Putting *FUTURE into Textiles.

Primasol NF
- brilliant solutions to wetting / de-aerating –
(continuous dyeing)
Wetting / De-aerating effect

* The effect: 3-in-1 effect; well-balanced quick wetting, strong de-aerating and low-foaming actions in one product

* BASF offer: Primasol NF

* The benefits:
  * good wetting action (improve penetration) without foaming in pad process
  * increase pad pick-up; compensate uneven pretreatment
  * no adverse effect to pad roller (contains no solvent / silicone)
  * good wetting action together with de-aerating action in exhaustion process
  * good wetting action with some anti-foaming action in Indigo dyeing process
  * readily washed out; no adverse effect on subsequent finishing step (e.g. water / oil repellent finish)
Wetting / De-aerating effect

Relationship between “wetting” and “foaming / deaerating”

The better the wetting power of a wetting agent, …

the worse will be the foaming and deaerating properties

P.S. Discrepancies in pretreatment (e.g. absorbency) and variations in fabric (e.g. temperature, moisture content, etc.) can be partly compensated by the use of a good wetting agent (e.g. Primasol NF).
Selection process for “wetting agent”

Wetting power
- no good → out
- good

Foaming property
- no good → out
- good

Deaerating property
- no good → out
- good

containing antifoam?
- yes → out
- no antifoam

Primasol NF
- based on “clever” chemistry
Criteria for an ideal “wetting agent”

* Good wetting power
* Good (low) foaming property
* Good deaerating action
* Not containing antifoam (silicone- or solvent-based)

In addition, ....
* Stable to strong alkali (good for Indigo dyeing)

The brilliant solution is .... Primasol NF
Wetting / De-aerating effect

Where you need “wetting / de-aerating” effect ??

* in dye pad (continuous process)
* in the wetting box (Indigo dyeing)
* in the first bath (exhaustion / wool or package dyeing)
Primasol NF’s de-aerating effect

Material: cone of raw cotton (500 g)

- without auxiliary
- 5 g/L Primasol NF
- 5 g/L rapid wetting agent
Primasol NF’s de-aerating effect ??

Material: cone of raw cotton (500 g)

The cone starts to sink after few seconds

without auxiliary  5 g/L Primasol NF  5 g/L rapid wetting agent
Primasol NF’s de-aerating effect ??

Material: cone of raw cotton (500 g)

The cone sinks after 33 seconds

- without auxiliary
- 5 g/L Primasol NF
- 5 g/L rapid wetting agent
Primasol NF’s de-aerating effect ??

Material: cone of raw cotton (500 g)

De-aerating action / air bubbles leaving the cone

5 g/L Primasol NF
Primasol NF vs competitions

The competitions:

- rapid wetting agents
- other wetting agents
- other wetting agents with de-aerating effect
Primasol NF vs competitions

Benefits of Primasol NF vs Rapid Wetting Agents:

* much less foaming
  - low-foaming with some anti-foaming property (--> ideal for Indigo dyeing)
  - rapid wetting agents need silicone anti-foam which can cause dyeing problems (e.g. dye spot, patches on padder)
* outstanding de-aerating action
  - rapid wetting agents normally do not have de-aerating action
  - important for dyeing pile / voluminous fabrics
  - also important for package / hank dyeings
Primasol NF vs competitions

Benefits of Primasol NF vs Other Wetting Agents:

* much less foaming
  - low-foaming with some anti-foaming property (--> ideal for Indigo dyeing)
  - some wetting agents need silicone anti-foam which can cause dyeing problems (e.g. dye spot, patches on padder)

* outstanding de-aerating action
  - most wetting agents do not have de-aerating action
  - important for dyeing pile / voluminous fabrics
  - also important for package / hank dyeings
Primasol NF vs competitions

Benefits of Primasol NF vs Wetting / De-aerating agents:

* silicone-free
  - some products contain silicone antifoam as ingredient; silicone antifoam can cause dyeing problems
* solvent-free
  - some products contain solvent (e.g. polyethylene glycol ether) which is not good for the pad roller
Chemical Influence on „Foulard“ Bowl Rubber

