



Unchallenged Market Leadership – More than 300 Voith shoe presses worldwide

Shoe presses offer numerous advantages in paper and board production, both with regard to quality and quantity. Thanks to product innovations and reliability, Voith is the unchallenged market leader for shoe presses, with a 60 percent share of installations worldwide.



Thomas Augscheller

*Paper Machines Graphic
thomas.augscheller@voith.com*

Shoe press technology applications

First introduced years ago, shoe presses are now well established in the paper industry. Nearly all modern paper and board production lines of every type are equipped with shoe press technology. A shoe press is basically a module comprising two press rolls, one with press shoe and soft sleeve, and the other as mating roll. The success of this concept

depends on how well the shoe press is integrated, which is decisive for compliance with the required process and quality parameters. The basic development goal was, however, well matured high-performance shoe press modules and press roll sleeves for the highest demands and production outputs.

The first Voith FlexoNip press was commissioned in 1984 in Austria. It was followed by 46 more shoe presses of the

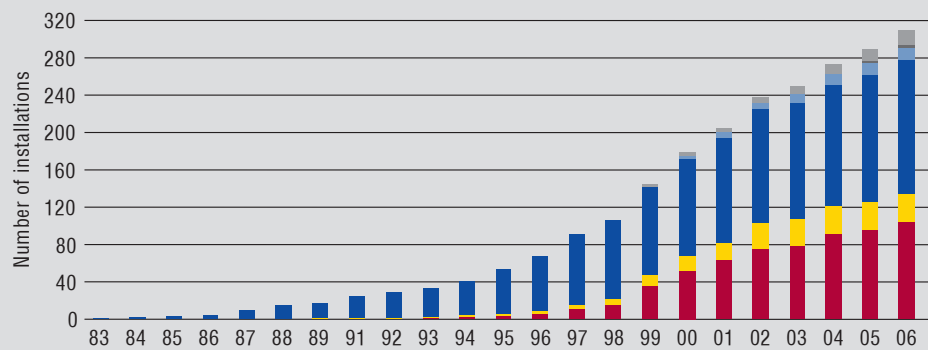


Fig. 1: Shoe press sales development.

- Pulp
- Calender
- Tissue
- Packaging paper
- Board
- Graphic grades

NipcoFlex press No. 300 sold to Aracruz Guaiba!

1



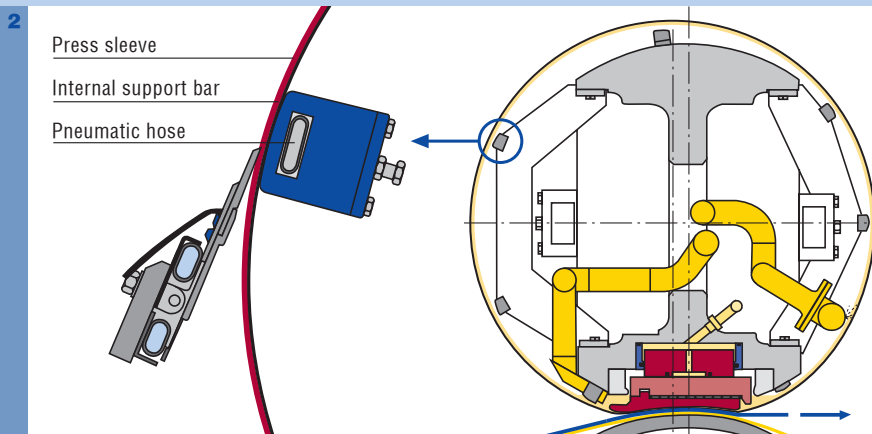
same type that are still giving excellent service. Another successful product was the Sulzer Escher-Wyss Intensa press for improving paper machine runability and production output. Thirty such shoe presses were installed in total. When Voith and Sulzer joined forces in 1994, the best press technologies developed by each company were combined into the NipcoFlex shoe press. More than 230 NipcoFlex presses have been sold worldwide since then.

As shown in Fig. 1, shoe presses were originally installed in packaging paper machines. With ongoing technical and paper technology developments, the concept was extended to new applications and performance classes. This led in 1994 to the first NipcoFlex shoe press installation for graphic paper production. Considerable success with these grades was achieved through compact press concept integration, and development of the Tandem-NipcoFlex press section, incorporating full web support and excellent drainage performance for high outputs. With the systematic development of further applications, shoe presses were also used for board and tissue production and in chemical pulp dewatering machines. In 2003 a NipcoFlex shoe press was applied for the first time outside the press section, in the form of the NipcoFlex shoe calender.

The 300th Voith NipcoFlex shoe press was sold to Aracruz Celulose in Guaiba,

Brazil. As part of a chemical pulp dewatering machine rebuild, it plays a key role in boosting production output from 400,000 to 430,000 t.p.a. of eucalyptus pulp. This press will be delivered with QualiFlex roll sleeves and is the second NipcoFlex shoe press ordered by Aracruz Celulose – a sure sign of their confidence in this well-proven technology. It is due for commissioning by the end of 2005.

NipcoFlex presses with web widths ranging from 2,600 to 10,600 mm and operating speeds of 50 to 1,912 m/min are in service worldwide to the full satisfaction of their users. In order to stay one step ahead of ongoing customer needs, a special NipcoFlex test unit is already undergoing trial runs at continuous speeds of up to 3,000 m/min. NipcoFlex presses offer customers important advantages both with regard to production output and product quality. Already 60% of all shoe press users worldwide believe in the Voith NipcoFlex shoe press, the most



reliable and well-tried technology on the market.

System optimization – Voith FlexDoc

As a process solution provider, Voith is concerned not only with machinery improvements, but also with process technology development for enhancing product quality. The complete removal of water collected in the press roll sleeve, whether blind-drilled or grooved, prior to nip re-entry is decisive for efficient web drainage. This ensures the high water removal rate required for a good moisture cross-profile.

