The most reliable calender cover
NanoPro
NanoPro represents a new composite cover design for the most challenging applications in multi-nip, super and soft calenders. In many applications the run time is still limited due to barring issues. NanoPro surpasses all other calender covers with its incomparable vibration resistance, even under challenging operating conditions, and thus reduces barring.

The new benchmark in calendering

NanoPro
The multi-layer, fiber-reinforced composite cover with homogeneous distribution of nanoparticles provides a more uniform TopLayer leading to better mechanical properties and higher wear resistance. The new dampening component in the BaseLayer significantly reduces baring. Its unique properties allow optimum performance in vibration-prone environments.

**Design of NanoPro**

- More uniform mechanical and thermal properties in TopLayer
- New vibration dampening BaseLayer
- Best adhesive system on the market
PRO vibration resistance
NanoPro provides consistent and optimum performance between regrinds in positions where vibration reduces the cover performance. NanoPro calender covers provide a reduction of vibration compared to conventional roll covers and therefore reduce barring.

PRO wear resistance
Wear resistance is almost directly proportional to run time – especially for barring sensitive positions. The homogenous distribution of nanoparticles in NanoPro covers significantly improves the wear resistance, resulting in enhanced performance.

PRO impact resistance
NanoPro covers are able to withstand further impact damages. The unique production process combined with the latest materials ensures that the functional layer reduces the crack propagation. NanoPro maintains high compressive stresses evenly over the nip and thus creates the best possible sheet characteristics.

PRO total cost of ownership
By applying NanoPro covers, the calender availability is considerably increased. The improved cover performance results in reduced downtime and maintenance cost.

Characteristics comparison
Conventional cover vs. NanoPro in %

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Standard cover</th>
<th>NanoPro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface quality</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>20%</td>
<td>0%</td>
</tr>
<tr>
<td>Operational safety</td>
<td>30%</td>
<td>100%</td>
</tr>
<tr>
<td>Damage resistance</td>
<td>40%</td>
<td>80%</td>
</tr>
<tr>
<td>Wear resistance</td>
<td>50%</td>
<td>70%</td>
</tr>
</tbody>
</table>

Influence of fillers on barring
Run time in hours

<table>
<thead>
<tr>
<th>Installation of standard cover</th>
<th>Installation of NanoPro</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 h</td>
<td>960 h</td>
</tr>
</tbody>
</table>

Acceleration (m/s²)
NipVision – making the invisible visible

NipVision enables online and real-time measurement using the latest roll cover technology to measure nip pressure, profile and temperature while the paper machine is running.

The exact processes in a nip cannot be detected when a paper machine is running and until now could not be measured. Glass fibers embedded in NanoPro and in a conventional calender cover make a live comparison of the nip pressure possible.

Excitation from the nip continues after the nip through the full revolution and is carried into the next nip cycle. The system never comes to rest, and vibrations can be reinforced.

Comparison of nip pressure

Vibrations occurring with standard calender cover

Less vibrations occurred with NanoPro
Your benefits with NanoPro

PRO perfection

- Outstanding vibration resistance due to dampening BaseLayer
- Increased calender availability
- Wear-resistant material leading to reduced crack propagation
- Reduced operation and maintenance costs
- Optimum surface quality through better fiber distribution in TopLayer leading to enhanced sheet quality