

Voith Paper

VOITH

**Twister™ – the innovative technology concept
for paper roll wrapping and conveying**



Voith – Our company



Voith is a reliable partner to essential industries. We set standards worldwide for paper making technology, power transmission, power plant equipment and for industrial services.



With annual sales of approx. € 3.3 billion, 24,000 employees and 180 locations worldwide Voith is one of the large family-owned companies in Europe.

We want to be our customers' preferred supplier and business partner

Quality, reliability and soundness are key concepts of our identity.

**These are expressed in three words:
Voith – Engineered reliability.**

The engine of our strong growth: innovative power and reliability

Voith engineers have again and again written new chapters in the history of technology. Today, Voith holds over 7000 active patents worldwide. Approximately 400 new ones are added every year.

Voith has operated in the black since its founding on January 1, 1867. The dynamic development and the growth over the last few years confirm that we have taken the right steps.

We will continue to expand our worldwide dedication to our markets.

Twister™ technology: solutions with a promising future for flexible roll wrapping

Paper manufacture is known to be a highly complex and work-intensive process. However, consistently high quality of the paper rolls supplied is the main aspect for the paper mill's customers. Roll wrapping must ensure this by offering a high degree of protection against mechanical and climatic influences.



New installations in the past few years have shown a wide and continually increasing range of roll dimensions. This makes it more difficult for paper mills to guarantee constantly high wrapping quality with conventional roll wrapping and conveying systems.

Standard systems have difficulty in fulfilling these increasing requirements. Not only the enormous space requirements of such installations, but also the extensive stocks of various wrapping paper widths with corresponding logistics are problematical, particularly with greater roll widths.

In 1996, Voith presented a new wrapping technology based on the principle of spiral wrapping: the Twister™ technology as a future-focussed and flexible wrapping concept with much lower space requirement and minimum logistics requirement, an investment with rapid return on investment.

The Twister™ technology is designed for production of up to 120 rolls per hour. Rolls of widths up to 4.50 m, diameters up to 2.50 m and an individual weight of up to 10 t can currently be wrapped with the Twister™.



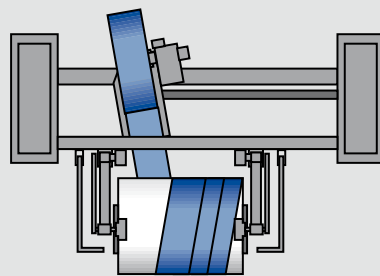
Stopover downstream of the winder – rolls ready for roll wrapping

Spiral wrapped rolls in a paper mill

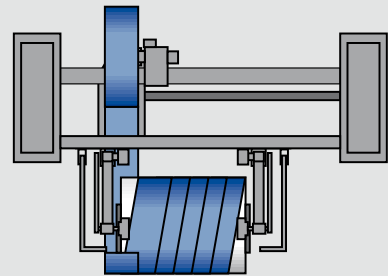
Not only paper mills but also the paper manufacturer's customers such as printing houses have accepted the wrapping principle of the Twister™ to a great extent due to its high optical and functional quality of the wrapping. The optional edge wrapping in particular offers top-grade protection during transport and storage, particularly for larger roll sizes.

The ingenious spiral wrapping principle: one wrapping paper format for all roll dimensions

The optimum protection for paper rolls is produced by enwrapping the rolls with wrapping paper and by applying inner and outer headers to the faces of the roll. This type of wrapping is standard in practically all paper mills since the high protection requirements for the valuable paper rolls can only be fulfilled in this way.