Due to the roll sleeve flexibility, however, a conventional doctor system is not possible. Voith recognized this problem at an early stage, and solved it by installing a flexible support beam inside the sleeve to

hold it against the exterior doctor blade (Fig. 2). This support beam is brought into the operating position pneumatically, and is designed to have a stabilizing and damping effect on sleeve operation without scraping the cooling oil film off its surface.

The efficiency and simplicity of the Voith FlexDoc system go hand in hand. In addition to the water drained centrifugally from the press roll sleeve, a lot of water is also removed by the doctor blade (Fig. 3). The advantages for the machine operator are self-evident: efficient sleeve drainage increases the nip water storage capacity and enables a higher dryness. This reduces web break frequencies and increases productivity. The success of this system is confirmed by 139 reference installations and highly satisfied production managers worldwide. Voith also retrofits this technology to shoe presses supplied by others.

Mini-NipcoFlex press – a new member of the Voith press family

4

Target: New, small NipcoFlex module (Ø 770 mm)

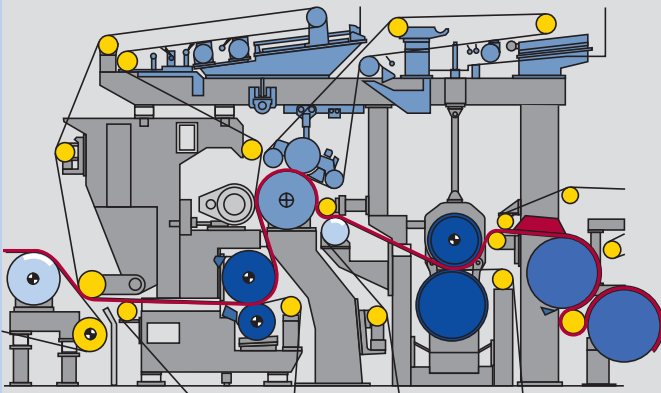
Suitable for almost all kinds of machines and rebuilds:	
Upkeep Improvement	Replacement of press rolls Increase of dryness and production output
New PMs	First Nip in DuoCentri press concept

Technical data
500 kN/m at 4,500 mm paper width

Efficient rebuild solution – Mini-NipcoFlex

Shoe presses are practically a must today for all new paper machines. This technology started however as an ideal rebuild solution for increasing existing paper machine performance. Shoe presses are now used for the majority of rebuilds, but limits are often set in such cases by roll diameters and weights. To solve this

5



problem, Voith has added a new member to the NipcoFlex shoe press family: the Mini-NipcoFlex press (Fig. 4). Despite its very small roll diameter of only 770 mm, this new shoe press has an extremely high performance of up to 500 kN/m line load with a web width of 4,500 mm.

The Mini-NipcoFlex press is an ideal rebuild solution for small to medium size machines, e.g. as replacement for an existing roll pair in the third nip of a compact press. Freestanding press versions are also possible, however, with the shoe press advantages of longer nip dwell time and adjustable line load profile can of course be fully exploited here as well. Furthermore, typical felt life in a shoe press is much longer than in a roll press.

Since the existing mating roll often limits the maximum possible line load, Voith has also developed a Mini-NipcoFlex module that also includes a mating roll. This enables full exploitation of the available line load capacity. A typical application is shown in Fig. 5, representing an ideal solution for increasing the output of a 6,000 mm web width machine by approximately 8 %.

If the machine output is limited by the dryer section, about 2 % more dryness after the press is required for a production increase of this order. In the example shown here (Fig. 6), this higher dryness and production increase can be achieved by increasing the line load in the third nip to 350 kN/m with a Mini-NipcoFlex press and suitable shoe geometry – a worthwhile rebuild investment that soon pays dividends!

6

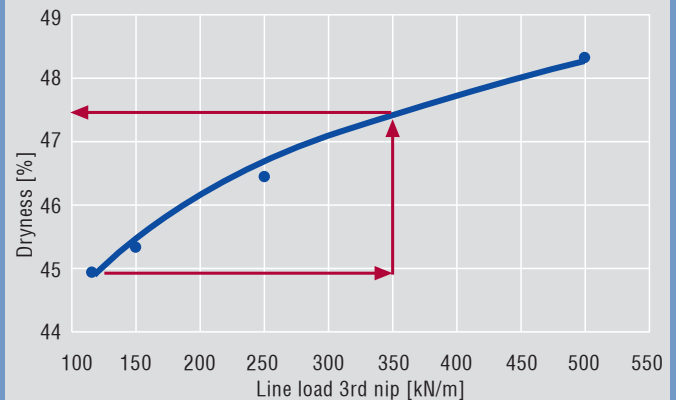


Fig. 2: FlexDoc doctor on a shoe press.

Fig. 3: Operating principle of the Voith FlexDoc.

- Mistig ahead of doctor
- High water removal – dewatering of void volume and sleeve surface
- No water before re-entering the press nip.

Fig. 4: Rounding off the product range – Mini-NipcoFlex.

Fig. 5: Typical application of a Mini-NipcoFlex module.

- For example: customer (woodfree paper grades) requires e.g. 8-10 % more output
- Solution: Mini-NFP module (with mating roll) Increase of dryness ~ 2 %
- Max. line load: with Mini-NFP much higher than with roll press.

Fig. 6: Attainable dryness increase with a Mini-NipcoFlex press.

Woodfree grades, 70-80 g/m² (15 % fillers)
 Current status:
 Duo-Centri II press
 Web width: 6,000 mm
 $v = 650$ m/min
 Line load = 70/86/117 kN/m