INTERNATIONAL MAGAZINE ON TISSUE PAPER MACHINERY AND TECHNOLOGY

TissueMAG

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CONTENTS

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MAY 2019

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World tissue consumption in 2017.

Steady global growth continues

Global tissue consumption reached 37.7 million tonnes in 2017, up by almost 1.4 million tonnes from 2016, the highest volume growth second to 2015 which was only slightly more than in 2017. This corresponds to a relative growth of 3.8%, nearly the same growth percentage as in 2016 but slightly lower than the peak of 4.2% reached in 2015, which was exceptionally high, mainly thanks to strong growth in China.

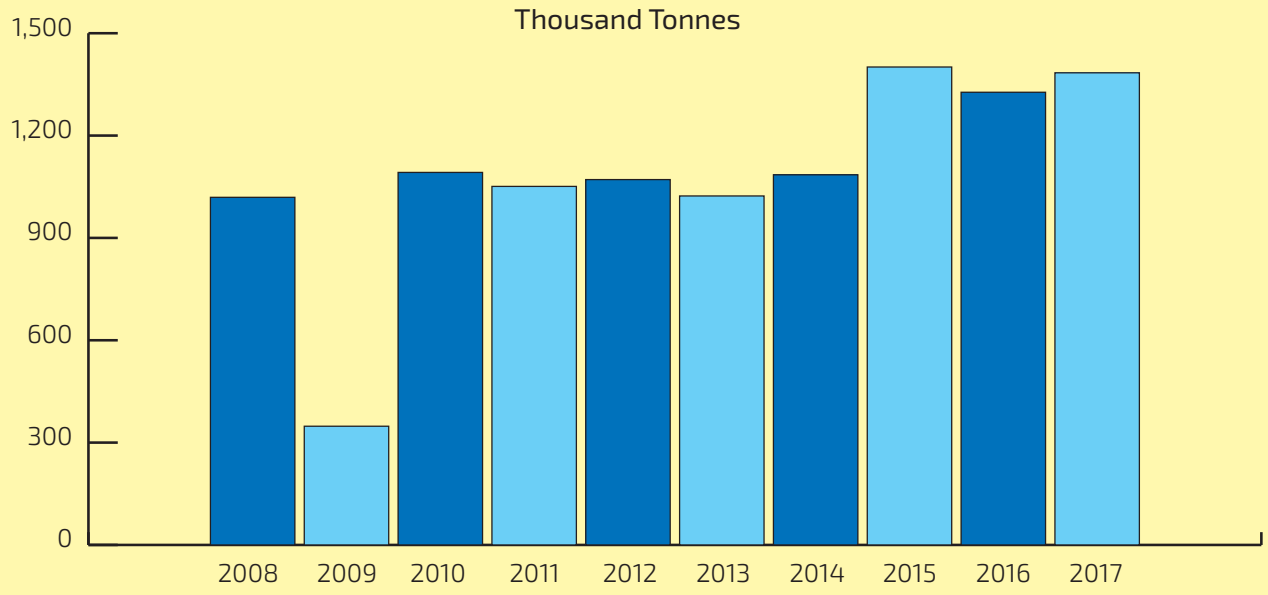
by: Esko Uutela, Principal - Fastmarkets RISI

The importance of emerging markets continues to grow, and as their markets tend to grow faster than those of developed economies, the global average growth rates are positively influenced by this change in relative regional weights. Consequently, the past three years show a substantially larger volume growth than the years before. China continues to be the main driving force for global tissue market expansion. It has repeatedly accounted for more than 40% of the volume growth in tissue consumption worldwide in recent years, and in 2017 its share was 45%. China's volume growth accelerated in 2017 to as much as 629,000 tonnes, a respectable achievement. North America and Latin America accounted for the second- and third-largest volume increases, followed by Asia Far East, Eastern Europe and Western Europe. In Japan, tissue consumption was stable in 2017. It should be noted that 56-57% of the global tissue market expansion took place in Asia (including the Near and Middle East) in both 2016 and 2017.

North American growth extremely strong in 2016, some slowing in 2017

Tissue consumption grew in North America by an average rate of 3.2% in 2016, mainly thanks to the very strong US AfH business activity and increased net imports, which contributed

Volume growth in the global tissue industry, 2008-2017.

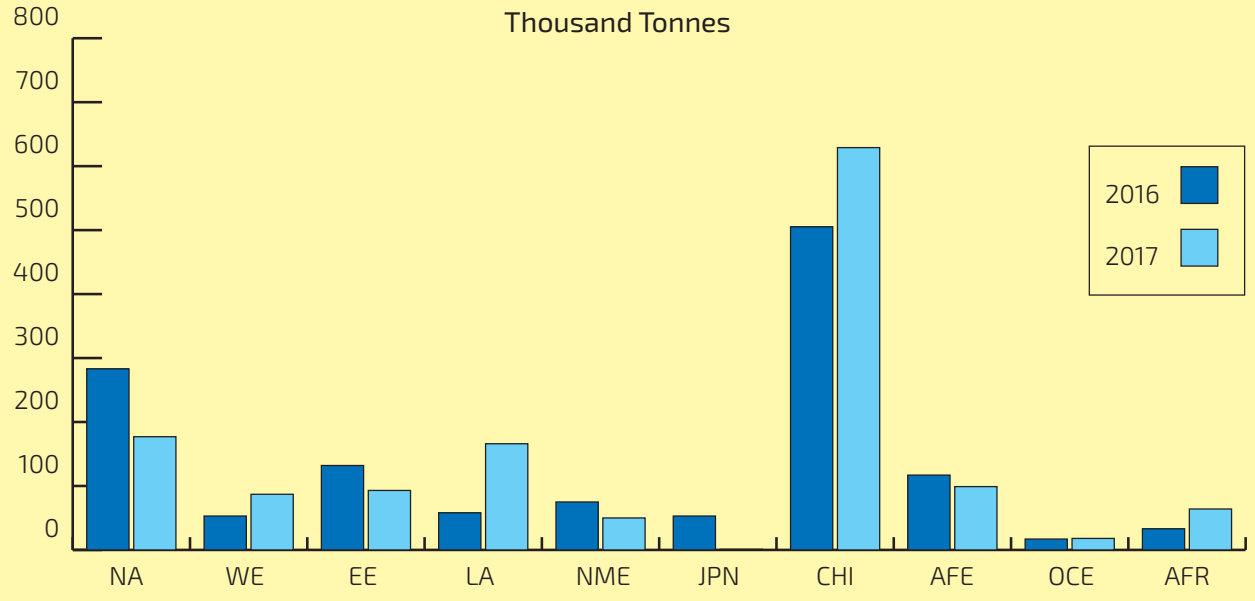


about 1.4 percentage points to the growth rate. In 2017, domestic shipments continued at very much the same level as in 2016, but net imports grew much less and did not add more than about 0.2 percentage point to consumption, so market growth remained at slightly below 2.0% (1.95%). Population growth is one driver for the North American demand, and in normal years it accounts for 35-40% of the organic market growth. One reason for the enhanced growth in North America is likely the fact that the main phase of product light-weighting and sheet size reductions seems to be over now, and shifts between quality categories, although continuing, have less influence on product and market structures than they did three to four years ago. The strong growth in the AfH sector is a major contributor as well; AfH toweling products are traditionally some of the heaviest tissue products.

In Europe, growth concentrated in the East and the South

The Western European tissue market has recorded rather disappointing growth rates in recent years, with just a few exceptions (2.7% in 2015). In 2017, the average growth rate was 1.3%, up from a poor 0.8% in 2016. High per capita tissue consumption, particularly in the Nordic countries, is an indication of maturation of growth, which along with limited product innovations (the high private label share in most countries does not support innovativeness) and low or no population growth (Central Europe) are major hindrances for tissue market growth. In addition, the Great Recession hit Southern Europe particularly hard, which has only gradually recovered from its economic misery. In 2017, Southern Europe accounted for 79% of the Western European volume growth, with Italy showing the most positive performance after several years' of stagnant tissue consumption. In the two largest European tissue markets, Germany booked a small contraction in its tissue consumption in 2017 and in the UK the market grew only marginally.
In Eastern Europe, there has been no final solution to the crisis between Russia and Ukraine, but the tissue markets continued to recover in both countries. The overcapacity that emerged in Russia because of a 30% increase in capacity thanks to several projects a few years ago has gradually been absorbed by domestic market growth and increased exports, and additional new investments are already in the pipeline in Russia.
In Central Eastern Europe, the tissue business continued to develop positively, particularly in the Czech Republic and Hungary. New expansion projects are under construction or announced,

Regional volume growth of tissue consumption, 2016 and 2017.



showing that companies believe in continuing market growth and the possibility of displacing some imports in both countries. Poland, the second-largest Eastern European market, has developed very positively in recent years and per capita consumption has rapidly reduced the gap with the average EU level. New investments have helped this development, and Poland is today also a major tissue exporter to its neighboring countries.

Brazilian Recovery Helping Latin American Growth

Traditionally, Latin American tissue consumption has shown major variation in its growth from year to year. Economic instability often affects some of the main countries in the region, and Brazil suffered through a major recession beginning in 2014, which resulted in tissue consumption contracting in 2015, although it recovered somewhat to the 2014 level in 2016. After low growth of only 1.5% in 2016, Latin American tissue consumption recorded average growth of 4.1% in 2017, supported by sound, albeit not spectacular, growth rates of 3.4% and 3.5% in the two largest markets, Brazil and Mexico, respectively. Argentina, the third-largest market, recorded a surprisingly high growth rate of 6.7% in 2017, despite the fact that the economy continues to struggle and suffers from high inflation. Among the other larger players, Chile and Colombia experienced only moderate growth, while Peru (now #6) is in a good growth phase, supported by new capacity recently started up by CMPC. The situation in Venezuela is catastrophic. Tissue products, like many other consumer goods, continue to be in short supply, hyperinflation makes the controlled official market non-interesting and the black market is flourishing.

There are no production statistics available, but we estimate that tissue consumption continued to contract in Venezuela in 2017. In contrast, some smaller countries in Central and South America performed rather nicely in 2017.

Near and Middle East: former growth drivers Turkey and Saudi Arabia experiencing difficulties

Tissue consumption in the Near and Middle East rose by only 3.4% in 2017, after growing by 5.4% in 2016. In a historical comparison, these growth rates are clearly below the long-term average of 7.6% per year over the past 10 years (2007-2017). In the previous issue of this publication (*World Tissue Business Monitor Q2 2018*), we discussed the regional problems in more detail. To summarize, in Saudi Arabia low oil prices resulted in a poor economic situation and worsened

World Tissue Markets, 2016-2017

Thousand Tonnes					
Region	**Production 2017**	**Consumption 2017**	**Consumption 2016**	**Market Volume Increase 2017**	**"Growth Rate (%) 2017/2016"**
North America	8,765	9,264	9,087	177	1.9
Western Europe	6,619	6,756	6,669	87	1.3
Eastern Europe	2,087	2,077	1,984	93	4.7
Latin America	4,075	4,192	4,026	166	4.1
Near & Middle East	1,573	1,515	1,465	50	3.4
Japan	1,789	1,984	1,983	1	0.1
China	9,234	8,360	7,731	629	8.1
Asia Far East	2,493	2,284	2,185	99	4.5
Africa	774	840	776	64	8.2
Oceania	255	458	440	18	4.1
World Total	**37,664**	**37,730**	**36,346**	**1,384**	**3.8**

purchasing power, while in Turkey the economy was doing well but tissue price increases due to escalating market pulp prices resulted in a doubling or even tripling of retail prices, which was difficult for consumers to accept, and tissue purchases were negatively affected. In Turkey, tissue consumption remained stable but in Saudi Arabia, it contracted slightly in 2017, according to our current information. However, apart from the two largest markets, many other countries in the region performed better. In Iran, the new domestic capacity has had an effect, and although no very reliable production figures are available, we estimate that the domestic market continued to grow steadily. Foreign trade figures show that both imports and exports had much less importance, so the country was more or less self-sufficient in 2017. New domestic capacity helped the market to grow, but the new sanctions by the USA and its alliance members are likely to make problems for raw material supply from late 2018 onward. Most of the smaller countries in the region enjoyed positive growth, which contributed to the average growth, even in the war-plagued countries of Iraq and Syria.

China's tissue consumption not reacting to slower economy

China's slowing economic growth seems to have had limited, if any, influence on tissue market growth. In recent years, actual consumption has repeatedly exceeded our expectations and growth in tissue consumption has also been higher than economic growth; in the past, GDP growth continuously exceeded tissue market growth. This change is likely a reflection of the ongoing structural change in China's economy with an increasing focus on domestic consumption rather than exports and investments. In 2018, Chinese tissue consumption grew by 8.1%, up from 7.0% in 2016 but lower than the extremely high growth of 10.5% achieved in 2015. New regional markets in inland China continue to develop and record higher growth rates than the more developed coastal provinces.

On the supply side, the primary issue in China is the major restructuring process in the domestic tissue industry: new modern capacity is replacing old mills equipped with smaller machines and poor energy efficiency. According to the data collected by the China National Household Paper Industry Association (CNHPIA), about 2.2 million annual tonnes of new, modern tissue capacity came on stream in 2017, while 1.3 million tonnes of old capacity was closed. Nevertheless, the net capacity change exceeded the organic growth in the domestic market by more than 40% and total shipments, including net exports which continued to grow in 2017, by more than 30%. This means that the prevailing overcapacity situation in the country

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worsened further. Japan suffers from a declining and ageing population, which is bad news for tissue consumption. The Japanese tissue market has grown very slowly in recent years, and not at all in 2017. Domestic consumption is approaching the benchmark of 2.0 million tonnes but has not quite reached it. Japan has developed into a major tissue importer; in 2017, imports were 212,000 tonnes or more than 10% of domestic consumption. Most of Japan's tissue imports originate from China, followed by Indonesia, the USA and Vietnam. Tissue consumption grew by 4.5% in the Asia Far East region in 2017, down from 5.7% in 2016. The largest market, South Korea, recorded growth of 2.7%, which is in line with its long-term growth trend, followed by Indonesia with 6.1% and Taiwan with 2.2%. Indonesia has benefitted from major recent investments in new capacity and the push of tissue products by main suppliers to additional clients. Sinar Mas (APP), with its tissue mills using integrated hardwood pulp, has led this development, but some other companies, such as the Sopanusa group, have also been on an aggressive expansion course, largely based on export demand. Indonesia is now the third-largest net exporter of tissue worldwide, with net exports of about 600,000 tonnes in 2017; only China and Italy continue to be larger net exporters than Indonesia.

> “Fastmarkets RISI offers over **30 years of experience** in reporting and analyzing the global tissue market”

Most other countries in the region also saw positive developments in tissue consumption. The only exceptions were Singapore, whose market contracted after strong growth in 2015 and 2016 (stock changes may have played a major role here), Hong Kong and Sri Lanka, which had no growth in their markets. Tissue consumption grew in the most populous Asian countries, India, Pakistan and Bangladesh, but their per capita consumption levels are still very low. The Philippines, Thailand and Vietnam, which are also interesting countries due to their size, also saw good progress in 2017 in tissue consumption, as did Malaysia.

Africa and Oceania showing some encouraging developments

African tissue consumption grew by as much as 8.2% in 2017, according to our current information, up from 4.4% growth in 2016. However, foreign trade statistics for some smaller

▲ Great value absorbent kitchen paper towels.

countries are not yet available, so revisions are still possible. In any event, it can be concluded that 2017 was a good year for African tissue consumption. The most positive result is that tissue consumption has begun to develop in many countries which earlier were practically non-consumers of tissue. For example, Ethiopia with its more than 100 million people, saw a tissue mill built as part of China's "One Road, One Belt" initiative, and another tissue mill is in the planning phase. In Kenya, the Chandaria Group has started the construction of a new tissue mill in Tatu City Industrial Park close to Nairobi, which when ready will reduce its parent roll purchases from abroad. However, this project seems to be developing quite slowly and very limited information is available about the phase of the construction after the official kick-off in October 2016. In Tunisia, Azur Paper is expected to start up its second tissue PM rather soon. And the Turkish Hayat Group has announced a major investment project in Nigeria, which started with absorbent hygiene product manufacture (Molfic baby diapers) but tissue product converting has also begun, and tissue base manufacturing is expected to follow at a later stage. In Oceania, tissue consumption continues to grow, and in 2017 growth was 4.1%. Tissue consumption picked up in the small Pacific Islands in 2017, particularly imports in Papua New Guinea and Fiji. There is no new information concerning the construction of new tissue PMs by ABC Tissue, which has four new tissue PMs from China, three second-hand machines and one new which has been in creates for several years. Local contacts say that the PMs seem to be stored at the company's mill sites, but no construction activity has been noted. Foreign trade statistics show that tissue parent roll imports, mainly from China and Indonesia, have continued as usual, and ABC Tissue has been the largest importer for its converting operations, which are much bigger than its own base paper production. ●

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by: Valmet

■ **The Advantage NTT technology opens endless possibilities for product differentiation.**

The tissue industry is facing new and higher demands from the consumers. New products with various paper properties are desired at the same time as modern consumers are pushing sustainability high on the agenda. This puts pressure on tissue producers to be more flexible, to deliver different grades and develop new products. The hybrid technologies Advantage NTT, QRT and eTAD developed in recent years provides an innovative and more flexible way to produce a wide variation of premium and ultra-premium tissue products at low energy and fiber consumption. A wider range of companies and market segments can now get access to premium and ultra-premium tissue products with high bulk, softness and absorbency at relatively low operational cost.

Rush forward

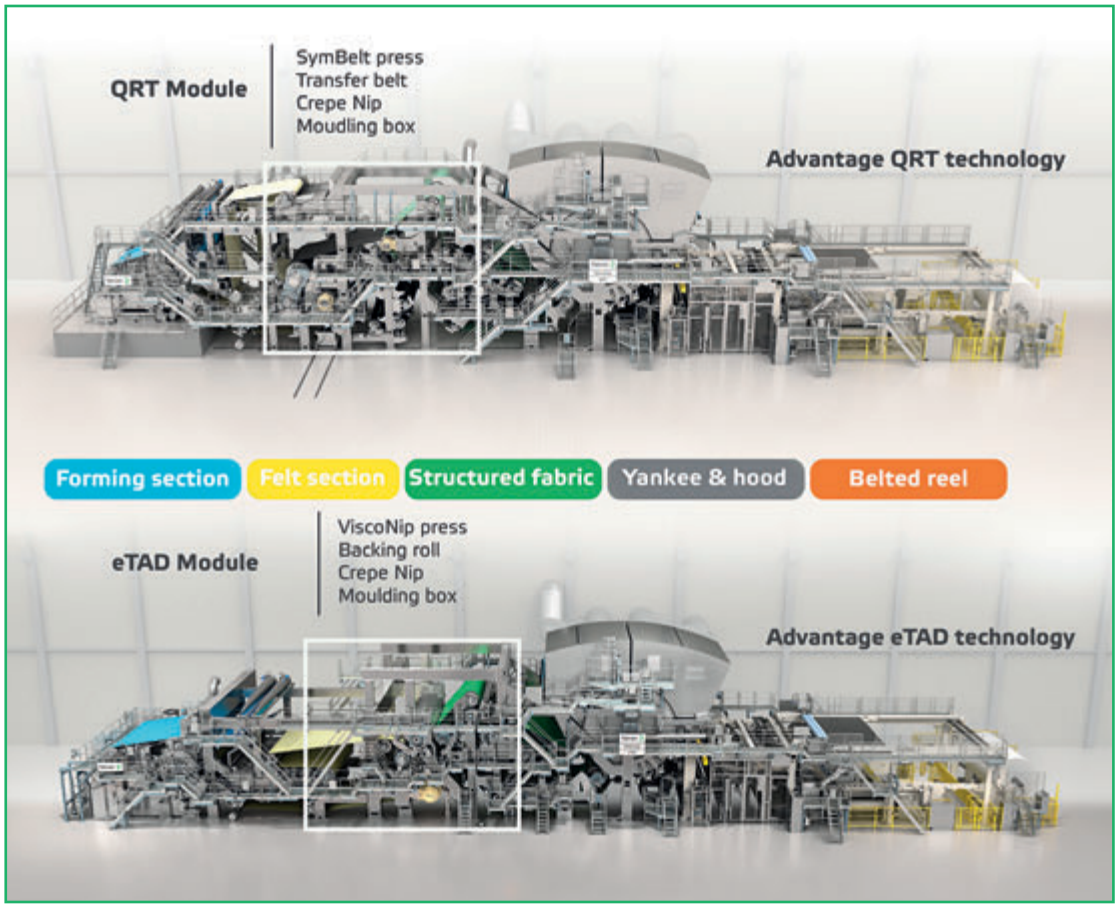
The receipt to reach the highest bulk and absorbency is normally to avoid pressing and use hot air to dry the sheet. But today it is possible to achieve premium and ultra-premium structured tissue products thanks to three new hybrid technologies. The secret behind Advantage QRT and eTAD, lies in the combination of pressing and so-called Rush Transfer. Simply explained the sheet is first dewatered by pressing to increase dryness and thereby reduce energy consumption. The sheet is then transferred to a structured fabric with the assistance of a nip and speed difference. The speed difference is, along with a following moulding step, the key for creating the sheet structure and bulk.

High absorbency and stretch

Absorbency rate is a key selling point and a differentiator for tissue producers. The product created in the Advantage QRT and eTAD process has high stretch and great absorbency. This feature makes it especially suitable for high grammage products like kitchen rolls and towel but is also perfect for bath tissue. The caliper is created already in the tissue machine and embossing is not needed.

Advantage NTT the most flexible tissue machine in the world?

The NTT machine can be operated in plain mode and textured mode. The key is the changeable belt. Operating with a plain belt provides conventional tissue. A fine belt is generating more bulk and is suitable when softness is demanded. The coarse belt enables production of textured tissue with high bulk and improved water absorbency compared to dry crepe tissue. And it is remarkably



> Valmet's technology provides **sustainable production** of all types of grades from plain to textured and structured tissue products

easy to swing between the production modes by a belt change which can be done in a few hours. Another unique feature is the possibility to create own belt patterns and imprint the desired design already in the tissue machine. This opens for endless potential of product differentiation and to operate within a wide range of basis weight and products from facial to towel.

Plain mode and remarkable production capacity

The NTT technology has a powerful dewatering system which enables not only energy savings but also very high production volumes. At high basis weight the drying capacity is normally the bottleneck for increased production in other tissue making processes. However, the NTT machine enables very high press dryness which can augment production capacity with about 30%. Continuous production of 180-185 tons per day on a 100-inch-wide machine is now a reality.

Textured mode for high bulk and softness

In textured mode, the NTT technology can achieve a bulk increase of about 50-80% compared to conventionally produced paper, depending somewhat on basis weight and belt design. Most of the European conventional products provide softness in the range of 85-90 TSA. With the NTT technology softness values between 90 and 97 can be achieved. Highest softness can be found in 2-ply products with low tensile strength.

Hybrid technologies a combine sustainability, flexibility and high tissue quality

For more than 40 years there has been two tissue making concepts on the market: conventional dry crepe and through air drying machines. **Valmet**'s new hybrid technologies fill the gap and bring a new dimension to tissue making. Thanks to its flexibility, it is possible to produce several grades and qualities in the same machine ranging from premium to high premium and ultra-premium tissue. The capability to produce different grades in the same process will give a competitive advantage and make you prepared for any changing market demands. It also makes it possible to enter new market segments and opens for product differentiation. Compared to other processes making the same quality, hybrid concepts can be operated at significantly lower energy and fiber consumption as well as low operation cost. ●

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SYSTEM HELIOS DESIGN

■ **Flex 700 Gambini Converting Line.**

Gambini has been able to present in 2018 the greatest product innovation with the introduction of the revolutionary AirMill technology, while other major challenges are planned for 2019. **Carlo Berti**, Sales Director of the company, tells us about it.

Mr. Berti, after the great success of the last year, can you tell us what you have planned for 2019?

2018 has been a very positive year for us. Our constant determination to innovate has found its full realization in the launch of **AirMill**, the innovative technology that revolutionizes the concept of embossing in tissue converting. It is a process that transforms conventional paper into textured paper, increasing its volume and absorbency without losing tensile strength, while creating benefits and new opportunities for the paper mill as well. AirMill turned out to be a stunning breakthrough for the tissue market, which was immediately welcomed with great interest and enthusiasm by the operators of the sector. However, Gambini's innovation process does not stop here. The recent setting up of Gambini's Tissue*Hub* and Gambini's Pilot Line - G4U (*Gambini for You*) - opens up new opportunities for the study

Gambini presents G4U, the first pilot line with format 2.8 m and speed up to 550 m/min, and the new Gambini's Tissue*Hub*

In the Tissue Converting sector, 2018 was definitely a successful year for Gambini.

by: TissueMAG

of new products and solutions, which have been unexplored until today, whose trials have already given very good results. **G4U** is the first complete Pilot line, from the unwinders to the log saw, with format 2.8 m and speed up to 550 m/min, which is installed in the new Gambini's Tissue*Hub* located nearby the headquarters.

The Pilot Center was built in the first plant where the company was born. Can we say that innovation for Gambini starts again from its origins?

Certainly, history is always a source of inspiration and in our origins lies our vocation for flexibility and performance, what we call *Perflexion*, which has enabled us over the years to build a future based on technological innovation. The idea of creating the first Pilot Center - Gambini's Tissue*Hub* - in the factory where **Gambini** was founded back in 1870 makes us proud of our history, although keeping focused on new challenges for the future.

Gambini continues researching and innovating. What G4U really means for the company?

The G4U pilot line has been a significant investment for the company, which however has allowed us to reach important goals and to meet new challenges from an increasingly demanding

■ Carlo Berti, Sales Director Gambini SpA.

■ G4U Pilot Line.

market, which constantly looks for distinctive signs in the field of technology and products. One of the focus is certainly to test all the potential of AirMill to better understand the various applications that this technology finds throughout the production chain: from the paper mill production to the converting process. Starting from conventional paper (Dry Creped Tissue - DCT), AirMill technology allows creating a new type of paper with characteristics similar to textured paper while improving its bulk, absorbency, strength and stability without losing softness. Gambini's new AirMill represents, therefore, a bridge between the paper mill and the converting activities. Last but not the least, Gambini's Tissue*Hub* represents also a great opportunity to train our customers and give them the opportunity to verify the excellence of new technologies and products.

> "Gambini researches, manufactures and designs **technologically-advanced machinery** and **converting lines** used for production of hygiene and personal care tissue products"

Speaking of customers, how are they responding to this news?

Very well. Many customers have already booked their trials with G4U. Soon the G4U pilot line will be complete with a double-layer wrapper machine that will allow interested customers to produce minimum lots to test on the market. G4U has also attracted interest from companies that are not customers, yet, which by booking their test could touch with hands our technology and understand its functionality and innovation, while appreciating its full potential. We can say that **Gambini's Tissue*Hub*** is a large operating laboratory where to exchange ideas, test innovations and develop new solutions. **G4U** is a great opportunity both for our R&D Department and for customers, as the improvement always comes from sharing ideas and comparisons, and from the capacity to translate the market demands into operational responses. ●

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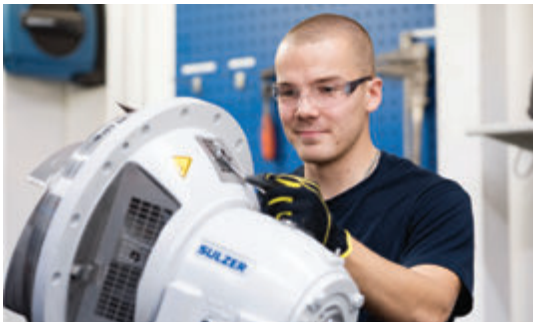

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Bonetti
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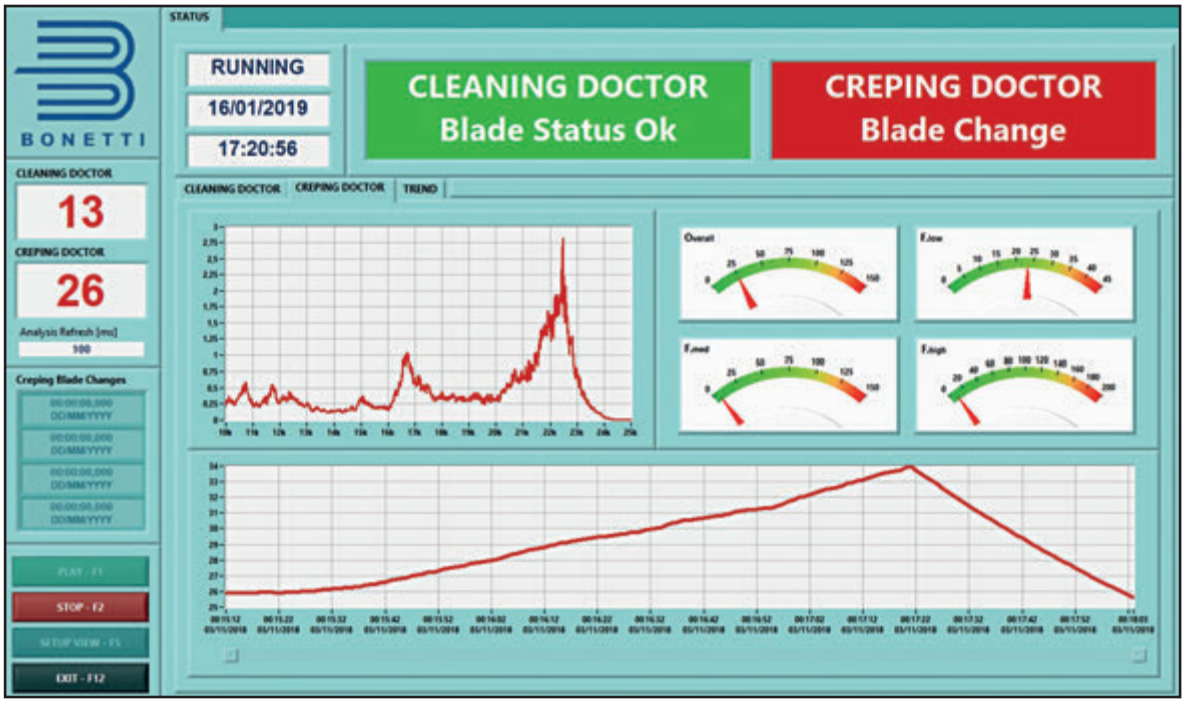
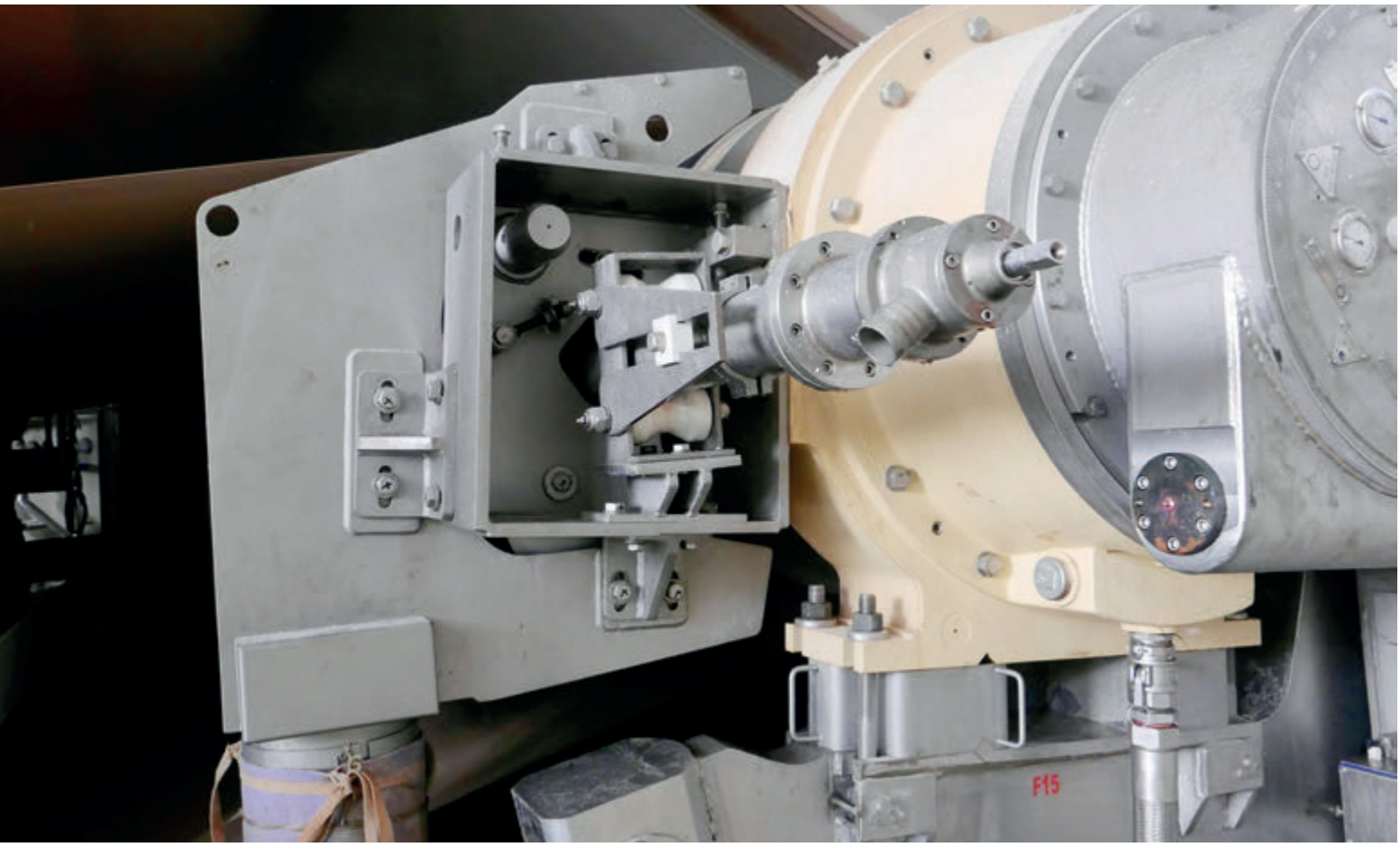
Bonetti can boast a long experience in the supply of products for the creping application that dates back to the seventies: when it comes to its products, Bonetti is right now one of the major suppliers to the Tissue Industry worldwide.

by: Bonetti S.p.A.



◀ Fig: 1. BONVIBES Vibration Monitoring System.



▲ Fig: 2. BONTWIN for suction press roll.

Over the years we've helped numerous customers improve their creping process, taking a comprehensive approach that spans from the blades to the doctoring equipment, them being both part of the current product portfolio. The main areas where the company focused its efforts have been the sheet quality improvement, the increase of the overall efficiency of the tissue machine and the reduction of its operating costs. The approach is diversified and tailored to the specific demands of the customer and **Bonetti** has been therefore bringing to the industry new tools and new products.

A good example of two new tools are the BonVibes, the new vibration monitoring system (**Fig. 1**), and the BonTwin, the double-doctor system for the press roll (**Fig. 2**). **BonVibes** is used in the Tissue Industry to monitor the status of the cleaning and creping doctors of the Yankee dryer.

By monitoring and analyzing the detected vibrations, BonVibes' software informs the tissue maker on the correct timing to change the blades, thus reducing at a minimum the risk of chatter marks formation. Main goals of the BonVibes are: protection of the Yankee dryer surface; real time monitoring and alarming; historical Data trending. BonVibes has an intuitive and user-friendly operator interface. Two versions are available, with one or two acquisition channels.

BonTwin is a double-doctor system especially designed to improve dewatering of the press rolls in Tissue machines. **Features & Benefits** of the BonTwin double doctor are: improved dewatering of the press, reducing the rewetting in the Nip;

> "Bonetti's success has always been based on a timely response to the **needs and demands of the markets** it serves"

▲ Fig: 3. FELT ROLL DOCTOR complete with shower pipe and internal cleaning brush.

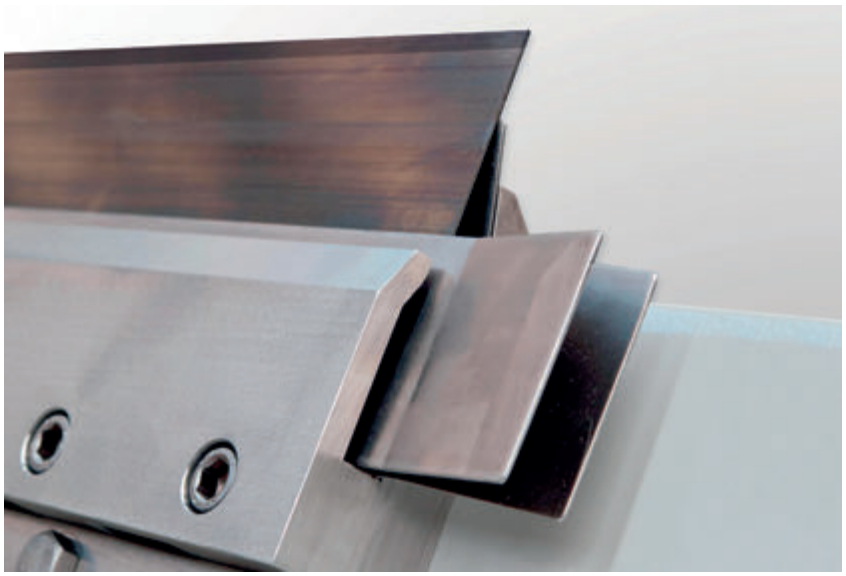
improved press efficiency; increased dryness, with consequent reduction of the energy required to dry the sheet; uniform moisture profile; improved cleanness of the press; increased life of the press; increased life of the felt; reduction of the numbers of breaks.

Global partner of paper mills and paper machines

Bonetti is a worldwide leader in the supply of doctoring systems (**Fig. 3**) and blades (**Fig. 4**). The portfolio offers a complete range of creping, coating and cleaning blades, in various materials and sizes. Focusing on the creping process, it offers two different types of tip coated creping blades: the MIZAR (Chrome Oxide) and SIRIUS (Chrome Carbide) blades. When compared to traditional carbon steel blades, they offer extended lifetime and greatly improve the softness of the sheet. These two blade qualities complete each other: whereas the MIZAR offers the longest possible lifetime, the SIRIUS, while sacrificing a small amount of lifetime, allows a smoother blade start-up, they are not prone to chipping and

> “Now in the third generation of family ownership, Bonetti has been and will continue to be a **global partner** of paper mills and paper-machine manufacturers”

▼ Fig: 4. MIZAR creping blade.



can be machined with sharper angles suitable for Super Soft tissue grades. Bonetti’s specialists can supply a complete audit of the doctoring systems and the blades in use. For doctoring systems the audit includes a geometric check of the mechanical condition of the doctors.
For blades, the audit includes a check of all the blades used as well as an analysis of both existing wear and of wear pattern. The technical and sales team can offer all necessary information and assist you in the implementation of your machine to keep operation running at peak performance. ●

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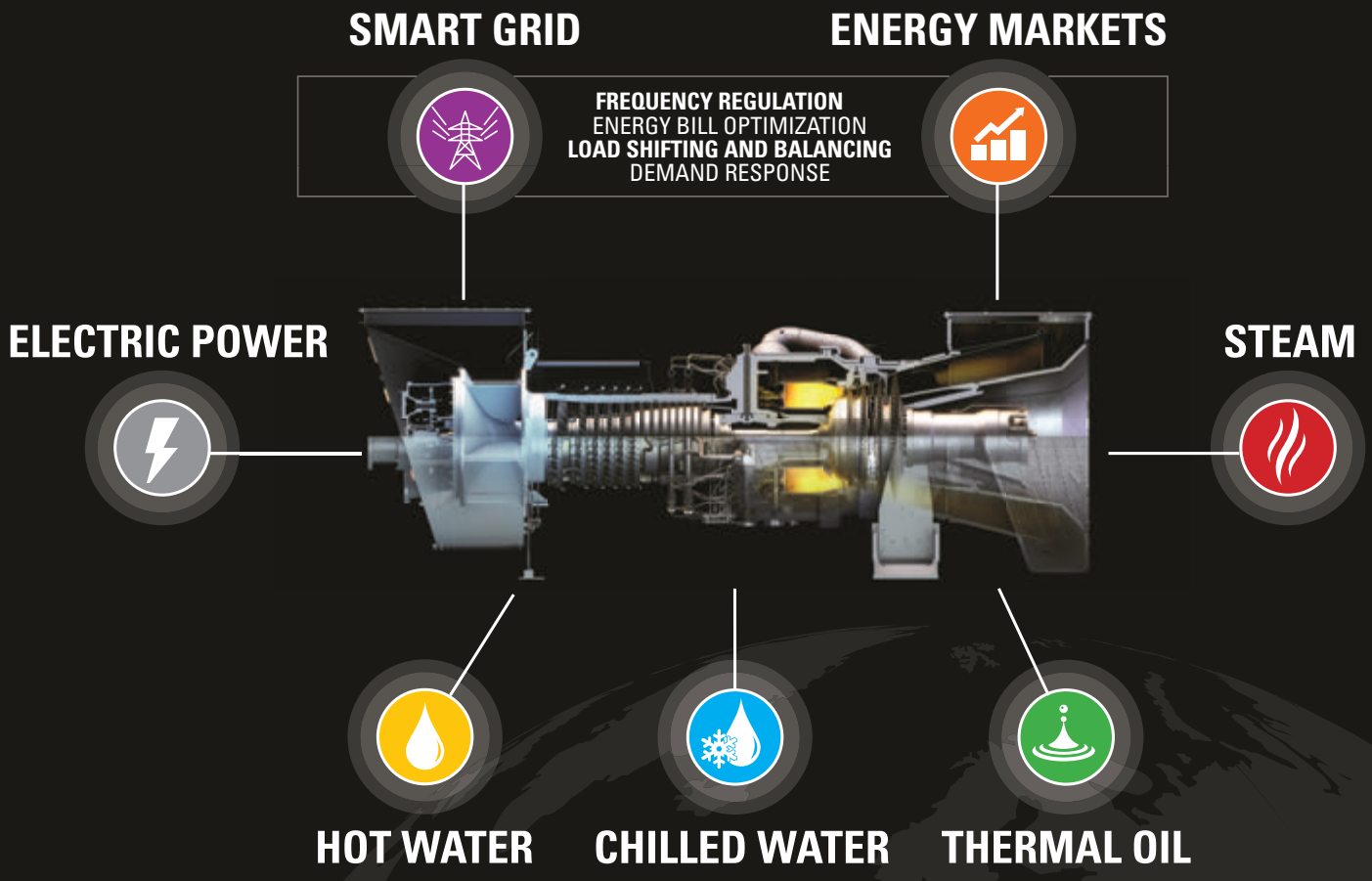

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Every year a wider range of models plus a range of optionals and accessories are available, all of them designed, manufactured and assembled on site at Renova, Italy. This allows us to quickly work at competitive prices and to be able to support our customers with personalized projects.