Spiral wrapping of the roll circumference



Edge protection left with crimped overlap

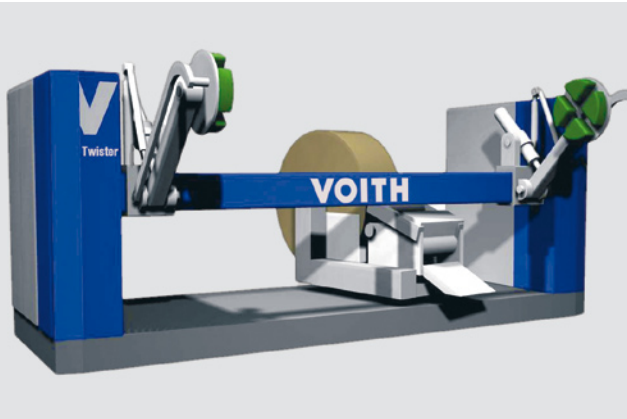
The Twister™ technology is based on the principle of spiral wrapping. Starting with the roll diameter and the required number of wrapping paper layers, the Twister™ control system calculates the set angle of the unwind unit, its lateral travel speed as well as the rotational speed of the paper roll. Thus the entire roll is wrapped in one single wrapping sequence.

The drive control system in the Twister™, a Voith patent, ensures perfect co-ordination of the drives in the wrapping paper unwind unit and the paper roll. The roll wrapping has optimum strength due to controlled web tension, without too much pressure being exerted on the paper roll.

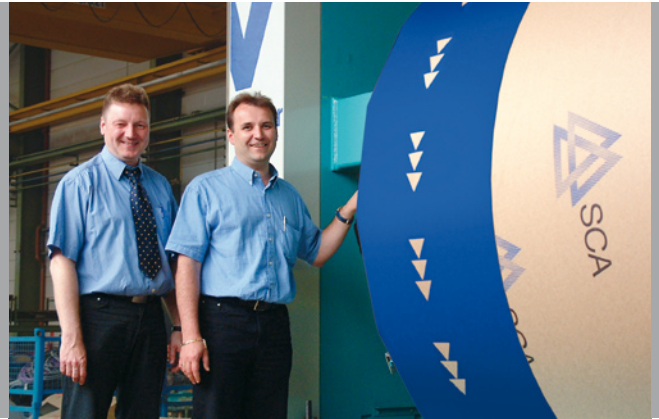
The individual wrapping layers are glued to one another by glue strips. During the wrapping process, the paper roll rotates on two carrier drums which have a patented elastic cover and this also guarantees a careful wrapping process even with higher roll weights.

In addition, the edges of the paper rolls can be even better protected. This edge wrapping can be effected in sequence or simultaneously depending on the type of installation. It is carried out parallel to the roll edges and allows a consistently optimum crimped overlap of 150 mm width for an even more stable and optically excellent wrapping quality.

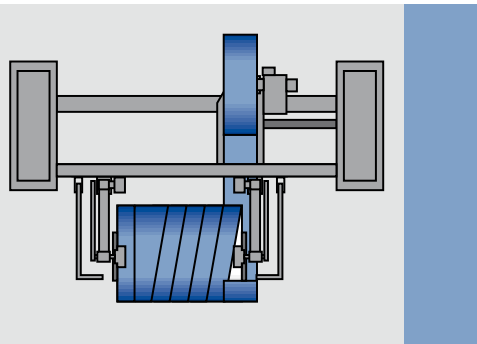
All elements of the wrapping are PE-coated Kraft paper and thus offer optimum protection against mechanical and climatic effects. Only one single wrapping paper format is used for all wrapping



The basic model: the Twister™ in the typical Voith design



Rolls wrapped using the Twister™ are not only protected to the optimum but also make a very good optical impression.



Edge protection right with crimped overlap

processes and for all roll dimensions. This has a number of advantages compared to conventional roll wrapping installations:

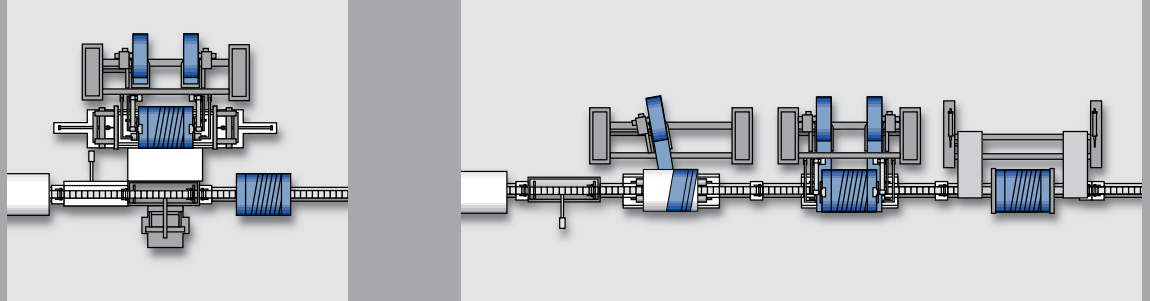
- Wrapping paper unwinders are integrated in the wrapping station; the great space requirement for some conventional unwind units, which may include as many as 12 stations in the case of a wide range of roll widths, is eliminated.
- Only one single wrapping paper format needs to be stocked, generally 500 mm wide. This format is not only easy to handle, but also offers enormous advantages in storage and logistics since wider wrapping papers cannot always be obtained at short notice.
- The optional edge wrapping protects the roll edges which, as experience tells, are particularly at risk during transport.

- The Twister™ technology is also designed to be adaptable for all future roll widths.
- Twister™ installations offer the highest degree of reliability, are operator-friendly and have a low level of maintenance. They are completely pre-assembled at the factory and subjected to extensive operational tests. This results in minimum time and low costs for set-up and commissioning.

The Twister™ technology is not only the ideal new installation but is also highly suitable as supplements to existing wrapping systems or in the upgrading of existing conveying systems due to its modular machine concept.

The modular Twister™ layout concept for flexible production solutions

The modular Twister™ layout concept is based on three basic configurations which can be extended progressively with increasing roll throughput. Thus all requirements can be implemented from the simple wrapping machine through to completely automatic installations with up to 120 rolls per hour.



The three basic layouts are the Twister™ Combi, Twister™ Center and Twister™ Line. The number of wrapping paper unwind units depends on the required production capacity.

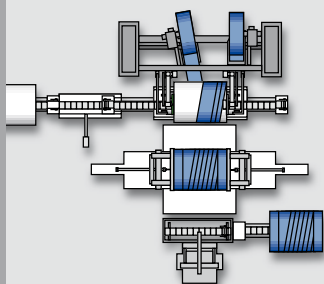
The wrapping process and the attachment of the outer headers take place in one station in the Twister™ Combi; the Twister™ Center has two separate stations configured in sequence and thus achieves greater cycle rates. The Twister™ Line is even faster since all the stations are located in series on one conveyor.

The selection of the respective installation layout depends on production specifications, such as roll throughput or also available space, particularly in the case of rebuilds.

The Twister™ Line in a completely automatic layout configuration is generally used for the highest production requirements. The increasing popularity of the Twister™ Line is also based on the careful handling of the rolls. Due to the layout, the rolls are wrapped “passing through” so to speak, without any additional ejection and catching. In the case of the Twister™ 3 Line Automatic, cycle times of up to 30 seconds are possible due to the use of industrial robots and a total of three unwind units.



