Experts are always seeking out new application areas for the Single NipcoFlex press.

Proven concept – not just for copy paper

Single NipcoFlex – breaking out to new paper grades

It is now more than six years since the first Single NipcoFlex press was put into operation. It quickly developed into a bestseller. Then, as now, the low investment and energy costs were especially appealing. Today seven Single NipcoFlex presses are being used to produce wood-free copy, writing, and printer paper. In the future the presses will also be able to be considered as alternatives for coated and wood-containing paper.

These days budgets for new machines and rebuilds are being cut massively, leading to the obvious desire for a low-cost but high-performance press section, which should then also be characterized by low operating and especially low energy costs. The requirements list sounds like an unattainable dream. However, installation of a Single NipcoFlex press can make this dream come true.

Apart from investment and energy savings, maintenance and clothing savings are also possible. The cost advantages of the single press are summarized in Fig. 2.

A valuable treasure trove of experience

There are currently seven Single NipcoFlex presses in operation. In August 2006, PM 1 in Docelles, France, was converted to a Single NipcoFlex. This represented a technological challenge. For one thing,

very demanding qualities, in part with high smoothness values, are made on this paper machine. For another thing, a multitude of grades are produced, meaning that speed, furnish, and additives as well as basis weight must be changed frequently. The latter, especially, was classified as critical in advance because a real test of the process stability with frequent grade changes cannot be realized on the pilot paper machine.

Khon Kaen PM 1	
Basis weight	70 g/m²
Filler content	14%
Bulk	1.30 cm³/g
Bendtsen roughness (mean)	110 ml/min
Bendtsen roughness (two-sidedness)	5%

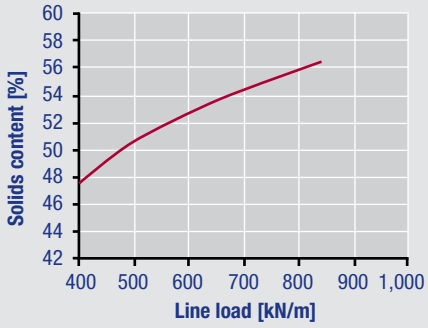

Fig. 1: Khon Kaen PM 1: The paper exhibits a high bulk with a high smoothness and a low two-sidedness at solids contents after the press of much higher than 50%.

Through the combination of the single press with two Softnip calenders, the quality specifications could be achieved. The machine speed and stability improved step-by-step, with the use of Voith press felts especially contributing to the progress. The moisture profile was significantly improved. This, in turn, enabled the moisture after the predrying section to be increased. The drying capacity thereby gained was then immediately converted to an additional increase in speed.

With the experience from the single presses that was now available, start-up of the next two new machines with Single NipcoFlex presses was nearly child's play.

In April 2008, PM 1 in Khon Kaen, Thailand, was put into operation, and in February 2009 the PM 1 in Tres Lagoas, Brazil, was started up. The stable, high solids contents of both machines made it possible to increase the speed significantly in the shortest amount of time. Thanks to the outstanding furnish, a very good bulk and a high smoothness can be achieved in Khon Kaen with the Single NipcoFlex press at extremely high solids contents. Even with the load on the press eased considerably, press solids above 50% are achieved on this machine (see Fig. 1).
Good news can also be reported from the six-year-old single press being used on PM 18 in Ruzomberok, Slovakia. It is continuously improving its production speed.

		Single NipcoFlex	Tandem NipcoFlex	DuoCentri NipcoFlex + 4th
Energy	Vacuum requirements [Nm³/h]	100%	135%	155%
	Installed drive power [kWh]	100%	190%	165%
Maintenance	Downtime	100%	130%	135%
	Press sleeves	100%	200%	100%
	Clothing costs	100%	130%	100%
	Investment costs	100%	155%	165%

Fig. 2: The cost advantages speak for themselves: Comparison of investment and operating costs for various press designs for manufacturing copy paper with no two-sidedness.

PM	Main Products	Wire Width	Max. Production Speed (Design)	Start-Up
Ruzomberok PM 18	Copy	7,300 mm	1,400 m/min	Sept. 2003
Ledesma PM 1	Copy (wf: 60–140 g/m²)	4,220 mm	1,000 m/min	May 2004
Merebank PM 31	Copy (wf: 60–100 g/m²)	6,370 mm	1,300 m/min	Sept. 2005
n.n. USA	wf: 75–90 g/m²	9,500 mm	1,200 m/min	Nov. 2005
Docelles PM1	Copy (wf: 60–160 g/m²)	4,350 mm	1,200 m/min	July 2006
Khon Kaen PM 1	Copy (wf: 60–120 g/m²)	5,850 mm	1,300 m/min	April 2008
Tres Lagoas PM 1	Copy	5,850 mm	1,250 m/min	Feb. 2009

wf=woodfree

Fig. 3: Reference list for currently installed Single NipcoFlex presses.

By now copy paper has already been produced at over 1,600 m/min. This is an impressive achievement for this paper grade and simultaneously a world record for single-nip presses. PM 18 was originally designed for a maximum speed of 1,400 m/min.

In contrast, PM 1 in Ledesma, Argentinia, is the first machine with a Single NipcoFlex that is being used in part to produce high-quality coated grades. This demonstrates the potential of this design.