Same power, different design models

All application needs are different. For this reason, **Renova** offers different design models of battery powered roll pushers for the handling of paper rolls and tissue paper rolls: MRE, MRE LP and MRE LPT, which are also available with several handle configurations to meet any operator requirements. They ensure a thrust force of up to 20,000 kg (44,100 lbs) and a maximum lift force of 5,000 kg (11,000 lbs).

Higher performance, longer life service

Customers reported problems of pour performance of their battery roll pushers - compared to pneumatically driven models - and short-term battery charge. Instead, Renova's Moviroll battery systems ensure very high and long performance to the complete satisfaction of users. This is possible thanks to their heavy-duty, but compact and handy design, and the high quality 24 V lithium battery, which powers the 24 V DC IP 44 motor. In fact, the Moviroll battery roll pushers ensures the operator to move from 60 to 120 rolls with only one battery charge, equal to 3-5 shifts. Lithium battery life span is numerable to 500 recharges and recharging the battery does not take more than 4 hours. They are provided with a second battery. The Plug & Play batteries allow quick changes of the battery (in less than 10 seconds) without interruptions during operations. Moviroll battery roll pushers are 100% designed to last and no maintenance is required. A 24-month warranty is applied to the whole system. 1-year warranty is also applied to the battery.

> "Values, passion and dedication, combined with a zeal for **experimentation and innovation**"

MOVIROLL, Renova's roll pushers

Renova's Moviroll roll pushers are the result of continuous research and development based on customer's feedback and their experience on field.

by: Renova Srl

■ Moviroll MRE roll pusher for paper rolls in action.

▶ Moviroll roll pusher in the plant.

▶ MRE model for paper rolls.

◀ MRE LPT model for tissue paper rolls.

▲ MRE LP model for paper rolls.

“Renova: **from 1960 a story from Italy**. Pneumatic brakes and web tension control systems”

Higher safety level

Moviroll means higher safety level in plant as it prevents injuries by helping the operator to easily and effortlessly move paper rolls across the plant with no more forklift track needed close to the corrugator line. Besides, battery Moviroll models are pioneers of eco-friendly roll pushers as they are the first-in-industry roll handling systems equipped with lithium battery, which is completely free of any environment polluting acid also dangerous for the operator. All models are managed by TUV-ISO 9001. ●

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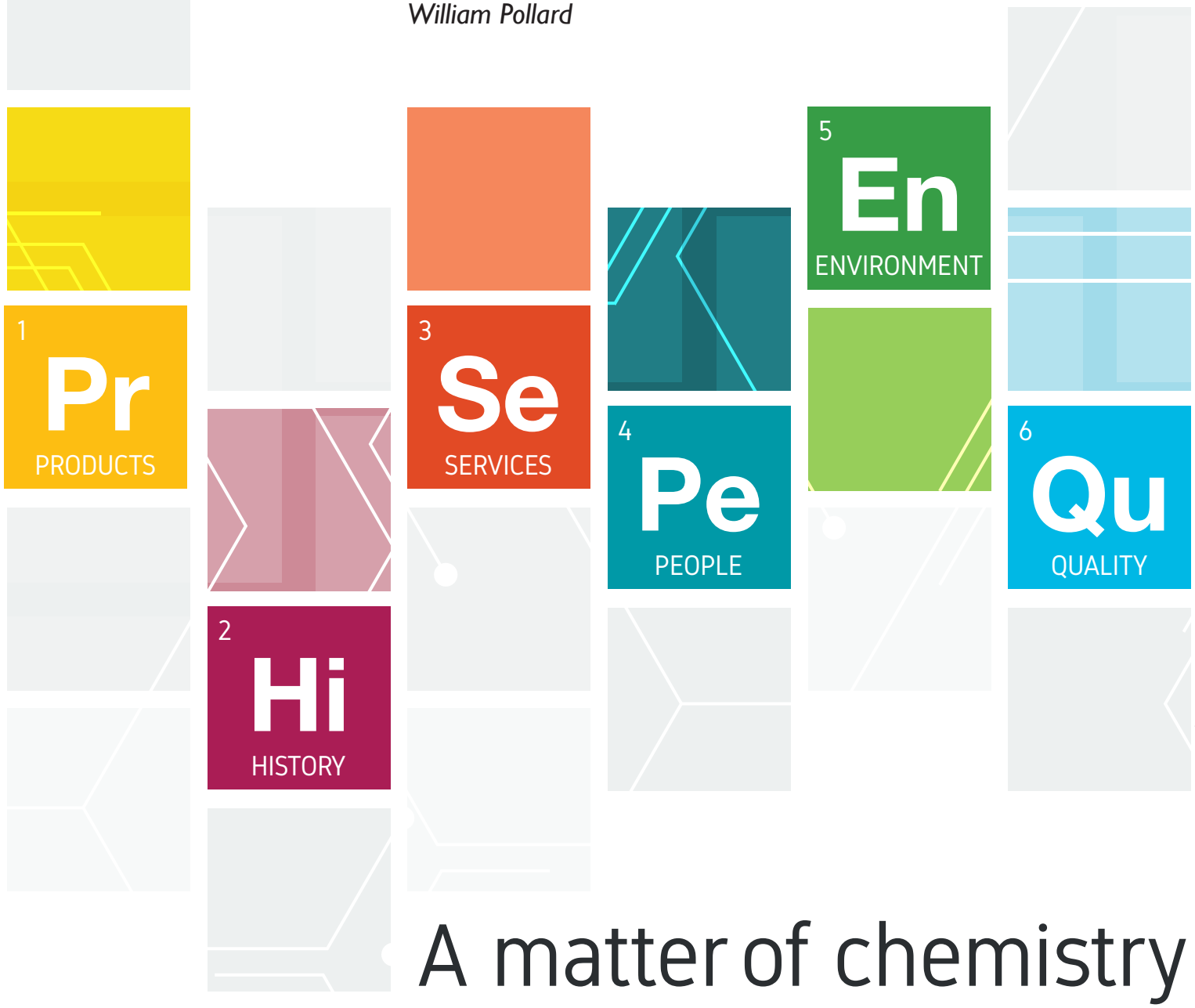
"Without change, there is no innovation, creativity or incentive for improvement. Those who initiate change will have a better opportunity to manage the change that is inevitable"

William Pollard



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A matter of chemistry

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The sticking power of water

Something is missing in Futura's latest innovation. And now it's time to tell the industry why it matters.

by: Futura SpA

■ JOI Hydro-bond.

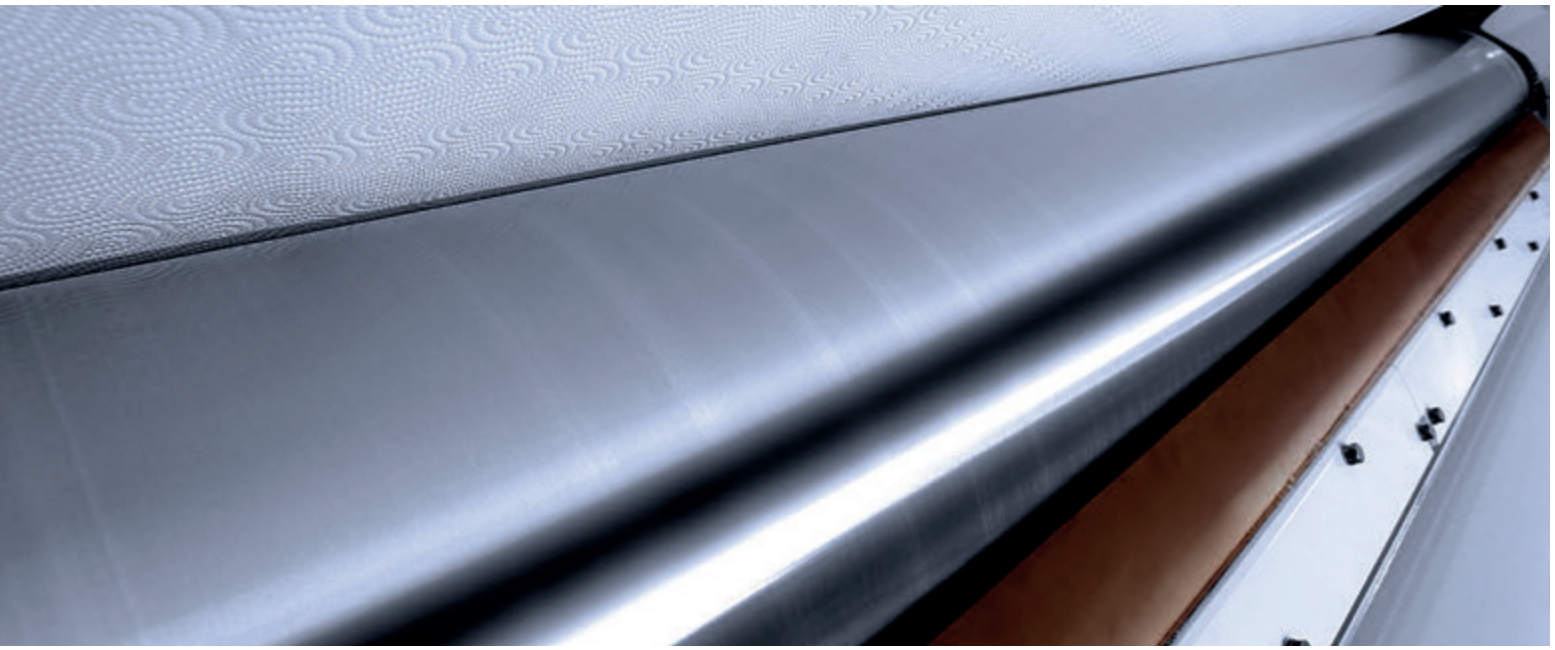
Water is not recognised for its adhesive properties, so when Futura proposes to discuss "the sticking power of water", it's natural that we should be curious.
JOI Hydro-Bond is a new technology from Futura, the tissue converting technology specialist. The name "JOI" is synonymous with advanced embossing and it is indeed revolutionary in its own right. But JOI Hydro-Bond is something entirely new. As the name suggests, **Futura** is talking about bonding with water. Something is missing? Yes - it's the glue.

The FuturaLab

The technology is the result of months of experimentation at FuturaLab - Futura's hub of innovation - and the results have been a revelation. FuturaLab is a laboratory for ideas and technology. Staffed by a team of design engineers, technical experts and process specialists, it is home to a complete and full-scale pilot line, on which new technological standards are created and honed, and it frequently hosts customers seeking to realise their product and production ambitions.
"There are no chemical reactions at play here", says Futura's Chief Technology Officer **Giovacchino Giurlani**.
"Perfect adhesion of the tissue plies is the result of a combination of the uniform nip pressure of JOI's renowned Zero Deflexion steel marrying roll, which evenly connects the plies through a kind of creative destruction, using water to create permanence to the tissue-to-tissue bond which results."

JOI Hydro-Bond innovation

The technology has been tested and proven under real-life operating conditions, using a wide variety of tissue, including conventional and structured. And thanks to collaboration with certain customers, Futura has been able to verify the process in everything from warm and humid to cold and dry climates, using the varied



▲ Zero Deflexion Steel marrying roll.

> “Our task now is to continue sharing this **genuine innovation** with the industry”

▲ Rolls.

local water quality available. The results have consistently confirmed the validity of Hydro-Bond. So what does this mean for the industry? It is nothing short of a revolution in toilet roll production, according to Futura. It heralds the new era of ply-bonding without glue. The implications are profound and far-reaching. To start with, the production process without glue will provide increased output. Removing glue from the equation also means reduced contamination of the machine with the benefits which this brings. Obviously glue represents a cost, but the main impact is the efficiency-related savings in the process, which mean increased Overall Operational Efficiency. The end result is a product which is more hygienic and pleasant for the consumer to use, and more sustainable, from both an environmental and economic point of view. “The roll which results from JOI Hydro-Bond retains all its qualities, but is better thanks to what it is missing”, says **Sergio Tonarelli**, Futura’s Chief Sales Officer. ●

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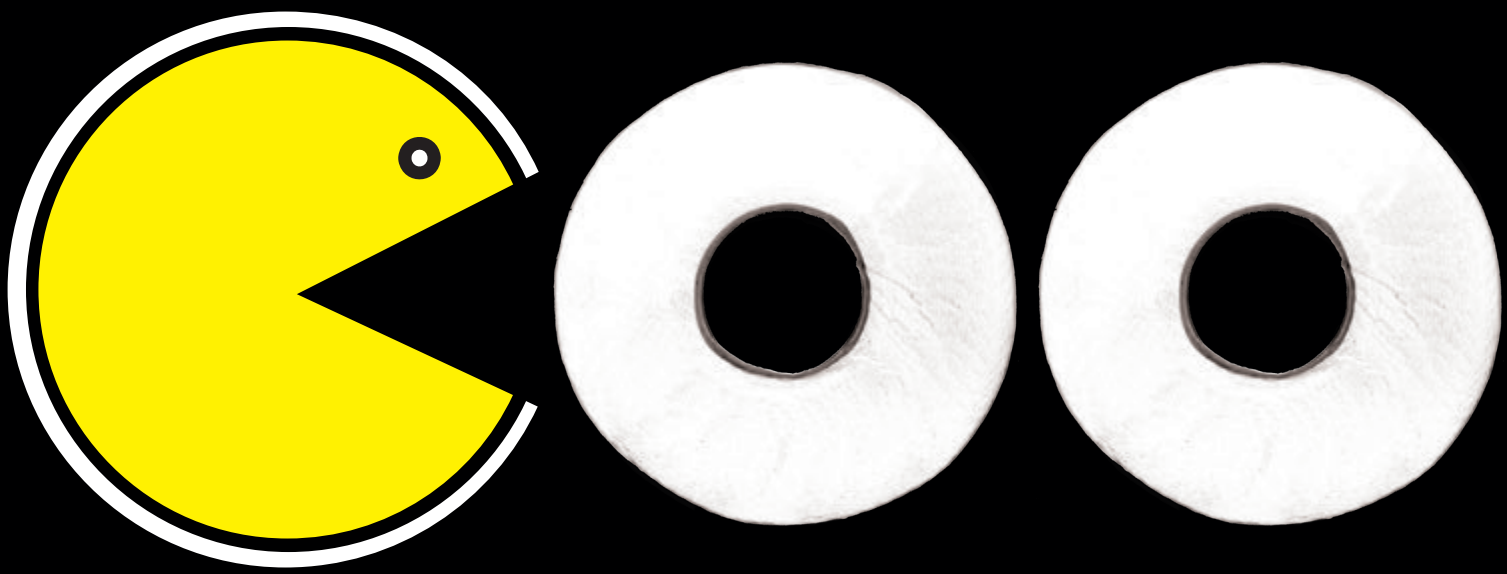
PACK-MEN



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▲ ACP Tissue Machine Industry 4.0.

The Group's strategy has always been based on long-term relationships and partnerships, supported by unremitting R&D, with the aim of anticipating and responding to our customers' needs, offering them the best results in terms of performance, innovation, quality and return on investment.
The **A.Celli Paper** products offering, consisting in advanced turn-key system solutions and the development and manufacture of the iDEAL® tissue machines, E-WIND® tissue, flat paper and cardboard rewinders, and R-WAY® roll handling and packaging systems, has undergone a major evolution with the advent of Industry 4.0, which has spurred us to reconsider our technology in the light of Digital Transformation and the improvement of Customer Experience.

The Extreme Automation division

As part of this evolution, we set up a new division in 2016, focused on innovative solutions for analysing and managing the data output by the machines. This new business unit, Extreme Automation, is a start-up composed of young graduates specialised in Big Data Analysis - Infrastructure IT - Machine Learning & Artificial Intelligence. The creation of the Extreme Automation division was made possible thanks to our collaborations with associations of specialists, polytechnics and universities, as well as the physical location of the Group in an area renowned for its technical experience and know-how, especially in papermaking. Extreme Automation projects have

> “Guaranteed competence from plant design to the finished product. **One source, one responsibility**”

Integration, tracking and digitalisation: welcome to the A.Celli "next level"

The A.Celli Group has been working in the paper and nonwovens market for 75 years, with solutions at the cutting edge of technology.

by: A.Celli Paper S.p.A.

resulted in the implementation of Machine Learning technologies for predictive maintenance and the optimisation of the operational configuration of the machine, supplemented and integrated by thoroughgoing digitalisation and connectivity. Another basic objective is to guarantee computer security, in terms of the availability, integrity and the complete non-disclosure of all data hosted in the Cloud, using a dual-layer infrastructure. Our new SMART machines monitor, analyses, archives and processes data to offer optimal solutions for product quality, efficient production and reduced downtime, human errors and consumptions. Our predictive maintenance programs enable automatic, global plant management. Extreme Automation's monitoring systems continuously monitor vibration, electrical and pneumatic consumption, alarms and machine status controls to ensure constant line supervision, while also assuring energy recovery and sustainability. With the development of Auto Defects Recognition programs, A.Celli Group offers the power of an automated defect classification system which leverages AI to identify and memorise even defects not envisaged in the database, thus constantly expanding the defects catalogue with the aim of automatically eliminating product non-conformities.

The Smart Factory concept

Another example of A.Celli R&D is the development of the iREEL® solution, which can be compared to a sort of "data passport" for the reel, designed to identify the specifications of the product and other significant information throughout production to storage and subsequent converting. And that's not all: the objective of the A.Celli Group, in its adoption of the Smart Factory concept, is global integration of all machines, extended to integrated end-of-line solutions for

■ ACP Tissue Machine.

> Supplying technology, **innovations and complete services** to the tissue, flat papers and cardboard and nonwovens markets

■ AC R-Way AGV.

optimised storage, preparation and shipping. A.Celli's R-WAY® automated warehouse solution offers unbeatable productivity and storage capacity, with a vast range of automated warehouse configuration options. A.Celli R-WAY® (in partnership with TecnoFerrari) is the answer to all applications, offering a wide range of AGVs, from pallet trucks to mini-loaders and shuttles. Each device has its own load capacity and different gripping systems, which contribute to the system's speed, flexibility and global productivity profile, controlled by an intelligent and flexible architecture which guarantees high quality performance and more efficient logistics. ●

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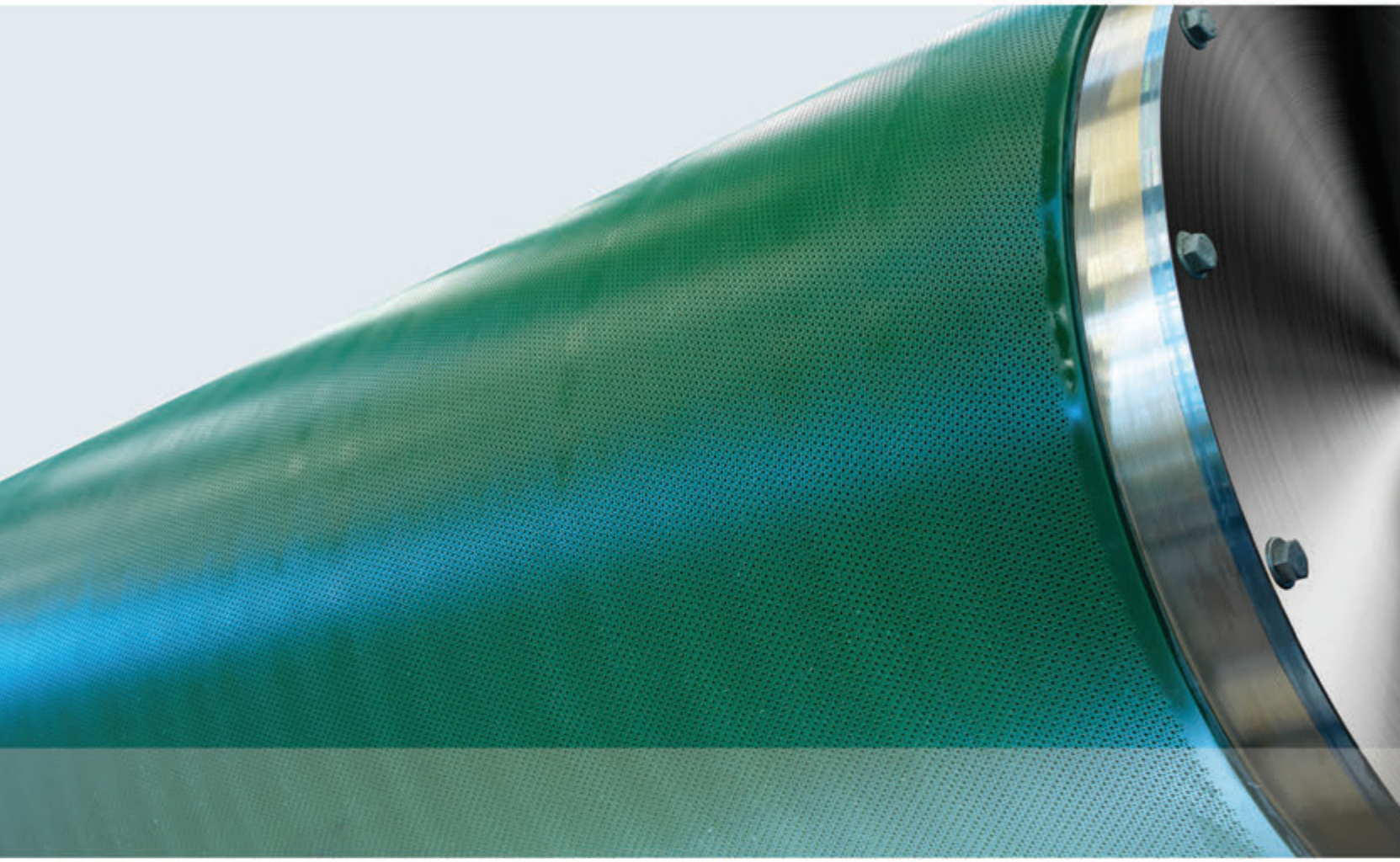

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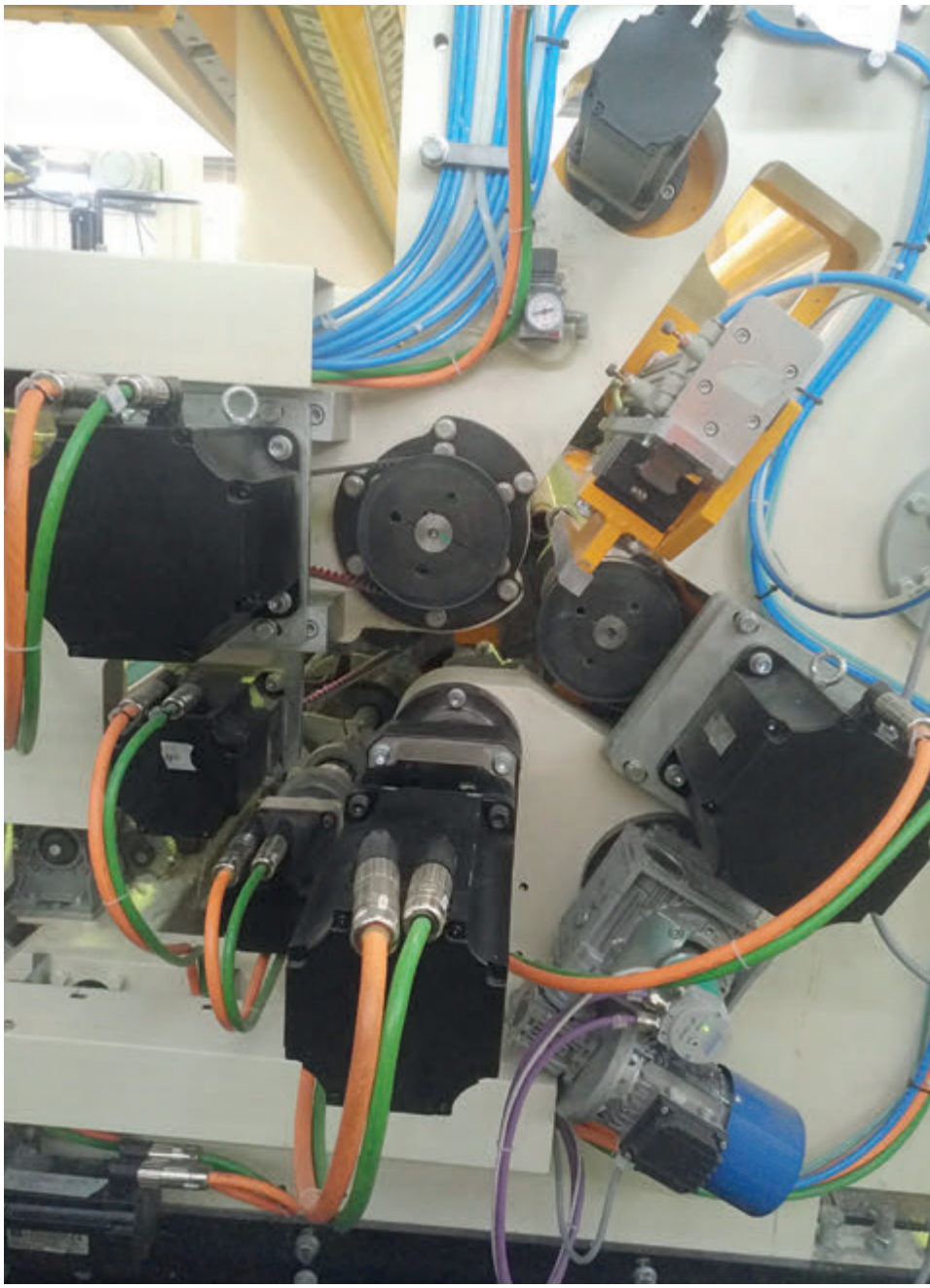
Roll covering and services for paper machines

■ AirEvo inside.

AirEvo, the mechatronic tailor is born

It just so happened that we were looking to solutions for production problems by looking at existing machines or procedures but, we were often left with unsatisfactory results. And then one day it hit us: what if we look for a "tailor" who builds customised machines or solutions? This is how AirEvo was born, an industrial roll machine centred around the customer's production needs. by: AFD Antica Fabbrica Digitale Srls



▲ One roll, one motor.

It all started with a request from Lorenzo Riva, the general manager of Eurocarta, to modernise an old line. So, we all sat down together at a table: us at **AFD**, Damiano and Graziano Giannini from OMT, the Eurocarta technicians and their director. By the end of the meeting, it had been decided that a new rewinder would be built, with the aim of creating a machine that would solve Eurocarta's production problems. First, an operating principle was chosen that would provide a changeover guarantee. Thus, an application was submitted for an OMT patent, which allowed a reliable and simple transfer to be calibrated and configured. We then focused on extreme speed and simplicity for changing the production type. Tooling adjustments were made without carrying out any mechanical

interventions on the machine: the core diameter was changed from 25 mm to 90 mm without having to modify the mechanics (solely by altering the parameters on the operator panel) and the perforation length was electronically adjusted from 200 mm to 400 mm without replacing the blades or pulleys. A motor was fitted to each roller: this ensured absolute tension and paper formation control. Given the types of motors used, substantial energy savings were also achieved. We then equipped the machine with strong, heavy-duty "foundations", by choosing 80 mm-thick plates for the sides of the machine.

▲ AirEvo running.

We chose CMZ's FCT300 with the CODESYS platform for the electronics; it controls 12 axes via cam or electric shaft. The choice of CODESYS, combined with CMZ's reliability and expertise in axis management, has allowed us to integrate devices from different manufacturers into the system, by assessing their reliability, quality and availability, without necessarily being tied to a single supplier.

> "We are not just a **technology supplier**. We listen to and implement the ideas of entrepreneurs that are looking ahead"

The AirEvo creation

During the construction phase which involved ongoing discussions between our technicians and those at Eurocarta and OMT, further technical changes were made to better comply with the customer's needs. For example, an additional procedure was added to the tail sealing gluer to bind the rolls and a spray glue system was added instead of the roller system, in order to use less adhesive. This collaboration has led to the creation of AirEvo: an exclusive machine characterised by changeover times that have been practically reduced to zero, an electric energy consumption with a cruising speed of 10 kW (less than the energy used for the motor to rotate an industrial roll cutting disc), an ergonomic easy-to-use operator panel, a roll changeover that works even if you forget to insert or misplace the perforator, and glue on the cores.

▼ The operator panel.

There is a very important final detail: as the Eurocarta technicians participated in the project from its development right up to the commissioning phase, they can easily carry out all the maintenance work on the AirEvo without having to use external technicians.
In practice, we have created a "mechatronics tailor", where the customer has not had to adapt to the needs of machinery as the machine itself has adapted to those of the customer.
A "tailor" that is very fitting with the words of the great irish playwright, George Bernard Shaw: Shaw's tailor was the only man who took his measurements every time he saw him, whereas all the others kept the old measurements and expected him to fit them.
The concept of Shaw's "miraculous" tailor has been used in "mechatronics" to create the AirEvo: it is the machine that takes the measurements to adapt wonderfully to the customer. ●

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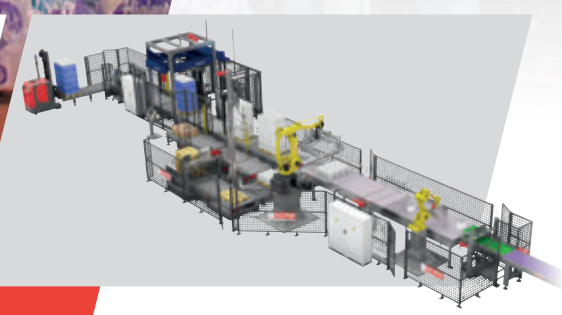

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Moving Ideas

EIL redesigns and reinvents the world of energy with REENERGY+

The first pilot plant in the world on a 90-tpd tissue machine was successfully completed. The results obtained are perfectly in-line with expectations. With its new REENERGY+ brand, EIL launches on the market a veritable revolution in the realm of energy. A revolution that can be applied to any tissue machine. In a market where energy costs and environmental constraints carry such importance, REENERGY+ is the complete solution, perfectly integrated in the production cycle.
EIL develops the entire project internally with no exclusions, relieving the customer of any burden up to the project's completion. The patented software guarantees a unique flexibility because it affords modulation and complete management of the gas turbine as well as of the entire production, without requiring additional specialised staff and without interfering with production.

REENERGY+ will play a key role in EIL's system energy saving division

REENERGY+ is integrated as an alternative and back-up burner that combines hot air generation and the production of electricity, a process completely independent from production that can be disabled at any time without stopping the machine.
The hot air is stored and managed through a sophisticated, totally automatic system that can be modelled based on machine requirements, exploiting its potential to the fullest. The air obtained is much drier and cleaner compared to traditional combustion. Energy production comes from the OP16 gas turbine

Today, it is possible to go beyond the concept of energy thanks to REENERGY+, the new EIL department entirely managed by internal personnel for assistance and maintenance on turbines, and air system and steam balancing.

by: EIL Srl

◀ REENERGY+ reduce the energy impact of production by 35% and emissions by over 80%.

marked Opra (for plants up to 90 tons/day) and BHGE (for plants from 90 to 200 tons/day) of which EIL is world partner for the paper industry. The guaranteed benefits are:

- 8,500 hours per year of continuous operation;
- 1 annual 5-day maintenance intervention;
- very low and all-inclusive maintenance costs;
- from 1,750 to 16,000 Kw produced in any outside weather conditions;
- 50% reduction of pollutants at the end of the cycle;
- 10% increase in production;
- enhanced paper softness;
- annual TEE (energy efficiency certificate);
- no noise impact;
- no increase in gas consumption;
- 10-year warranty with no decrease in performance.

A dedicated sales network

The system is monitored 24/7 by the team of specialised technicians at the EIL facilities is activated with on-site assistance in the event of failures. An internal department dedicated exclusively to REENERGY+ ensures full support in the event of problems, relieving the facility of any burden and ensuring electrothermal production 360 days a year.

And last but not least, EIL completes its services with the possibility of wholly financing the plant. After an important test period during which the related environmental, performance and flexibility assessments were performed, REENERGY+ is today marketed in every country through a dedicated sales network.

In parallel with the energy efficiency plants, EIL provided total electrification on 8 tissue machines in 2018 and in 2019 it will inaugurate an additional department dedicated to end-of-line robotic stations for converting. ●

EIL technical assistance.

EIL technical assistance.

> “EIL was established in 1980 by **a staff born in the paper industry**. The fundamentals and the ethics of the company never changed over the years”

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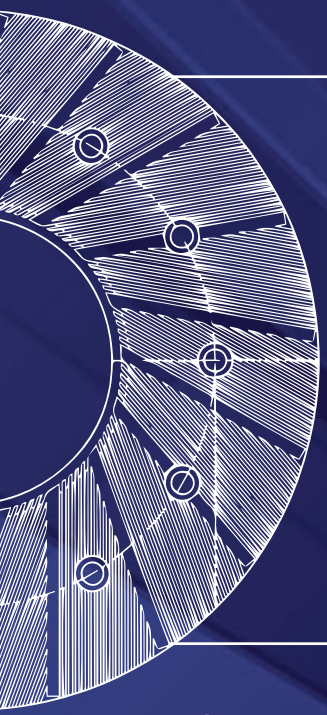

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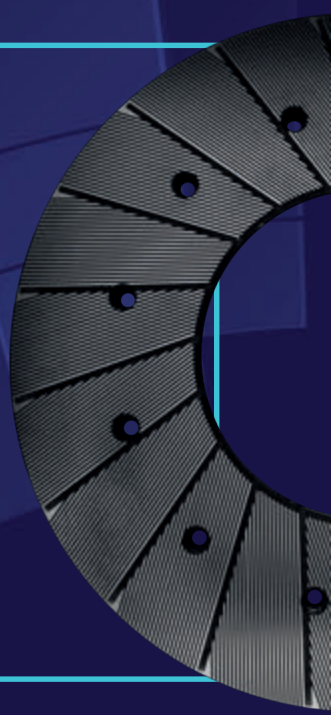

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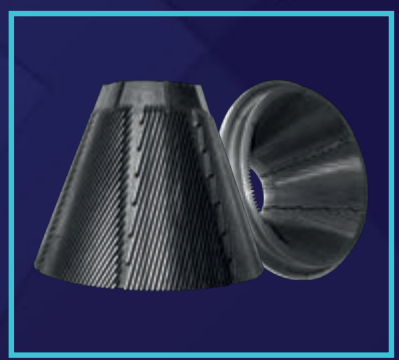

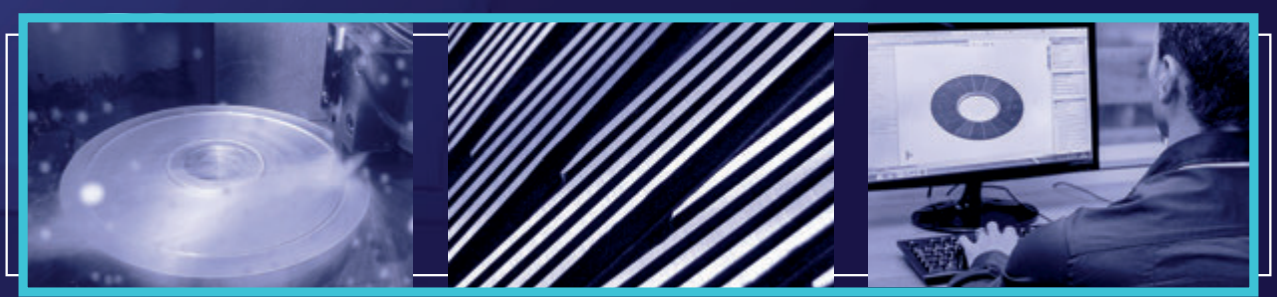

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AZMEC


is always looking
for the discovering
of a better and
improved product

Azmec is projecting and producing machines that grant an excellent quality together with high performances even in very hard working conditions. Offers vacuum pumps of various dimensions to grant the customer a wide range of machines working at different levels of energy consumptions.

by: Azmec Srl

■ Vacuum pump groups AL22.

The skill and the experience consolidated in almost 60 years of presence in the market (AZMEC was founded in 1960) say that AZMEC is a serious and available partner for all the companies of the paper mill industry that have to optimize the performances of their own vacuum plant, a main part of the paper machine; AZMEC is not only proposing its own solutions in new vacuum plants but allows the customers, through its overhauling service, to rebuild old pumps working for many years, to the original performances with an accurate revamping operation.

The production includes six lines of vacuum pumps, machines available to grant capacities from 150 up to 50,000 m³/h. Together with the vacuum pumps, AZMEC offers the customers all the available accessories, that's to say the driving systems (pulleys and V-belts, gear reducers when the installed power is more than 355 kw), the discharge separators, the silencers, the pre-separation groups, the safety valves, the self-priming extraction pumps and the dampers, just to mention the main parts.

The vacuum pumps of the range AL/2000 cover a capacity interval from 150 to 12,500 m³/h; the range ALBV/2000 covers capacities from 2,000 to 7,500 m³/h and the characteristic of these pumps is to have practically two pumps in one due to the presence of a divider that creates two sections each one available to grant the 50% of the total capacity and different vacuum degrees; the same solution, but with horizontal suction nozzles, is granted from the pumps of the range ALZ/2000 that have the same range of capacities of the range AL/2000; with the size ALCZ, pumps available to work without and with the divider, the capacities reach the maximum of 50,000 m³/h; the range ALBC grants capacities from 450 up to 17,000 m³/h and the range ALB4 grants capacities from 4,500 up to 21,000 m³/h.

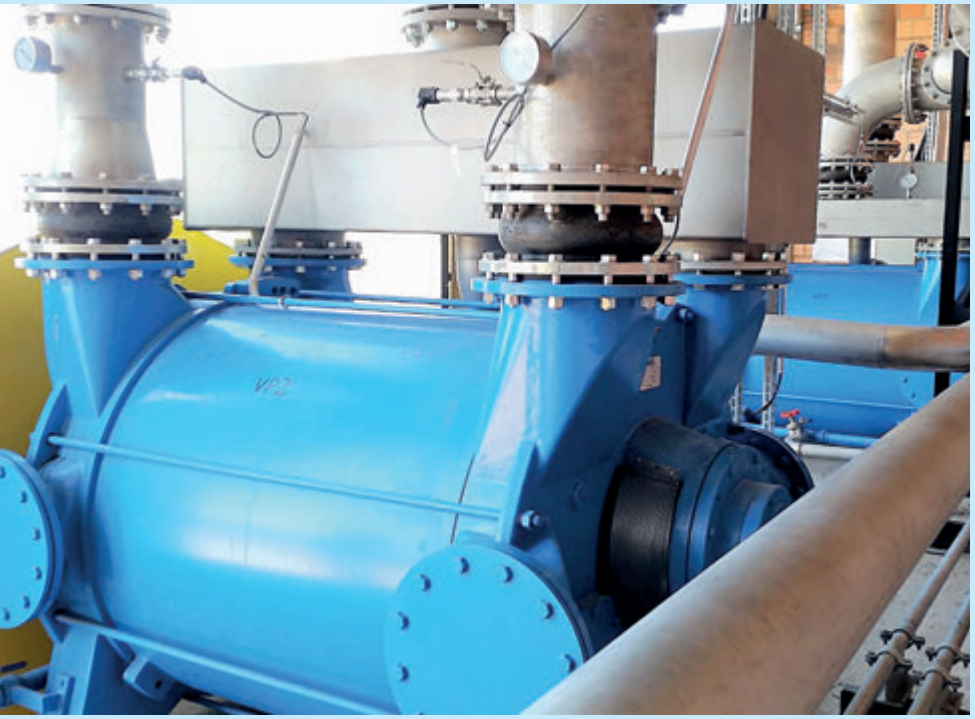
A complete service for the best arrangement of the vacuum plant

A special care is offered from **AZMEC** to one of the problems that is present more and more frequently: the reduction of the noise level of the machines according to the laws concerned to the environment; to get the best solution, the company offers the customers the covering of the pumps with soundproof panels available to reduce the noise level to 75 dB(A). Clearly these solutions can be applied also on machines already installed.

The proposal is not only concerned to the supply of its own machines; AZMEC is also offering the customers a complete service for the best arrangement of the vacuum plant; usually it is preparing a lay-out of the vacuum plant arranged according to space necessity and to customer installation just to optimize everything both from a technical view and a logistic view just not to have problems in case of maintenance.