This Twister™ Center wraps up to 60 rolls/hour in a small space

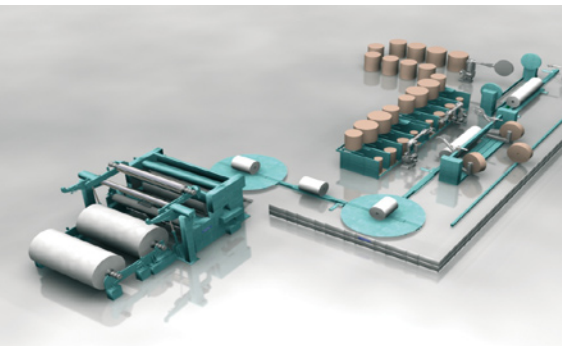


References

GBR	UPM-Kymmene	1 Combi	Kraftliner
GBR	BPB Paperboard	1 Center	Kraftliner
USA	Great Northern Paper	2 Center	Fine Paper / Newsprint
GER	Myllykoski Group	1 Combi	Magazine Paper / Newsprint
USA	Myllykoski Group	2 Center	Magazine Paper / Newsprint
BRA	Klabin	1 Line 1 Line	Kraftliner Kraftliner
GER	August Koehler	1 Line 1 Combi 1 Combi	Decor / Thermo Paper Decor / Thermo Paper Decor / Thermo Paper
GER	Steinbeis Temming	1 Combi 1 Line Automatic	Fine / Magazine Paper Fine / Magazine Paper
GER	Stora Enso	1 Combi 2 Line	Magazine Paper Magazine Paper
GER	Süddekor	1 Combi	Decor Paper
NED	SAPPI	1 Center	Fine Paper
POL	Maltadecor	1 Combi	Decor Paper
ESP	Papelera Peninsular	2 Line	Fine Paper
ESP	Papresa	1 Combi 1 Line	Newsprint Newsprint
AUT	SCA Graphic Paper	2 Line Automatic	Magazine Paper
KOR	Hankuk Paper	2 Center	Fine Paper
TPE	Yuen Foong Yu	2 Line	Fine Paper

Production reliability at the highest level: completely automatic roll wrapping

When cycle rates increase, manual application of inner and outer headers as well as the attachment of roll labels can lead to a bottleneck in production. These processes are completely automatized in the Twister™ Automatic with special robot units. The entire production process is controlled by the process control system Rolltronic™.



3D installation layout of a Twister™ 2 Line with robot units



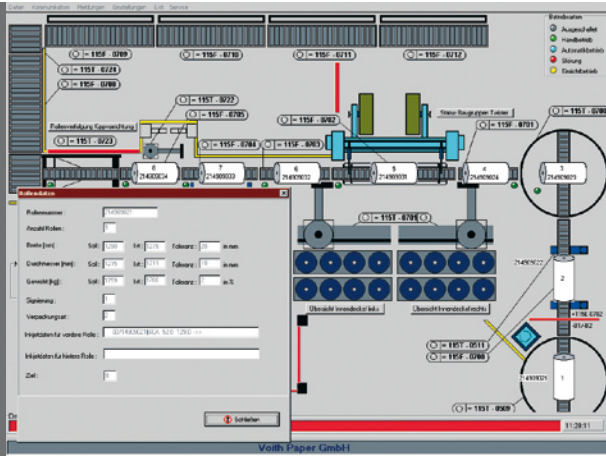
Two robots for simultaneous positioning of both inner headers



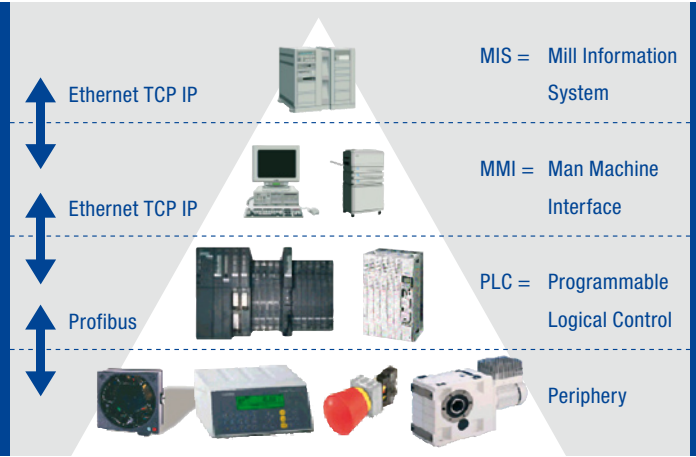
Industrial robot with double grab head to position the outer headers

In the automation of the header handling particular importance was placed on simple and operationally reliable processes. Thus, the two robots for the positioning of the inner headers are mounted on special travel units. Due to their action radius, they can directly gain access to a variety of different sized inner headers. Two headers are simultaneously removed from the respective stacks using suction grabs and these headers are pressed against the respective faces of the roll until they are held in place by the crimped edge of the circumferential wrapping.

The robot unit for the outer headers has a special double grab head which removes two headers one after the other from the stack and positions these with millimeter accuracy right



The desktop of the Rolltronic™ process control system



All control systems in the factory are closely linked to one another



The robot removes the labels from the printer

and left to the plates of the press station where they are fixed using negative pressure until the pressing process starts.