Further development as a key to success

Development of a press design is never over, even after the machine has been started up. Each installation brings with it new challenges. Hence, it is important that the machine operator and the supplier are always in a dialog – even long after the start-up phase. The Voith single presses are now distributed over numerous locations around the world. Two references are in Europe, three in America, one in Africa, and one in Asia. A strong exchange of information is maintained with all customers. The corresponding service employees and technologists are always available. Through the local presence of the service employees, strong on-site support is ensured. This allows the best design regarding machine construction and clothing to be provided to every Single NipcoFlex operator.

Single NipcoFlex – what's next?

Due to the success of copy and wood-free uncoated paper, the question naturally arose as to whether or not a Single NipcoFlex could also be used for projects with other paper grades. Within the framework of an extensive development project, Voith investigated the possibilities and limitations of the Single NipcoFlex for other paper grades.

The challenges are manifold. Production of wood-free coated paper arises as the next application case. Purely in terms of the dewatering behavior and the expected pollutant load, the furnish qualities used are very similar to those used for copy paper. In extensive process trials with subsequent print tests, the quality differences in comparison with conventional press designs were investigated. The quality of the paper from the Single NipcoFlex was definitely convincing. Fears that the surface quality in particular could suffer from the hefty pressing in a single press nip were clearly crushed.

As expected, papers from various press systems differ in terms of parameters such as bulk, porosity, and internal bond strength. For this reason, for every single customer project, the advantages and disadvantages of the various design alternatives must be weighed. The single press can now also be viewed

Fig. 4: In March 2009, PM 18 achieved a world speed record for single presses by running at 1,600 m/min.

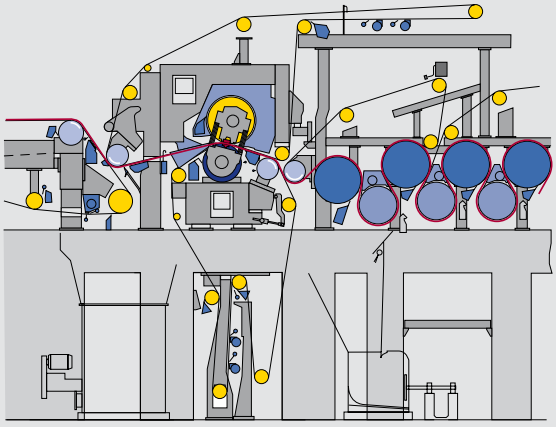

Fig. 5: Simple concept, sophisticated details: Design of the Voith Single NipcoFlex.

as an alternative to the tandem press in particular, especially if the overall machine design provides a precalender and a starch application.

Greater obstacles must be overcome in the use of the Single NipcoFlex with wood-containing grades. Considerably higher peak pressures in the press nip are necessary in order to achieve the required solids content for fast machines. Besides this, the furnish used contaminates the felts more than it does with woodfree paper. This occurs, for example, with recycled paper-containing furnish with high stickies content. Particular attention must hence be paid to the combination of clothing used and suitable machine construction during development. Voith is ideally equipped for these development types in particular. Clothing and mechanical engineering experts work hand-in-hand so that this goal can be promptly achieved.

Trials with surprising results

How high can the press solids actually be for wood-containing furnish with the use of the correspondingly adapted clothing? The answer even surprised the Voith experts.

With just a single press, newspaper could be produced on a trial scale at a speed of 2,000 m/min, with a solids content after the press being much higher than 50%. The basic requirement that a press design must fulfill for high-speed machines was, therefore, met.

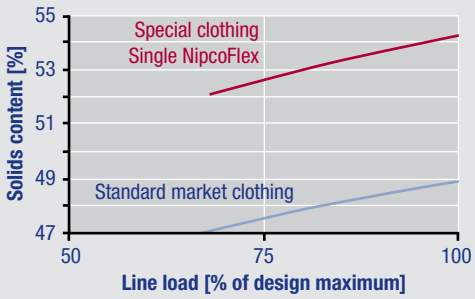

Fig. 6: Solids content after the Single NipcoFlex press on the pilot paper machine for newspaper production at 1,800 m/min.

How, though, are these high solids contents possible after a single shoe press nip?

Even in classic press systems (considerably lower), and even in the two shoe press nips of the tandem press together (barely higher), dewatering performance is achieved. Two factors are decisive for this.

The Single NipcoFlex uses a shoe length that achieves a considerably higher dwell time in the press nip than in the sum of three or four roll nips in series. In addition, the fiber web is dewatered on both sides along the entire press length. The two felts in the Single NipcoFlex have a difficult task to accomplish. They have to handle the total water and pollutant load in the press section. In doing so, they must work stably to ensure that process fluctuations have practically no effect on the dryness after the press.

The compensating effect of several press nips in series does not exist in the single press. Hence, it will still take some time before the Single NipcoFlex press also becomes a standard design for wood-containing stocks and extremely high speeds.

Despite this, in the future the Single NipcoFlex press design will increasingly come into consideration as an alternative for projects in the wood-containing area. It is simply unbeatable in terms of investment and operating costs.

On Focus: Single NipcoFlex Press

ProEnvironment ++++
ProRunnability +++
ProQuality ++
ProSpeed +++
ProSpace ++++

Section: press
Width: all
Paper grade: woodfree coated and uncoated

Contact

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