Just to go inside the maintenance, AZMEC not only overhauls its own machines but also the pumps of competitors; all the pumps are sent back with the due guarantee and with the test data available to confirm the right operating; to check the eventual necessity to arrange a maintenance, AZMEC can be present with its technicians near the customer workshop to do the measures of capacity, vacuum degree and absorbed power of the vacuum pumps present in the plant. Usually, AZMEC supplies the customers a spare pump so that the production has not to be stopped during the repairing of the pump.

It's important to mention the last and very important supplies made recently by AZMEC: A2A GENCOGAS n.1 turn key solution skid AL75/2000 with soundproof cabin



▲ Vacuum pump group ALC500Z and ALC506Z.

> Azmec satisfies **all the necessities of its customers** arranging engineered groups complete with products and accessories of high quality, according to the technical requirements

■ **Vacuum pump groups ALN68 TM ATEX.**

■ **Turn key solution skid al75 with soundproof cabin.**

(Chivasso Plant), FLSMIDTH MILANO n.3 vacuum skid AL40/2000 in AISI316 with soundproof cabin, GAPCON TISSUE n.5 ALC420Z pumps + n.1 ALC400Z (final destination Indonesia and Bolivia), TECNIMONT SPA n.3 vacuum skid ALN64/2003 totally in AISI316 with mechanical seals and API681 execution (final destination The Netherlands), ATLANTUM n.10 vacuum groups ALC420Z (final destination Belarus), ANDRITZ n.2 vacuum pumps ALC670Z and n.1 vacuum group ALC500Z (final destination Russia). The production is arranged in two workshops: Arenzano (GE) and Verderio (LC). The vacuum pumps are manufactured through the use of CNC tool machines and tested in the certified test room. AZMEC is working according to the rules ISO 9001 and its target is to offer a more and more complete service to the customers, depending to the consolidated quality of its own products and to the efficiency of its staff. ●

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BOLZONI AURAMO

Effectively solving tissue production, converting and packaging problems using event capturing camera systems

▲ Web inspection provides real-time analysis across the full width of the wire to record and classify defects.

Increasing demands for operator safety, faster production speeds and enhanced product quality make it imperative to have visibility of all production processes.

by: Martin Rempel - Papertech Inc. - Hamburg, Germany

High-resolution cameras and comprehensive event capturing and quality inspection software not only deliver full process visibility, they also provide the opportunity to address issues at their root source, allowing overall machine efficiency (OEE) to be maximized without jeopardizing operator safety.

DISCUSSION

Full visibility into all production processes is fundamental to the overall success of any tissue operation and yet most operators are not able to answer a resounding "yes" to the following questions.

- Can tissue machine, converting line, packaging line and palletizer processes be safely observed?
- Is there a means on every machine to visually capture an unwanted process event and to find its root cause?
- Is there a means of viewing uninterrupted video footage from the past 24 hours (or more) of process?
- Is there a means of identifying and eliminating poor quality product at the end of each process stage?

These questions can be answered with a "yes" if a high speed and high-resolution camera-based event capturing and quality inspection system has been fully integrated into the process of operating each machine or line. Simple visibility can be provided by any surveillance system; however, full synchronized process visibility, with automatic event and quality analysis can only be achieved through advanced event capturing, web inspection and discreet item inspection systems, such as **Papertech**'s set of TotalVision™ solutions.

The motivators that warrant an investment in such solutions are:

A - The need for efficient high-quality production

- **Excessive process interruptions** - Is the tissue machine operation interrupted by frequent web breaks? Would solving the root cause of the breaks improve the plants return on assets? Web break footage can be acquired by an event capturing system through strategically located cameras - each synchronized to see the same web area to ensure rapid root cause analysis.
- **Product quality problems** - Are converting operations inefficient as a result of an unacceptable number of product defects in finished reels? An advanced event capturing system with web inspection capabilities can map and classify defects. Together with additional critically located cameras, the system can often show the defects' root causes.

B - Eliminating converting bottlenecks

- **Operate with knowledge of incoming product quality** - Could knowledge of the quality of incoming product improve converting line setup and reduce process interruptions due to web defects? Could product quality be improved by running reels of lesser quality as middle plies on a multi-ply re-winder? OEE increases can be achieved via the automatic receipt of accurate reel quality maps (provided by a web inspection system on the tissue machine) at the converting line.

▲ Papertech's WebVision software and cameras can monitor a preset region of interest on the paper web and alarm for any change in the sheet.

- **Excessive process interruptions** - Could process engineers, who are presented with the increased challenges of complex converting sequences, solve converting issues quicker with visual information? A typical re-winder may experience process interruptions due to faulty transfers, improper web tensioning, poor web quality, incorrect embosser setup, laminating problems, incomplete perforations, log formation issues, vibrations and log bounce and improper core insertion. An event capturing system is the only solution for capturing these events for slow motion playback and root-cause analysis.

▲ Multiple cameras views showing defects.

- **Ensuring a high-quality end product** - Can assurance be provided that end product meets the customer's minimum requirements? Without knowledge of incoming product quality and the ability to measure quality parameters, the end product is often packaged in the "good faith" that it meets customer quality requirements. However, top tier converters have started rejecting product based on base sheet flaws and monitoring other quality factors using camera-based quality inspection systems.

> "Papertech is the **Vision technology** vendor of choice for industry leaders in Paper Production in the World"

C - Eliminating packaging and palletizing problems

- **Excessive process interruptions** - As on a converting line, could process engineers solve packaging issues quicker with visual information? Packaging lines and are enclosed, high-speed processes and an event capturing system provides the only alternative to capture and present issues that occur in the packaging sequence.
- **Ensuring a high-quality end product** - Can assurance be provided that the package and placement of the product inside of the package meet the customer's minimum requirements? Inline camera-based quality inspection systems are able to see and alarm on package flaws as well as when product is incorrectly positioned inside of clear wrappers. These are just a few examples of how event-capturing and quality inspection systems can meet the needs of tissue producers and converters.

member of IBS PAPER PERFORMANCE GROUP

RESULTS

An event-capturing and quality inspection solution investment will typically provide the quickest payback and provide the largest return on investment under the following scenarios.

1. **Rapid and efficient start-up of a new tissue machine, converting, or packaging line**

Visibility and proof of commissioning problems will ensure that a new machine or line is up and running as fast as possible. The return-on-investment is achieved by being able to rapidly find out where process interruptions are occurring and why, as well as finding the sources of quality issues that prevent new lines from achieving desired production output on schedule.

2. **Improving the performance of an existing machine**

Rebuilding or re-purposing an existing machine for a change in product output and quality poses similar challenges as commissioning a new machine. Also, any machine that is production-limited can often benefit from an event capturing solution that provides the ability to resolve unwanted process interruptions.

3. **Eliminating poor quality**

Product claims can be costly. The ability to measure and document the quality in each production phase-production, converting and packaging can shorten extensive quality investigations. Also, the ability to eliminate poor quality product at its production source can provide a very large payback to any organization with quality concerns.

4. **Conforming to new safety and operator training regulations-machine guarding**

Many operators are faced with decreased or often completely restricted visibility of their machines as a result of newly implemented safety guarding measures. An event-capturing solution can restore operator-machine visibility, and also enhance it to levels otherwise unattainable.

CONCLUSION

High speed camera technology for both event-capturing and quality inspection has a clear return on investment for tissue machines and converting and packaging lines. Proof of this is the rapid growth in vision-based system installations by first and second tier tissue producers who see it as paramount that their assets deliver the best possible OEE. ●

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With 300 sold devices worldwide, it is clear the tissue industry speaks TSA!

One more time
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▲ The Water Cooled "Platform ONE DRIVE" inverters, equipped by the ONE Card (one card fits all: DC-AC-Brushless and Reborn) and Film Capacitors, ensure "infinite life" to the inverter itself.

After having equipped the inverters with film capacitors and ONE Card, now we go for the liquid cooling system.
The advantages: reduced spaces, absence of dust contamination, humidity in acid environment, preserving the internal components guaranteeing through time an important energy saving.

by: SAEL Srl

▲ Sectional drive electrical cabinet by the exclusive "Platform ONE" drives WATER.

Fulfilling the mission voted to the "Spirit of Improving", SAEL applied the know-how achieved along the Tunnel Boring Machines experience, to their massive production drives. The hard environment in which the inverters work on, are among the most severe that can be encountered: small spaces, strong vibrations and high temperatures. Those reasons have driven R&D team to create a water-cooled drive: extremely reliable, compact and strongly immune to thermal and mechanical shock; applied in well-protected environments such as the paper mill, just a few months after start-up, it allowed to sleep peacefully and to encourage massively the paper mills to be led towards this technology.

The technological gap. SACI paper mill

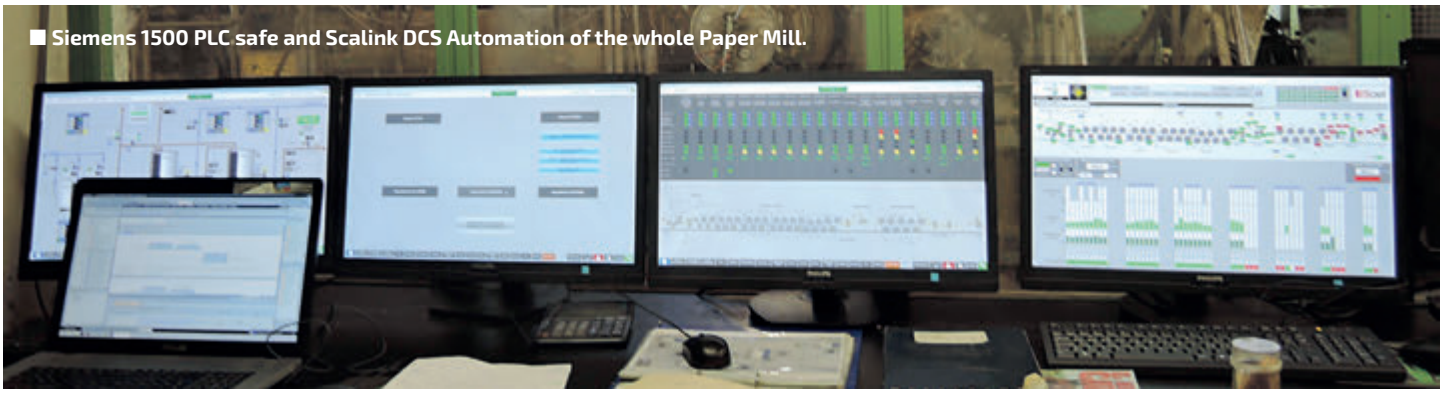
The liquid cooled drives, without tangential fans (one each inverter), allowed us to remove all the ventilation normally mounted on every door of the electrical cabinet. The new electrical cabinets where our panels are installed, abundantly conditioned before, today become normal rooms, since the system becomes independently cooled. The double-sided electrical panels, where the inverters are mounted, have closed air recirculation ensuring no contamination of dust, humidity and air acidity; they preserve over time. The experience gained as well as the excellent performance monitored over the years due above all to energy saving, will allow Cartiere SACI to save about € 60,000 a year, eliminating the need for maintenance of the air conditioners and fans. The drive system dealt with the management of 46 AC motors of about 2 MW of installed power; the realization, unique in its kind and coordinated with our DCS in Drive, both in paper machine and in rewinder, was strongly desired to equip the paper mill with all the qualities that our Platform ONE offers today in the market.

SAEL Platform ONE drive. Industry 4.0

The "ONE drive" platform born for the paper industry, that entered the market in 2011, and in 2018 was enriched with the solution "liquid cooling" was immediately proven to be innovative and highly performing. All drives (AC, DC, BRUSHLESS, CHOPPER and REBORN) of paper machine, winder, calander, wrapping machine and stock preparation, are always managed by the "ONE" hardware card: identical to the others

■ Water-water exchangers with direct in-let from the well of water.

> “Custom and flexible solutions for **easier and quick installations:** systems and friendly user interfaces for any production stage”



■ Siemens 1500 PLC safe and Scalink DCS Automation of the whole Paper Mill.

(ONE Card “Fits All”). The ONE card is supported with by one ductile memory that contains the data, extractable and easily replaceable by anyone even without experience. In practice no programming, parametrization and operation like normally in the technical world with a connected PC is necessary to restart with our drive in case there is a failure. A system simple and dedicated to the auto diagnosis for helping the paper mill to conduct unparallel trouble shooting. The platform “ONE drive” foresees the use of the latest generation drives Long Life, practically with an infinite life. The drives are equipped with components that are not in fear of aging (for example all the electrolytical capacitors with which every inverter is equipped with a 60,000-90,000 hours’ lifetime, our drives are substituted with film capacitors) and are easily repairable in contrast to our competitors who are constructing drives in a more consumeristic model as all appliances are build. In the presence of a fault they prefer to replace them. Also, the changing of models very frequently is always lurking; another nice idea to confuse the end customer that they must upgrade or get expensive spare parts. Remote assistance and the possibility to understand every single problem that happens in the drive system through the “DCS in drive ONE”, complete the platform that except from saving spare parts, guarantee their fast replacement and a long-life lasting system. This is the philosophy with which **SAEL** has responded to the drives market for paper mills since 2011. ●

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ANDRITZ: at the forefront of innovation in Tissue

▶ Klaus Blechinger, Vice President Tissue, ANDRITZ AG.

▼ The tissue pilot plant *Prime*LineTIAC at the ANDRITZ headquarters in Graz, Austria.

The high-level appointment goes in line with other major developments at **ANDRITZ** in the tissue sector including the launch of a new machine concept for textured tissue "*Prime*LineTEX" (a result of the R&D activities at the ANDRITZ tissue pilot plant *Prime*LineTIAC) and the launch of the *Prime*LinePerformance Center for digital customer support worldwide.

What is your impression of the tissue industry and in your opinion what does the future look like for tissue as an industry?

Klaus Blechinger: The tissue industry is highly competitive and growing at the same time. Innovation is key in this industry, production costs and product features are in focus. In order to be able to take a lead in this dynamic industry, customers need to rely on strong suppliers, suppliers who are able to support their development efforts.

How do you rate the tissue industry in terms of innovation?

KB: I rate the tissue industry very high in terms of innovation and this applies as such not to innovation for tissue products and production processes only. The tissue industry naturally triggers innovation in affiliated industry sectors, for example in the logistic sector. Thus, we must draw our attention in the future also to the whole lifecycle of a tissue production line and to the entire sourcing, production and distribution chain. Lifecycle Service, customer care, quick reaction support, reduction of logistic costs are all in the focus of our tissue customers.

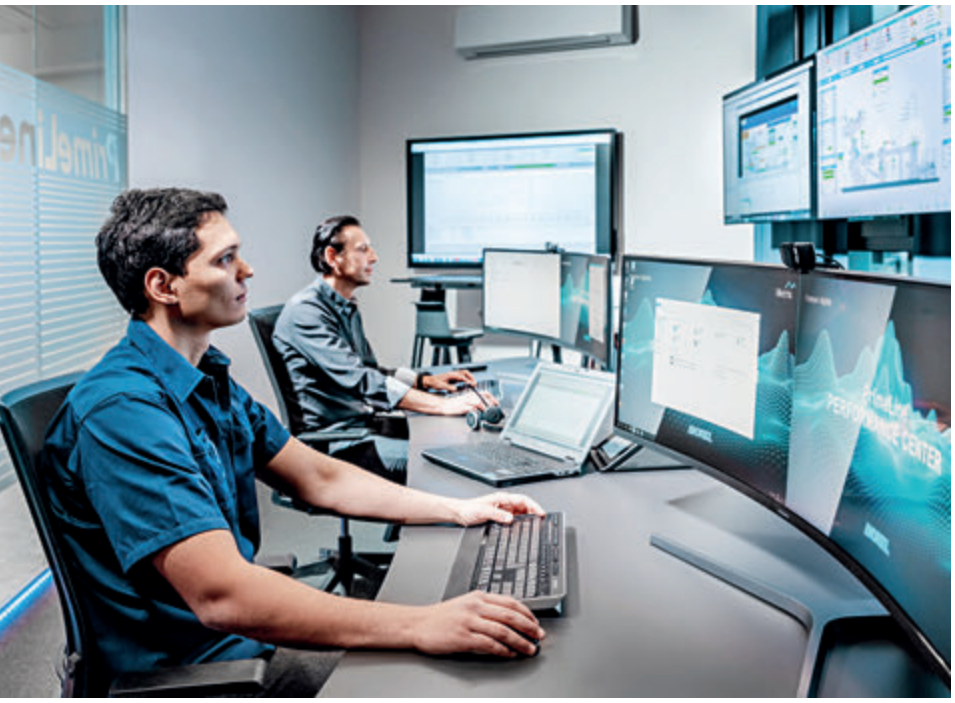
On the subject of innovation, and now that the tissue pilot plant *Prime*LineTIAC has been in operation for a couple of months, can you tell us about some of the work that ANDRITZ is carrying out in R&D? Anything important to report?

KB: Our *Prime*LineTIAC Tissue Innovation and Application Center has developed very successful since its official launch in March 2018. The pilot plant is available to tissue producers and suppliers, research and development companies and universities but also for our own R&D activities. Within the last months, we carried out several internal R&D projects to further develop and improve ANDRITZ products for tissue machines. For example, new products such as the latest shoe press technology, *Prime*Press XT Evo, have been developed and tested successfully under all conditions. Furthermore, existing products and technologies, for instance the ANDRITZ Vertical CrescentFormer (VRT) have been optimized. Our latest R&D project is the new machine concept *Prime*LineTEX that we now officially introduce to the global tissue market.

What does this new machine concept *Prime*LineTEX offer to tissue producers?

KB: The new machine concept, focusing on the reduction of investment and operating costs,

ANDRITZ has reinforced its position as a leader of innovation in the tissue industry by recently appointing a new member to its Global Tissue and Paper team. Klaus Blechinger joins as Vice President Tissue and has been with ANDRITZ for close to 20 years. by: TissueMAG



▲ The *Prime*Line Performance Center offers digital service and support for tissue, paper and board mills worldwide.

enables the production of textured tissue with a quality much better than dry-crepe and very close to structured (TAD) tissue. The machine offers up to 25% fiber savings (compared to dry-crepe) and even 50% less energy consumption compared to TAD. It is remarkably shorter in length than other market solutions, and uses only one fabric instead of two. Furthermore, the *Prime*LineTEX machine can be rebuilt within one day for the production of dry-crepe tissue.

> “Process technologies, equipment, plants, and systems: ANDRITZ provides a **comprehensive product portfolio**”

What results do you see in the tissue industry with the introduction of digitalization or the Industrial Internet of Things (IIoT) through Metris *Prime*Control E?

KB: Digitalization will be of utmost importance in this industry. Metris *Prime*Control E is our answer to this development and is the ANDRITZ current state-of-the-art IIoT solution for tissue machines. Others might come, as we are continuously advancing in this area. *Prime*Control E is supplied with every ANDRITZ tissue machine. Initially, we installed it at *Prime*LineTIAC to optimize and monitor R&D activities and trials, as well as to develop new, pioneering solutions for OPP (Optimization of Process Performance). At the pilot plant, OPP is used to monitor and control the different machine configurations as well as stock preparation and includes alarm management, advanced reporting, drive systems, quality control systems, and remote support. There are also reports on energy and resource efficiency capabilities available to monitor and optimize consumption of energy and other resources. Metris *Prime*Control E is used for immediate, fast and efficient customer support and increasing efficiency during start-ups and operation. We expect the first OPP contracts to be concluded with tissue producers later this year.

ANDRITZ has also recently launched the *Prime*LinePerformance Center. Can you give us an overview of the digital services that this center provides to customers?

KB: The *Prime*LinePerformance Center is an impressive milestone for ANDRITZ in the area of digitalization and Industrial Internet of Things (IIoT) solutions. Tissue, paper, and board mills are able to benefit from individual and fast customer service by using the ANDRITZ Metris platform for the optimization of production processes, operator trouble shooting and decision support.
The center is located at the ANDRITZ headquarters in Graz, Austria and demonstrates an excellent combination of process, technology and product knowledge with digital services for our *Prime*Line tissue, paper, and board mills. It features various applications for a perfect global customer service and support by providing remote solutions, real-time communication or data analytics.
The paper & tissue industry will see a constant operating cost optimization and thus, also, a strong move to digitalization. With the *Prime*LinePerformance Center, we can offer support to our customers exactly when they need it. ●

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PROUDLY ITALIAN, SINCE 1870

■ Quality inspection machine for packs with rejection unit.

Pulsar Engineering presents the tissue quality system which improves the efficiency of the whole converting, packaging and palletizing line

Pulsar Engineering, which is a part of the Pulsar Group, specializes in the engineering and manufacturing of machines and lines for packaging and conveying of tissue products and in-line quality control systems.

by: Pulsar Engineering Srl

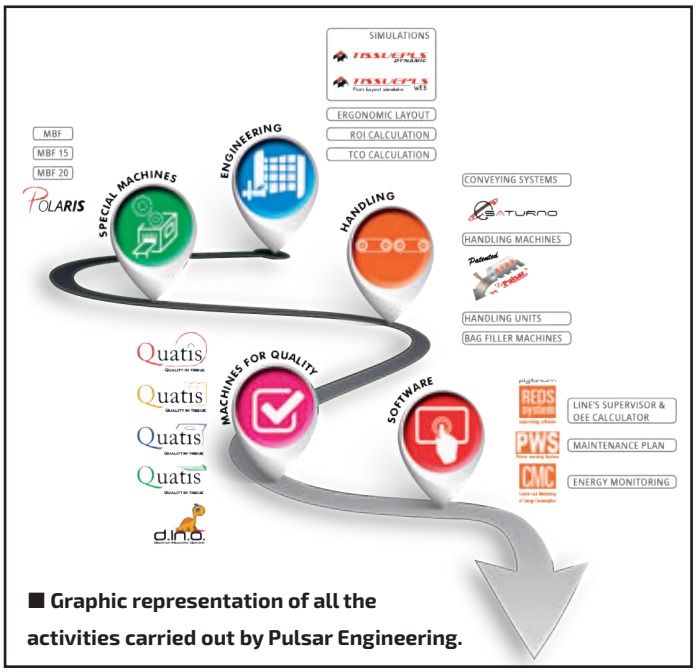
This Group includes the commercial facility in Green Bay, WI where there is a wide demo room for customers to have the opportunity to see and test many of our products first hand. Pulsar Engineering holds over 89 patents and patents pending around the world. In recent years, Pulsar Group has launched many innovative solutions dedicated to the tissue industry, focusing on the Industry 4.0 concept for the generation of the "smart factory". QUATIS machines are able to collect a large amount of data in real time and to inform handlers of issues with the product or machine, allowing them to fix problems quickly and efficiently. This helps reduce the amount of non-compliant products and jams in the machinery, and increase the efficiency considering same operators number, working hours and equipment. Since the QUATIS machine was launched, customers have been able to manufacture tissue while checking 100% of the production flow along with the measurement of the level of quality obtained and set within the parameters identified by the customer. This gives the customer assurance that the products intended for sale conform to the requirements, increasing the quality perceived by the end user. Currently for the Quatis for packs, checked non-conformities include non-compliant bottom

cross sealing, side sealing and print centering as well as paper that gets stuck in the pack, incorrect roll orientation, missing roll(s) and the presence of handle. QUATIS is also able to create a more efficient, accurate production of unwrapped products such as toilet paper rolls, kitchen paper, industrial rolls and folded products. Not only does the QUATIS system control 100% of the production, but it also implements quality control in real time, directly on the conveyor system with no operator intervention. This also gives the opportunity to adequately improve the upstream machine settings, thereby increasing the efficiency of the line and consequently, production capacity. QUATIS machines are available in two models. The first can inspect the products, collecting and processing data for overall production analysis. The second has the benefit of an ejection unit, which inspects and analyses production data as well as automatically ejecting non-conforming products. QUATIS for both wrapped and unwrapped products are currently stand-alone machines that allow them to easily be installed in new or existing converting lines. Pulsar also offers remote support service for 6-24 months after the machine is purchased in case the format needs to be changed, new recipes need to be created and for any training required for employees.

Important results of QUATIS installation

To demonstrate how installing QUATIS machines in a converting, packaging and palletizing line can improve the efficiency of the entire production process and whole line settings, we analyzed the data of one of the many machines installed all over the world. This identified several interesting issues.

First, we looked at the effects of overturned rolls at the infeed of the packaging machine and how it would affect the end user, distribution chain and the machine itself. While overturned rolls may cause dissatisfaction with the end user and distribution chain, there was also a high chance that rolls incorrectly positioned would cause a jam in the machine. We analyzed this data over a six months' period with a line composed by a rewinder, an accumulator, a log-saw, a QUATIS rolls machine, a bag-filler machine, a bundler and a palletizer to study the number of overturned rolls inspected by a QUATIS machine. In this time, the number of overturned rolls was 50.168, representing the 0,2% of total rolls manufactured. However, without the presence of a QUATIS machine, we estimated that operators could only detect about half of the overturned rolls, adding up to about 25,084 rolls. At least 50% of the mispositioned rolls entering the packing system caused a jam. This caused major changes in the time it takes to produce the product. In fact, the non-compliant rolls that caused a jam in the bag-filler machine estimated 60 added seconds for each bag. This adds up to 415 hours of down production time over the course of six months. Once the QUATIS machine was installed, the company participating in the study was able to save that time because of the system's ability to detect non-compliant products, discarding them without jams in the packaging machine. The ability to save this time also helped the company save money and become much more efficient.



■ **Graphic representation of all the activities carried out by Pulsar Engineering.**

> The lines are equipped with **remote monitoring systems** and management software

Work alongside the customers

On an annual basis, these data show an increase in production time to be estimated in 830 hours of time producing non-compliant, overturned rolls. We also calculated the OEE increase, which added up to +3.72%. By installing a QUATIS machine, the search for the cause of the mispositioned rolls is eliminated, which results in a much higher efficiency level. Through this new service, **Pulsar Engineering** will provide its customers with real-time service of data collection, analysis and reporting through the machine's online connection. At Pulsar, not only do we believe in innovation, we also believe in the integration and cooperation between people, organizations and nations. We work alongside our customers in the process of production lines in the tissue converting industry to create top-of-the-line machines, equipment and software that work together to increase product quality and improvement of everyone's standard of living. ●

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Striker: high performance felts for **crescent former machines**

Binet sul Liri Mill in Isola del Liri Italy.

Besides being a single felt like the traditional Pick-up, in fact, it also performs a forming function for the paper sheet, receiving a huge amount of water in addition that will essentially dispose by centrifugation through the forming fabric that wraps externally the felt in correspondence to the Forming Roll. The dry content after the landing on the felt is only 0.2%, meanwhile after centrifugation through the forming fabric, the dry content of the paper sheet is 12%, therefore, at the formation, a 16 g/m_2 sheet loses a quantity of water equal to 7866 g/m_2. Like all felts for tissue machines, it must therefore be featured by: a fast start-up (24-48h); low thermic and electrical consumption; an acceptable duration (30-60 gg). The quality and quantity of the production are directly linked to the felt and therefore to its performances, both at the press suction area and in the Nip area.
From our knowledge it turns out that just 1g/m_2

A Crescent Former machine felt is definitely a very complex product that requires great precision both in design and manufacturing.

by: Binet sul Liri SpA.

more of water in the sheet is enough to lose 1% dry and 4% speed, to say 72 m/min for a machine running at 1,800 m/min.
The initiation of the project for such a felt should start from the acquaintance of the airflow which is sucked by the suction press. It should also take into account the air characteristics, i.e. temperature and humidity of the air intake. In fact a hot and dry air is much more effective, from the point of view of dehydration of a cold, moist air.
In this regard there is the study of the systems to suck instead of ambient air, a preheated air conveyed in front of the suction zone of the press from particular boxes, as the old steam boxes.
As said, it is important to know the capacity of the pump connected to the suction press.
In fact, it will be the air molecules that cross the sheet + felt sandwich to get loaded with the water that they come across along their way and they will load as much as they can hold.
So, how much more air we can withdraw through the Felt, greater is its hygroscopicity and greater will be the sheet dryness at the ingoing side of the pressing area, and at the exit of the Nip, thanks to a lower rewetting as a consequence of a drier felt.
Obviously, the amount of air extracted is often a fixed parameter for each machine and as well tending downwards due to the high energy costs associated to the engines of the pumps that can be estimated approx. 500 €/year/Kw installed and 1.0-1.5 Kw/m_3/min of vacuumed air.
Consequently, the felt is asked to take charge of the "transformation" of the air quality in order to make rather insignificant molecules from a hygroscopic point of view, become extraordinary moisture "eaters". Transformation will be carried out by the so-called "Vacuum". And the vacuum is produced by the felt structure that determines a loss of charge of air flow when it is crossed by this. This loss of charge is directly proportional to the specific surface of the fibres (finer fibers, greater specific surface), to the thickness of the felt, to the speed of the flow

▲ Heatsetting of a base fabric.

> Our inspiring philosophy is to transform the **art of manufacturing felts** in an exact science

▲ Ing. Marco Viscogliosi, General Manager Binet sul Liri SpA.

▼ Weaving loom for tissue felts at Binet sul Liri SpA.

and, in reverse, proportional to the open area of the various layers of the felt. The equation that describes the loss of load of a fluid in a porous medium is the equation of Darcy, reshaped for modern needled felts in the Kozeny equation:

$$\Delta P = z * 2.25 * K * M * V * S * (1-\varepsilon)\ 2/g * \varepsilon 3$$

where K (Kozeny constant) is a constant value without dimensions that represents the tortuosity of the capillaries that has variable values, from 3 to 6, g is the well-known force-mass conversion factor, ε is the empty fraction of the felt element. S is the specific surface of the fibres and can be calculated with the following expression:

$$S = 4 * d/d2$$

where d is the diameter of the fibers that compose the Batt.

Felt engineering: tech support

All these complex equations must be applied to each layer of batt in order to subsequently rebuild the total load loss and from this the permeability of the felt in the canonical CFM.
Obviously, this is practically possible only with the use of a specific software known as our FELT ENGINEERING® at present exclusively owned by **Binet sul Liri**. Returning to the molecules of the air, these, thanks to the resistance encountered in the crossing of the felt and the consequent depression that is generated, compared to the atmospheric pressure, they dilate increasing their hygroscopic capacity by loading the water deposited between the sheet and felt fibers to the passage. The physical law describing the phenomenon is Boyle's law, enungated for perfect gases, but it is valid with good approximation also for air, so at constant temperature.

$$P1 * V1 = P2 * V2$$

from which

$$V2 = P1 * V1/P2$$

If P1 = 1 atm and P2 = 0.5 atm we will have that

$$V2 = 2 * V1$$

That is, with a vacuum of 0.5 atm = 5 m of water column, the volume of the air molecule doubles its volume and if its relative humidity was in the typically humid environment of the paper mill of 70-80%, becomes of 35-40% and therefore highly hygroscopic. This is the reason why a low vacuum does not take water away, simply because the air molecules are not sufficiently hygroscopic. ●

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Pictures are shown for illustrative purposes only; actual products may vary due to A.Celli's R&D activities.

Meet us at **MIAC 2019**, Lucca - Italy, October 9-11, booth n° **1**

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■ Ghost technology.

Tailor Made tissue products and 3D experiences with Engraving Solutions

We expanded our existing product portfolio with digital services and customized solutions for the new needs of the tissue market.

by: Engraving Solutions

The tissue market is changing. **Premiumization** and **Digitization** trends play an increasing role in the choice of converters. Offering personalized products to the specific customer's needs has become one of the strengths of companies. Today the customers want to co-create with the supplier, being part of the creative and development teams from the early stage of the project for a better match of their requirements.
The challenge of **Engraving Solutions** is to provide customers with innovative solutions that answer and anticipate market changes and help them optimize their manufacturing performance.
For this reason, thanks to the technological know-how in the production of embossing rollers, and keeping continuous exchanges and workshop with the customers, we have expanded our offer with **new digital and customized solutions** that fit the new market trends and simplify the processes of development of new products. This assures the shortest time to market of a new product on the shelf.

New embossing technologies: Smoothie, Ghost, and Ex-Press

In 2018 we expanded our range of embossing rollers by creating three new embossing technologies: Ghost, Smoothie, Ex-press. Highly competitive products as an answer to the tissue market trends.
Ex-Press. It is dedicated to premium products. It allows to obtain highly decorated products, even with double colour, without having to use to printing groups, without limiting productive speed and maintaining the technical qualities of the most modern embossed products. Similar to Colour-Embossing, a simple pre-embossing station gives decoration with a first colour. A sequent second embossing phase, thanks to the use of a colored glue, creates an extremely personalized product. This method enables to produce soft, highly decorated and distinctive tissue rolls.
Ghost. We can define it as a micro-revolution, as for the first time the two engraving techniques, mechanical and chemical, are combined obtaining a decisively first-in-class kind of embossing. By applying this variable-density embossing, the "B side" of the multi-layer products becomes protagonist. Thanks to this process, the finished tissue product gains softness, bulk and resistant features with an extraordinary hand feel.
Smoothie. It has been designed for the entry level products while thinking of two major pain points to improve: making the paper smoother and to obtain more appealing products, both to the sight and

▶ Touch'N'Roll. The new 3D embossing configurator by Engraving Solutions.

▲ Pixel technology engraved roller.

▼ Ex-Press technology.

> "Touch'N'roll is **the first 3D configurator for tissue products** designed by Engraving Solutions Know-How"

to the touch. We achieved the goal thanks to a double-function embossing cylinder, applying consequently a decoration feature and a slight calendaring phase on the upper side of the web.

Touch'N'Roll - Design your tissue roll in One Touch

At Tissue World Milan we launched the new tissue configurator **Touch'N'Roll**. The new configurator aims to simplify the process of new product development. Through a digital platform accessible from PC or Tablet, in a few simple steps, the user can make a preview of the finished product, a real-time prototype, even before making a pilot line test. This allows the customer to have an early view of the product and reduce decision-making time.
The process is very simple:

1. Choose between three predefined types of rolls: toilet rolls, kitchen towels, away-from-home;
2. Insert technical specifications (height, diameter, virgin or recycled paper);
3. Choose between up to 36 embossing patterns in eight colours for a total of 1,440 possible configurations;
4. Obtain a preview of the final product.

The customer can consult at any time, remotely, the complete list of engravings made and have immediate availability and access to the technical data sheets of the rollers. Still through the platform, the customer can communicate directly with the Engraving Solutions experts, reserve a pilot test and check the order status of new rollers or product tests. A real **digital experience** that allows the customer to speed up the decision-making cycle and reduce its time-to-market. If you want to arrange a demo of the new tissue roll configurator, please contact Engraving Solutions. ●

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Read more at www.kemira.com

kemira

■ Toscotec AHEAD - The Navigator Company, Portugal.

Toscotec's turnkey scope of supply encompasses the entire tissue making plant, with the only exception of the civil works. The scope includes the complete stock preparation plant (tanks, chests, agitators, the piping system, stock and water pumps and instrumentation), Toscotec's patented TT SAF (Short Approach Flow) system, the tissue line, crescent former or TAD, and its auxiliaries (vacuum plant, hood and air system, steam and condensate plant, dust and mist removal systems), the water treatment plants, the electrical power plant with cabinets, motors, cables and accessories, the control system, the compressed air system, the steam generators, the bridge cranes, the HVAC system (Heating, Ventilation and Air Conditioning), the chemical preparation skids, and the complete package of services including the plant erection, commissioning and start-up, operational and maintenance training, and the technical/operational support after start-up to achieve the guaranteed performances.

Projects all over the world

The sites of installation extend across four continents, with projects in Asia,

Toscotec recognized as global leader of turnkey tissue projects

In the last 15 years, Toscotec has specialized in the delivery of turnkey projects, providing more than 20 turnkey projects across the world. Based on this substantial experience, the Italian manufacturer has become the global leading supplier of turnkey tissue projects.

by: TissueMAG

Africa, America and Europe. Every project has specific logistic requirements and it often demands compliance to local standards of machinery manufacturing, with required coordination with local governmental bodies. This is part of the reason why Toscotec's considerable flexibility and continuous communication with customers play a crucial role in the successful completion of complex projects such as turnkeys. Over 70% of Toscotec's turnkey projects install its top of the line AHEAD tissue machine, with paper width ranging from 2.7 m to 5.6 m, capacity up to 250 t/d and operating speed exceeding 2,000 m/min.

Toscotec's competitive edge is threefold

Cristina Brocchini, Toscotec's VCTO/ Process & Project Engineering Manager says: "Our first competitive advantage as turnkey supplier is our internal ability to manage complex projects, based on the extensive experience we gained over 15 years". The vast scope of supply of turnkey projects demands remarkable management skills and fine-tuned internal coordination. Cristina Brocchini points out: "The entire engineering is developed internally, which means that 100% of the plant design is completed by Toscotec's technical department, including all

processes (stock, water, vacuum, hood, steam, dust, mist etc.)". The second advantage Toscotec offers as turnkey supplier is its proven capability to expertly deal with all kinds of raw materials. **Toscotec** has significant experience in the full range of fiber types, including virgin fibres, recycled paper, non-wood (bamboo, bagasse and others) and de-inked fibres, pre-dried, flash or slush. Brocchini says: "With turnkeys we can go a long way towards truly tailoring the process and the plant to the customer's needs. As for recycled fibres, we provided stock preparation systems on several turnkey plants in Africa and Europe.

■ Toscotec YES, Your Expert Service.


■ Toscotec AHEAD - Bel Papyrus, Nigeria.

"One partner for an integrated solution. **Top technology** complete lines designed to guarantee customers the best result in terms of performance and return-on-investment"

Bel Papyrus PM3 was a rather challenging case. We supplied two stock preparation lines, one for virgin fibres and one for recycled, which could run as fully independent or together to get a mixed pulp. The recycled paper line included various screening stages, a low density cleaning system, a de-inking plant, two loops of washing, hot dispersion and two bleaching stations. We also supplied the sludge treatment system, which is crucial when it comes to recycled raw material". The third key advantage of Toscotec's turnkey supply is its focus on saving energy and pushing the envelope on energy efficiency, across the entire plant. Heat recovery is Toscotec's specialty, aimed to achieve the maximum possible thermal efficiency. On the air system, Toscotec can install up to five heat exchangers. Brocchini adds: "But the most important aspect is that before we start engineering a plant, we carry out a detailed analysis of the available energy streams and the local cost of energy sources. In order to reduce the operating cost of the mill, we balance the system, according to which source we can use and what it is more convenient to recover." Toscotec will start up five new turnkey projects later this year and at the beginning of 2020. ●

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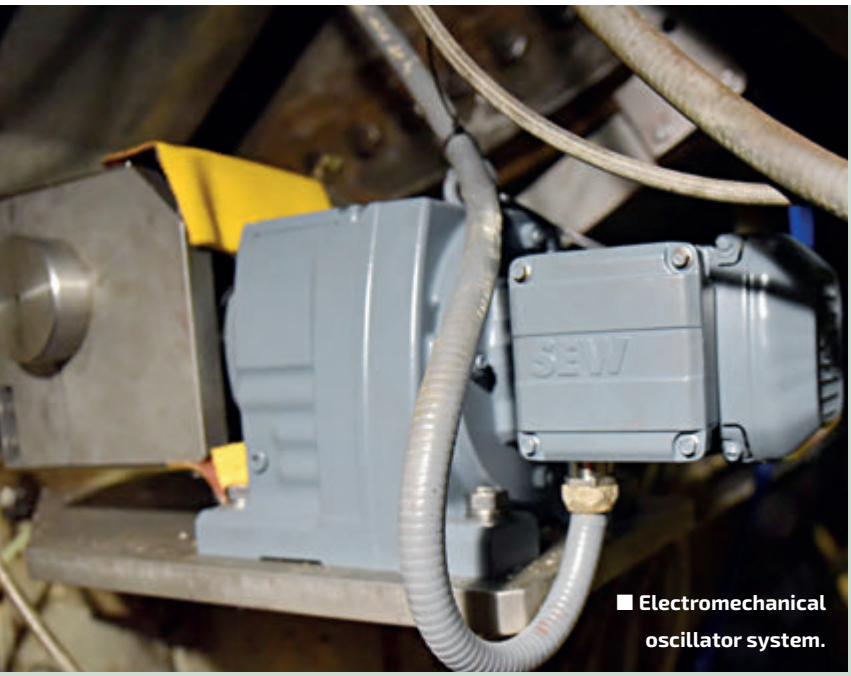


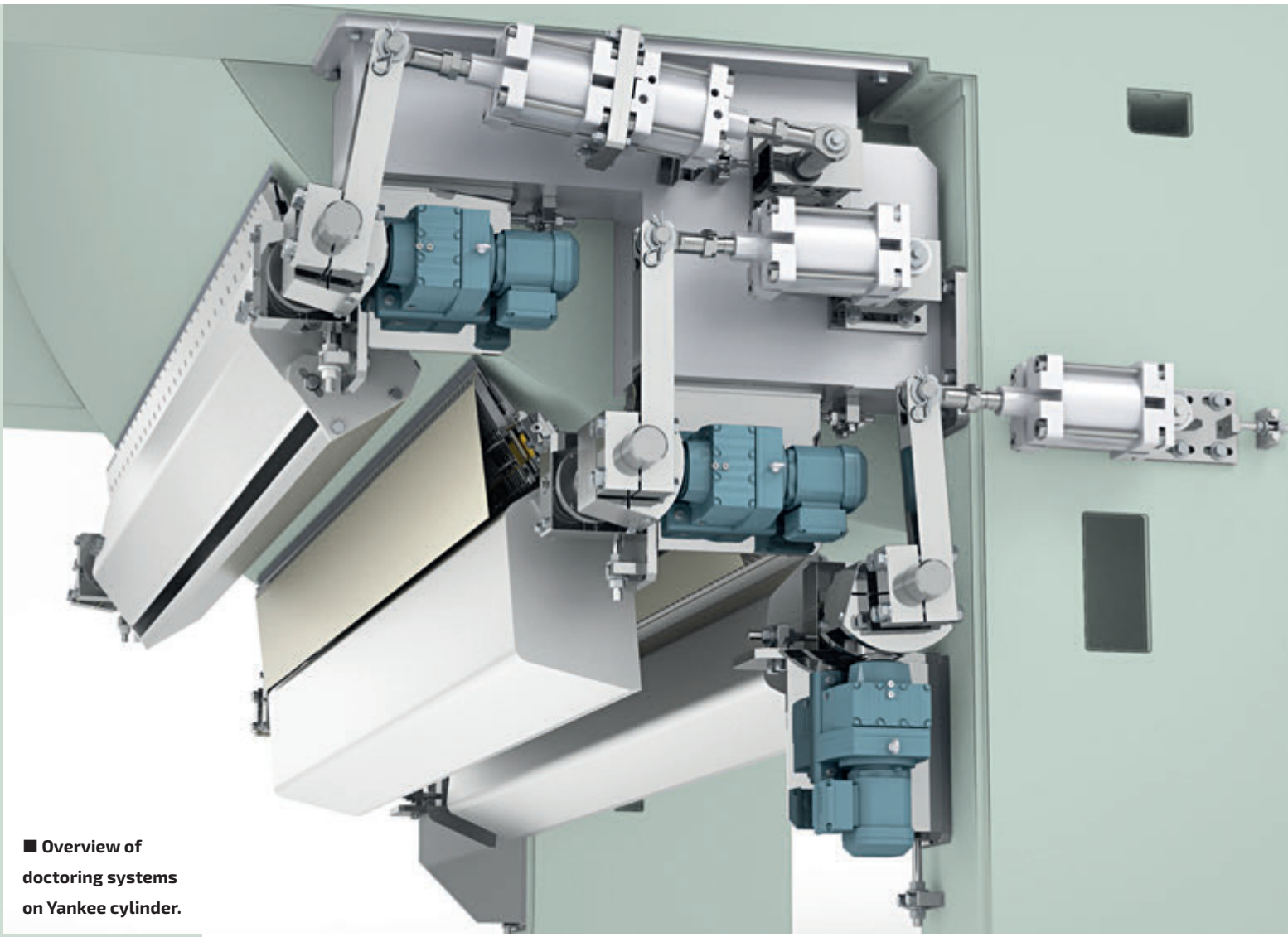
■ Electromechanical oscillator system.