Without auxiliary

Primasol® NF

Competitor product

unaffected Ø 27mm

(Expansion, means swelling) Ø 39mm

Ø = diameter
# Primasol NF vs competitions

<table>
<thead>
<tr>
<th>Item</th>
<th>Supplier</th>
<th>Ionicity</th>
<th>Main Chemistry</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primasol NF</td>
<td>BASF</td>
<td>anionic</td>
<td>salt of phosphoric acid ester</td>
<td>Si- / solv-free</td>
</tr>
<tr>
<td>A…..x FFC</td>
<td>Ciba</td>
<td>s. anionic</td>
<td>alkylaryl ethoxylate</td>
<td>with Si + solv</td>
</tr>
<tr>
<td>A…..I FFA</td>
<td>Ciba</td>
<td>anionic</td>
<td>alkylaryl EO sulfate</td>
<td>with solvent</td>
</tr>
<tr>
<td>C…….w PAD</td>
<td>Ciba</td>
<td>anionic</td>
<td>alkyl phosphate + FA EO</td>
<td></td>
</tr>
<tr>
<td>I…….I FFU</td>
<td>Ciba</td>
<td>anionic</td>
<td>alkylaryl EO sulfate + PEG</td>
<td>with solvent</td>
</tr>
<tr>
<td>P…..n GNS</td>
<td>Boehme</td>
<td>nonionic</td>
<td>Fatty Alcohol ethoxylate</td>
<td></td>
</tr>
<tr>
<td>S…….n AMP</td>
<td>Clariant</td>
<td>anionic</td>
<td>alkyl sulfonate+org. phosphate</td>
<td>with anti-foam</td>
</tr>
<tr>
<td>C………..n OK</td>
<td>Cognis</td>
<td>anionic</td>
<td>alkane sulfonate + FA EO</td>
<td>for Indigo</td>
</tr>
<tr>
<td>L…..I KS liq.</td>
<td>Clariant</td>
<td>anionic</td>
<td>mix of anionic surfactants</td>
<td>for vat/sulphur</td>
</tr>
<tr>
<td>Leophen RA</td>
<td>BASF</td>
<td>anionic</td>
<td>sulfosuccinate</td>
<td>rapid wetting</td>
</tr>
<tr>
<td>A…I ASN</td>
<td>Cognis</td>
<td>anionic</td>
<td>sulfosuccinate</td>
<td></td>
</tr>
<tr>
<td>S…..I SB CHT</td>
<td></td>
<td>anionic</td>
<td>sulfosuccinate</td>
<td></td>
</tr>
</tbody>
</table>
Primasol NF for Indigo

* Requirements of wetting agent for Indigo dyeing

1. Wetting property

* **Primasol NF shows outstanding wetting power when compared to the benchmark products e.g. Cottoclarin OK (Cognis, anionic), Sandozin EH2 (Clariant, anionic)**

* **Testing conditions**: at R.T. with 20 ml/L NaOH (38° Bé)

<table>
<thead>
<tr>
<th>Dosage</th>
<th>Primasol NF</th>
<th>Cottoclarin OK</th>
<th>Sandozin EH2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 g/L</td>
<td>62</td>
<td>46</td>
<td>&gt; 180</td>
</tr>
<tr>
<td>2 g/L</td>
<td>8</td>
<td>8</td>
<td>81</td>
</tr>
<tr>
<td>3 g/L</td>
<td>3</td>
<td>5</td>
<td>24</td>
</tr>
</tbody>
</table>

* Conclusion: **Primasol NF is as efficient as (if not better than) the benchmark at dosage of 2 g/L or above**
Primasol NF for Indigo

Requirements of wetting agent for Indigo dyeing

* 2. Foaming property

  * a little foam formed on the surface of the Indigo boxes is desirable
  * this thin layer of foam acts as “insulator” minimising the hydros in the dye box to be consumed by air
  * but, if foaming is too much, then it disturbs the bath stability, causing too much oxidised Indigo pigment accumulated at the foam layer
  * → soiling of padders and sky rollers
  * Primasol NF shows outstanding foaming property vs Cottoclarin OK or Sandozin EH2
Primasol NF for Indigo

* Testing conditions: **IG-Beater test, R.T., 250 ml., at 1 g/L with NaOH**

<table>
<thead>
<tr>
<th></th>
<th>Primasol NF</th>
<th>Cottoclarin OK</th>
</tr>
</thead>
<tbody>
<tr>
<td>immediately after beating</td>
<td>290</td>
<td>850</td>
</tr>
<tr>
<td>foam height (ml)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>after 30”</td>
<td>60</td>
<td>750</td>
</tr>
<tr>
<td>after 60”</td>
<td>20</td>
<td>700</td>
</tr>
<tr>
<td>after 120”</td>
<td>5</td>
<td>640</td>
</tr>
</tbody>
</table>

* Testing conditions: **IG-Beater test, R.T., 250 ml., at 1 g/L without NaOH**

<table>
<thead>
<tr>
<th></th>
<th>Primasol NF</th>
<th>Sandozin EH2</th>
</tr>
</thead>
<tbody>
<tr>
<td>immediately after beating</td>
<td>120</td>
<td>250</td>
</tr>
<tr>
<td>foam height (ml)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>after 30”</td>
<td>75</td>
<td>10 **</td>
</tr>
</tbody>
</table>

likely containing antifoam

|                      | 50          | 10 **        |

**Conclusion:** low foaming property of Primasol NF makes it an ideal wetting agent for Indigo dyeing
Thank you for your attention !!