As soon as the paper roll is completely wrapped, a fourth robot removes two labels (generally A3) in one working cycle from an industrial printer. These labels are glued onto the roll body and one roll face without any creases. The labels are passed through a gluing unit, however self-adhesive labels may also be used.

The entire production process, i.e. wrapping, applying inner and outer headers, labelling and conveying, is controlled by a system specially developed for the Twister™ technology: the Rolltronic™. This system is connected to the paper mill programs for production planning and warehouse management.

The Rolltronic™ also controls the allocation of production data, such as weight, width and diameter, to the respective rolls.

Since the Rolltronic™ also controls the entire wrapping process at the Twister™, it can specify individual wrapping types for every single roll according to the production and dispatch specifications. Thus, one paper roll can be wrapped with four layers for sea transport and the next roll with only two layers with additional edge protection.

Roll handling with feeling: the reliable combination for wrapping and conveying

The co-operation between Voith Paper and Raumaster Oy, Rauma / Finland offers the opportunity of creating completely new solutions on the sector of wrapping and conveying rolls. The synergy from this partnership in roll handling guarantees a reliable and smooth routing of paper rolls from the winder to the warehouse.

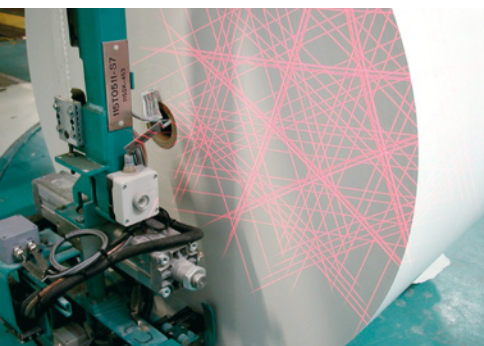
The modular technology concept for paper roll handling comprises elements for conveying, tilting, rotating, ejecting and catching as well as for marking and identifying rolls.

In the picture sequence below the roll set is caught immediately downstream of the winder by a divided stopping rail and every second roll is passed to the next position. Thus, the individual rolls can be checked and provided with barcode adhesive labels on the faces for ease of identification

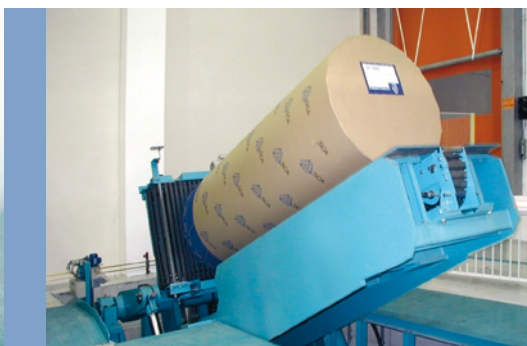
Particular care is required for roll ejection and catching. Therefore the roll ejectors which are integrated into the floor work hydraulically, in



*Separation of roll set
downstream of the winder*



The end of the roll is labeled using an InkJet after the barcode label has been scanned



This upender handles rolls of up to 10 t



Finished roll warehouse with storage conveyor belts

contrast the roll catchers work pneumatically. Combined roll catchers and ejectors include both modes of operation.

Further important components are the slat conveyors, turntables and roll tilting cradles which upend the finished paper rolls prior to transport into the roll warehouse.

Complete maintenance-freedom has been achieved in the development of the slat conveyors due to design details and the materials used. Thus, for example the conveyor chain has ball bearings and is low-friction. This facilitates the use of frequency-controlled drive motors with low output, despite today's usual feed speeds of up to 60 m/min and roll weights of up to 10 t.

From winder to roll warehouse: the Twister™ technology by Voith and the conveying systems from Raumaster offer tailor-made solutions for complete roll handling in paper mills and printing houses. The components for roll wrapping and conveying are completely compatible to each other. They combine the highest degree of production reliability with future orientated technology, comparatively limited investment and subsequent costs and a rapid return on investment.



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