■ Creping doctor bearing support.

ORADOC tips for choosing the right **creping doctor** for tissue machine

Could you ever imagine your daily routine without toilet paper, napkins, handkerchief, paper towel? Tissue paper products have become one of the most essential commodities of daily life.

by: Oradoc Srl



■ **Overview of doctoring systems on Yankee cylinder.**

Tissue paper products firstly came into use in the 1920s and since then the consumption of tissue paper has been increasing consistently thanks to changing lifestyles, rising healthcare expenditures, increasing population and GDP. A number of properties, such as absorption, porosity, coarseness, tensile strength, and tactility, determine the quality of tissue paper. A proper creping plays a key role in obtaining such characteristics and a good finishing of the final product. The first aspect to be taken into consideration is the creping blade holder, and the market currently narrows down the choices to just two possibilities: semi-rigid or flexible.
A semi-rigid blade holder surely needs less maintenance, despite a more difficult fine-tuning and profiling on the Yankee cylinder.
This is even more true for stainless steel Yankee cylinders, which, if compared to older cast iron cylinders, have a significantly different cross and circumferential deformation.
The flexible blade holder represents a more adaptable alternative, as it permits an automatic profiling of the creping blade on the changing, deforming surface of the cylinder.
Apart from being self-profiling, it also allows for lower blade load, which turns into a longer blade service life. As far as cut-off position is concerned, the semi-rigid blade holder is the most commonly used, due to the above-mentioned characteristics, except few particular cases.

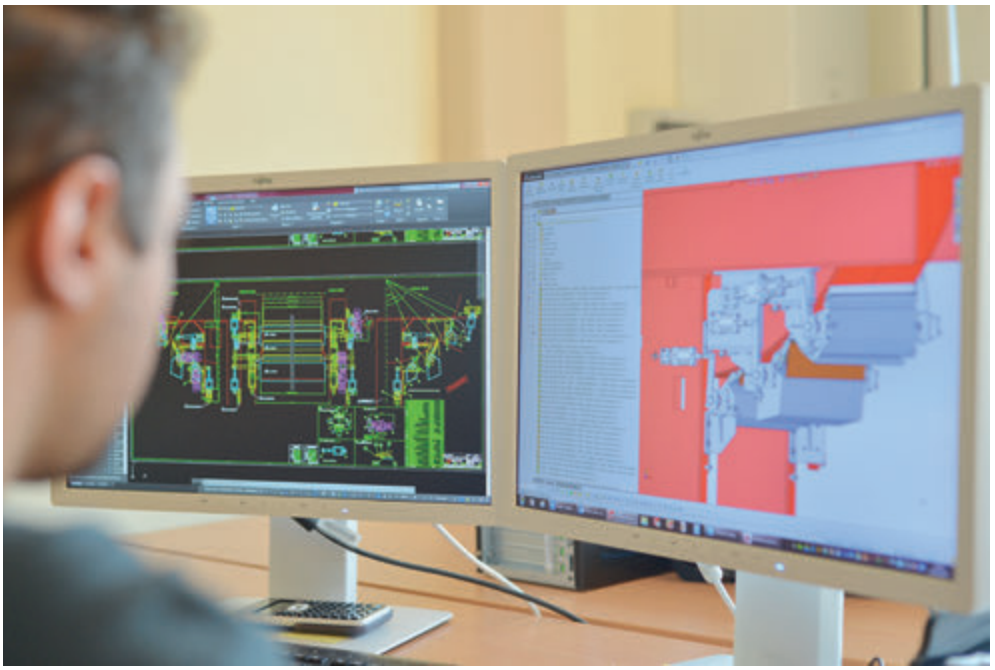
Both semi-rigid - if manually well profiled - and flexible blade holders, instead, will do in cleaning position.

Performing creping doctor

The creping blade is the fundamental element complementary to the blade holder and its geometry is very important in obtaining specific tissue characteristics. All creping blade types can be clustered in two macro groups: steel blades and steel with ceramic coating blades. Steel blades with ceramic coated tip offer a better performance and a longer service life, even if they are more expensive and need a more careful handling. As steel Yankee dryers become more and more commonly used, this kind of blades is replacing the older steel blades almost everywhere. Oscillation is also a must for a creping system on a Yankee: be it pneumatic or electromechanical, an oscillating system guarantees a more performing creping doctor and it helps obtaining a higher product quality. The electromechanical system is easier to maintain; it is sturdy and it can endure also difficult working conditions such as high humidity, temperature and dirt, as motor gearboxes come with very high IP protection level. The pneumatic alternative is more compact, and this of course means a better protection of elements from working environment conditions. Moreover, it needs no electric power and this of course makes it safer; on the other side, it is more difficult to maintain and less reliable over time. Yankee creping doctors work in an high-temperature, high-humidity environment where built-ups are frequent and where chemicals are also employed, that's why they're commonly made in stainless steel. Compared to stainless steel, simply painted steel proves to be cheaper upon purchase, but when it comes to the type of maintenance it needs on the long run, the cost-benefit analysis favors the stainless steel version.

Knowledge of the tissue production process

The doctoring loading and controlling system, the doctor back oscillation and all other accessories are usually driven either through a dedicated control panel or a remote DCS; the latter is usually adopted on new tissue machines, as it allows a safer and more precise control of various parameters and a better monitoring of process performances



▲ Oradoc offers tailor made projects.

(air leaks on cylinders, bearings wear and tear, any aberration in the oscillating system, etc.). Thanks to these pieces of information it is possible to carry out an objective maintenance analysis in real time in order to be able to intervene, if needed, in the shortest possible time. In over 30 years of doctoring experience and thousands of doctoring installations worldwide, **Oradoc** has gained a comprehensive knowledge of the tissue production process; this makes it possible to suggest renowned solutions according to different machine characteristics and production plants' needs. Having focused on such a specific system, which is a fundamental part of the tissue machine, has enabled Oradoc to win a very good reputation in the paper and tissue world. ●

> "ORADOC can supply the three main **doctoring systems** needed in the creping process: **cutting**, **creping** and **cleaning**"

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Technical innovation and flexibility are Amotek's key words for 2019

Since 1977, Amotek has been based in the surrounding area of Bologna, in the heart of the Italian Packaging Valley.

by: Amotek Sales & Service Srl

A new combination of Italian passion and creativity together with strategy and technical support was created, when Amotek joined the German company OPTIMA Packaging group GmbH in 1999. The tissue bagging machines' solutions offered cover kitchen and toilet rolls for low and high performance line outputs, multiple formats of prepacked facial tissue and interfolded tissue products, as well as industrial toilet rolls. Packaging solutions for nonwovens and consumer products are also part of the company's portfolio.

New sustainable machine generation

Everyone knows the PB182 model as Amotek's top machine in the tissue industry. It is the right bagging machine for tissue rolls offering the possibility to work in both single and dual lane configurations. Nevertheless, Amotek breathed from the market the need to have additional choices. Therefore, **Amotek** introduced a new machine generation of PB192 models during the last Tissue World Milan exhibition. Technical and technological innovations are paired together to reach a wider configuration flexibility (PB192 FLEX) and higher performances (PB192 DUAL). The flexible machine setting from single to double lane, the quick and easy size changeover, and best performances at products output up to 150 ppm (productivity realistically increased by 30% at same lapse compared to PB182) are undoubtedly the main innovations. In parallel to the birth of the PB192 series, relevant improvements in terms of monitoring and saving consumptions have been reached and are now successfully adopted on all Amotek baggers.

Main features

Monitoring. With an incorporated computer technology into machines, more data are easily displayed on a wider, higher resolution smart panel and can be consulted directly by the

■ New smart panel on all Amotek baggers.

operator. This information from the system allows the customers to understand what is going on with the machine, by analyzing the production phases and being able to act promptly in the precise area, in case of alarms. The artificial intelligence is also able to remind the main maintenance activities, automatically recommended, granting an easy care system. This technology is really appreciated from most of the customers that visited Amotek booth, it is also responding to the parameters of Industry 4.0, which is being requested even more in the Italian market.
Saving consumption. Air and energy consumption can be monitored in real time, helping to furtherly understand if an air loss occurred accidentally. Servomotors that allow the saving and reuse of the accrued energy during braking and stopping phases generate about 85% of the movement.
Style. Last but not least, Amotek offers a new smart baggers generation with the possibility to choose a renewed charming style and sturdier frame.

The ecological trend in the market

In recent years, the global market trend has been strongly concentrating on and increasing the requests of the use of ecological packing material for having biodegradable and fully compostable eco-packs. The aim is to reconcile economic growth with environmental protection and social responsibility, balancing people, planet, and profit with the huge use of disposable hygienic products. Amotek soon felt this tendency and promptly reacted by setting its baggers to manage the different types of green packaging materials. This has been a large success among Amotek customers and potential ones representing a further benefit of the bagger features.

Machine solutions

Another Amotek's Tissue machine is the IS220 series, which is suitable for the bagging of clips of interfolded tissue products and facial tissue coming from the upstream line in different shapes. This model has been developed to have high level of flexibility

▲ Amotek PB192, new generation.

> “Amotek designed machines support **the most diverse package formations**, e.g. packaging of tissue products in vertical, horizontal or multi-layer arrangements”

for format changes, wide presentation range, and different infeed directions. Thanks to these concepts, market feedback has been very positive for the new machines that have been installed in different regions of Europe and Mena (Middle East and North Africa). As Amotek baggers are especially flexible, scalable, and customizable to adapt to the very different kinds of converting lines from all over the world, Amotek provides a very professional after-sales service for all customers, no matter their level of experience. It is handled with care by a dedicated and experienced team of skilled personnel, with the goal to support customers from installation to the production phase.

Stay tuned

Next unmissable tissue appointment to meet Amotek and to know more about technical developments is the MIAC show, from October 9-11, 2019 in Lucca (Italy). Amotek will be at booth no. 121. Amotek is ready to reply to any request, idea, or new project to create a win-win partnership and keep growing together. ●

▼ Amotek IS220, Bag filler for interfolded tissue products and facial tissue.

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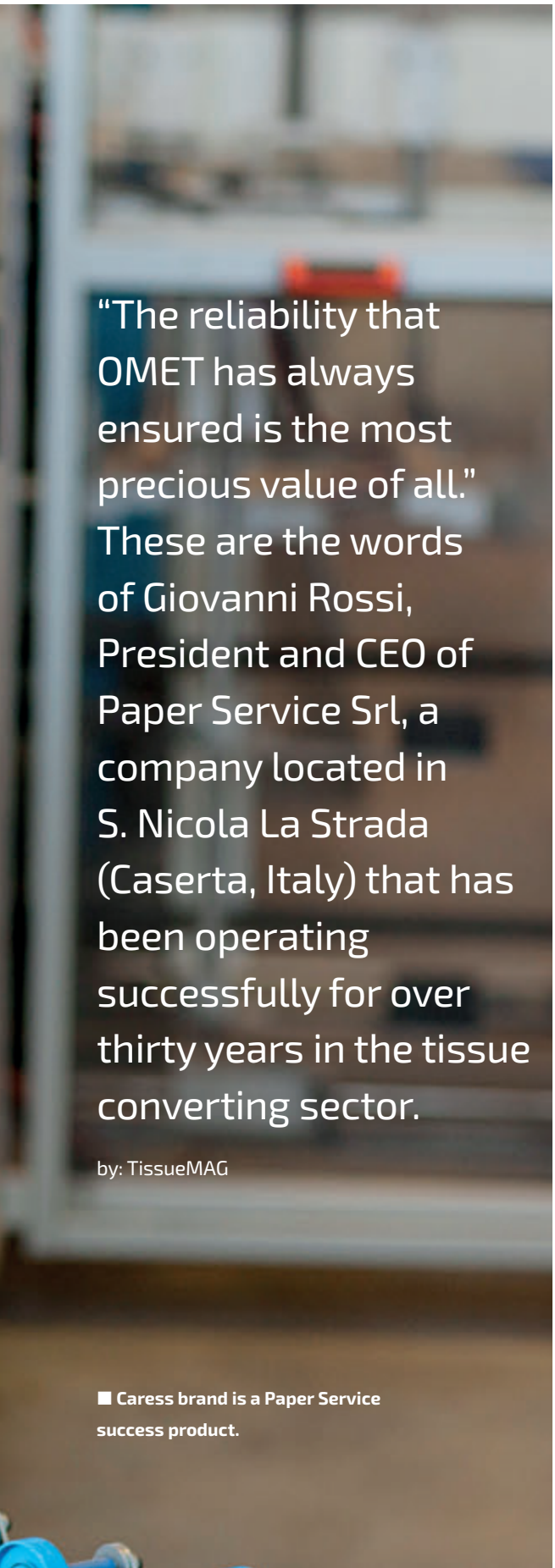

"The reliability that OMET has always ensured is the most precious value of all." These are the words of Giovanni Rossi, President and CEO of Paper Service Srl, a company located in S. Nicola La Strada (Caserta, Italy) that has been operating successfully for over thirty years in the tissue converting sector.

by: TissueMAG

■ Caress brand is a Paper Service success product.

ng. Rossi, what were the main steps of development for your company?

Paper Service Srl was founded in 1999 and this year celebrates 20 years of activity, even if the founding partners have been dealing with tissue for over 30 years. The deep experience gained in the industry has allowed the company to start with a well-defined project and successfully achieved its goals. The growth is the result of different factors, beginning with the strategic choice of focusing on three different markets (consumer, ho.re.ca, private label) to the unceasing investment in innovation and the careful selection of the partners. Considered as a point of reference for the market, Paper Service is well known and appreciated by the domestic and international retail purchasing operators, the main airlines and shipping companies, and the major hotel and restaurant chains: over the years, customer loyalty was improved through a careful policy focused on seriousness, quality, reliability, and respect for the environment.

▲ Rossi brothers, owners of Paper Service.

How is organized your production process?

We work with two different business units: Rolls Division and Folded Division, located in two different, modern and functional plants, equipped with the most innovative - sometimes exclusive - technologies. Although similar, folded products have a different production process from the rolls, which is why each division has a specific management and know-how.
We work for the consumer, private label and ho.re.ca markets with different products: 1/2/3/4 veils napkins (embossed or glued, white or colored), 2/3/4/5 veils toilet paper (smooth, embossed, glued, white or colored), 2/3/4 veils towels (Desl, white or colored), 2/3 veils rolls (Desl, white or colored). For the consumer market we have different commercial lines: Classic, Cuordiseta, Infinita, Argantherapy, Grandissima, Extra, Imorbidissimi, Prestige, Cartasciuga, Asciugopiù, Desirèe, Color, Happy Hour.

What about your commercial strategy?

The Sales Department is coordinated by one manager for the three different business units, each one supervised by an area manager who organizes the specific sales force. Service is an essential element for us: the word "service" states even in our company name. A diligent and competent customer service in all phases of purchase, a graphic office available to customers and a careful logistics planning allowing fast deliveries are our winning tools to provide a tangible added value.

Which is your positioning on the Italian market and what trends do you see in the short term?

We are well-known and appreciated on the consumer market, both nationally and abroad, with our historic brand Caress, synonymous with quality and reliability. Over the years, the company has grown constantly and today looks to the future with optimism. More and more customers are relying on Paper Service, especially those looking for careful partners, willing to find the

> The expertise of OMET in the tissue converting sector is **the result of years of leadership in the tissue market** and the ability to understand the customers' needs and turn them into winning market solutions

best solutions for their needs. It is precisely because of the positive growth forecasts that we are investing with confidence. The next few years will be intense and full of innovations aimed at differentiation, with innovative proposals up to date. We export about 30% of our products throughout Europe, and recently we have entered new markets in North Africa.

▲ All Paper Service products are carely tested for quality control.

Recently you have purchased an OMET TV840 and two TV503 XP, but your partnership with OMET has lasted for many years. How was this collaboration born and what are the goals of your recent investments?

Our partnership with OMET has lasted for over 30 years. We started producing personalized napkins and we have always found in OMET the perfect partner for this technology. We have experienced almost all the stages of the technological development over the recent years, from the first TV500 folder, to modern contemporary lines, and we are witnessing an incremental evolution. We have now 10 OMET machines in our production sites. Knowing our starting point and making a comparison with the current activity allows us to appreciate the commitment that **OMET** has created over the years to become - and rightly so - an absolute leader in this industry. Relying on a serious partner has allowed us to fully develop our projects, and we hope this will continue to happen.

▼ An operator at Paper Service production lines.

What prospects for development do you see for your company?

The new OMET lines will allow our company to expand and update the portfolio with innovative and very high quality references, which will give us the opportunity to satisfy an increasingly demanding and careful market. We are very happy with OMET's technological innovations and we are already evaluating investments in both digital printing and interfolded products. This time again, the long-lasting collaboration and the personal relationship with Marco Calcagni, OMET Sales Director, guarantee us the opportunity to feel comfortable in making our choice, counting on OMET's reliability, which is probably the most precious value of all. ●

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Innovative end-of-line solutions

for the tissue industry

■ Robot Palletizer ZEUS SABA for toilet paper & kitchen paper.

Over the years, SABA Automation has developed versatile and customised automatic palletising systems especially for end of tissue industry lines.

by: SABA Automation

We supply innovative robotised solutions for palletising product (toilet paper, kitchen paper, paper napkins, paper handkerchiefs, industrial paper rolls, interfolded paper towels, etc.) exiting the packaging line entering the warehouse. "We have undertaken to never stop innovating and finding solutions that can help our customers improve their production process", explains **Alessandro Pollini**, Sales and Marketing Director. "Automating the end-of-line process is an essential factor for increasing production output. It not only makes operators work better and with less fatigue, but also allows you to become more competitive and, last but not least, to offer a well-palletised product that is ready to be shipped. The company activity began back in 2005 and was since then also focused on the Tissue sector. Robotised systems were thus designed. They have proved to be the only solution for the specific requirements that the paper industry want their suppliers to fulfil."

The new line branded SABA Automation

- **Robot ZEUS**. This solution guarantees ultimate speed in terms of cycles per minute, which means that it can be used for lines with a very high production output. Particular care has been paid to design of the pick-up implements both for unpacked and packed tissue products. These special grippers grasp the product without causing any kind of deformation; this drastically improves quality of palletising. The gripper is motorised with the robot's fifth interpolated axis to ensure adequate handling of such a delicate product as is tissue paper. The size changeover system adopted is much more accurate than the typical pneumatic systems so that the gripper does not squash the product. Thanks to this system, the operator running the cell or management system can adjust which type of grip is needed and the intensity required for the incoming product by giving a simple software command to the robot. The latter thus adapts to the job to do.
- **BD14 Cartesian Robot**. Compact and particularly efficient, they are the ideal solution for lines handling paper napkins, paper handkerchiefs and interfolded paper towels.
- **SABA Software**. Management software and operator-industrial PC interface have been optimised to make line operation easier still and allow for better control over all end-of-line stages. This software can be interfaced with the latest management systems for data exchange, etc. The **SABA Automation** programme for handling different product formats is the same for both ZEUS robots and the BD14. Thanks to the combination of robot and software, SABA Automation robotised palletising systems offer more advantages in terms

> SABA Automation supplies **end-of-line solutions**. By using our technology, you can handle production, reduce costs and improve logistics management

▲ Cartesian Robot Palletizer BD SABA for paper napkins, paper handkerchiefs and interfolded paper towels.

▲ Robot Palletizer ZEUS SABA for industrial paper rolls.

of cycle time reduction, adaptability to different products and elimination of downtime. Operators no longer have to deal with heavy palletising work and no longer have to perform size changeover operations since a production order can be called up and uploaded in an instant.

- **Complete end-of-line systems**. To complete our end-of-line range, we offer fully automatic solutions for pallet packaging, such as pallet stretch-film wrapping machines, labelling systems and Agv.

As always, SABA Automation will be at MIAC in Lucca. Furthermore, the doors of our premises are always open, so do not hesitate to pay us a visit. ●

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Via della Fisica 23/25 41042 Fiorano Modenese (MO) – Italy
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BIM

Infinity celebrates 15 years of building world-class packaging machines

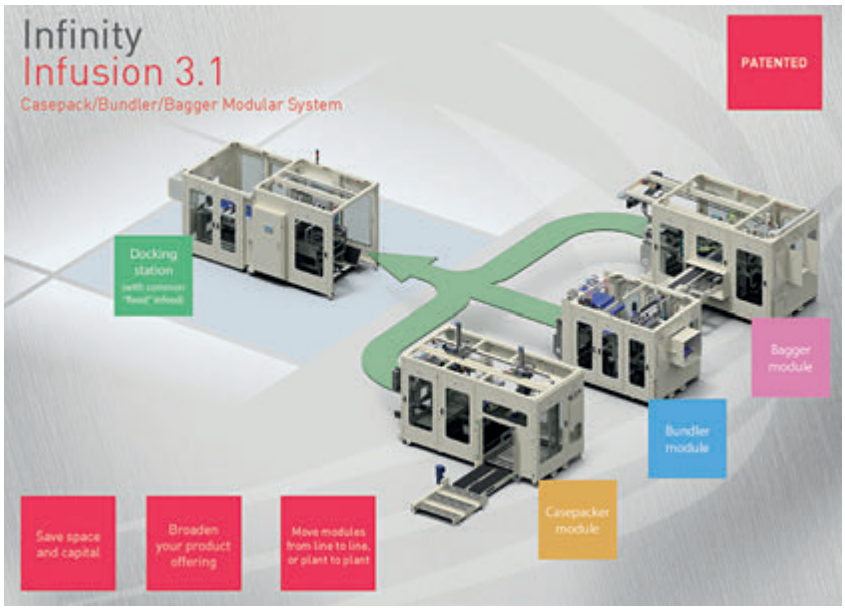
■ Infinity Facilities (over 100,000 sq ft).

For over 15 years, Infinity has been engineering and building packaging machines for customers around the globe.

by: Infinity Machine and Engineering Corp.

From its inception, Infinity was founded with an entrepreneurial spirit and the commitment that all Infinity employees act in the best interest of the customer and accept any responsibility necessary to meet the customer's expectations. That commitment stems from one of their main goals: to be the very best in the industry at what we do. Officially incorporated in 2004 by four partners, operating in a one-room facility, Infinity started the company with the idea of building only poly bundlers, however, that changed when Infinity received its first order, which was for a casepacker. The next order Infinity received was for a customer that had limited space but also wanted to be able to bundle product in the future. Infinity's owners went to work and created the perfect solution for an all too common problem, the Infinity Infusion modular packaging system. The Infusion system operates by utilizing a fixed infeed section (docking station), which can be coupled with modules that are moved in and out of the docking station to give customers multiple machines in one. Cases, bags and bundles all in one machine. Since then, the Infinity Infusion System has been installed throughout the world as the original modular packaging system, giving the customers flexibility and options for their downstream packaging needs. In addition to the flexibility, the Infinity Infusion System is a time and money saver. By 2010, Infinity was growing strong, with around 30 employees. It was during this time that Infinity's bundler began to take shape. Infinity's bundlers are different than most on the market. They have small footprints, are simple to adjust, and robust enough for long production

■ Infinity C15 Casepacker - Capable of 15 CPM and Tray Capable.



▲ Infinity Infusion 3.1 Casepacker/Bundler/Bagger Modular System.

▲ Infinity Bundlers. Four different models to suit any needs.

INFINITY MACHINE AND ENGINEERING CORP. (US OFFICE)

2249 American Blvd. De Pere, WI 54115 USA
website: www.infinitymec.com
contact person: Ryan Holmer, Technical Sales/Marketing Manager
phone: +1 920-965-0222; +1 920-912-8057

Infinity Italia Srl
Via Buozzi 55 40057 Cadriano di Granarolo (BO) - Italy

runs. The forming section of the Infinity bundler has a robust adjustable former with a top and bottom belt feeding system for unstable products. In addition, a code newly written in 2018, provides the machine with increased adjustability, reliability, and runnability. Whether high or medium speed is required, Infinity has the bundler for any application.

Infinity Eclipse T4 multi-pack wrapper

In 2012, Infinity released their version of multi-pack wrapper and single roll wrappers which allowed Infinity to offer every piece of equipment between the log saw and the palletizer. Infinity wrappers are the perfect combination of Italian design refinement and american ruggedness. This combination creates a machine that is the most robust wrapper on the market with internal components, such as bearings, which are 25% larger than other wrappers. Infinity's standard multi-pack Wrapper, the Eclipse T4, features a continuous motion brush style head folding system, continuous

> “A complete range of **tissue packaging machinery** and engineering services. The perfect integration of performance and flexibility”

motion low folder, along with elevator and seal bar. In addition, it has the option to wrap in paper. In just six years, Infinity has delivered over 112 wrappers to the global market. As Infinity enters its fifteenth year, the company has no plans of slowing down. Whether it was building the first machine in a one-room facility, broadening the product line, growing the company across multiple facilities, or maintaining a company culture built around employees and customers, **Infinity** has become increasingly successful over the last 15 years by building premier packaging and keeping promises to our customers. From our growing wrapper product line to our patented Infusion 3.1 casepacker/bundler/bagger combination system, Infinity has everything to make the production a truly world-class operation. ●

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Damage-free Tissue Handling with Bolzoni Auramo Roll Clamps

During the handling stages, paper rolls are subject to several damage risks, such as incorrect handling and shocks. To prevent rolls to get damaged, to avoid machine downtime and productivity loss, the choice of the correct paper roll clamp is the first step forward to a good handling practice.

by: Bolzoni S.p.A.

The Paper Handling Specialist

For more than 70 years Bolzoni Auramo has been working in close cooperation with the paper industries worldwide, always finding better handling solutions. Well known for its expertise in forest products handling, the company holds the market leader´s position in sales of paper handling tools in Europe.

Bolzoni Auramo Cares for Tissue Paper Roll Handling

"Damage free handling has always been our goal when developing new paper roll clamps", says **Lars Petersson**, Bolzoni Auramo's Forest Products Handling Division Manager.
"We have implemented an internal education program to give our sales force very high competence in paper handling. This allows us to advice our customers in a professional way. How to select the right clamp for dedicated handling? What's the correct clamping force? What kind of contact pad is most suitable? These are the questions daily given to our sales force."

Tissue paper roll clamps: engineered to suit the application needs

Tissue paper rolls often have larger diameter than the common other paper grades, which can be very extensive, even larger than 3,000 mm (120") diameters do exist. As rolls are often very

◀ The Bolzoni Auramo Tissue paper roll clamps have higher and wider contact pads, designed to handle large diameter rolls and to reduce surface pressure on the soft paper.

▲ The pad edge is smooth and well rounded. Pad corners have large radius design, without protruding parts or edges.

soft and loosely wounded, Tissue clamps have higher and wider contact pads to reduce surface pressure. The contact pads have a special form which is designed to reduce point loads under the pad edges. It is also common that large diameter Tissue rolls deform under their own weight when lowered down to the floor in horizontal position. This deformation causes a flat area which can in some cases be several hundred millimeters wide, with roll handling problems unless it is compensated in the clamp design.

> “With a brand synonymous with expertise in forest products handling attachments, **Bolzoni Auramo is the world’s leading supplier** to the main lift truck manufacturers of factory installed products”

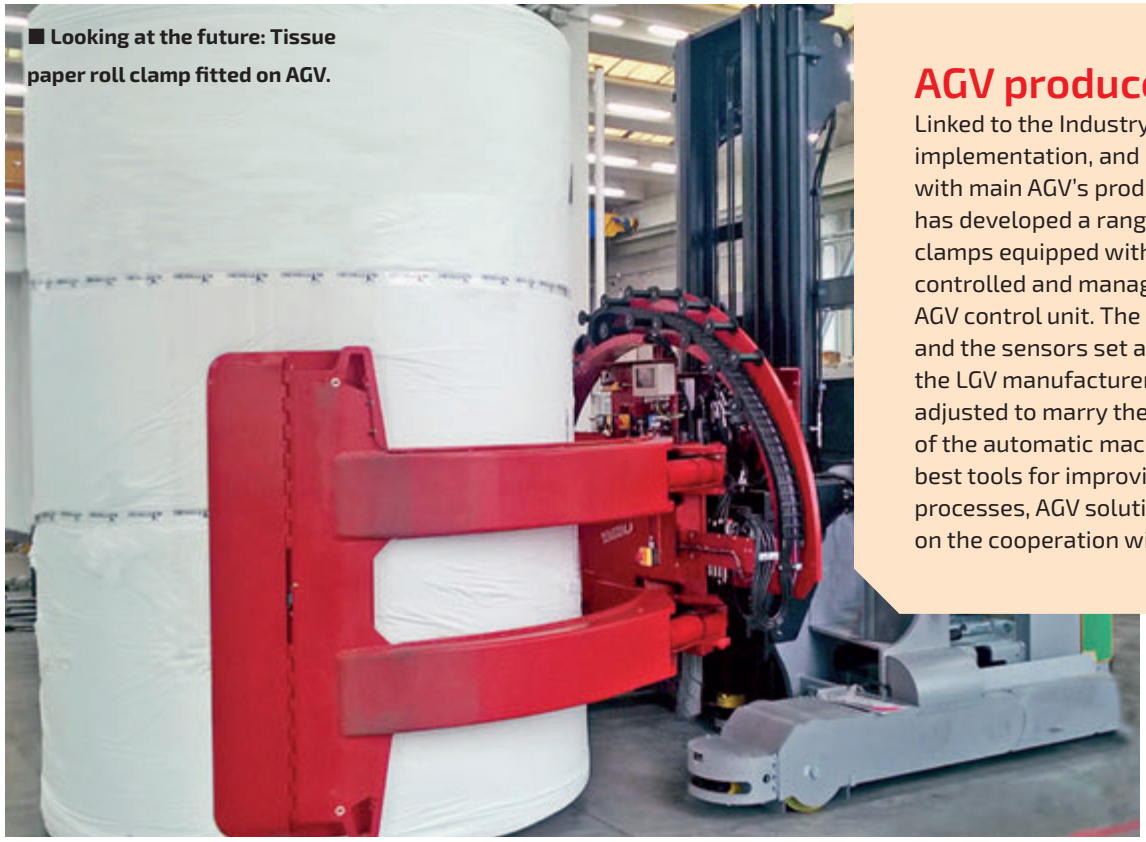
Bolzoni Auramo has a wide variety of Tissue paper roll clamps, with capacities range from 1,500 to 6,000 kg (3,000 to 13,000 lbs.), and roll diameters are up to 2,700 mm (106”) in standard series. All standard Tissue clamp models have following features in common:

- fast and effective 180-degree rotation, which enables effective handling of both vertical and horizontal rolls;
- short and long pivoting arm design makes the clamps versatile with a wide roll diameter range;
- standard Tissue clamps are designed for handling on single rolls only, split arm models for handling two rolls are available on request;
- special opening ranges, non-rotating and/or forward tilting clamps are available on request for special applications.

A complete range of damage reduction products

Bolzoni Auramo provides a number of state-of-the-art damage reduction options for a safer and more productive operation. Here an overview of some developed specific products.

Contact pads. In most normal handling situations, the pads are the only parts of the clamp in contact with the paper roll. Therefore, as standard, Bolzoni Auramo Tissue roll clamps have a dedicated range of designed contact



■ **Looking at the future: Tissue paper roll clamp fitted on AGV.**

AGV producers partner

Linked to the Industry 4.0 philosophy implementation, and in strict cooperation with main AGV's producers, Bolzoni Auramo has developed a range of tissue paper roll clamps equipped with specific sensors controlled and managed directly by the AGV control unit. The hydraulic system and the sensors set are co-designed with the LGV manufacturer and specifically adjusted to marry the control system of the automatic machine. To offer the best tools for improving customer processes, AGV solution providers can rely on the cooperation with Bolzoni Auramo.

pads: Single radius, Triple radius or Convex radius pads, with wide variety of friction surface options.

Clamping force. Another key issue in Tissue handling is the excessive clamping force, which is one of the most common causes of paper roll out-of-roundness damage. The varying paper roll hardness, weights and diameter plus the high value of the rolls themselves are all factors requiring control of excessive clamping force on behalf of the operator. In this handling situation, we suggest using the *Force-Matic,* a fully mechanical pressure control system applicable to paper roll clamps in order to prevent overclamping causing roll out-of-roundness.

Worldwide support

Bolzoni Auramo is a forklift truck attachments, lift tables and forks manufacturer, with manufacturing plants in Italy, Germany, Finland, America and China. Operating on all continents and on all main pulp and paper manufacturing and transportation sectors, their Technical Engineers are able to support with effective material handling solutions. ●

Bolzoni Auramo

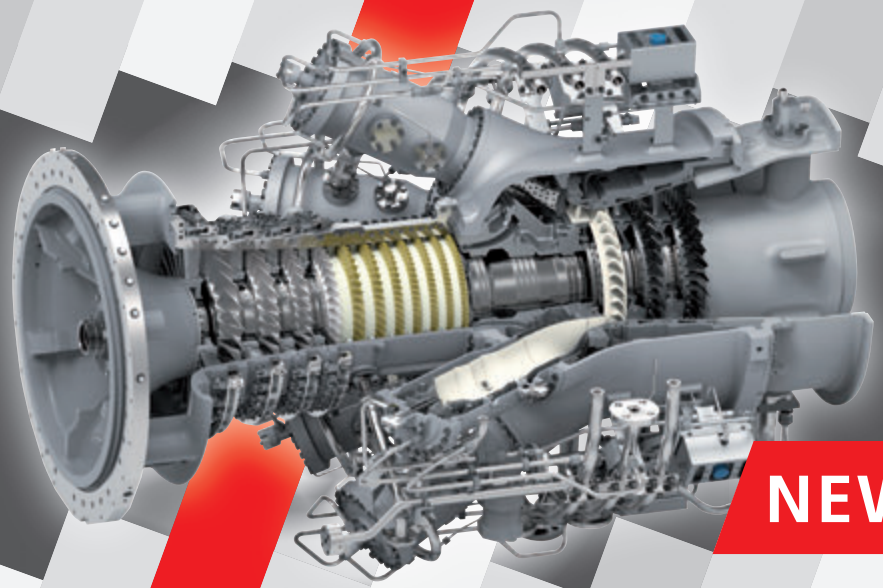
website: www.bolzonigroup.com
contact person: Lars Petersson
email: lpetersson@bolzoni-auramo.com

▲ The minimized pad thickness ensures good knifing properties when handling tightly stacked and bilge rolls.

Kawasaki
Kawasaki Gas Turbine Europe GmbH

Two Specialists

No Compromise



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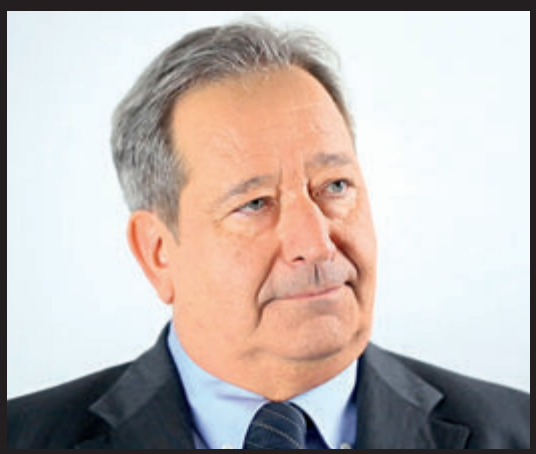
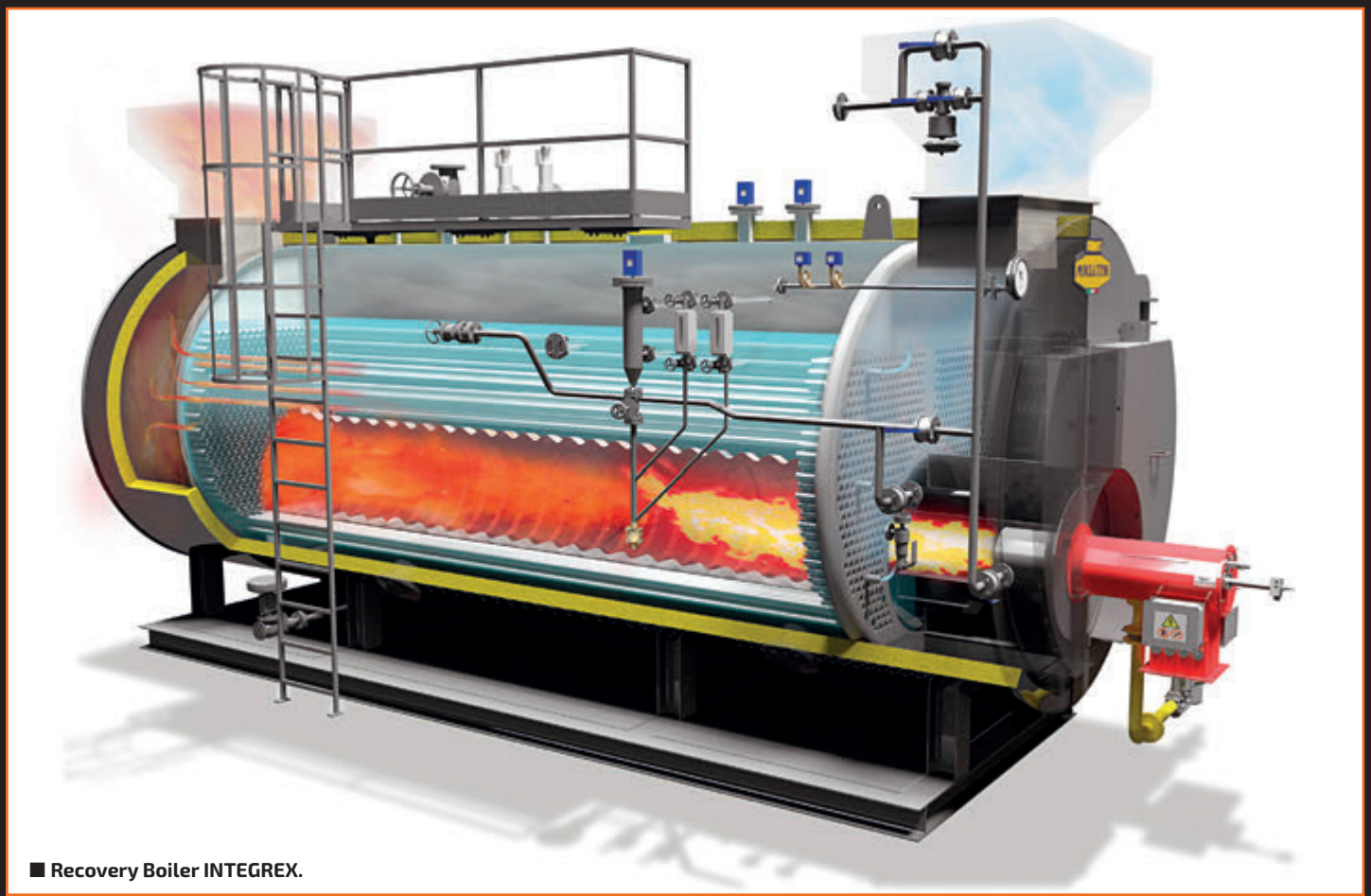
FOMAT, systems and technology for paper mills



Bruno Giannelli, founder and partner of Fomat, describes his company's range of paper-making components, highlighting its focus on innovation, high-quality and energy efficiency.

by: TissueMAG

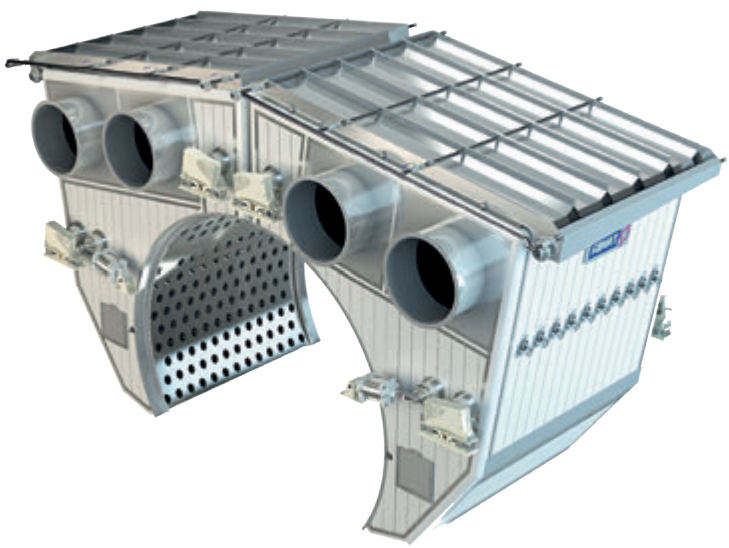
Fomat is based near Lucca, northern Tuscany, where it was founded by **Bruno Giannelli** in 1973. It started as a commercial company, supplying quality service and innovative products to the renowned local paper industry. The company evolved very rapidly, starting to manufacture its own solutions and expanding its geographical markets. Today it serves customers over the world, supplying high quality and energy efficient products and complex systems to the paper industry. Fomat comprises four divisions: Technologies, Aerothermic, Automation and Handling. The Technologies division offers a wide product range, including felt and wire cleaning systems, water filters, basis weight control valves, monoflow and duoflow rotary joints, Yankee Doctor blade oscillators, edge cutters and tail cutters, and Yankee coating systems. The Aerothermic division takes care of complex systems dealing with air and steam handling. Its focus is on paper drying and creating a healthy paper mill environment. Its range of systems includes Yankee hoods, hall ventilation, Yankee head insulation, and dust and mist removal solutions, as well as steam systems for tissue machines. The Automation division is focused on paper mill management and process control, offering quality control and distributed control systems. Recently, the Handling division has been added, which allows **Fomat** to increase its product range with conveyors, expandable shafts, shaft pullers and the handling of the paper roll up to converting.



