Bio-Polishing is the controlled hydrolysis of cellulosic fibres to modify the fabric in a way that reduces the pilling tendency and increases the smoothness and softness of the finished fabric.

The Bio-Polishing process is usually applied under acidic conditions (pH 4.5-5.5), at 50-55°C and just after the bleaching process and before dyeing. The process can be applied after dyeing, but due to colour change that is unacceptable to the dyehouse, this is not preferred.

Novozymes’ latest product, Cellusoft CR, is an easy-to-use cellulase specially developed to improve Bio-Polishing in the textile industry.

Cellusoft CR gives the possibility of applying Bio-Polishing before or after dyeing. Due to its broad pH profile (5-8), you can work under different process conditions to achieve similar Bio-Polishing effects. Additionally, you can combine the Bio-Polishing process with other processes such as Bleach Clean-up and Bio-Scouring for cost optimisation.

Benefits
Cellusoft CR gives the typical benefits offered by classic acid cellulases for the Bio-Polishing process and also has several advantages over other cellulases on the market:

- Good colour retention and less cross-staining
- Can be applied in final soaping-off baths
- No need to adjust pH
- Can be used just as effectively before dyeing
- Maintains higher tensile strength
- Good Bio-Polishing repeatability due to robustness
- More forgiving in the event of pH variance
- Negative effect of core alkali minimised
• Can be combined with other enzymatic processes like Bio-Scouring, Bleach Clean-up, desizing (towelling)
• Less weight loss
• Less lint formation

Cellusoft CR vs Acid Cellulases

Usage
The Bio-Polishing process ensures that loose fibres on the fabric are dislodged. For optimum results, it is therefore important that equipment with high agitation is used to remove the loose fibres from the fabric. Suitable equipment includes jet-dyeing machines as well as aqueous fabric tumblers.

<table>
<thead>
<tr>
<th>Product</th>
<th>Temp. (°C)</th>
<th>pH</th>
<th>Dosage</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cellusoft® CR</td>
<td>40-55</td>
<td>5-8</td>
<td>0.5-2.0% NR</td>
<td>Continuous</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NR</td>
</tr>
</tbody>
</table>

Table 1.

NR – not recommended
++ - very good
+/− - suitable in certain circumstances
Application/process type
Bio-Polishing can be applied at various stages of processing and at different liquor ratios. The most common practice is to apply Bio-Polishing before or after dyeing.

Fig. 2. Bio-Polishing process with Cellusoft® CR.

Safety, handling and storage
Safety, handling and storage guidelines are provided with all products.