronal® PRO 761</td>
</tr>
<tr>
<td></td>
<td>• Early Rain</td>
<td>Acronal® LR 8977</td>
</tr>
<tr>
<td></td>
<td>• Corrosion and Humidity resistance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• C3 - C4</td>
<td>Acronal® PRO 80</td>
</tr>
<tr>
<td></td>
<td>• High Corrosion and Humidity resistance</td>
<td></td>
</tr>
</tbody>
</table>

**WORKHORSE**

**Acronal® PRO 761**
ecological APEO free version of Acronal® S 760

**Acronal® LR 8977**
improved hardness & corrosion resistance, higher PVC

**Acronal® PRO 80**
improved barrier and inhibitor for water
### 3. Product overview
medium demand primer, C2-C3 classification

<table>
<thead>
<tr>
<th>Products</th>
<th>NVC</th>
<th>MFT °C</th>
<th>pH</th>
<th>Tg °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acronal® PRO 761</td>
<td>50</td>
<td>22</td>
<td>9.5</td>
<td>~20</td>
</tr>
<tr>
<td>Self crosslinking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acronal® LR 8977</td>
<td>50</td>
<td>37</td>
<td>7.5</td>
<td>~35</td>
</tr>
<tr>
<td>Self crosslinking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acronal® PRO 80</td>
<td>50</td>
<td>22</td>
<td>8.5</td>
<td>~17</td>
</tr>
<tr>
<td>Core shell</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. **Acronal® PRO 80**

barrier & inhibiting binder

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**Substrate:** CRS  
**DFT:** ca. 80 µm

Acronal® LR 8977  
self crosslinking acrylic disp.

400 h

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Acronal® PRO 80  
Improved film formation, barrier properties & corrosion inhibition  
acrylic disp., core-shell

700 h
4. Heubach Active Pigment
Acronal® PRO 80 at DFT 90 µm

720 h Salt Spray Test
acc. to ISO 9227: 2006-10 / ASTM B 117-09

920 h Climate Chamber
acc. to DIN 50 017/ ASTM D 2247-02
3. Performance overview
Primer

- **VOC**: High
- **Salt Spray resistance**: 80, 761, 1555, 8977
- **Early Rain resistance**: 80, 761, 1555, 8977
- **Humidity resistance**: 80, 1555, 761, 8977
- **Hardness**: 80, 1555, 761, 8977
- **Block resistance**: 80, 761, 1555, 8977
3. Product overview
Positioning of primer

- **Acronal® PRO 80**
  - 720 h
  - barrier & inhibition

- **Acronal® LR 8977**
  - 400 h

- **Acronal® PRO 761**
  - 320 h

**Primer formulation, actively pigmented**
Substrate: CRS DFT: ca. 80 µm
2. Product overview – application topcoat / direct to metal

**Application field:** light duty (air-drying) coatings for the maintenance, agriculture / earthmover and do-it-yourself segment among others.

**Steel**

- DTM 25-40 µm

- Chemical and UV resistance, lower anti corrosion properties
4. Product overview – DTM & Topcoats

<table>
<thead>
<tr>
<th>Markets</th>
<th>Technology</th>
<th>Key Properties</th>
<th>Recommended Products</th>
</tr>
</thead>
</table>
| DTM / Topcoats | Self-crosslinking | • Durability  
                      |                               | Acronal® PRO 761              |
|                |               | • Adhesion                            | Acronal® LR 8977              |
|                |               | • Scratch resistance                  | Joncryl® 8322                 |
|                | OH functional |                                      | Joncryl® 8300                 |
|                |               |                                      | Joncryl® 8312                 |
|                |               |                                      | Luhydran® S 945 T             |
4. Product Overview – DTM & Topcoats

<table>
<thead>
<tr>
<th>Products</th>
<th>Technology</th>
<th>NVC %</th>
<th>MFT °C</th>
<th>pH</th>
<th>Tg °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joncryl® 8322</td>
<td>RC Acrylic</td>
<td>41</td>
<td>31</td>
<td>8.3</td>
<td>-</td>
</tr>
<tr>
<td>Acronal® PRO 761</td>
<td>Conventional Acrylic</td>
<td>49-51</td>
<td>22</td>
<td>8.5-10.0</td>
<td>~20</td>
</tr>
<tr>
<td>Acronal® LR 8977</td>
<td>Conventional Acrylic</td>
<td>50</td>
<td>37</td>
<td>8.5</td>
<td>~35</td>
</tr>
</tbody>
</table>

**Joncryl® 8322**
- self-crosslinking
- high gloss and hardness

**Acronal® PRO 761**
- ecological APEO free dispersion

**Acronal® LR 8977**
- improved hardness
## Product range DTM / Topcoats

<table>
<thead>
<tr>
<th>Products</th>
<th>Technology</th>
<th>NVC %</th>
<th>MFT °C</th>
<th>pH</th>
<th>Tg °C</th>
<th>Hydroxyl Number on Solids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joncryl® 8300</td>
<td>OH Functional</td>
<td>43.5</td>
<td>&lt;15</td>
<td>9.6</td>
<td>20</td>
<td>42</td>
</tr>
<tr>
<td>Joncryl® 8311</td>
<td>OH Functional</td>
<td>42</td>
<td>50</td>
<td>7.6</td>
<td>67</td>
<td>120</td>
</tr>
<tr>
<td>Joncryl® 8312</td>
<td>OH Functional</td>
<td>45</td>
<td>48</td>
<td>2.7</td>
<td>67</td>
<td>100</td>
</tr>
<tr>
<td>Luhydran® S 945T</td>
<td>OH Functional</td>
<td>40-46</td>
<td>60</td>
<td>1.5-2.5</td>
<td>64</td>
<td>100</td>
</tr>
</tbody>
</table>

**Joncryl® 8300**
WORKHORSE for amino resin oven curing

**Luhydran® S945T**
Broad compatibility with isocyanates and amines
good hardness
Long Live
Corrosion
PROtection!!