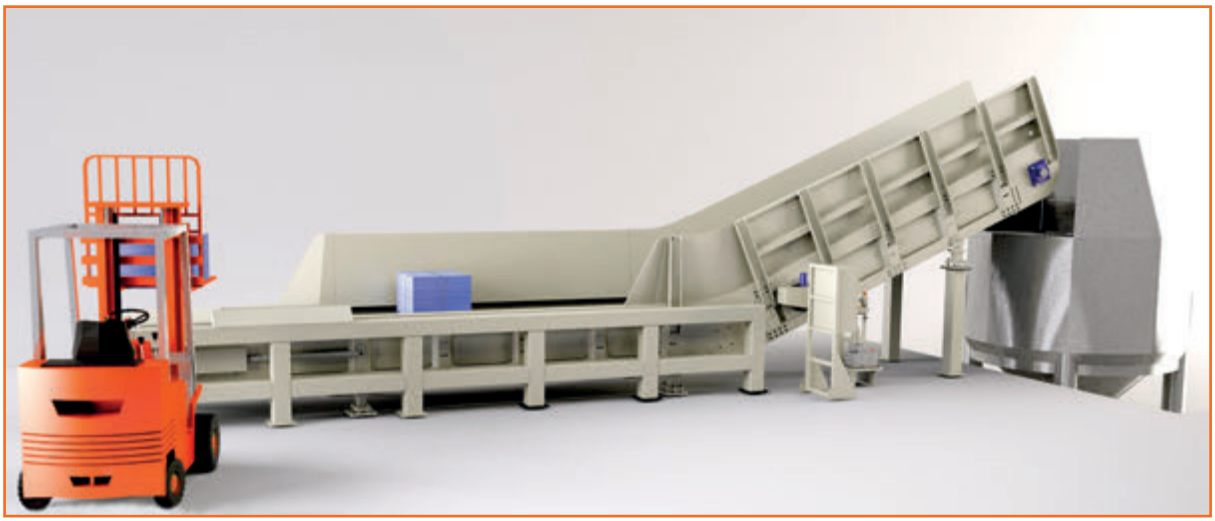
■ Recovery Boiler INTEGREX.

■ COMBO air system.

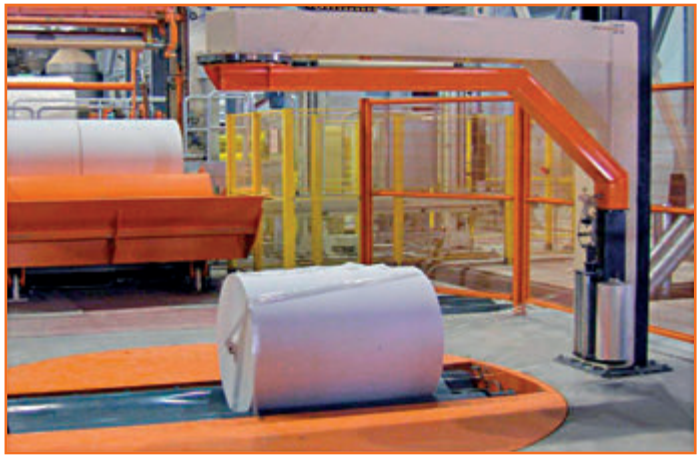
■ Yankee hood.



Conveyors. ▶



▼ Wrapping Machines.



> “Knowledge and **technological innovation** for paper mills, with systems that guarantee reliability, production quality and energy savings”

Innovation is a must

“All our divisions are very important - Bruno Giannelli remarks. Our aim is that of providing optimal solutions for our customers’ needs. The solutions we provide to paper mills are always tailor-made, in order to fulfill this objective.
Even the components that we provide to paper-making machine manufacturers are customised, according to the energy needs of the country in which their final customer is based. Energy efficiency, quality and ease of use are at the very heart of what we do - states Giannelli. For this reason, innovation is a must.
This energy efficiency was possible thanks to our Integrex product, a heat exchanger and boiler. Basically, the burner only ignites to produce the small amount of steam that it is needed.
The space saving result was possible through the use of a combo solution. As all its components are pre-assembled at our premises, this solution also minimises machine downtime during installation and future upgrades, as the necessary work can be carried out in only seven days.” The company operates from a sole site, comprising four buildings, with planning permission gained to build a further facility here. All production takes place at these premises, because the company has a vertical production model, internally taking care of all the necessary production processes, from raw steel to final product. No outsourcing or delocalisation strategies are employed. Geographically, the company supplies its solutions all over the world. “We have customers all over Europe, North and South America, Africa, the Middle East and Australia, as well as Japan and Korea - says Giannelli. We serve customers in every market that demands high-quality products.
Our future is one of innovation. We have new cleaning systems for felt and wire. I expect significant demand for them, as they offer better cleaning results, while lowering water consumption. We will also bring the market products and complex systems with increased energy efficiency, which I think will be successful, as I believe that reducing energy consumption will continue to be a vital factor for any manufacturing company.” ●

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Successful implementation of MARE

yankee coating technology on state-of-the-art tissue machine

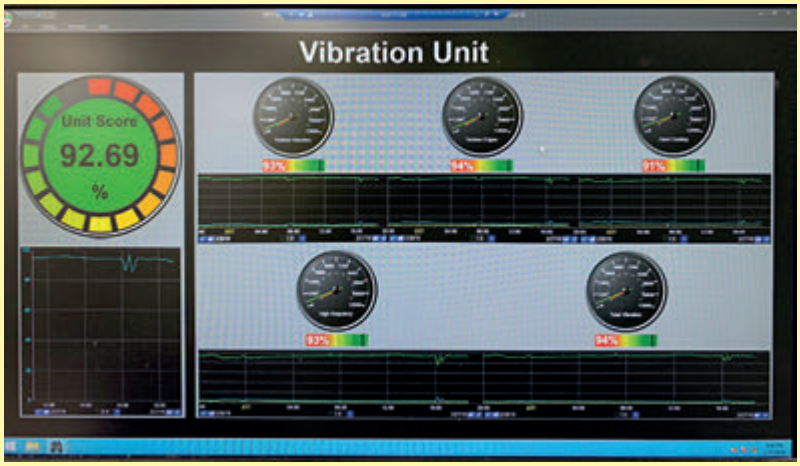
■ Detail of yankee surface on the run, with clearly visible the coating layer.

by: MARE SPA

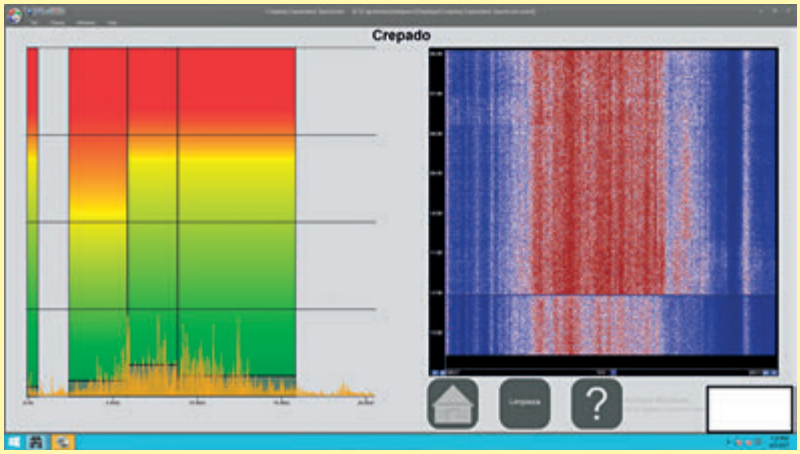
Dear Reader of Tissue MAG,
We are glad to have this space on TissueMAG to update you about our latest success in the implementation of yankee coating chemical programs on world top level tissue machines.
More specifically, MARE was selected as a key supplier for the start-up of a high speed double size tissue machine, equipped with a crescent former section, suction roll, shoe press, cast iron yankee dryer and mist removal system. The goal of their customer was to produce high caliper soft tissue paper at a target speed level up to 2,000 m/min. **MARE** took part in the full and careful implementation of the yankee coating equipment and yankee cylinder pre-conditioning. The start-up was very smooth, good quality paper was achieved from the very first roll and it was possible to shift to the use of low beavel ceramic blades quite soon. Now, let's have a glance to the coating chemical package which was used.
MAREMOD P 600: selected as protection aid to provide long term preservation of the yankee surface from erosion and corrosion. MARERELEASE R 250, synthetic release agent: was made part of the recipe in order to provide a well controlled sheet doctoring and proper softness and caliper development of the tissue sheet. MARECOAT A 598: filming agent which provides a soft and stable adhesive coating layer, based on an innovative polymeric chemistry, thought for modern machines and for the production of premium tissue paper grades. The nature of MARECOAT A 598 provides unique properties such as stability on "cold" Yankee cylinders and in presence of uneven moisture profiles while maintaining a soft coating layer. The development of the newest family of products MARECOAT A 593/595/597/598 started more than two years ago with a careful lab selection of various polymeric bases. The parameters taken into account for the selection were film softness, adhesion strength in dry and wet conditions. The lab selection, performed in accordance with a top tissue making company, with production sites located near to MARE offices, was followed by a comprehensive plant test were the excellent performance of this family of coating chemicals has been exhaustively assessed.
The yankee coating package was completed with MAREMOD M 470, edge control chemical, applied when needed on the out-of-hood section of the yankee in order to control coating build up in this part of the machine.

Mare's products and technical expertise

During the start-up and subsequent adjustments, MARE yankee coating chemical program has been subject to quite extreme conditions without losing film stability, such as uneven moisture profile with wet sections higher than 10% and, for short periods, to 12-13%, all this at high speed and with the regular use of low beavel ceramic blades. Noticeably, it was possible to obtain target softness values without the need for drier paper and without the addiction of a softener. Softness results have been assessed by TSA measurement up to values of HF 100. It is important to mention that a very high "creping efficiency" has been reported soon with the first rolls as well, defined as the ratio between the elongation measured on the finished tissue paper and the "creping ratio" on the machine. The papermaker can exploit high creping efficiency to reduce crepe ratio, that is



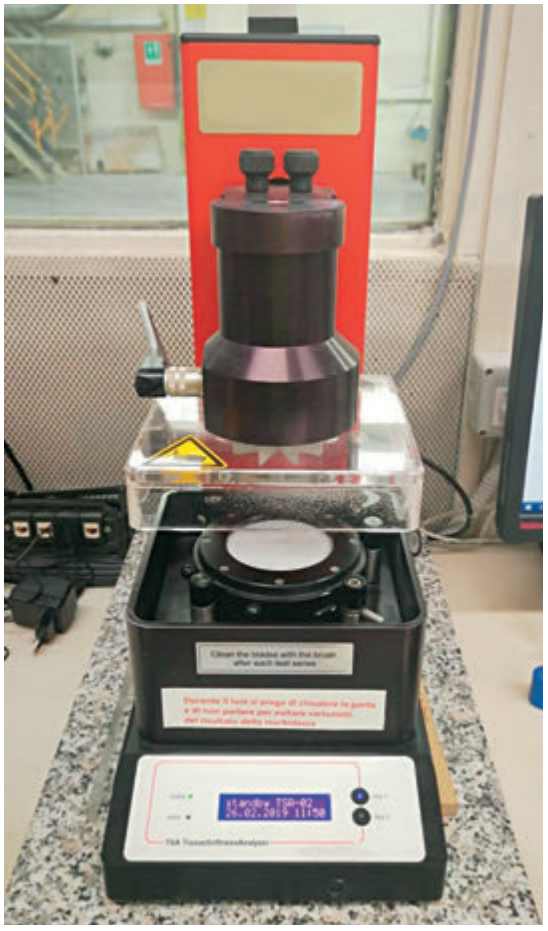
▲ Main control panel of the on-line vibration system used to monitor yankee surface conditioning; the main indexes used to evaluate the components of the vibration behavior are visible as well as the global "Score" index.



▲ Detail of the vibration measurement. Instantaneous values and trend in time are clearly visible.

increase pope reel speed with the same yankee dryer roll, so growing production while increasing mechanical properties and save on refining energy or paper formula due to the increase of the basis weight of the paper sheet prior to creping. Excellent stability to acidic conditions (pH 5) was also observed.
The supply package of the tissue machine where MARE coating chemicals have been applied, included a state-of-the-art system for the recording and analysis of the vibration behaviour of the Yankee blade system.
This system allowed a careful optimisation of the coating dosages allowing a deeper understanding of the coating layer behaviour.
Dear TissueMAG reader, we hope this article has provided you with some relevant pieces of information about MARE latest development in tissue making. If you want to know more, please contact your local MARE representative. ●

> "MARE's products and technical expertise demonstrate **optimised cost solutions** ensuring reduced costs, increased flexibility and increased competitiveness"



▲ Equipment used to perform TSA.

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Looking to extend the life of your power plant? Need a repowering and renovation partner who has a wealth of experience in existing gas turbine installations? Who can renovate not only their own equipment but other manufacturers' too? Maybe it's time to talk to Centrax Gas Turbines.

by: Centrax Gas Turbines

◀ Engine workshop at Centrax, Newton Abbot, UK.

▲ CX300 installation at Ahlstrom Munksjö, Saint-Séverin, Charente, France.

Centrax Gas Turbines offers a range of power packages using up-to-date technology that can be used in combined heat and power (CHP) which is ideally suited to paper production - making it better for the environment and better for profits. Centrax has designed and installed gas turbine packages for nearly 60 years and understands the importance of generating reliable and efficient power. Which is why it has invested in a comprehensive service system throughout Europe and Russia - to provide local support and maintenance, ensuring that units are in optimal condition and leaving customers free to take care of their core business.
All of Centrax's generator packages use reliable, high-performance Siemens core engines, and with power outputs ranging from 3 MW to 15 MW, packages can be scaled to match customers' specific needs. This power range is ideally suited to the demands of paper production with packages offering excellent operational flexibility. In Italy, **Centrax Gas Turbines** has supplied Favini S.r.l. paper mill with a CX501-KB5 high-efficiency cogeneration power plant.
The indoor unit provides 3.8 MW of electricity plus 23 tonnes per hour of saturated steam used in the papermaking process. Favini benefits from Centrax's in-country customer support centre which services the unit as part of a comprehensive maintenance contract.

Electricity and steam for the paper manufacturing process

Another CX300 8.5 MW is powering Ahlstrom Munksjö, Saint-Séverin, France, a world leader in the production of sulphurised paper for the food industry. The generator set powers the site and produces steam

> Centrax creates a series of **high-efficiency gas turbine-powered generator packages** to suit a wide range of industries and power applications

▲ Centrax Limited headquarters in Newton Abbot, UK.

Centrax Gas Turbines specialises in the manufacture and service of gas turbine-powered generator sets ranging from 3 MW to 15 MW that use core engines from Siemens. The generator sets are used mainly for combined heat and power but also in base load, simple cycle and standby applications. It is a global company with a broad customer base throughout the world. Centrax has invested in a comprehensive service infrastructure that has earned it an excellent reputation in customer support leading to a 100% customer loyalty in maintenance contracts. This assured after-market care supports the lives of units and maximises revenues for its customers throughout the life of the generator sets.

and electricity for the plant and its processes. One of Centrax's longest-standing customers is Smurfit Kappa Roermond Papier in the Netherlands, who has been running four CX501 packages at its paper mill for the last 36 years. These units have been serviced by Centrax throughout. In 2015 the units reached a one million hour milestone, and a recent decision to upgrade the control panels to a state-of-the-art digital system was a vote of confidence for the longevity of the 501 engines. In 2016, Centrax Gas Turbines strengthened its relationship with Smurfit Kappa with an order for two 5.3 MW gas turbine generator sets to replace an existing CHP plant at a paper mill in the UK. The two CX501-KB7 DLE units are linked to waste heat recovery boilers to provide both electricity and steam for the paper manufacturing process. Unlike conventional power generation, CHP not only provides electricity but also makes use of the waste heat produced. This thermal energy can then be harnessed to create the steam, hot water and hot air needed in manufacturing processes. To arrange a site evaluation to maximise efficiency of your existing CHP plant, contact Centrax's Sales team. ●

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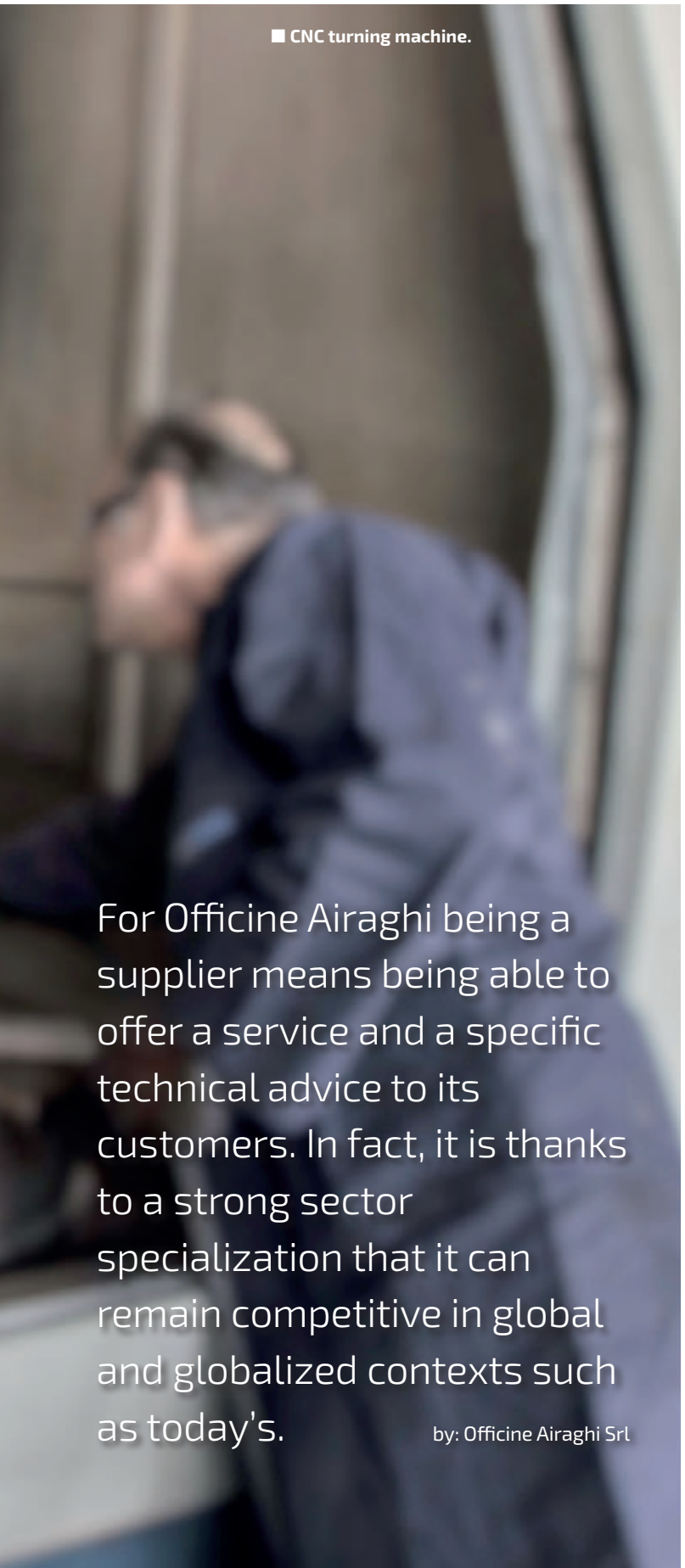


■ CNC turning machine.

For Officine Airaghi being a supplier means being able to offer a service and a specific technical advice to its customers. In fact, it is thanks to a strong sector specialization that it can remain competitive in global and globalized contexts such as today's.

by: Officine Airaghi Srl

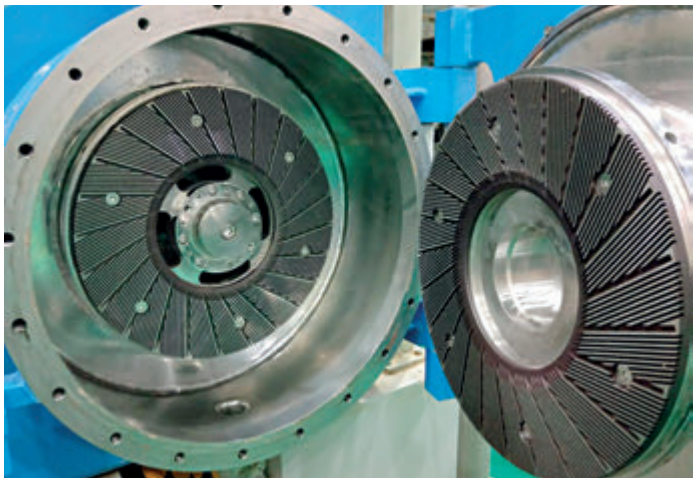
With its 70 years of experience in the stock preparation field, Officine Airaghi brings its clients a wealth of knowledge and the newest technologies for the production of spare parts such as discs and cones for refiners, spares for deflakers, screen plates (or sectors) for pulpers, sleeves for shafts, impellers and shafts, basket screens and much more. The experience acquired throughout this seven decades allows us to have a deep knowledge of technical and maintenance problems. The company can design and manufacture all spares parts for stock preparation machinery with a very quick turnaround.

Officine Airaghi product range

Refiner spares. Officine Airaghi is able to supply both disc and conical refiner spare parts for all brands on the market.
All products are made using a MILLING CNC Machine, so the pattern (bar, groove, angle) can be easily modified and changed according to customer's needs. For conical spares, we offer a wide range of moulds as well as milled solutions (CNConic®, internationally patented). The company can manufacture every common pattern and geometry required by paper mills machineries, such as short conical fillings with shallow angle (Conflo), low conical fillings with shallow angle (Jordan), short conical with large angle (Claflin).
Deflaker spares. Officine Airaghi can supply all the most popular deflaker spare parts on the market (toothed rims or casted). In specific the company manufactures: drilled deflaker discs in stainless steel alloys thermally treated; toothed rims in stainless steel alloy thermally treated, from 270 to 950 mm diameter; deflaker monoblock castings in stainless steel alloys thermally treated. Additionally, can manufacture deflaker's parts based on new models and castings, if the paper mill requests it.
Other spare parts. Officine Airaghi has a long history in the stock preparation field and has developed and manufactured other spares for many different machines and applications.
In particular: basket screens with holes and/or slots in stainless steel alloys for any basket model and machinery; screen or pulper drilled plates in special new alloys, with better performance than AISI 304; impellers and shafts in stainless steel thermally treated; sleeves for shaft protection in stainless steel thermally treated or with hard surface (ceramic, etc.).

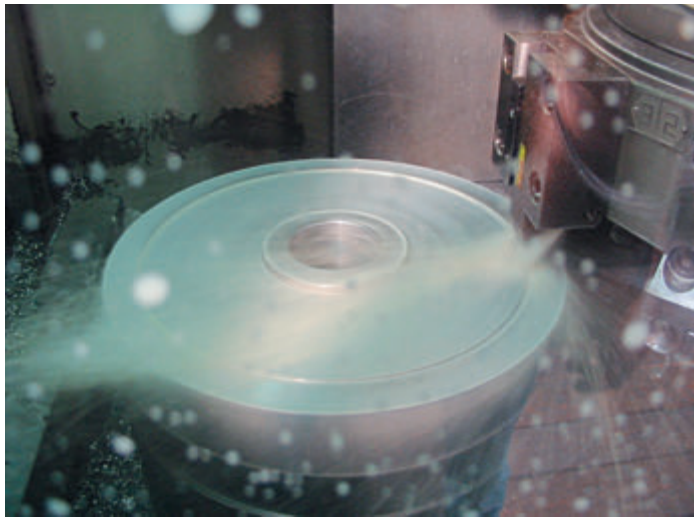
Topic of interest: cellulose refining and role of appropriate milling components

The refining process can be considered as one of the most important stages in the paper production using cellulose as a raw material. As a matter of fact, refining can be considered as the only process in the whole paper mill system in which fibers are physically modified, to reach the right balance between flexibility and bonding capacity. The choice of the most appropriate refining intensity is fundamental and is dependent on the selection of a spare part that can optimize energy consumption and obtain the best results for the final product.



▲ EFP discs installed on refiner.

▲ Airaghi IQ Screen basket.



▲ Turning operation on a disc refiner spare.

Customized precision with milling technology

Officine Airaghi has developed a specific manufacturing method for achieving this result: the milling technology. Thanks to the milling technology it is able to design and produce spare parts specifically tailor-made for each customer, without any fabrication restriction in realization, which is not possible with traditional methods like casting, fabricating and welding.
Paper mills can choose among an infinite range of solutions and combinations of geometries, patterns and sizes with the warranty of a constant fulfillment of characteristics (both of fillings and fibers) throughout the lifetime of the spares.
The milling technology is the only solution that allows extreme customization because of the precision in execution of the new generation numerical controlled machines (CNC).
The attention for details and the accurate fillings finishing obtained by the use of CNC machine tools make the perfectly perpendicularity of bars and grooves and the consequent reduction of friction and of energy consumption possible. This will translate in maximizing the hydraulic capacity and the refiner efficiency maintaining constant values through the spare lifetime.
Another key factor is the consistency of refining parameters set up. All milled fillings made by Officine Airaghi maintain the bar and groove dimensions, throughout the entire filling lifetime. In fact the bars in our spares will maintain their rectangular section independently from wear while castings filling will not.

> “We **design and produce** various types of spare parts for stock preparation machineries”

Our mission: competency, quality, reliability, precision, punctuality

Officine Airaghi offers its clients a complete and very high quality service, from the design customization and specific technical study, to the manufacturing and final execution and delivery of spare parts. The delivery time is prompt and fast, typically they can manufacture a spare in less than 30-40 working days (EXW).
All Officine Airaghi quality standards are guaranteed by the Certification UNI EN ISO 9001:2015. ●

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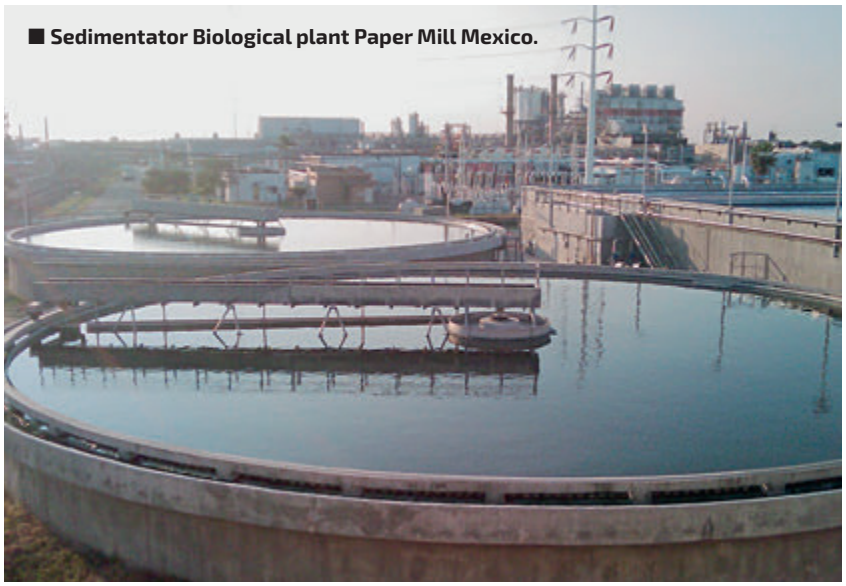
■ Biological plant and Deltafloat Paper Mill Toscana, Italy.



■ Sedimentator Biological plant Paper Mill Mexico.

OMC Collareda Srl was founded in 1974 in Schio, in the north-east of Italy, where a generation of brave captains, with a unique entrepreneurial spirit and the ability to put themselves at risk to jump headlong into the idea they believed in, began to sprout. At that time it was called F.lli Collareda, and it was a small mechanical workshop of carpentry construction for industry in general producing tanks, vats, pipes and their installation at the customer's site. In 1981, understanding the needs of the paper industry to recover the process water for their reuse, and the recovery of raw materials contained in them, it began the adventure of designing and building equipment suitable for these goals, with the development and construction of the first

Optimizing resources, protecting the environment and maintaining competitiveness

These are the three key rules and philosophy that guide the work of OMC Collareda.

by: OMC Collareda Srl

"self-cleaning" sand filter, currently still in production. In those years some changes in the company name took place, which led F.lli Collareda Sdf to become OMC Collareda Srl and, with the aim of creating its own products, resources were dedicated to the development and design of other technologies for the paper industry, not only for water treatment and recovery of raw materials, but also for auxiliary equipment to be installed within stock preparation.

Development in USA and central-south America

The turning point of the company came in 2016, when **Bruno Collareda,** one of the founding partners and the entrepreneurial mind of the company, decided to liquidate the other partner, because of incompatibilities that in the long run would have led to the destruction of the company. This choice was not painless, especially at a personal and moral level, but it was necessary and fully supported by his son and daughter, who had already been in the company for many years, and by the employees and collaborators. A considerable economic commitment, rewarded by a new company organization, a more serene and livable working environment, a more collaborative and efficient team working method with confidence in its employees and, last but not least, a further growth of the company, which in two years has seen an increase in the technical and production staff of about 10 new elements. This continuous evolution of the company has always brought important new contracts in the United States and in Central and South America, as the recent acquisition of a new order for a complete water treatment plant, worth about € 6,000,000 from a new Mexican customer.

45° ANNIVERSARY
to be continued ...

Quality and efficiency of production and processes

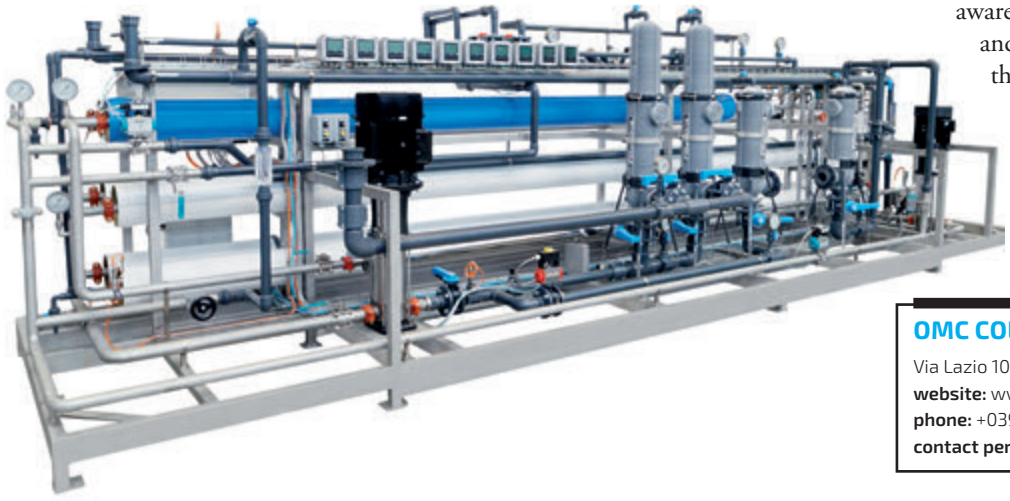
Currently the fields of activity are design, production, assembly and start-up of plants for water treatment from industrial and civil processes, biological plants, primary water treatment, sludge dewatering as well as plants for stock preparation for the paper industry, for any type of paper, and complete deinking plants. **OMC Collareda** can say that it is able to satisfy any customer requirement at 360 degrees: from closing the internal water circuit at paper mills, applying flotation and filtration systems suitable for primary water recovery, to the treatment of waste water through biological Anaerobic and Aerobic plants, with the recovery and reuse of the water treated through filtration, Ultrafiltration and Reverse Osmosis. Experience and structure allow OMC Collareda not only to build customized equipment, but also to develop any engineering project in specific sectors, to built turnkey installations anywhere and to carry out studies to improve existing water cycles, with a special attention for all engineering and design services. A specialized technical department constantly applied to the research and development of new projects to be able to keep up with the times, which is essential nowadays to be competitive and to be able to constantly update the proposed technologies. OMC Collareda was one of the first companies, back in 1995, to obtain the UNI EN ISO 9001 quality certificate, a guarantee of quality and efficiency of production and management processes.

> “OMC Collareda intends to focus on maintaining and improving its **leading position** in the supply of technologies for **water treatment**”

OMC brand is wellknown all over the world

A wide range of products and technologies that many have tried to imitate: what makes the difference, however, is the ability to be a partner for customers and not just mere suppliers. This is precisely the company’s strength: to meet customers in person, with an accurate technical file, with detailed plans of the plants and a preparation that comes from the long experience in the field. OMC Collareda evaluates case by case proposing the most suitable and customized solutions in compliance with the regulations and the customer needs: recovery of raw materials, water recovery and energy saving. Not only being able to offer its technology in the world but also to praise its total component Made in Italy is now one of the greatest satisfactions of the company. In fact, the whole know-how is Italian: design, study, ideas, insights, are part of the culture of which the company is proud. However, the company vision does not stop within the Italian borders, the OMC brand is wellknown all over the world: it is difficult to say in which countries there is not at least one plant of the company. OMC Collareda does not forget sustainability and environmental protection. Water is precious: an indispensable resource and source of existence. For forty-five years it has been the passion of the company, what it strongly believes in and therefore protects. The company is aware that the future will bring new challenges and will therefore continue to invest in the Italian territory but with a globalized view, with a constant commitment to the search for new technologies for a sustainable world and in the training of human resources. ●

▼ Reverse osmosis plant paper mill Mexico.



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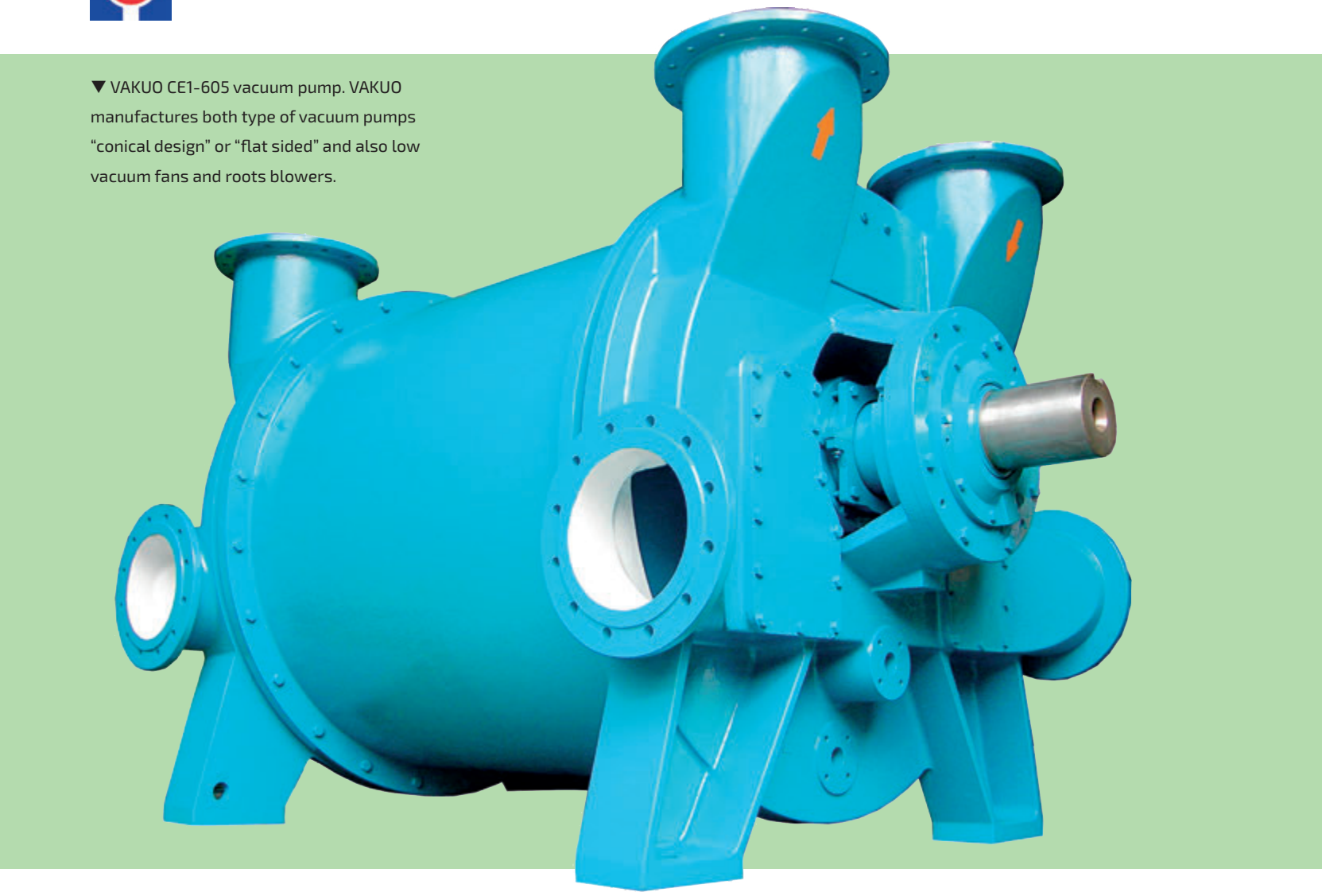

▼ VAKUO CE1-605 vacuum pump. VAKUO manufactures both type of vacuum pumps "conical design" or "flat sided" and also low vacuum fans and roots blowers.

Energy saving with existing vacuum systems using liquid ring pumps

VAKUO GmbH continues the success story of CUTES Europe Ltd. in manufacturing vacuum pumps for the paper industry - being recognized as one of the leading liquid ring pump supplier - and assisting the mills on their own energy saving projects, looking for energy saving potentials on existing vacuum systems.

▼ VAKUO CVP-90M vacuum pump. From 2019 CUTES Europe Ltd. became VAKUO GmbH offering the vacuum pumps manufactured by CUTES Corp. in Taiwan but focusing on the optimization of existing vacuum systems in the pulp and paper industry.

by: TissueMAG

The right condition and correct operation of vacuum systems is a key to the overall paper machine productivity - in terms of reliability as well as in terms of efficiency and energy costs. 50% of energy saving are possible, with a mosaic of optimization measures. We will eventually reduce the rotating speed of the liquid ring vacuum pump by 30% (x 0.7) and consequentially reduce the power absorbed by 50% (as 0.7 x 0.7 = 0.49). We take advantage of leverage: the suction capacity is proportional to the rotating speed, but the power absorbed increases (or decreases) exponentially. It is not new: in the 90s replacing 25 year-old liquid ring pumps through new one, we could reduce the specific consumption and save 50% of energy but this issue became nowadays more and more important.

SOME RELEVANT TOPICS

A bunch of relevant questions leads to good practices, energy saving and improved reliability: how much vacuum do we really need? How to produce it? It is about materials of constructions, about water recycling and fiber recovery, etc. for this we have selected a few frequently asked questions.

When to repair, restore or rebuild a vacuum pump?

