Optimal process control in the calender
Nipco™ roll systems
The timeline of an ingenious concept

**Nipco™**

The basic concept behind today’s Nipco roll was born in Zurich in 1971. A short time later, the first version of this roll was operating in a paper machine. Thousands of delivered Voith Nipco rolls are testimony to the vast experience garnered from the most diverse sectors, including many outside of the paper industry. This know-how led to new, product-oriented technology solutions for a vast variety of requirements.

The Voith Nipco rolls today – solid, reliable and maintenance-friendly roll concepts, which allow each and every user to adjust the production process according to their product requirements.
The Nipco roll principle

A Nipco roll has three key elements:
• the stationary cross shaft
• the rotating roll shell
• the hydrostatic pistons

Of these, the cross shaft is the element that supports the entire roll structure. It transmits force from the calender into the nip. The Nipco shell rotates freely over the cross shaft. Either steel or highly flexible shells are selected, depending on the application case concerned. The surface temperature of the shell is controllable. Hydrostatic pistons individually installed in the cross shaft support the freely rotating roll shell against the load from outside. With the conventional Nipco roll, these hydrostatic pistons are actuated zone-by-zone. This allows individual line load curves over the entire width of the nip – even with the smallest linear loads.

The result
Reliability and experience spanning over 40 years

The individual distributed force across the entire width of the nip, regardless of the total force or the deflection of the counter roll, creates enormous adaptation potentials for the user. Even operation with a uniform parallel working nip is possible. The individual force permits purposeful corrections, depending on the Nipco roll design. The effective width can be adapted to suit specific requirements.

Technical potentials

<table>
<thead>
<tr>
<th>Linear loads</th>
<th>20 – 15 000 N / mm</th>
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<tbody>
<tr>
<td>Speeds</td>
<td>5 – 2 200 m / min</td>
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<tr>
<td>Product widths</td>
<td>0.5 – 12.8 m</td>
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<tr>
<td>Surface temperatures</td>
<td>up to approx. 300 °C</td>
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Applications

Tougher quality requirements, increasingly larger working widths and higher operating speeds call for market-oriented technologies that guarantee the best possible production reliability.

The Nipco roll systems satisfy these criteria and are individually tailored to meet the needs of our customers. And the field of applications goes way beyond the paper industry.

From printing floor coverings or magazines to rolling steel plates or aluminum, from milling foodstuffs to finishing textiles and technical textiles.

Advantages

The use of Nipco roll systems allows the user to set individual forces in the nip. Consequently, the deflection curves of the shell can be adapted to suit the requirements concerned.

Depending on the roll design, operation with parallel nip is possible, i.e. the deflection of the Nipco roll precisely matches that of the counter roll. To generate this parallel nip, the Nipco roll shell is mounted equidistant to the counter roll, and the shell is precisely bent to the calculated deflection of the counter roll in a parabolic manner under the generated hydrostatic piston force.

Likewise, these roll types are suitable for non-woven applications, such as thermal bonding.

For flexible use in various calender systems, smoothing and printing presses, embossing calenders or with the thermal bonding calender, the ideally formed print curve also rules out the risk of local over-pressing.

A Nipco roll system can usually be retrofitted into an existing system without major conversion effort, creating an almost endless list of applications for this roll system.

If the process demands that the force distribution is varied across the entire width, the hydrostatic pistons and/or hydrostatic piston zones are controlled zone-by-zone. A different pressure is applied to each zone.

In addition, the precise limits of the working width permits a gentle transition across the edge zones in case of different material widths. This significantly improves the process result and reduces wear on the cover. With calendering, embossing, laminating and coating in particular, the individual advantages of the Nipco roll are key to a reproducible high product quality.
The Voith Group is a global technology company. With its broad portfolio of systems, products, services and digital applications, Voith sets standards in the markets for energy, oil & gas, paper, raw materials and transport & automotive.

The operating business is concentrated in four Group Divisions: Hydro, Paper, Turbo and Digital Ventures.

A large proportion of the world’s paper production is manufactured on Voith paper machines. A quarter of the energy generated worldwide from hydropower is produced with turbines and generators from Voith Hydro.

Voith’s drive components are found in applications all over the world, both in industrial plants and in road and rail vehicles, as well as on the waters. And the services and solutions provided by Digital Ventures make Voith one of the pacemakers for digital change in key global industries.

Founded in 1867, Voith employs around 19,000 people, generates €4.2 billion in sales, and operates in over 60 countries around the world.¹

¹ Excluding the discontinued operations.
1 Energy
2 Oil & Gas
3 Paper
4 Raw material
5 Transport & automotive