We recommend measuring the performances of each vacuum pump on a regular basis, ideally once a year and offer surveys including capacity test and endoscopy. Measuring and collecting data is our first step (and priority) to be able to analyze and optimize.

Repair or replace the vacuum pump?

Is it the right pump for this service? An 100 KW-pump can often save or waste 30 KW. They cost 30 KW x 12.5 Ct/KWh x 8,000 h/a = 30,000 euro/year, which is the price for a new pump. The price for repair or for a new pump is negligible compared to the potential energy saving.

Why does the efficiency of LRVPs decrease?

Wear of critical areas, because corrosion or abrasion, will affect the critical clearances.

◀ VAKUO CNN pump with dismountable bearing brackets. Vakuo vacuum pumps are interchangeable with other brands, they are "bolt-on" replacements (same performances, same dimensions) but offer many features/advantages like for example the removable bearing brackets.

> "VAKUO focuses on demanding applications, like paper manufacturing, where a **reliable technology** is required"

▲ Drain-pump. The CKD extraction pump is the "work horse" designed to drain the pre-separators under a vacuum up to -80 KPa. Pre-separator and extraction pump are key components for an efficient vacuum system.

The worst solution is to increase the rotating speed to compensate the loss of capacity. Deposits of fiber, fillers, scale, etc. will clog the internal paths creating a backpressure leading to an increased power draw.

What is a good efficiency for a vacuum system?

1 KW/m³ min is our target, with pumps that are in good condition and are properly selected for the services. The liquid ring pumps, cooling and condensing at the inlet, take advantage of the "condensation effect" and will handle an effectively reduced volumic flow.

Central vacuum or dedicated pumps?

A system with dedicated pumps for each service (each vacuum) is more efficient as we avoid an expansion, which creates an additional volumic flow: 100 m³/min at -40 Kpa become 150 m³/min if they have to be expanded to -60 Kpa.

Do we need preseparators?

Yes. Because vacuum pumps are compressors, they are designed to handle air and vapors, not to pump liquids. Liquid ring pumps are robust, they can handle water, but in a very inefficient manner: a pre-separator will improve the efficiency as well as the maintenance intervals.

Energy saving using water at a lower temperature?

Yes, but not directly. Using water at a lower temperature, we would just increase the suction capacity of the pump. We will save energy as soon as we reduce the rotating speed (by replacing the small motor pulley or installing a frequency converter).

"Flat sided" (axial) or "conical design" (radial)?

Both designs have advantages, **VAKUO** offers both. Pumps with "cones" are more robust and more efficient, if we take advantage of the larger ports to recycle more water. The "flat sided" pumps are more versatile and can adapt to different vacua.

Are LRVP's suitable for variable speed operation?

Yes, especially liquid ring vacuum pumps will take advantage of the above mentioned leverage: adjusting the suction capacity we get an exponential energy saving. We will adapt capacity and vacuum along the lifecycle of the felts.

VAKUO was launched by the end of 2018. F. Olivares and P. Strauch look forward to meeting you at MIAC 2019 (VAKUO booth 128). ●

VAKUO GMBH VACUUM PUMPS AND SYSTEMS

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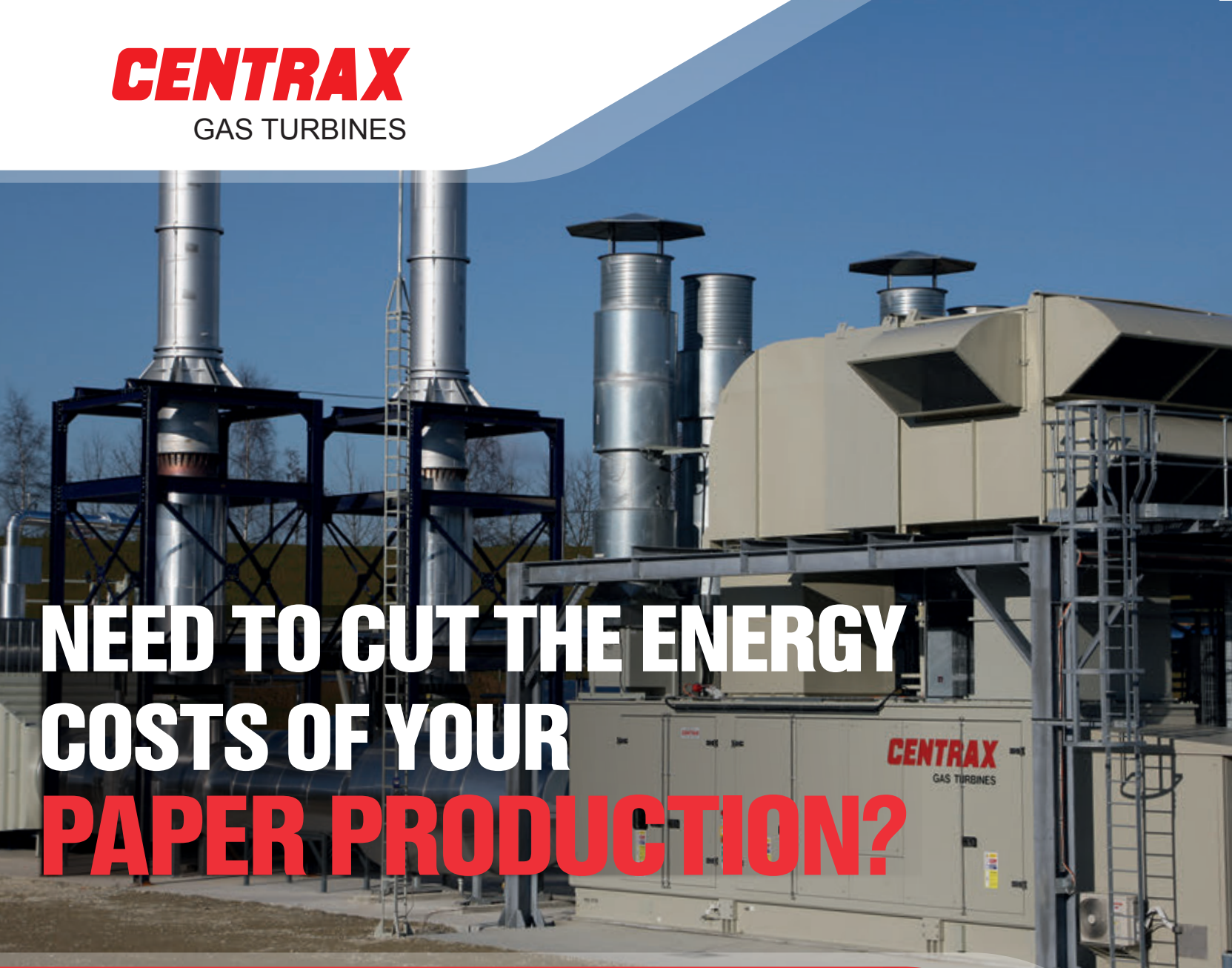

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CPS Company looks at the future with Active Pull Technology

■ CPS 452 in operation.

"Revolution is our watchword", says Stefano Cassoli, CPS Company CEO. "Our goal is to launch machines that improve the quality of the packaging, which improves productivity, reduces manufacturing costs and has a minimal impact on the environment. CPS confirms its mission and wants to be a precursor of novelty in terms of design process, functional, reasoned and sustainable."

by: TissueMAG

The Active Pull Technology, the latest solution patented by **CPS Company** confirms the company mission statement. Perfect for secondary packaging, it produces a better quality finished product as well as a significant packaging material saving: from 10% to 20% less than traditional systems. The new CPS patent guarantees an extreme extension of the overpacking film, optimizing the stability and compactness of the product for subsequent palletizing, storage and transport phases without the need for inefficient heat/shrink tunnels. Reducing energy and material consumption ultimately means reducing manufacturing costs for the producers. Another key objective for CPS is to look at ways of increasing production efficiency without sacrificing quality, reliability and safety: it is one of the cornerstones of CPS design strategy, even on machines that guarantee high performances and high flexibility.

■ CPS 452 an overall view.

> “Our technology assures **maximum efficiency** with a minimum consumption of materials and energy”

Anticipate customers' expectations and needs

Already highly requested, CPS 352 and CPS 452 are the first CPS packaging machines to boast Active Pull Technology. Both are dedicated to secondary packaging: the CPS 352 is suitable for napkins, interfolded tissue and personal care products. Format dependent it can reach speeds of 30 bundles per minute. The CPS 452 is ideal for conventional Kitchen/Bathroom & Industrial rolls for speeds up to 25 bundles per minute. It is a fact that the Push Technology used in the bundling process is now history, developed more than 40 years ago from an idea by **Paolo Cassoli** and today widespread and replicated in many different applications. CPS Company, which is located in the heart of the Bologna Packaging Valley, also stands out for its solutions for primary and end-of-line packaging of folded products, rolls, industrial rolls and products for personal care. “We try to propose from year to year more effective and cutting-edge systems, keen to anticipate customers’ expectations and needs. This brings us to offer machines that are compatible with all production lines of the market worldwide and able to ensure the best yield; at the same time, we are strongly committed to pursue a key objective in terms of maximum environmental sustainability”, concludes **Stefano Cassoli**. ●

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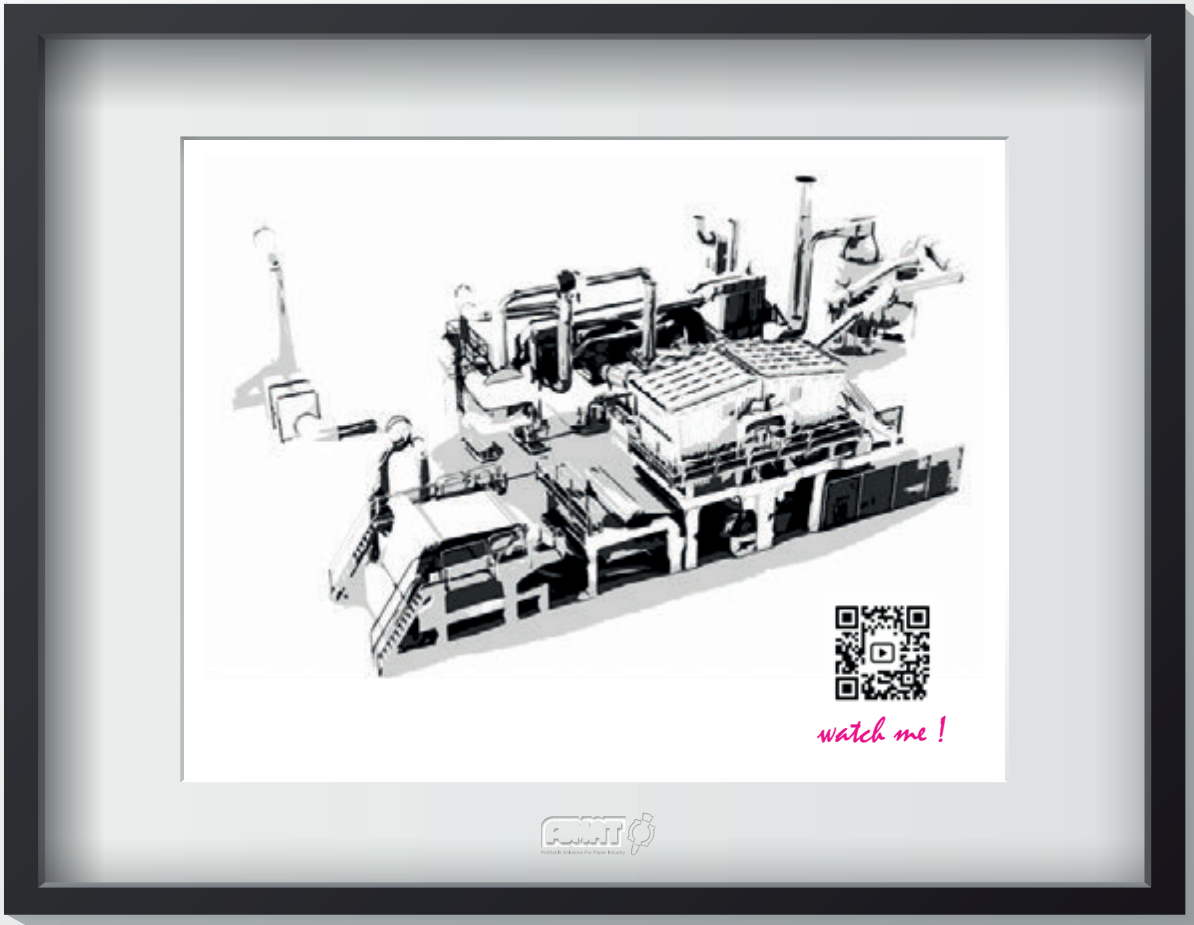

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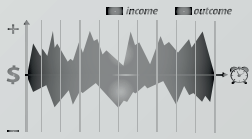

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Waterlube® for the tissue industry

Since the company's establishment in 1997, **WVT Industries NV**, with its headquarters in Aartselaar, Belgium and regional operations in France and Spain and asian operation in Singapore, has grown rapidly into a leading manufacturer and supplier to the industrial cleaning market.
Their customers include companies from various industry sectors situated worldwide, such as the chemical and pharmaceutical sectors, the automotive industry, aviation, metalworking, printing and packaging, marine, waste management, and transportation businesses.
In addition, WVT is also supplier to many Private Label customers in the Tissue Industry.
WVT Industries provides customers with a broad range of safe and ecologically sound industrial cleaning products. Its product range is composed of over 650 items, varying from acids to strong alkaline cleaners. Additionally the company is able to respond to customer's requests by developing specific cleaning chemicals to solve particular cleaning problems. The company attaches major importance to the environment and endeavours to ensure that its activities have the least possible impact in that respect. To achieve this aim, it ensures that all of its cleaning products are biologically degradable and bio-ergonomic.

▲ Marry roll.

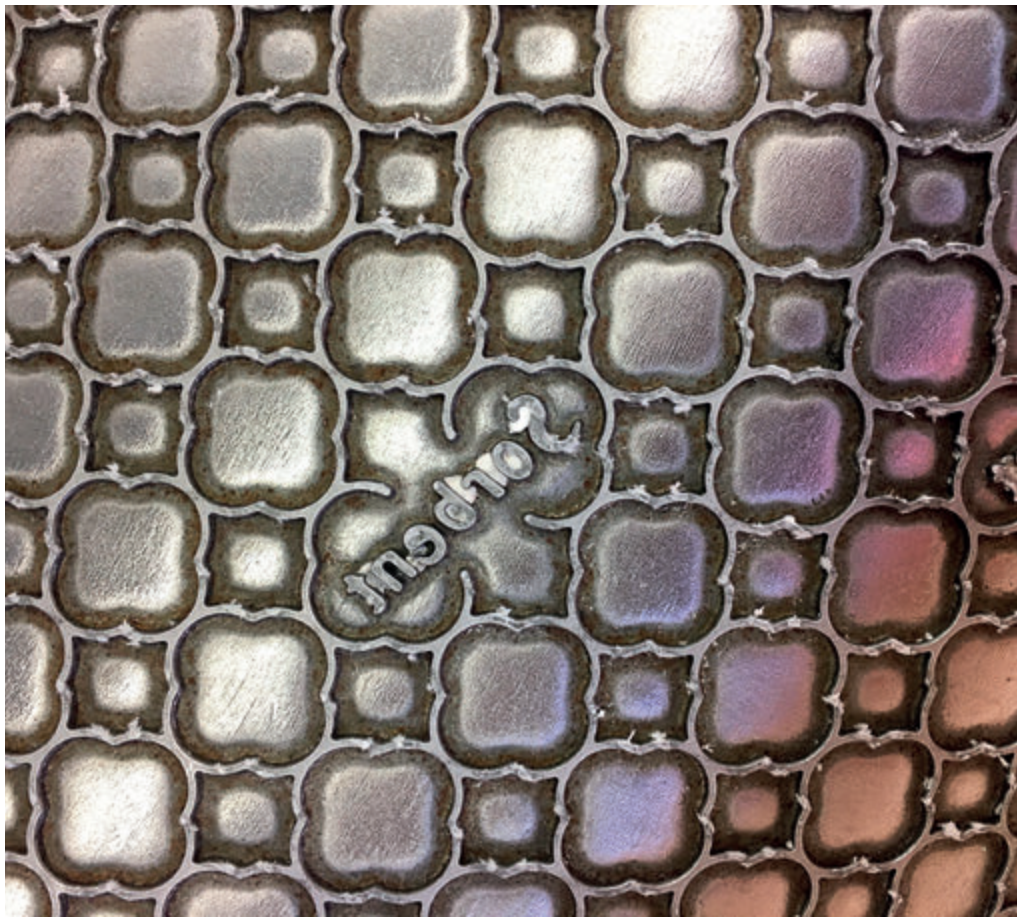
Tailored solution for the customer

For the production of all its detergents, WVT applies the state of the art technologies, using a

> "WVT Industries is a rapidly growing company that specialises in the research, development, production and marketing of **industrial cleaning chemicals**"

Suitable for lubrication of steel to steel, pin to pin, nested, micro-deco, micro-macro and perf and fan embossing processes. No flash point, no friction fires, 100% water-based formulation, 100% biodegradable, odourless.

by: WVT Industries NV



▲ Steel Roll WL.

sophisticated software that controls the accurate mixture of ingredients and the production line, where they can monitor production step-by-step, assuring that each recipe receives exactly the correct amount. Automatic processing reduces human intervention to a minimum. The use of this technique enables them to adapt the detergent formulas to the customer's needs and allows WVT to take into account important factors such as the nature of the pollution that has to be removed, the cleaning techniques and the ergonomic and environmental aspects.
After having received contaminated raw materials sent to them by their customers, the Research & Development laboratory analyzes important parameters like the nature of the contamination, the method of cleaning that is currently used (circulation, high pressure, etc), possibilities surrounding temperatures, the human parameters like whether protective gloves or other safety measures are permitted, the nature of the company (paper industry, printing, tissue converting, packaging, etc). With these parameters, WVT can quickly produce a tailored solution for their customer.

Waterlube® for the Tissue Industry

For the Tissue Industry, in the past few years WVT developed a 100% water-based product, Waterlube®, specially designed for use during the production of tissue toilet rolls and kitchen towel products in the Tissue Converting Industry. It is

WATERLUBE® PHYSICAL AND CHEMICAL PROPERTIES

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- Relative density/20 degrees C - 1,001
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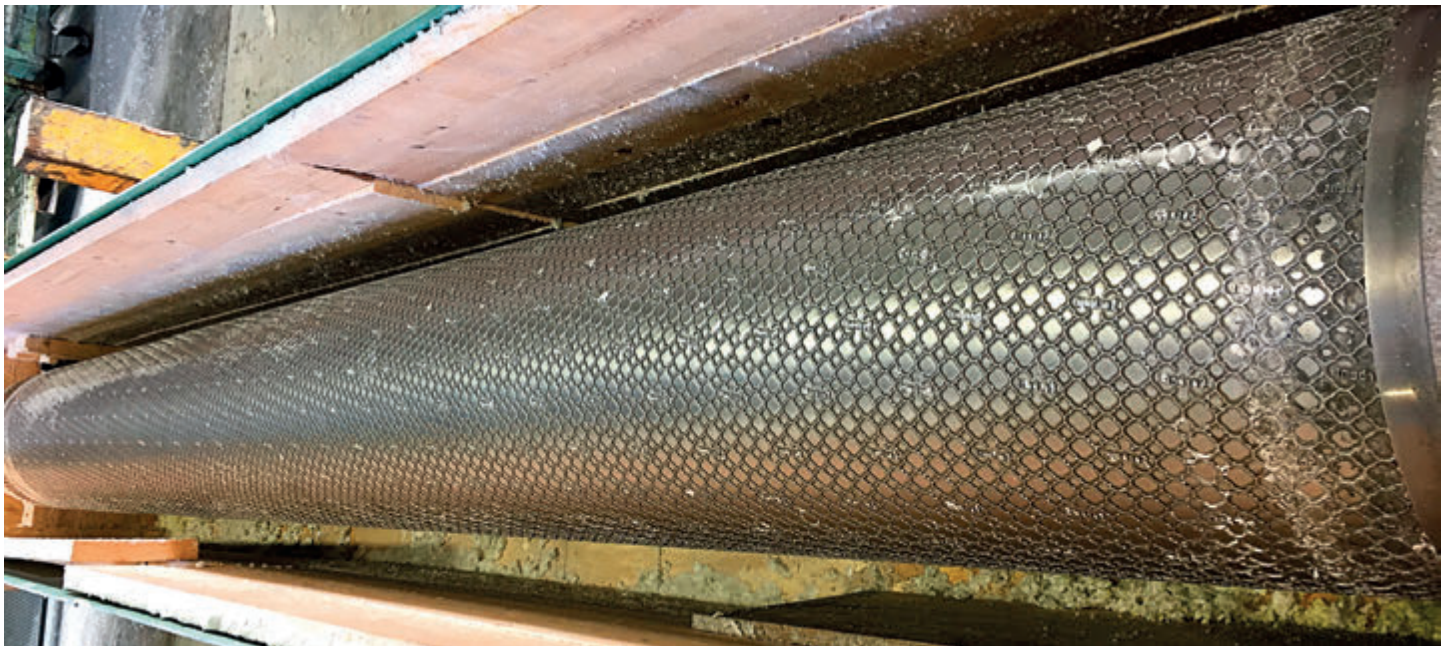

▲ Steel Roll.

> “WVT Industries provides customers with a broad range of safe and ecologically sound industrial cleaning products, **with over 650 items**, varying from acids to strong alkaline cleaners”

designed to replace the use of mineral oil lubricants, which have been traditionally used to avoid the build-up of glues on the steel rolls used in the lamination process with steel to steel rolls, pin to pin, nested, micro-deco, micro-macro, perf and fan.

▼ The Headquarters of WVT Industries NV in Belgium.

The formulation is non-corrosive and will not damage surrounding surfaces or equipment. The product can be applied by spray, brush or felt applied in-line during the production process in an undiluted form guaranteeing a lower consumption with a saving of up to 30% compared with a comparable mineral lubricant. Technically Waterlube® benefits the customer as it has a neutral pH and is completely water-based; it has no flash point and it eliminates the possibility of friction fires generated by the process. Furthermore, it also has a food-grade approved formulation, therefore following today’s legal regulations. From ordinary everyday to the most complex cleaning solutions, WVT supplies the customer with a package of chemical cleaning options so that the converter can focus on their own core business. ●

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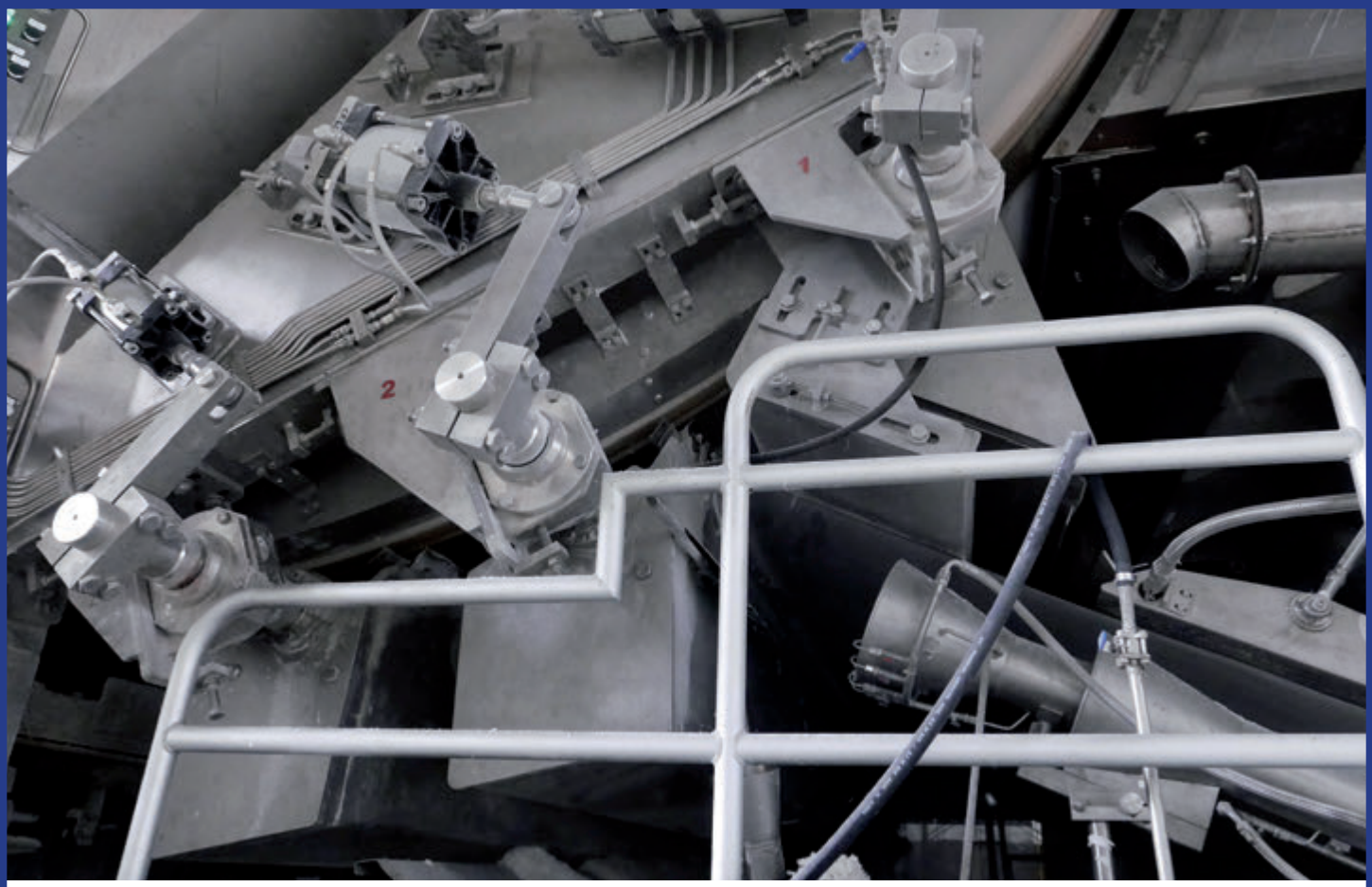

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BONETTI

Doctoring the world

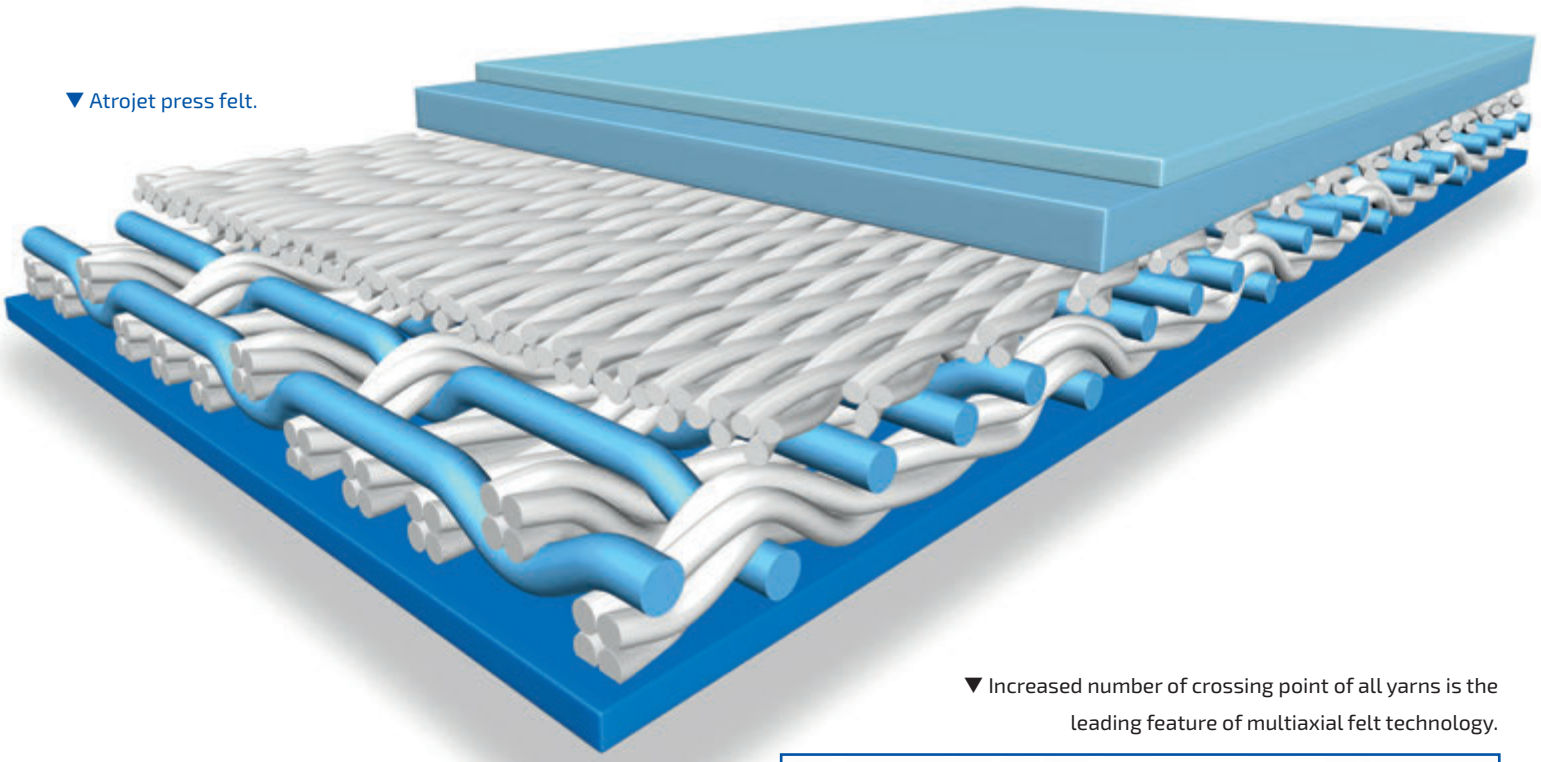
Atrojet from Heimbach.

Tailor made press felt technology

Even at the beginning of its development, Heimbach product managers were sure: Atrojet has the potential to usher in a new era in press felt technology.

by: Heimbach GmbH

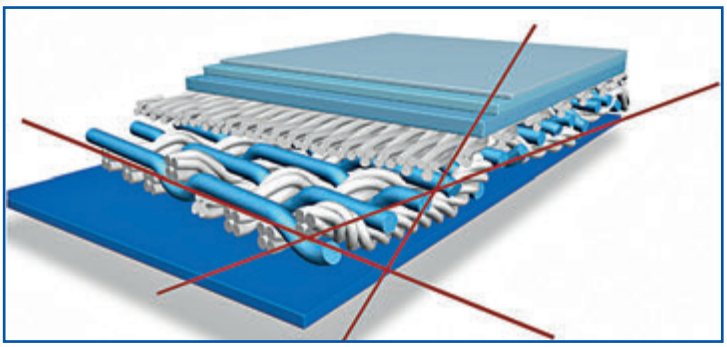
"We promised paper manufacturers that we would develop a press felt that creates completely new opportunities", **Jochen Pirig**, strategic product manager at Heimbach, remembers.
This has been accomplished, as Atrojet is the first felt worldwide that unites the advantages of Heimbach's most significant press felt design groups: the non-woven design group Atrocross and the multi-axial design group Atromaxx who both belong to the modern felt designs, so called *advanced technology bases (ATB)*.
Non-woven Atrocross and multi-axial Atromaxx press felts are offering comprehensive product ranges in their individual design group to meet the requirements of press felt application. Either design group have their prominent advantages such as short break in time and high nip dewatering capacity of Atrocross or the great flexibility of base weave combinations of Atromaxx to meet individual and particular requirements which is important for customized well-engineered press felt application.
In addition to these two modern press felt design groups the classically woven, respectively laminated base weave felt designs, belong to the Heimbach assortment too. Even though the existing product spectrum of Heimbach is sophisticated, Heimbach keeps on improving its existing product lines and developing new products. **Atrojet** is the brand name



▼ Atrojet press felt.

atrojet.T

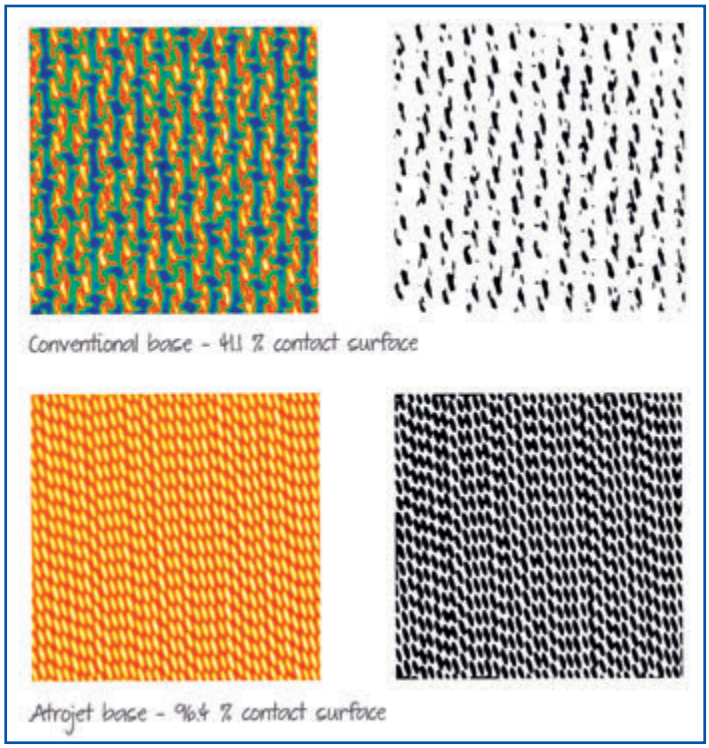
▲ Especially designed for the production of tissue papers.



▼ Increased number of crossing point of all yarns is the leading feature of multiaxial felt technology.

of one of Heimbach's latest developments which is an innovating new press felt design combining the advantages of multi-axial and non-woven technology. With the multi-axial non-woven technology the **Heimbach** felt designers can meet the particular requirements of press felt positions even better. The specific quality of Atrojet is the structure of the base inside. With Atrojet the inside base facing the paper side consists of a unique non-woven layer. That layer of yarns is made of machine direction yarns only which results in great strength, evenness and smoothness of the base facing the paper side. The machine direction (MD) yarn structure is arranged in diagonal direction which is the characteristic multi-axial angle improving collapse resistance by increasing crossing points of all yarns. Broad flexibility is given by the fact that the non-woven paper side layer can consist of different ply twist yarns as well as different yarn diameters and flexible yarn count.

The evenness and uniformity from inside the felt provides smooth felt surfaces through high contact area. The homogeneous and high contact area of Atrojet base is superior among press felt technologies. Homogeneous compact felts are important features for Tissue felt application regarding even pressure transmission at the press nip which is key for even dewatering and even CD profiles of the paper. The roll side base of Atrojet felts is made of multi-axial arranged components and are selected as per individual request concerning void volume, mechanical



▲ Members of staff from Heimbach Switzerland and colleagues from Germany in front of the new production facility.

◀ With its uniform machine direction yarn structure Atrojet has far greater surface contact than conventional bases. This leads to more even pressure transmission at the press nip resulting in very steady dewatering and even CD profiles.

> Atrojet represents **the next evolutionary step** in felts sector

strength etc. and in context of the individual requirements of the position e.g. one or two nip positions or shoe press position, uhle boxes & vacuum rolls involved. A typical Tissue Machine could present the performance of a press felt in the proper light. Mileage of >100,000 km while passing about 6 Million nip cycles and handling > 50,000 m^3 of water are normal requirements for a Tissue felt. In addition, the level of performance is expected to be at steady high level all along the service life of a felt. Modern press felt designs from Heimbach are high-tech products which meet these requirements. In case that process parameters vary very little the felt design can be fine-tuned to its maximum performance under those standard conditions. More the process parameters vary more challenging can be the designing to get an adaptable felt design. Typical example of varying process parameters are paper grade changes which include machine speed and paper weight changes but also affect usage of different furnish compositions like virgin pulp or recycled fibres as well as usage of wet strength resin or dye and fixative. Production planning is always aiming for as smooth as possible transition of process parameters during machine clothing lifetime. But these days flexibility can be key too, just to think of just-in-time deliveries, so sudden process changes may do occur. These changing conditions the press felt has to tolerate. Here the Atrojet design flexibility can offer advantages to adapt to those changing conditions well. Thanks to the homogeneous and strong inner structure, which also contributes to high fibre batt anchorage, Atrojet has proven its robustness towards harsh high pressure shower cleaning which can prevent felt clogging e.g. when changing from virgin pulp to DIP and/or producing non wet strength to wet strength grades. Atrojet has been proven itself in the field to be able to take up even long-term laminar HP shower at pressure in range of >30 bar. The company has considerably invested in the facility in Switzerland: within the Group the Olten facility is considered a competence centre for multi-axial products in web technology. ●

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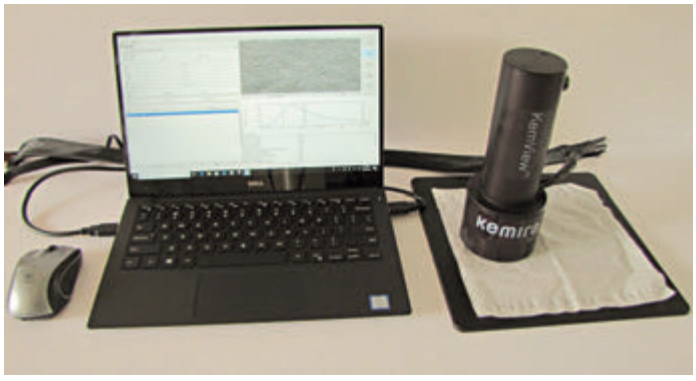
Valmet FORWARD

Utilizing KemView™ sheet analyzer to optimize softness and control the creping process

There are different roads one can take to achieve tissue softness. The key is to be able to determine how to get there and when you are at your target destination.

by: Kemira's Clay Campbell, Lucyna Pawlowska, Xiaosong Huang



> "We help customers improve their **process efficiency**, productivity and end-product quality"

An easy and reliable measurement of sheet properties that determine softness will help to choose the most effective path and set a measurable sheet quality target. Paper manufacturers can utilize a variety of process tools to improve overall surface softness, formation and appearance. The most significant factor is the fiber type and ratios, followed by machine type and creping process configurations. Each process change impacts the sheet structure in positive or negative ways. The key to improving and maintaining final sheet softness is to measure how each process factor change impacts the sheet structure and then how each change in sheet structure impacts the softness.

KemView™ sheet structure analyzer (SSA) description/features

Kemira KemView™ SSA is an easy to use, fast response, sheet structure analyzer that provides a diverse array of sheet measurements and can be effectively used as a laboratory and

■ Kemira combines best-in-class application expertise, latest technologies for smart process management and a complete chemistry portfolio.

Comparison of retail 2ply consumer facial tissue from four different manufacturers.

TEST METHODS	MEASUREMENT	EFFECT ON SOFTNESS	FACIAL #1	FACIAL #2	FACIAL #3	FACIAL #4
TSA	**HF – Hand feel**	**Higher the better**	**88.8**	**85.3**	**80.5**	**78.7**
	TS 7000 Bulk softness	Lower the better	8.8	9.6	10.5	11.7
	TS 750 Surface smoothness	Lower the better	7.2	9.7	15.2	13.8
	D (mm/N) – Stiffness	Higher the better	2.9	2.9	3.0	2.7
Sheet Properties	Caliper		0.134	0.131	0.136	0.122
	MD Tensile (gF/in)	Lower the better	0.71	1.03	1.03	0.69
	MD Stretch (%)	Higher the better	14.6	32.1	24.5	23.4
	MD TEA		0.067	0.171	0.119	0.082
KemView™	FFE - Velvety surface softness	Higher the better	81	152	234	211
	Crepe count (ct./inch)	Higher the better	81	101	65	90
	Intensity (%)	Lower the better	0.43	0.59	1.21	0.78
	Roughness (mm)	Lower the better	0.0041	0.0021	0.0034	0.0027

field support tool assisting in the diagnostics of paper sheets. KemView™ consists of a digital optical detector positioned at the top of the unit. LED bulbs illuminate the sheet sample from 8 directions: one light at a time for FFE planar count and 4 light positions for crepe bar structure measurements.
Kemira's KemView™ SSA diverse features are beneficial for a new grade development, external product benchmarking, comparison of the same product manufactured on different machines, and troubleshooting sheet quality issues. It provides quick feedback allowing for optimization of creping, softening and strength programs. A variety of sheet surface properties can be measured by utilizing KemView™ and emtec Tissue Softness Analyzer (TSA). Combined results from these two measurements provide a comprehensive insight into the sheet structure and softness, and allow for comparative analysis of various tissue products.
KemView is a novel image-based measurement tool that provides in depth 3D analysis of the sheet with the ability to easily measure the following parameters: crepe bar count (#/ inch); crepe bar width, length and height; crepe bar uniformity and distribution; embossing pattern; sheet roughness and intensity (crepe visibility); pinholes; number of free fiber ends (FFE).
Typically, a sheet structure that has a high crepe bar count and low crepe bars intensity (visibility) provide softer tissue. The higher free fiber ends count, the softer or more velvety hand feel surface.

Case study: comparison of retail 2ply consumer facial tissue from four different manufacturers

Four consumer facial tissue products were tested for sheet strength, crepe structure, FFE's & softness utilizing a tensile tester, KemView™ SSA, and emtec TSA.

Facial tissue #1 appears to be made on a TAD structured sheet machine, as indicated by sheet structure design, while the three other facial samples were made using a conventional dry crepe process. FFE count of facial tissue #1 may be low as a result of the structured sheet design.
Facial tissue #2 has a very high crepe bar count (101ct. in) and high sheet stretch.
Facial tissue #3 has poor surface smoothness, high crepe bars intensity and a very low crepe bar count. An increase in the crepe bar count and decrease in crepe bars intensity could increase TSA hand feel from 80.5 into the mid 80's.
Facial tissue #4 had a very high FFE count and a relatively high crepe bar count, which contributes to tissue softness. However, both bulk softness and surface smoothness measured by TSA are not that great. In this case, selecting fiber of higher quality could improve softness.

Conclusions

There are many process factors effecting sheet softness. Kemira's Kemview™ SSA unique multi-functional portable measurement tool provides quantitative insight into the sheet structure, creping efficiency, free fiber ends, pinholes and overall sheet surface parameters that correlate well to sheet softness. ●

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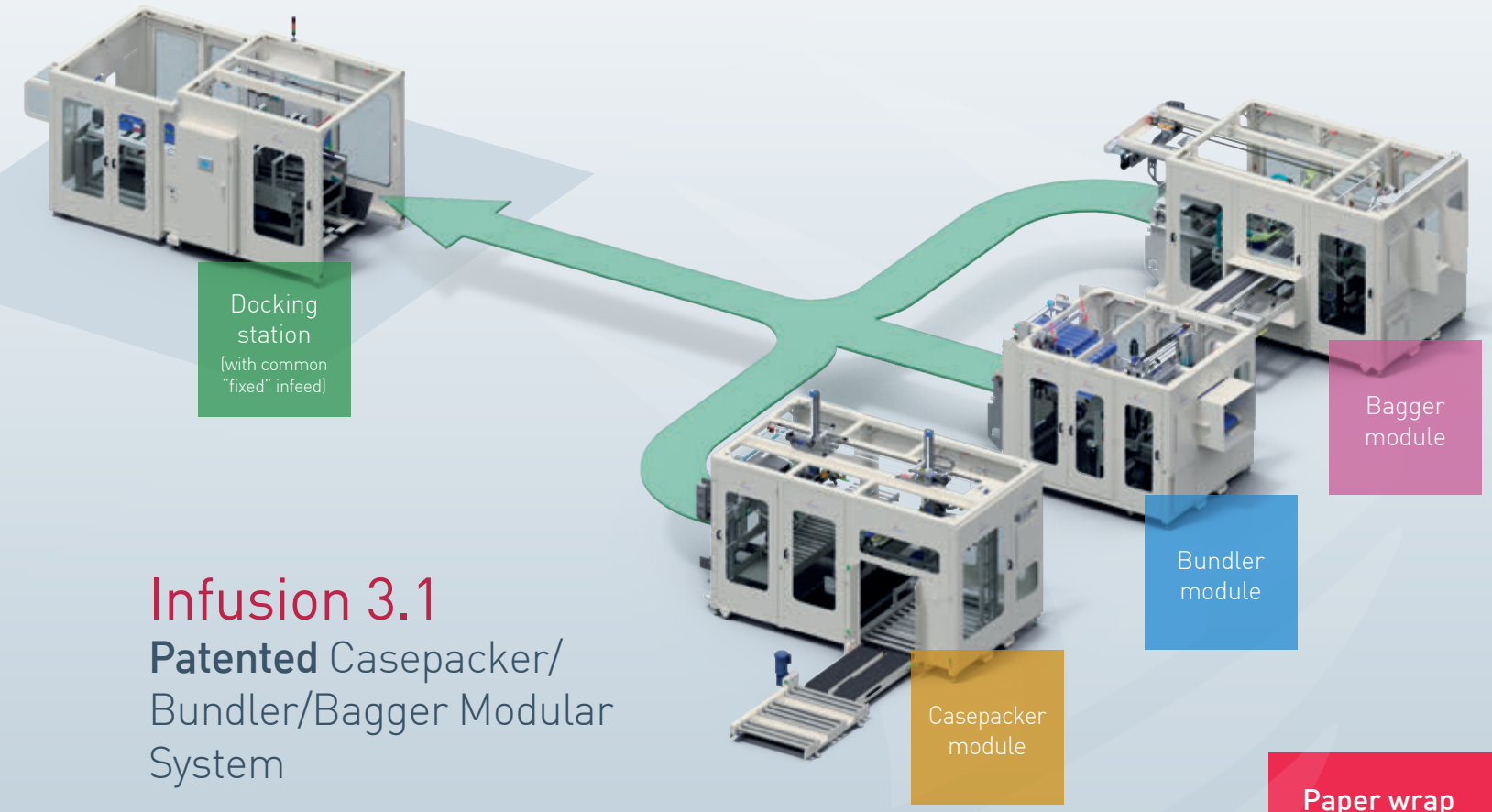

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We take care of your rewinder

Elio Cavagna Srl - Helios - working for over 40 years in the industrial cutting sector, is skilled to recognize the best solutions for already existing machines to make them more performing.

by: Elio Cavagna Srl

■ Beloit machine before retrofit.

■ Beloit machine before retrofit.

■ Beloit machine after retrofit.

Today we update and modernize the cutting systems of rewinders of all brands and we operate all over the world thanks to our team of expert installers and software engineers. Our goal is to solve customer problems, to optimize production processes, increase the production capacity of the plant and ensure superior cutting quality.

To achieve these results we focus the attention on the cutting area that has some critical issues. First of all, the main problem could be: long time to prepare and position the blades, high blade usury, waste formation, frequent maintenance and bad quality of the cut. An example of intervention on an existing plant is the one we carried out on an old Beloit machine installed by one of our Mexican customers. It was a cutting system with a

■ Our retrofit on a tissue paper machine.

> With 32 years of experience in industry, we are sure that Helios can propose the **right solution** to **cutting requirements**

work table of 6 meters and a speed of 2.000 m/min, outdated with problems in safety and reduced performance due to dead times and excessive blades usury.

FAST-MAN system

The system was somewhat obsolete and thanks to our experience we were able to carry out a complete revamping of the cutting area, a change that allowed to replace the old system with a modern and functional one. The system supplied is called FAST-MAN, whose peculiarity is to be able to move blades and counterblades together, in fact the operator has just to place the blades to the desired size without having to intervene continuously. A product, the FAST-MAN, which therefore reduces machine downtime and the number of operations to be performed and which allows to obtain advantages such as longer blade life and better cutting quality. A second example concerns the automation of a Toscotec tissue machine. The plant was already equipped with a Helios FAST-MAN cutting system which has been integrated by an automatic positioner managed by a touch-screen operator panel. A Siemens touch panel has been added to the control panel of the rewinder and from this position the operator can manage the machine without going beyond the protection barriers. Following the customer's needs, we performed an upgrade in order to transform the positioning system from manual to automatic. To note that **Helios** software is friendly-user, the operator interface is simple to use and requires only basic training to enter data, also not-skilled worker can quickly learn how to program it. Software can be individually customized upon request and can be integrated to the informatic system of the client. Moreover, all the machines that we supply allow remote assistance in order to simplify the maintenance and facilitate fast interventions by our operators. ●

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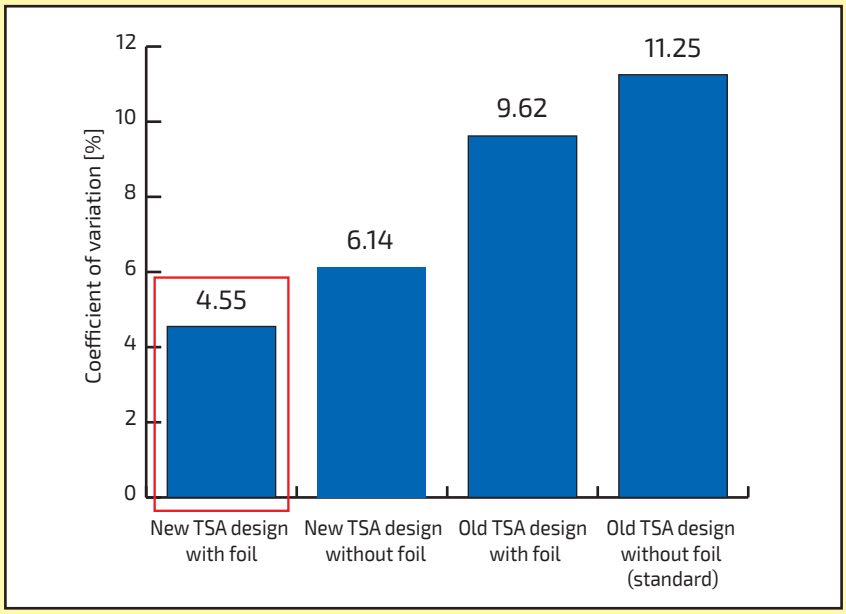
New opportunities to evaluate the **Hand Feel (HF) Potential of Fibre Resources**

▲ emtec TSA.

Softness is defined as a multisensorial human perception. Many different senses play a role. But the most important is the tactile impression.

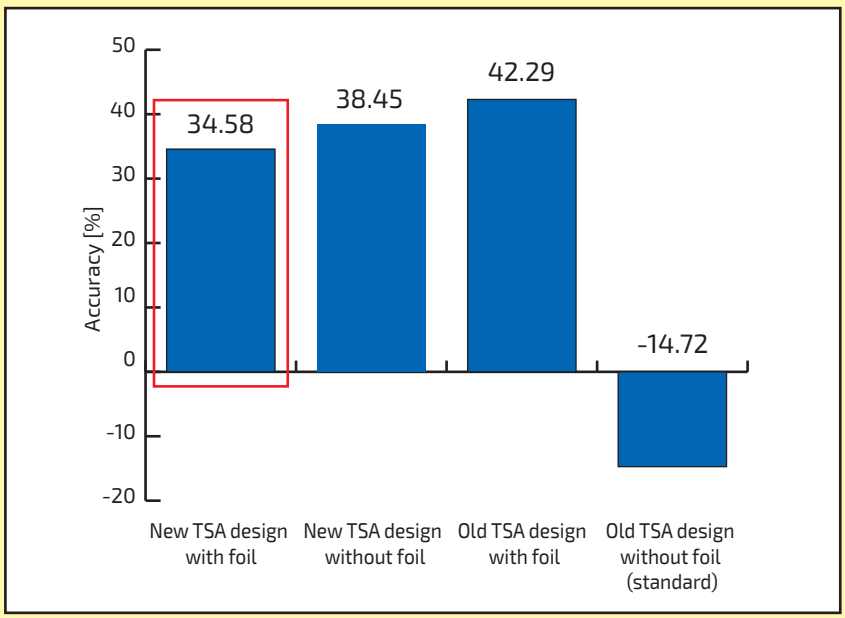
by: Marcel Prinz, Doctoral Student at University of Applied Sciences in Munich

Today, some available measurement devices try to describe the perception of softness. Since softness is received by five different mechanoreceptors located in the human skin, it is difficult to imitate. Furthermore, the perception of softness includes a subjective component coming from the consumer. This component differs between societies, religions, gender and several more. Nevertheless, tissue



▲ Results of comparison - variation coefficient.

> The **TSA Softness Analyzer** is used in the tissue, nonwoven and textile industry and gives reliable and objective information

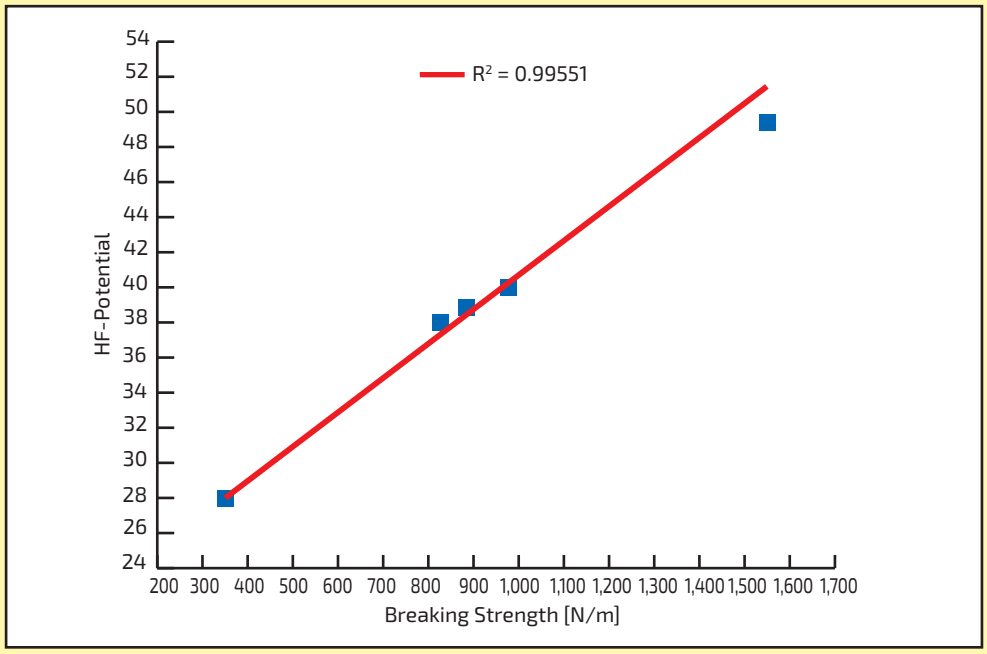


▶ Results of comparison - Accuracy.

softness can be described to certain extends by different paper properties, such as stiffness, surface texture/smoothness and strength. The human skin does nothing more than sensing those physical properties and processing them to a perception of softness.

The emtec TSA

For several applications, the emtec TSA (Tissue Softness Analyzer) could show its beneficial insights into this complex subject. This is especially true for tissue producers and converters as well as their chemical suppliers. But also, nonwovens and textile users highly appreciate the knowledge gained by the TSA. It enables the objective evaluation of the three single parameters softness, roughness and stiffness. From these three parameters, a hand feel value can be calculated, adapted to already mentioned subjective components. Until today, it is impossible to evaluate the influence of different



▲ Strong correlation between pulp softness and breaking strength.

> “Emtec Electronic celebrates the 300th globally sold TSA, Tissue Softness Analyzer. The device is used in **48 countries** on all continents”

fibre mixes (long/short fibre ratio) to the tissue softness potential of pulps before running them on a tissue machine, but that is now set to change. By a successful cooperation between the developer **emtec Electronic**, the University of Applied Sciences Munich and the company Mercer Pulp Products a procedure was developed to first-time observe well known influences of different pulp sources on softness, obtaining a high reproducibility on hand sheets. To achieve that the TSA was slightly modified, and the hand sheet preparation was adapted to the needs. Which means a new sensor design was added to the existing TSA configuration. Furthermore, a plastic foil was positioned underneath the hand sheet sample. For the adjusted sample preparation, a standard laboratory hand sheet former was used to create 30 g/m² hand sheets. Those were dried inside a climate control room at 25°C and 50% relative humidity, with one surface exposed to the air.

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By doing so, only the used fibres defined the sample surface and not the usually used smooth counter sheet.

Technical data and measurements

To rate the correctness of this new approach the well-known difference between soft and hardwood needed to be defined, here it is called “Accuracy” and is calculated as followed: $A = (\Delta\overline{X}_x/\overline{X}) * 100\%$. Where A: Accuracy; $\Delta\overline{X}_x$: difference between long and short fibre mean; $\overline{X}$: average of long and short fibre samples. The aim was to show a significant difference between long and short fibre pulps, and at the same time, to achieve a low coefficient of variation. The investigation could show the expected differences between long and short fibre with a variation coefficient of less than 5% and an accuracy of 34,58% (rel. difference between long and short fibre). Furthermore, a strong correlation between the newly measured pulp softness potential and the breaking strength gained through refining was demonstrated. Both corresponds to the expectations of researchers and operators inside the tissue industry. The observed results open a wide range for following investigations. With the outlined procedure pulp and tissue producer might also be able to develop their products further in the lab without the need of running expensive customer trials at a tissue machine. ●

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OCME and Robopac: the ideal solutions for the tissue industry

From 2017, thanks to the team up between OCME and Robopac, the synergy from the whole range is taking a step forward to design new end-of-line concept solutions for the tissue sector.

by: OCME Srl

ROBOPAC
Innovation driven by values

▲ Genesis Cube stretch-wrapper machine.

The experience and reference of these two companies improved range, with a high level of efficiency, speed and flexibility, is supported by a skilled engineering department to create future-oriented products, combining the know how in palletising and stretch-wrapping. The group palletising department, in fact, can supply different solutions from low to high speeds, with traditional or robotic palletising, meeting all customer needs. Thanks to our software engineering and a dedicated R&D department, **OCME** is increasing and perfecting the "Program Maker", an interface that allows our customers to create and modify palletising patterns. Highly intuitive, user-friendly and developed on user experience guidelines, the "Program Maker" displays and sets up on the control panel the best palletising configuration for your needs.

The TissueTool

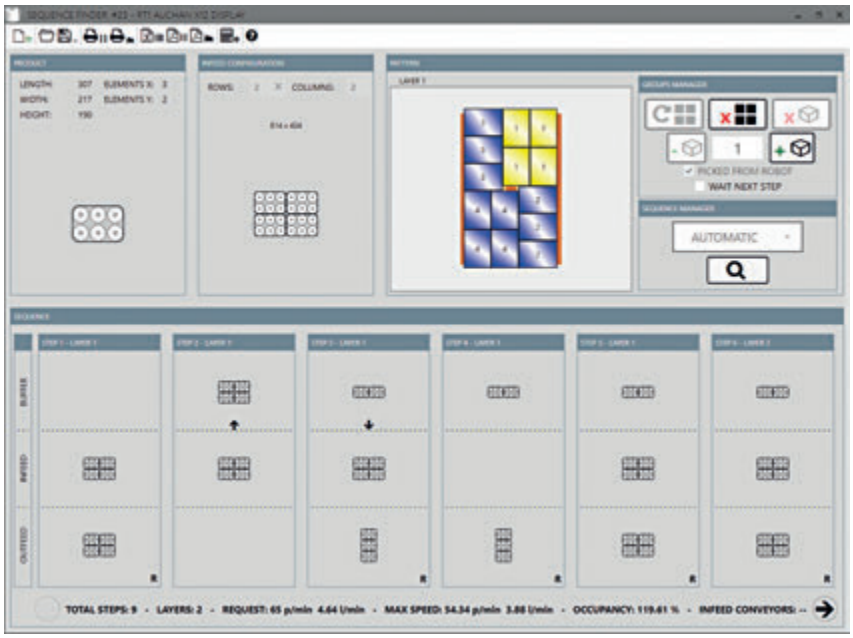
An important innovation of the last "Program Maker" release is the "TissueTool", which finds the best product sequence to optimize layer formation for palletising, buffering single items, and reinserting them in the process when required by the palletizing scheme.
OCME and Robopac R&D departments, composed by mechanical, electronical and IT engineers with high experience and creativity skills, started a long-term relationship to develop and create new tailor-made solutions, to guarantee the highest level of innovation and integration between palletising and the machine range where Robopac is leader: stretchwrappers.
The place where this innovation will see the light is TECHLAB™, a dedicated area committed to the research and development of the best solutions for end-of-line packaging, optimizing customers' product stabilization, new palletising gripper and customising wrapping processes suiting them to the specific needs of the load and to design the new generation of an integrated solution between palletising and stretch-wrapping areas.

Innovative solutions for tissue industry

But already now we can see the innovative technologies that we are developing as Robopac's CUBE TECHNOLOGY™ that allows the maximum load stabilization without damaging the products especially in the corners, thus

◀ Auriga 14 RT H, New OCME LGV.

> "We manufacture primary and secondary packaging machines, fillers, as well as **handling solutions**"



▲ New program maker with TissueTool.

reducing film costs and improving load protection; NIP&TUCK® the clamping device that fix the last wrapping film's tail without sealing, eliminating all issues for automated warehouses, removing presence of hot parts in the wrapping cycle, suitable for environment with reduced maintenance possibility and, in addition, it helps to prevent condensation by working with macroperforated or net stretch film. The innovative solutions for tissue industry are not only for Stretch-wrapping and palletising, in fact, the dedicated intralogistics department plays a big role in designing fully automated warehouse and packaging lines.
This year we are glad to introduce Auriga 14 RT H, our industrial-type and fully automated reach truck, with OCME's technology solutions for navigation, handling and safety features.
Last but not least, among all advantages, there is the worldwide team up between OCME and Robopac, which can resolve any problems with a "local for local" approach thanks to on-site branches and after-sales centers. To deepen and discover all our new solutions don't miss the opportunity to meet us at our booth 64 during MIAC - 26th International Exhibition of Paper Industry, from 9th to the 11th of October 2019 in Lucca, Italy. ●

▼ Pegasus - Robot palletiser.

> "OCME is not a product but a **solution provider**, anticipating trends through innovation"

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A perfect match between quality
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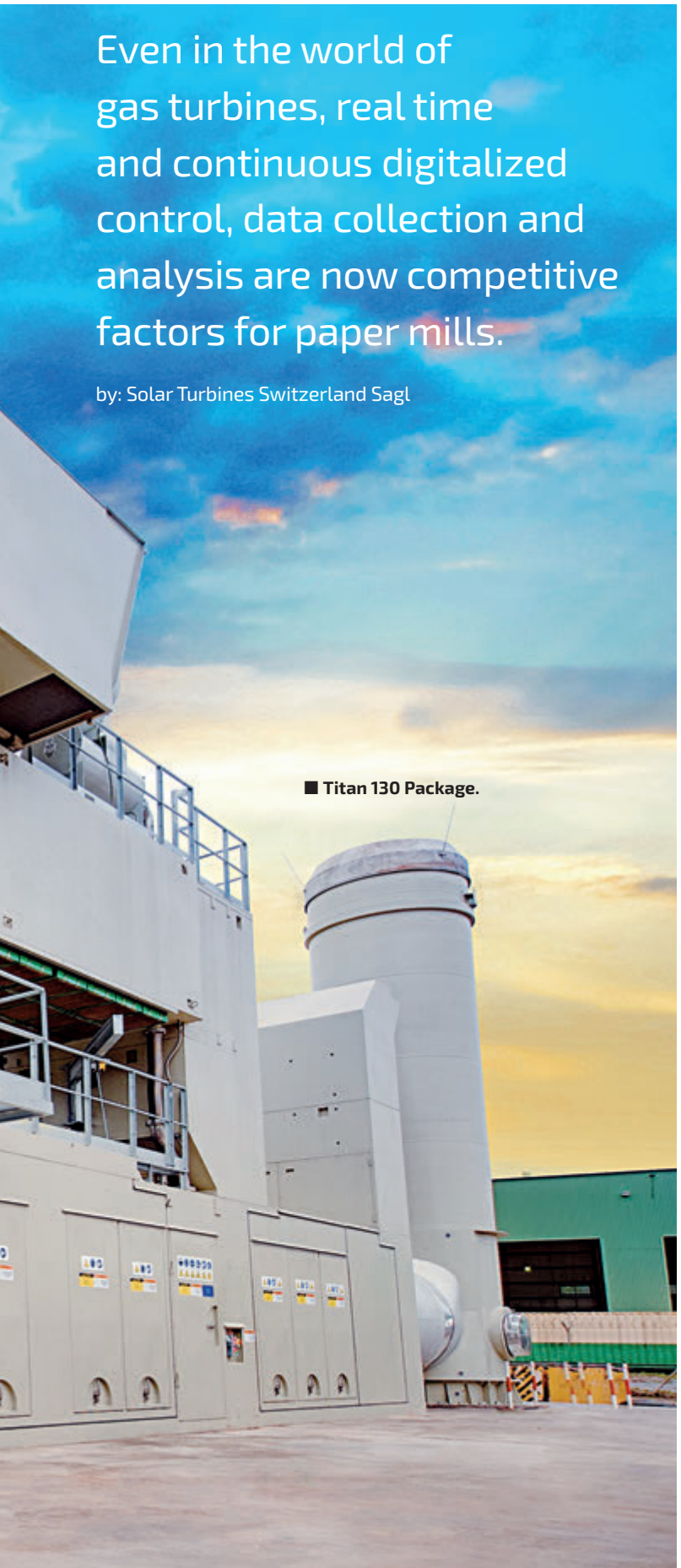
DISCOVER MORE

Energy 4.0

Cogeneration from an IoT and Industry 4.0 perspective

Even in the world of gas turbines, real time and continuous digitalized control, data collection and analysis are now competitive factors for paper mills.

by: Solar Turbines Switzerland Sagl



■ Titan 130 Package.

The Industry 4.0 parameters include control of the cogeneration process and energy supply. Digital control systems are now essential to monitor the performance of the production cycle and its energy requirements, at any time, allowing timely interventions, optimizing the process while reducing costs. However, when we talk about energy production, alongside production data measurement and control, other elements come into the game, including the need to comply with strict and necessary environmental standards.
Solar Turbines, that produces energy generation solutions, is turning to sophisticated technologies capable of producing more with a smaller environmental impact. Increased power of gas-turbines can go with reduced CO_2 emissions, to meet paper mills' energy requirements and its environmental sustainability. Solar Turbines is presenting two new types of gas turbines within its gas turbine ranges: the most recent models have been shown to be suited also to the needs of the paper industry by enhancing the **Taurus 70** family, with versions producing 7.5 to 8.2 MW_e, and the **Titan 130**, which ranges from 15 to 16.5 MW_e.

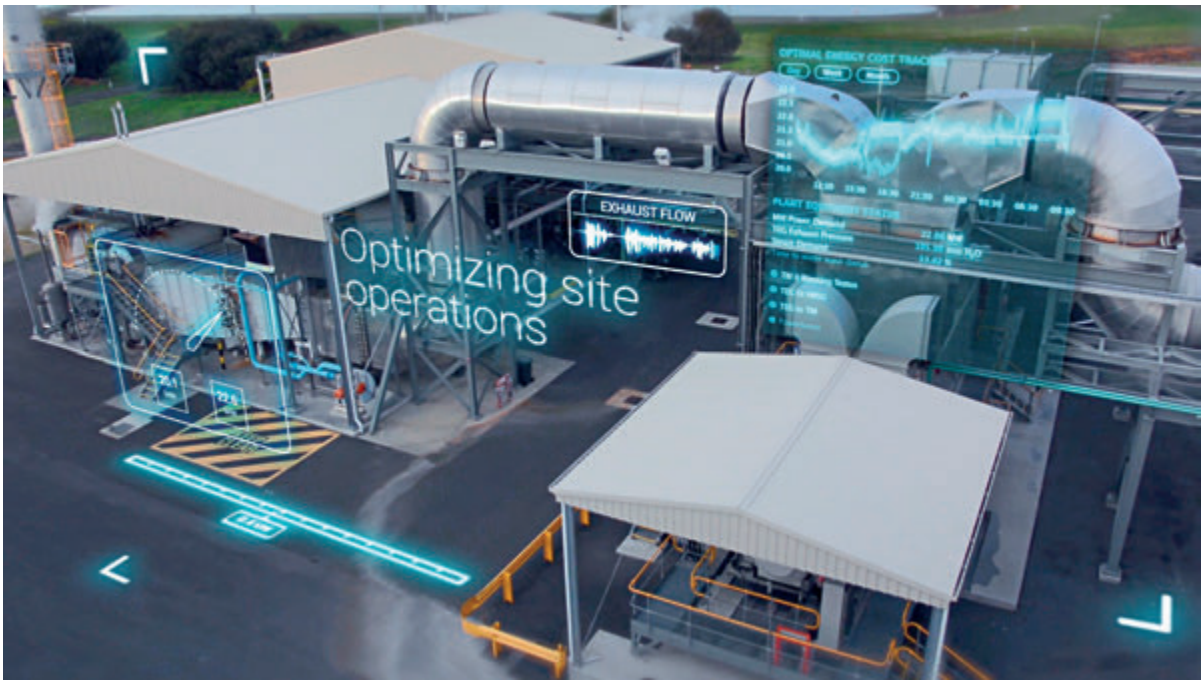
Taurus 70 and Titan 130 models

To explain why a paper mill should be interested in this turbine, calculations have been made showing how the largest Taurus 70 model would provide substantial savings, despite its greater power. In particular, a paper mill with average energy needs of around 8.5 MW_e and steam demand of 18 tons per hour has been considered. Acknowledging the steam production and the increased electric power, thanks to the higher efficiency, the new model makes it possible to produce the required steam while reducing natural gas consumption, thus reducing CO_2 emissions: even though the electric power increases, it has been possible to reduce CO_2 emissions by a further 3% with a new design strong focused on "environmental" performance. The Taurus 70 continues to be a market success, if you think that over 900 of these systems have been sold and have accumulated over 68 million operating hours. The same calculations can be translated to the uprated Titan 130, with over thousand references sold worldwide. The electricity production of the new turbine has increased from 15 MW to 16.5 MW and in this case the CO_2 savings are even clearer: in case of a paper mill requirement of around 17 MW_e, and steam demand of 32 tons per hour, an extra 23% reduction in CO_2 emissions compared with the previous model has been achieved. This shows that it is not always true that increasing electric power and burning natural gas necessarily increase emissions; on the contrary, Solar Turbines managed to reduce them with its products.

IoT integration for more targeted and efficient use

These two new gas turbine evolutions have characteristics that will be attractive for many markets and especially for paper mills. The upgraded gas turbines perform even better with the development of digital systems. The use of IoT-based systems is not new to

▶ Tissue Paper Industry 4.0.



▼ Titan 250 Tissue Direct Drying CHP.

Solar Turbines: in the past, with its digital platform, designed initially to control only the performance of the turbogenerator and carry out predictive analysis, Solar Turbines obtained extremely positive results and increased machine uptime.
With the integration of the IoT, the instruments developed on the new models go even further. Today, with the new systems that incorporate and manage all the process data, Solar Turbines can recommend to the paper mill ways to operate the machine, based on actual production requirements, thus balancing steam production and turbine power according to the requirements of the production cycle, and by that reduce operating costs.
The turbine can therefore be operated according to real needs, once again reducing CO_2 emissions and, where possible and appropriate, sending excess electrical power to the national grid.

> “Solar's experience in the **pulp** and **paper** process and **tissue** paper manufacturing process spreads across the globe”

In future, the prospects regarding this could change: for example, we are working on making the turbine interact with a “smart grid” system, to respond to energy demand and balancing programs, which are being requested more and more by the organizations that manage national electrical grids.
In addition, using our experience in designing turbogenerators, we have developed an energy storage system capable of managing energy changes and of communicating with both the turbine and the national grid. But above all, the integrated control systems of the gas turbines will enable firms to optimize energy production, avoiding overproduction and permitting more targeted and efficient use of the energy. ●

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▲ Steam boiler mod. PB 70, complete with economizer, steam output 7,000 kg/h.

> “Our **history and know-how** to answer to every new and challenging need of the customer”

Mingazzini is an expression of the culture, flexibility and creativity that have made the “Made in Italy” famous and appreciated worldwide. Like a tailored suit, each plant is carefully designed and tailored with expertise and experience. An exclusively family-owned business since the beginning in 1929, Mingazzini still keeps unchanged its brand pride and its values, handed down for four generations.
These values, in perfect combination with the technological upgrading and innovation, over time have created a modern company that continues to pay close attention to the customer: not only in terms of the highest quality of the product, but also for an excellent level of pre- and after-sales service. All this in order to create a concrete proactive and one-to-one relationship of cooperation with the customer. In the year in which it celebrates its 90th anniversary, Mingazzini presents its latest generation of steam boilers, which meet the most demanding challenges of the near future.

ARS - Advanced Recovery System

These boilers represent, in short, systems that are increasingly performing from the point of view of energy saving and respect for the environment.
The quality and reliability of Mingazzini boilers are already widely recognized on the market and remain unchanged. In fact the design and construction of the boilers of the PB and PVR series guarantee first

MINGAZZINI: 90 years of technology and Italian style

▲ Steam boiler mod. PB 200, steam output 20,000 kg/h.

Despite the constant and continuous growth from the technological point of view, both at product and process level, Mingazzini has never lost sight of its original purpose: in-depth analysis of customer needs, customized responses and utmost attention to detail.

by: Mingazzini Srl

and foremost the maximum reliability over time. Starting from this certainty, the R&D Department has developed "ARS - Advanced Recovery System": an exclusive energy recovery system, which is flexible and tailored to the specific needs of each individual customer and industry.
With specific reference to the paper industry, the company acquired, directly on the field, a deep knowledge concerning the special needs of customers of different sizes, becoming a market leader capable of offering a complete service to the client, also providing innovative solutions and aiming at specific needs in order to optimize investments in plants and energy saving.
The R&D activity is constantly focused on the introduction of new and more efficient solutions for the best management of thermal power plants of any size, even with boilers configured for operation without continuous supervision for 24-72 hours and all this with the availability of remote supervision and management of whole systems. Going into the details of energy saving, all the **Mingazzini** steam boilers of the PB and PVR series provide a standard efficiency of 90%. Depending on the number of working hours and the type of fuel used, they can then be equipped with additional "standard" energy recovery systems thought for the single unit, capable of obtaining efficiencies up to 97.5%. Finally, even a greater efficiency, up to 99%, can be obtained with tailor-made energy recovery systems (ARS system) which, pushing the condensation of the boiler

◀ Turn-key boiler room, composed of n. 6 steam boilers mod. PB 200, equipped with energy recovery system, steam output of each boiler: 20,000 kg/h.

▼ Turn-key boiler room, composed of n. 3 steam boilers mod. PB 120, equipped with energy recovery system, steam output of each boiler: 12,000 kg/h.

▲ Turn-key boiler room, composed of n. 3 steam boilers mod. PB 120, equipped with energy recovery system, steam output of each boiler: 12,000 kg/h.

smokes to the extreme, recover the latent heat as much as possible (obviously in addition to the sensible one). Another primary dimension in which a significant improvement in the performance of the last generation of Mingazzini boilers has been achieved is that relating to the progressive reduction of emissions into the atmosphere, through the use of the most innovative combustion systems. Thanks to the combination of the new "Low NOx" burners to the large combustion chambers that characterize the Mingazzini boilers, it is possible to obtain NOx and CO_2 values that respect the most restrictive local and international emissions standards. The commitment of Mingazzini for the future, even for the next 90 years, however, remains the same: increase customer confidence in their products, using the best technological solutions and ensuring safety, quality, reliability and service according to the "Mingazzini standard". ●

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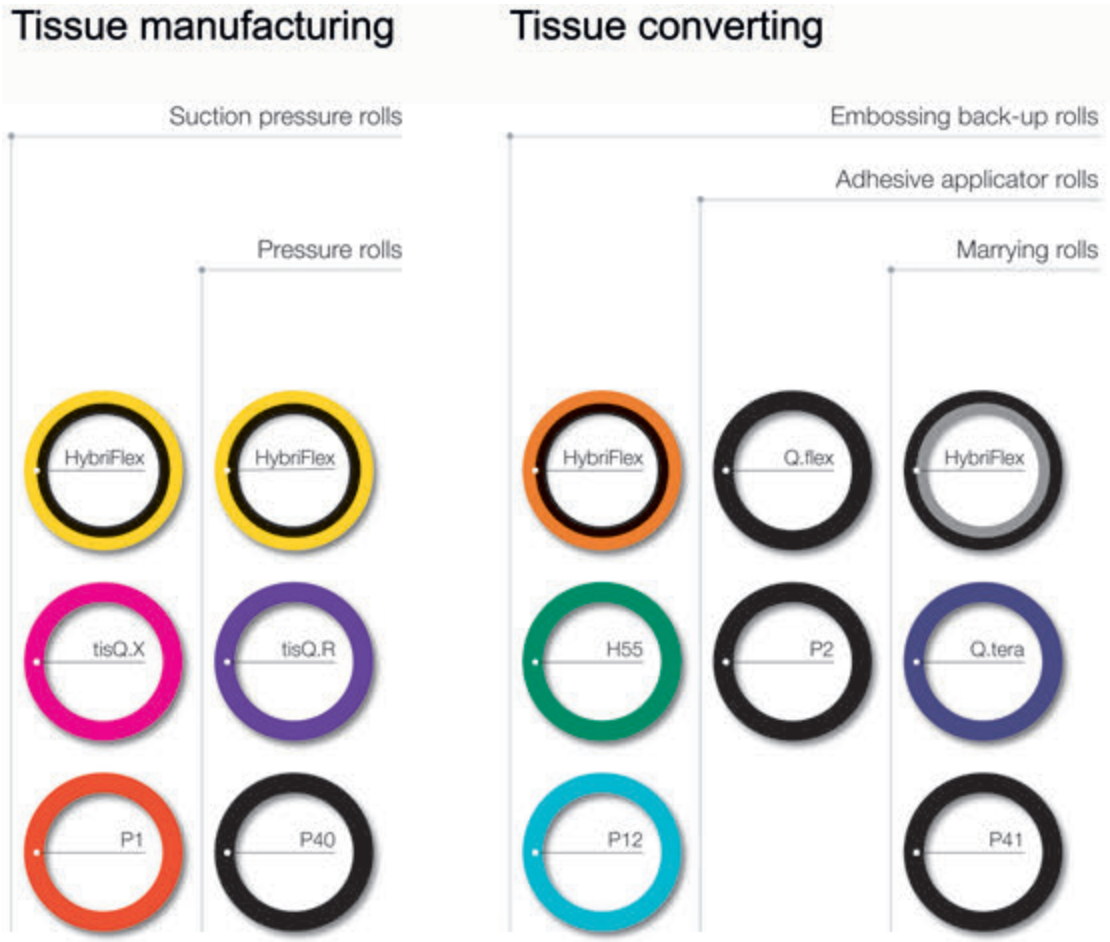
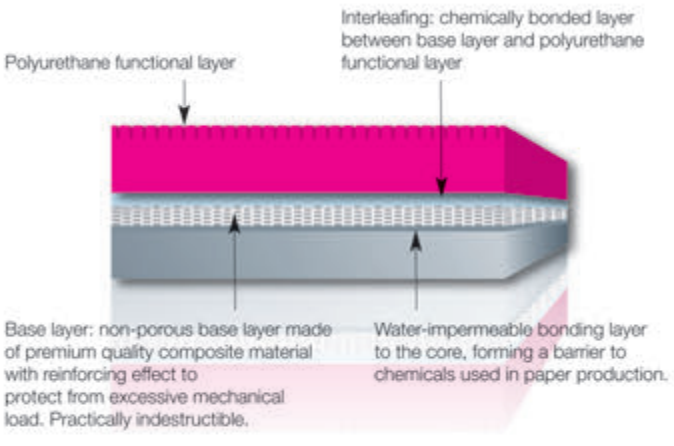


■ **Figure 1: High-quality roll covers from SchäferRolls, from fail-safe and economic through to ultimate performance.**

The manufacturing of tissue products is one of the most challenging technical processes in the paper industry: very low basis weights, high production speeds exceeding 2,000 m/min, high temperatures and a variety of additional processing steps including creping, rewinding, converting and all the other actions taken before the finished and packaged product is ready for roll out. Moreover, tissue manufacturers are faced with an increasing demand for more efficient use of resources and cost effectiveness in production, without affecting product quality. With the right choice of roll covers, tissue producers can benefit directly from reduced energy consumption and increased efficiency of the Yankee by raising the level of dry content during the pressing process. In converting, the roll cover is decisive for a successful balancing act between volume and absorption quality versus mechanical strength as well as ply bonding versus tactile properties such as bulk or drape softness - while archiving premium quality goods at the lowest possible costs. Tissue roll covers from **SchäferRolls** (**Figure 1**) have been developed to

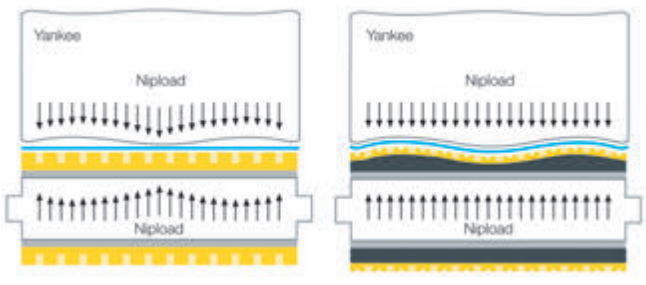


■ **Figure 2: tisQ.X - characteristics and cover design.**

Roll covers for tissue manufacturing and converting

SchäferRolls meet the high technical demands as well as the need for increasing efficiency.

by: Dipl.-Ing. (FH) Jörg Reiprich, Head of Application Engineering - SchäferRolls

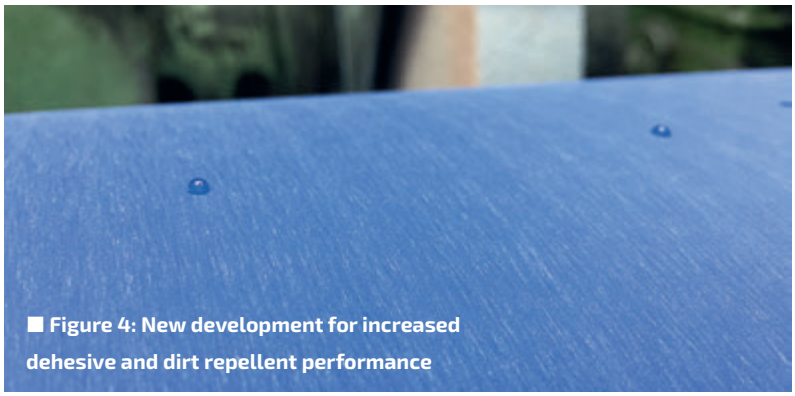


■ **Figure 3: CMD profile improvements through adaptability of the roll cover.**

> We produce quality **roll covers** with constant dimensional and shape stability

comply with the special demands of the respective roll position, the specific product manufactured and the particular preferences of the machine operator. They are a reflection of profound experience, gained through numerous successful applications over decades. A choice will be explained below.

- **tisQ.X, a suction pressure roll cover**, has been designed especially for fast-running machines to achieve ultimate dewatering performance and energy efficiency (**Figure 2**). It delivers maximum resistance to moisture, temperature and wear and thus improves dry content and operating speeds. Among several successful applications at international paper manufacturers and OEMs, the Wepa Leuna GmbH in Leuna, Germany can exemplary be mentioned where a dry content increase of 1% oven dryness was determined from 42 to 43 % (ref. TissueMag 1/2017).
- **HybriFlex two-layer cover, an option for the pressure roll position**, packs a punch or two that have to counteract CMD profile problems caused by uneven Yankee deformations (**Figure 3**). With its soft inner layer, the HybriFlex roll cover adapts remarkably well to the Yankee cylinder and makes a



■ Figure 4: New development for increased dehesive and dirt repellent performance

> SchäferRolls is a **leading name** in the industry, at home and abroad

■ Figure 5: SchäferRolls SurfaceOptimizer for optimal dewatering performance.

valuable contribution to profile improvements across the paper web. The highly wear-resistant top layer allows for excellent cover life and variable surface designs to support the dewatering performance.

- **H55, an option for embossing back-up rolls**, is made for extreme demands in terms of bulk and surface smoothness. It offers excellent resilience properties and very low compression set and performs excellently at adjusting to the pattern of the embossing roll. H55 can be used for micro and macro embossing and is thus an ideal all-round cover for premium tissue products.
- **Q.flex is one option for the adhesive applicator rolls**, especially for high-speed systems with high outputs. Its outstanding mechanical-dynamic properties, very good resilience and distinctive abrasion resistance make it particularly suitable for long operating periods at various speed ranges. Homogeneous surface properties deliver even adhesive application.
- **Q.tera for marrying rolls** is the ideal solution for converting systems prone to glue deposit build-ups. Its surface is dehesive and dirt-repellent with excellent cleaning properties, resulting in low cleaning intervals and extended cover service life. With Q.tera, excellent ply bonding and high product quality in terms of bulk and softness will be achieved. At MIAC 2018, SchäferRolls has launched a new development, which increased the dehesive and dirt-repellent performance even further (**Figure 4**).

In general, SchäferRolls offers an extensive service to meet the individual requirements. One of the tools is the **SchäferRolls SurfaceOptimizer** (**Figure 5**), a computer simulation to determine the specific design of the roll cover for optimal dewatering performance in the press section, resulting in improved dry content, thus in increased efficiency.

The specialists from SchäferRolls' application engineering support the customers from technical design analysis to start-ups, from maintenance to end-to-end integration of the rolls within on-going processes - always with the commitment to taking the customers product quality, productivity and overall tissue manufacturing and converting performance to new levels. ●

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■ Automatic packaging line for AFH paper rolls.

Microline is specialised in the manufacture of automatic end-of-line packaging machines. Thanks to its know-how in the tissue sector, over time it has created dedicated machines that fully satisfy the demands of this particular market.

by: Microline Srl

Given a continuously evolving industry that demands continual changes in packaging, dictated by marketing strategies, the range of product processing methods has been increased; provision has been made for even smaller minimum dimensions, without sacrificing the maximum dimensions, and in view of new demands, it is possible to create new configurations to meet new demands. In addition to versatility and high reliability, the lack of scraps during the packaging process increases energy savings.
Within the wide range of machines offered, an important place is occupied by the case packers (for paper rolls and folded products), which are divided into two different types: horizontal (side-loading) case packers (ROM) and vertical (top-loading) case packers (RVM). Basically, the machine picks up a blank for an 'american style' slotted case from a magazine, forms and fills it, and then seals the case closed with an adhesive tape or hot glue system. Case packers feature a 1-metre capacity case magazine that allows high autonomy and the magazine can be topped up/loaded without having to halt the production cycle. Of equal importance are the shrink-wrappers for paper rolls, conventional two-reel bundlers, and flow-wrap machines of the latest generation.

Shrink wrapper for tissue rolls AL80

The automatic paper roll wrapper (AL80) is a machine designed for horizontal packaging of products and uses either polyolefin (POF) or polyethylene (LDPE or MDPE) film as the wrapping material. It can handle rolls in single, double or triple collations and wrap up to 210 rolls per minute in the 1x3 collation.
The machine creates completely sealed bags containing the desired product configurations. The subsequent heat shrinking allows the bag to perfectly fit the shape of the product inside. This type of packaging is especially well-suited to paper rolls for industrial (AFH) and medical use. The pack is closed on the top by overlapping the film edges; this is followed by ionisation and longitudinal sealing (contactless).

▼ Horizontal case-packer for paper rolls.

▲ Microline Srl.

▲ Automatic bundler for paper rolls.

The packs are then conveyed to the transversal seal station, where they are separated. The roll completely wrapped with film is made to pass through the shrinking tunnel. Roll packs can be customised with (glueless) label insertion or pre-printed film.
With this packaging process, film consumption is approximately 20-25% lower compared with other wrappers available on the market. The machine can also be equipped with an integrated centre folding unit, which enables the use of a centre-folded reel or a flat sheet reel.

> “Microline offers **highly specialised, versatile turnkey systems** for the Tissue Industry”

FLOW WRAP 1000 and two-reel bundler ML1500

The conventional two-reel bundler (ML1500), on the other hand, is a machine suitable for packaging collated products. As a packaging material it uses heat-sealable, heat-shrinkable polyethylene film (LDPE). The shrink-wrapped bundle remains partially open at the sides and a sealed pack can be obtained by using extra film. Where required, the machine can introduce a label inside the bundle, to be applied with glue. The packaging process does not generate any scraps or rejects of wrapping material. The FLOW WRAP 1000 is likewise a machine suitable for horizontal packaging and wraps products with heat-sealable or heat-shrinkable polyethylene film (LDPE or MDPE).
This type of machine, which is completely controlled by a servo-motor system, creates perfectly sealed bags containing the desired product configurations. The rolls coming from the saw are oriented and conveyed inside the machine in multiple rows according to the desired collation. The selected rolls are subsequently inserted into the bag, which is then closed by cutting the film crosswise and folding the edges inside the package. This machine can pack up to 18 bags per minute, without the need for a shrink tunnel, in all configurations demanded by the market. When required, the machine can work with pre-printed film and an oven can be used to heat-shrink the bag.
The packaging process does not generate any scraps or rejects of wrapping material, which cuts out disposal costs. A meticulous selection of mechanical and electrical components, special care taken during the design phase, and an efficient after-sales service have today made **Microline** a partner of leading manufacturing companies in Italy and around the world.

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Partnership that pays back

The knowledge gained through committed long-term research and development as well as mergers and acquisitions has strengthened Sulzer's know-how and enables full-scale research for the development of pumps, mixers and agitators.

by: Sulzer Pumps Finland Oy

◀ AHLSTAR high performance process pumps for demanding applications.

Pulp, board and paper processes and applications as well as new technologies based on wood raw materials represent high-priority commitment and partnership areas for the business and product development organization of Sulzer. End suction single-stage centrifugal pumps cover 85% of all pumping needs in the world. Thanks to the new design principle developed by **Sulzer**, the efficiency of especially the largest energy-demanding pumps can now even beat the efficiency of double suction pumps, which traditionally had better efficiency.

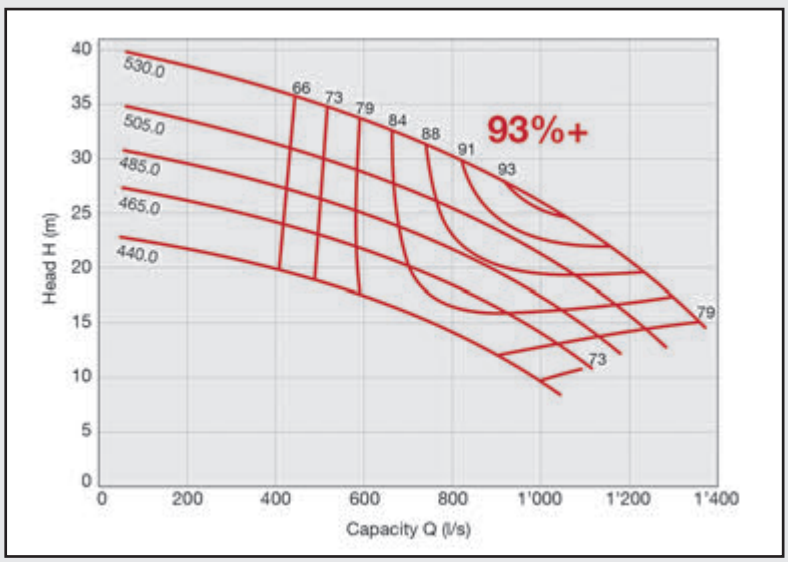
Process reliability, high efficiency and low operating costs

Our AHLSTAR pump range is the world's most comprehensive pump series for demanding industrial processes, in particular for the pulp and paper industry. A wide range of various hydraulic units, materials and shaft seals have been developed to cover the requirements of the various pumping applications. The AHLSTAR range exceeds the technical and quality requirements of the international standards ISO 5199 and ISO 2858. In the design of the pump series, we paid attention to the specific requirements of customers in the pulp and paper industry, such as good pumping performance of fiber-containing stocks and gaseous liquids as well as reliable shaft sealing solutions. To offer the best solution, it is very important for us to identify the specific requirements and parameters of each pumping application and to be familiar with the pumped liquid such as viscous fluids, fiber-containing sludge, mineral slurries, and liquids that contain large solids. The AHLSTAR pump range is designed to suit various liquid types in all industrial applications:

1. Clean liquids and liquids containing some impurities (water, chemicals etc.);
2. Viscous liquids (oils, syrups, black liquor etc.)
3. Fiber-containing sludge (pulp and paper stock, other fiber-containing sludge etc.);
4. Non-fiber-containing sludge (mineral slurries, kaolin, lime milk, light mining slurries etc.);
5. Liquids which contain large solids (chip water, waste water, recycled materials).

The pump series can also manage all different combinations of the basic liquids. In addition to fibers, the pumped liquid, for example pulped recycled paper stock, may contain large solids and some mineral slurry.

▼ The AHLSTAR pump range works reliably at high efficiency in all industrial pumping applications.



Designed for easy installation and service

The AHLSTAR pump series is designed to minimize the lifecycle costs during the entire long service life. The energy cost constitutes the biggest cost item of a pump, which is why high efficiency of the pump is of utmost importance.
In process industry, reliability is even more important to secure continuous production. Reliability also minimizes the maintenance costs during the lifecycle of the pump. When the pump ultimately requires maintenance, it must be easy and fast. The AHLSTAR pump series has been designed in cooperation with service specialists to

■ Advanced and proven design methodology.

> As one of the world's **leading pump manufacturers**, Sulzer provides a wide range of products for engineered, configured, and standard pumping solutions as well as essential auxiliary equipment

enable easy installation and maintenance. The high degree of internal standardization of the components together with a sensibly modulated pump series translates into easy and swift spare parts supply for the almost 150,000 pumps already installed globally. This way, the customer's spare parts inventory is kept to a minimum.

Strategic and committed partnerships

Partnerships and close cooperation with the world's leading pulp, paper and board producers, machinery suppliers, engineering companies and research institutes set the baseline for our research and development work. Long-term development forums that include pilots and demos are imperative for dealing with the fascinating future potential of the industry. For the time being, the growth rate in the tissue and packaging boards markets is high. The increase in pulp demand continues strong for board, tissue as well as other hygienic products, and it will accelerate for textiles. The time is right to strengthen the already close cooperation between the players in the industry, to the benefit of all. Forest companies, research institutes and other industry partners are actively investigating and developing new processes for additional higher-value wood raw material based products. Such developments are, for example, to replace cotton and oil-based synthetic fibers like polyester, or to produce higher-value carbon products and modified cellulose materials for packaging barriers, coatings for medicines and nutrients.

■ Full scale testing in our research center.

The pulp, board, tissue and paper segments offer a very interesting and important scope together with new additional wood based future products. We are committed to this new development trend. ●

SULZER PUMPS FINLAND OY

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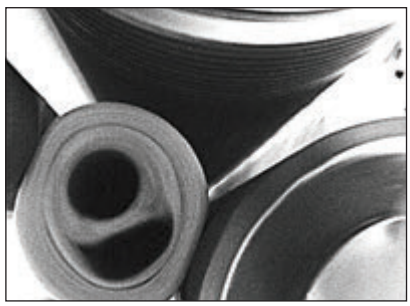
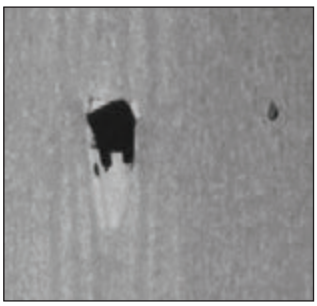


Converting problems can be identified to avoid costly process interruptions.



Holes detected at the winder can be traced back to locate the root cause of the defect.

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TecnoFerrari: innovation in automatic handling and storage systems

Over 3,000 AGV automatic guided vehicles installed worldwide.

by: TecnoFerrari SpA.

Managing complexity is in TecnoFerrari's DNA, as TecnoFerrari dealt with automation since 1973, following the growth and development of the ceramic industry since the very beginning to this day, gaining knowledge and experiences in an industrial sector that has identified in automation the key to success before others.

Today TecnoFerrari can boast expertise and flexibility in its approach to storage systems and applies this valuable know-how and many other working areas as paper, food, beverage. The over 2,000 AGV systems installed with laser or inductive guidance vehicles allow designing and implementing the most suitable customized solution for the required application. **TecnoFerrari** can boast expertise and flexibility in its approach to storage systems and applies this valuable know-how to many other working areas. There are many production processes that require one or more storage phases before the completion of the final product. In these cases TecnoFerrari's system, based on AGV technology (or LGV according to the guidance system used), can connect the various production stages and manage the intermediate product parking, with extreme precision, improving performance and productivity. The range is completed by all the fixed loading, unloading and handling machines necessary for conveying the product until the end of the working cycles. TecnoFerrari offers a fast track towards success to every company, regardless of their size, since automation means: maximum safety level for operators; completely automatic functioning; process control and optimization of the production cycle; time and working precision; perfect control over all process stage; cost reduction; ability to interface with other production technologies; data protection and collection; and also versatility of the system and limited working for track extensions, modifications; Reliability and sturdiness of the vehicle.

▲ Safety systems for continuous control of the surrounding space.

TecnoFerrari worldwide

TecnoFerrari, together with the companies of the **A.Celli Group**, were present at the last CIDPEX fair in Whuan (China). The two companies have presented the result of their precious collaboration, from a "*smart factory*" perspective, focused on the global integration of the Tissue, Paper and Nonwovens production machines, extended to offer integrated end-of-line solutions, which allow the management and the handling finished coils with the use of AGVs. TecnoFerrari and A.Celli, thanks to their recent successes in the Chinese market, are preparing to consolidate their international presence, participating in all the most important trade fairs in the sector.

■ **Handling of paper rolls and lifting/lower to another level of the installation.**

> We meet each customer's specific needs with **customized** and **dedicated solutions**

Key of the success: customized and innovative solutions

TecnoFerrari's automatic vehicles are provided of laser or magnet guided automatic system, adaptable to every plant needs and to any kind of product.
For both systems the structure of the vehicle is the same, with many advantages for what concerns the maintenance and the spare parts. The automatic guide of the TGV is suitable to manage any type of pallets.

Change Battery system

Automatic battery change for continuous operation 24 hours per day without the need of man power for the change. When the battery charge is low the vehicle, when finished the mission, goes automatically to the battery charging station. Charge happens in few minutes. Models also exist in which re-charge takes place automatically in a partial re-charge station. In this case the vehicle dedicates all block times to the auto-recharge of the batteries, without operator intervention. It allows for continuous operation.

Automatic vehicles for heavy transport

TecnoFerrari's automatic vehicles (TGV) are battery-powered shuttles that move automatically following a track of permanent magnets inserted into the floor. They allow a wide variety of applications, they are heavy duty designed and can transport up to 15,000 Kg. The four lifting device placed at corners of the shuttle can simply lift structures where jumbo rolls can be stored or structures with roller or chain conveyors. The structure is lifted, transported to the destination where is lowered on the floor pan. Structure can be left there waiting to be freed from the load. The shuttle without the structure can start a new mission. In case of the structure with conveyors they transfer the load to other conveyors. One application is the handling of pulp bales.

Safety

The vehicle have sophisticated and reliable active and passive system for continuous control of the surrounding space, to prevent accidental blows: these safety devices are virtual programmable laser bumper, mechanical bumper, side straps, sound and flashing signals. ●

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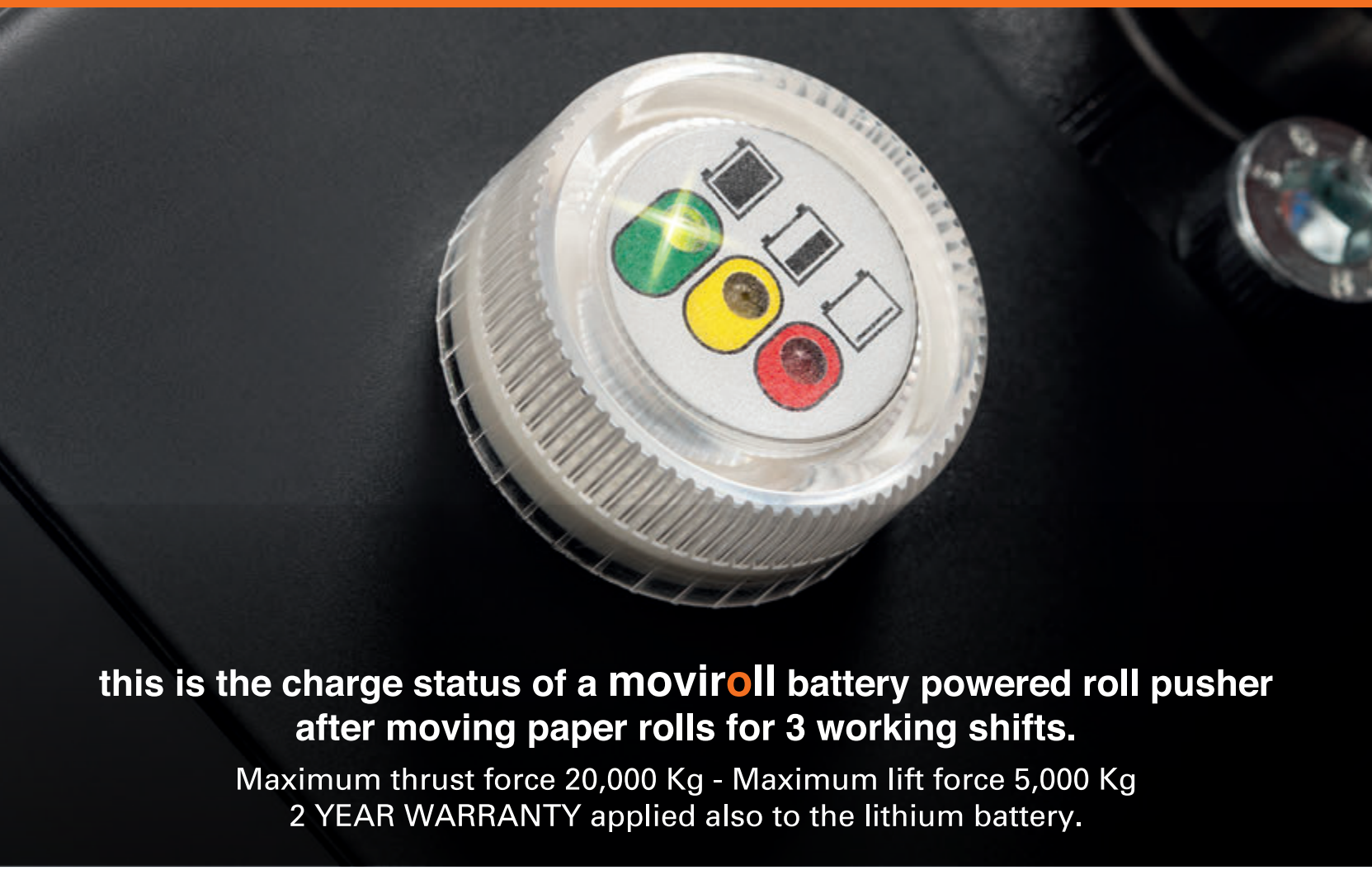
INNOVATION PIONEERS



this is the charge status of a moviroll battery powered roll pusher after moving paper rolls for 3 working shifts.

Maximum thrust force 20,000 Kg - Maximum lift force 5,000 Kg
2 YEAR WARRANTY applied also to the lithium battery.

*pneumatic version also available

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Global strength, local presence

BIM provides services and concepts all over the world through a global network of experts, production units and R&D facilities.

by: BIM Kemi

BIM is a family owned specialty chemical company supplying the pulp and paper industry. We focus on creating more value from fewer resources to use the world's limited resources more efficiently.

Your challenge, our mission

Our unique knowledge of pulp, paper making and converting, makes BIM your perfect partner in developing sustainable tissue products. We provide a full range of chemical solutions and services to optimise your performance and value. BIM has over 40 years' experience of tissue applications. Whatever the problem, we find the solution.
In 2017, a new lotion and balms plant was installed at our facility in Bolton, UK to meet increasing customer demands. We've seen an increased demand for specialty lotions and balm

■ BIM green world.

solutions and this investment keeps us well equipped to produce higher volumes. This manufacturing flexibility makes us a reliable partner to cover all tissue making and converting solutions. Our microbiological and formulation laboratories specialize in customising and developing customer specific products in niche areas.
Producing tissue with the right softness, strength and bulk is a balancing act. In today's highly integrated but still

BIM in brief

- Pulp and paper focus
- Founded in 1973
- Approx. 200 employees worldwide
- Certified according to ISO 9001 and ISO 14001
- Member of the UN Global Compact
- Gold rated by Ecovadis
- Associated with the Responsible Care Program

> We provide **specialty chemical solutions** for pulp and paper

very competitive global tissue industry there are two important needs for a tissue maker:

- Improved tissue quality with maintained machine productivity;
- Better machine productivity without sacrificing quality.

Adding value and softness to tissue

In the modern consumer world, the sensory feeling of tissue is of paramount importance. Therefore, one of the most important quality factors differentiating tissue products is softness or surface feel, particularly for grades such as facial and bathroom tissue. Other functional properties with respect to the grade produced, such as absorbency and strength, are equally important and should not be sacrificed in its pursuit. An understanding of how to enhance and quantify softness is critical to ensuring these criteria are met. Softness is therefore essential for tissue products and whilst creating softness is hard enough, measuring it can be equally challenging. The perceived softness of the tissue can be controlled by fibre selection, the forming and creping section, as well as external use of chemicals to enhance quality. Together with the chemical supplier, the tissue maker can apply an objective approach to process and product development. Looking for your niche? BIM can support you to personalise your tissue portfolio. Our products are continually developed to provide further quality enhancement to comply with all required regulatory constraints whilst retaining all other desirable properties. We can tailor make a speciality surface application just for you. All you have to do is ask.

Process optimisation can be a game breaker for Converters

Clean running and operational efficiency have become increasingly important in today's competitive arena - making more of less! But no two base sheets behave in the same way. We know this and understand that the market demands differentiation. This is our specialty, so challenge us at BIM. BIM has a wide range of technologies to ensure maximum machine productivity.

Paper making and converting are intregrated processes

We can connect the two. Our company was founded in fibre modification. We have a comprehensive portfolio of process chemistry including 'green' machine hygiene packages, strength agents and deposit control aids. The uses of chemicals have a relatively small impact when we consider paper productions cost structure. However, they have an important part to play in the overall process from furnish to finished product in terms of their contribution. The ability to network different technologies to the benefit of machine productivity and finished product quality is a high priority for **BIM** as a chemical supplier. We have the knowledge and competence to understand the papermaking process and implement complimentary chemical treatments to ensure minimum interference and interaction with each other and to maximise their impact on cost efficiency and paper quality. We can deliver expertise for both papermaking and converting by our problem-solving skills, fast response, tailor made solutions and innovation approach. ●

BIM KEMI

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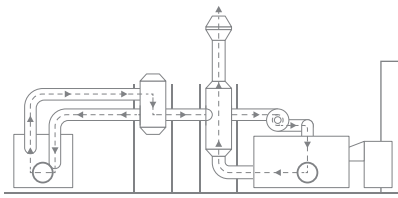

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Electrical consumption **300 Kw/h per Ton**

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0% increase in gas consumption compared to conventional systems

Reenergy+. Redefining the boundaries of production to develop new standards of efficiency and sustainability.

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A complete, custom service, **from A to Z**

As a division of the Hannecard Group, we offer a complete service, from pulp production to converting, from new rolls and roll repairs to roll coverings and technical support. All backed by a strong global network and highly experienced teams.

by: Hannecard Paper

> “The growth has been characterized by a strong **international focus** and a commitment to improving service in local markets”

You can count on us for the sale and engineering of new rolls and repairs, but also for the development of custom cost-reduction oriented solutions. A few examples? Nip profile optimisation, low-energy absorption covers and efficient dewatering solutions, such as the Surface Manager software, which allows you to optimize the cover surface design in order to lower the nip draining time. We can also perform a roll audit, both during operation and machine shutdown, provide any type of roll body and covers, and even assist you with your start-up. In a nutshell, Hannecard Paper is your trusted partner, from A to Z, for TCO (Total Cost of Ownership) solutions.

A customer-oriented approach, innovation and quality

Hannecard Paper can count on a highly specialised team of technical experts and collaborations with leading paper institutes. That allows us to offer a wide range of custom solutions and services, including the development of specific covers. Innovation and quality lie at the heart of our activities. We constantly monitor technological developments to improve the efficiency of paper machines and to push the limits of our covers. Our in-house R&D laboratory is equipped to take charge of quality control during the production process. We also have the equipment and expertise required for the measurement of the dynamical, mechanical, thermal, tribological, chemical and surface properties of our

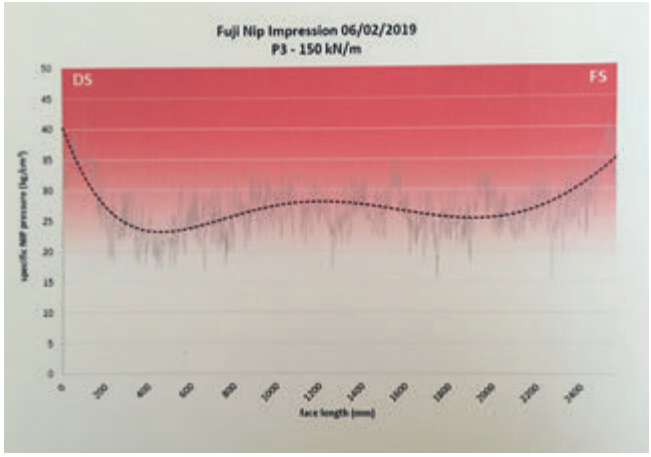
covers. We can optimise cover bonding resistance in the nip vs. nip load, speed, temperature and chemicals, in both wet and dry environments.
Last but not least, we comply with strict industry standards and regulations. We have ISO 9001 Quality certification, our compound measurement tolerances are in line with ISO 6123 standards and we respect the "REACH" standards, i.e. the European Union Regulation on the Registration, Evaluation, Authorisation and Restriction of Chemicals.
We offer a wide range of services for the paper industry, from the repair of used rolls to the replacement or delivery of new rolls, and the development of roll covers and coatings for all types of paper production.
Our priorities? Listening to our clients to find the solutions that best meet their needs and optimise: maintenance costs, machine efficiency and paper quality.

Roll covering

• New covering or recovering, in any position of the paper mill, from pulp preparation to converting. At our workshop: polyurethanes, composites, rubbers and carbides. On site: carbides • Grinding (drilling and/or grooving).
At our workshop: all types of covers. On site: cylindrical grinding on metallic or carbide-covered rolls • Inspection & expertise • Repair & cleaning • Optimisation.

Mechanical roll services

• Complete overhaul (including cleaning, washing and spare parts replacement according to the needs identified during disassembly & inspection) of suction press rolls, suction couch rolls - crown-controlled rolls such as Kusters, CCRolls and Nipco, including a test run with a hydraulic bench • Spreader rolls overhaul, all brands (Mount Hope, Wittler, Plastex, Robec, Irga, Finbow, Tuvasa, Gorostidi, Kickert, Technomec, Hansen, Tevo, etc) • Journal replacement • Bearing seat repairs • Non-destructive tests (crack tests): upon request, we can conduct ultrasonic, magnetic particle and colour tests in order to check for cracks on rolls and journals, so as to limit the risk of major mechanical failures • Dynamical balancing at machine speed • Cleaning and Painting.

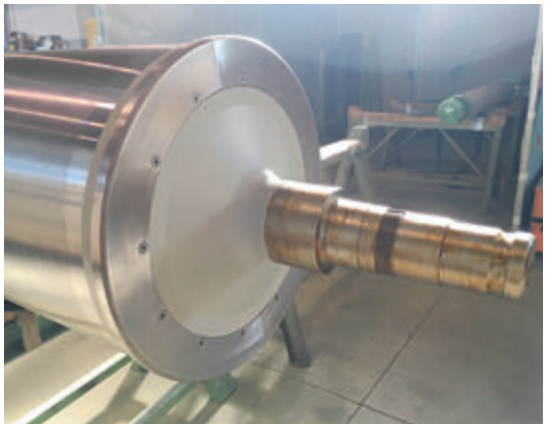


Roll bodies

• New rolls (cores, shells and spreader rolls) • Inspection & expertise • Repair & cleaning • Optimisation.

Various services

• Paper machine audit • Rolls & doctoring inspections during machine shutdown • Profile measurements • Thermographic analysis • Creation of roll drawings from 3D geometrical controls • Chemical resistance optimisation • Start-up assistance • NIP optimisation: to verify the performance of the grinding profile, we can make nip impressions (static and dynamic) in machines and conduct a wear-profile analysis • New transport boxes. ●



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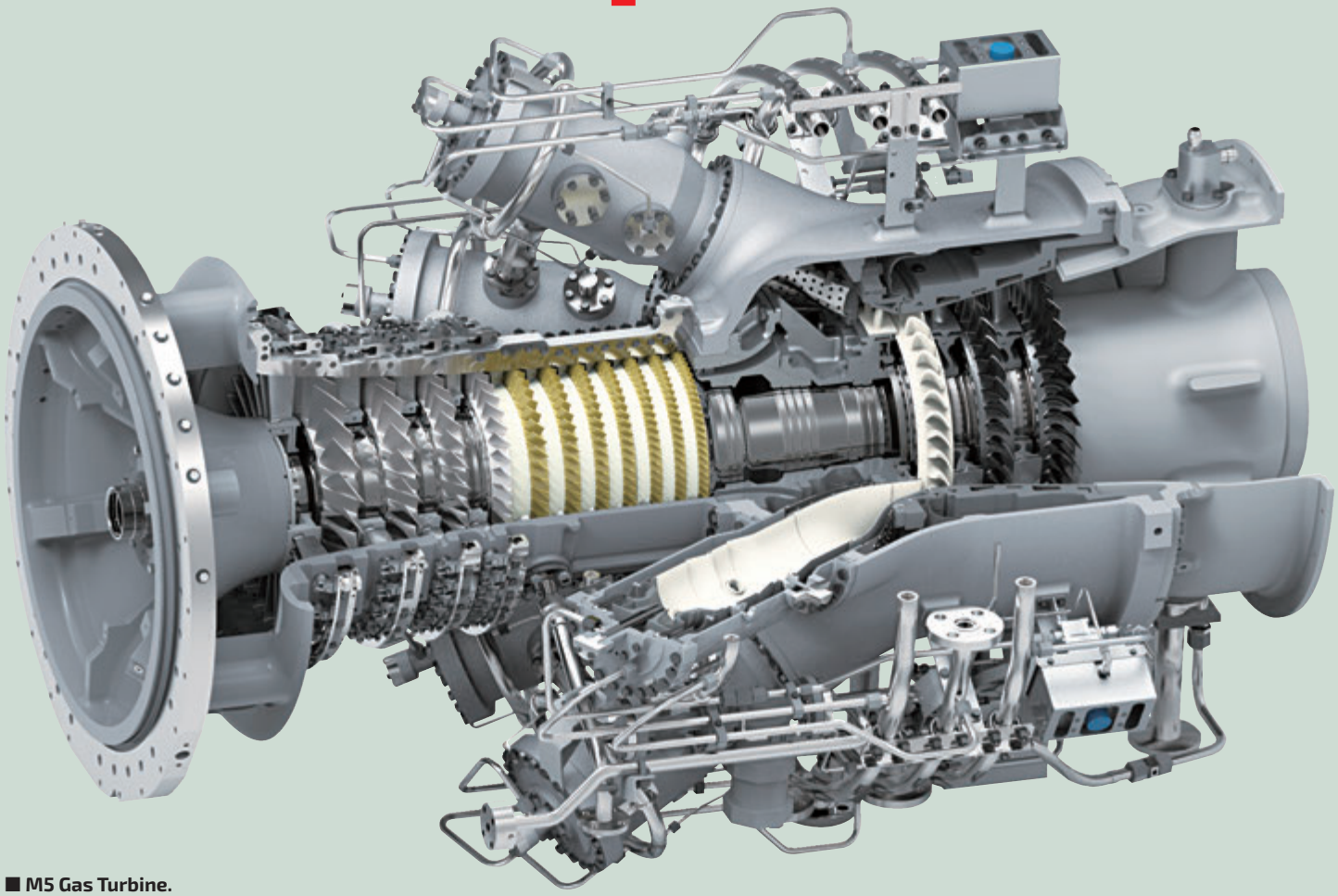


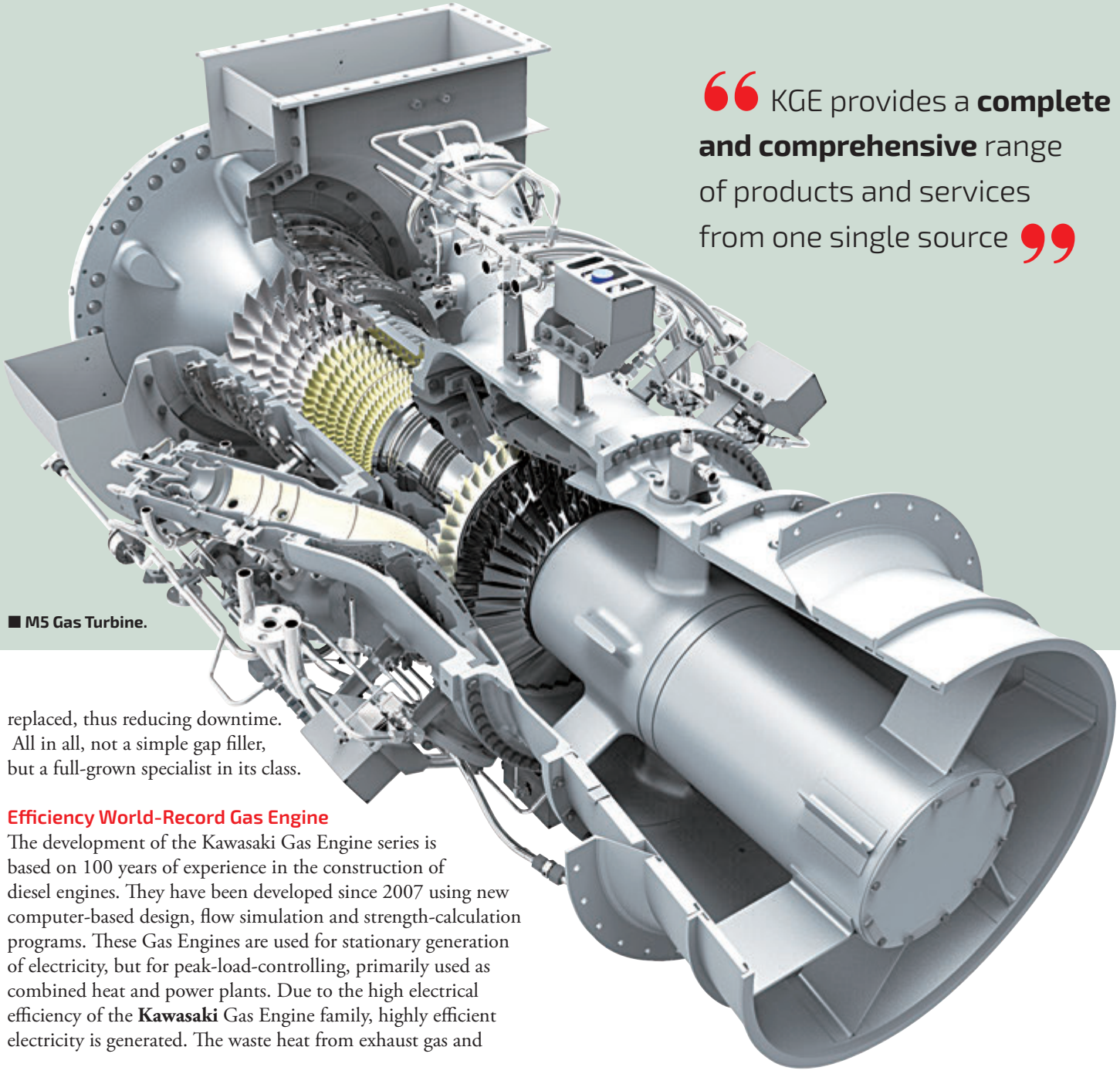
■ M5 Gas Turbine.

The M5A-01 (4.7 MW_e) is the latest model and a new member of the family of Kawasaki Gas Turbines. The reason for the development of this 5 MW_e class Gas Turbine was to close the gap between the M1 (1.8 MW_e) and the M7 (7.8 MW_e) family and not at least to meet the changing requirements of the market. The development focused on outstanding performance in terms of efficiency, usable exhaust heat and the compactness of the Gas Turbine. The experience gained from the proven technologies of the M1- and M7-families was a decisive factor in the development.
The result is a compact and reliable single-shaft industrial Gas Turbine especially for smaller combined heat and power (CHP) applications where a maximum of electrical efficiency and at the same time maximum usable waste heat is required.
The M5A-01, or GPB50D as a completely assembled package, has the highest electrical efficiency in its class - coupled with a correspondingly high exhaust gas temperature for steam generation, a very high overall efficiency is achieved. A strong contribution in terms of profitability and environmental friendliness. The electrical efficiency of this Gas Turbine is 33% and emissions can be reduced to <15 ppm for NOx by the proven Kawasaki Dry Low Emission (DLE) technology and for CO < 25 ppm from 50% to 100% load. Here again 6 DLE combustion chambers, a proven fuel system and a simple housing design are used. Other big advantages are longer and customer-friendly maintenance intervals. The compact and very light Gas Turbine (Power Section) can be easily and quickly

no compromise!

New 5 MW_e Gas Turbine developments and Efficiency World-Record Gas Engine.

by: KAWASAKI Gas Turbine Europe GmbH



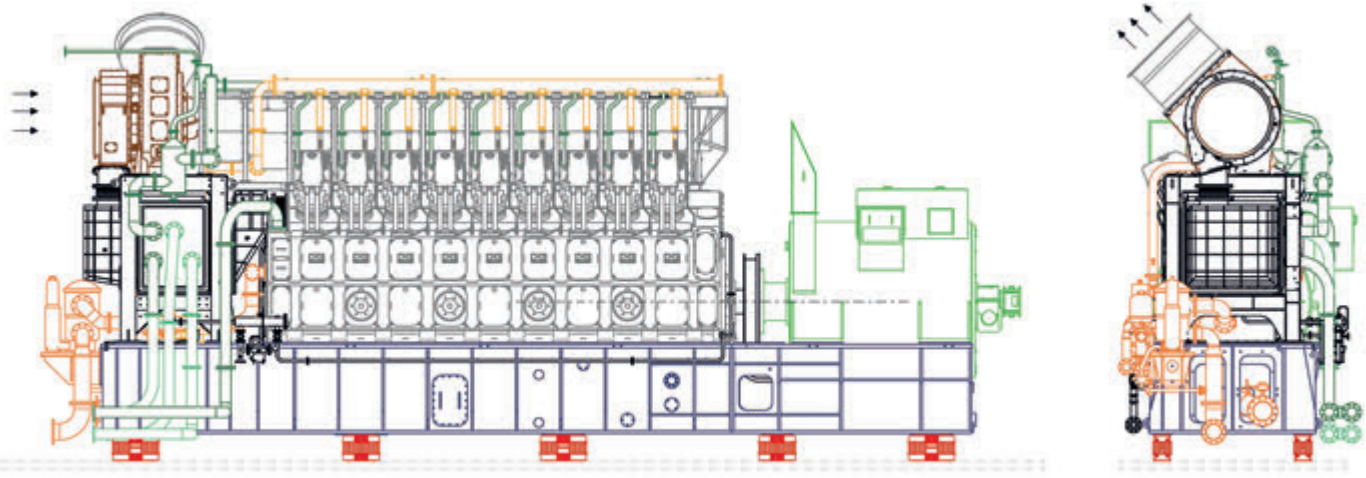
■ M5 Gas Turbine.

> “KGE provides a **complete and comprehensive** range of products and services from one single source”

replaced, thus reducing downtime. All in all, not a simple gap filler, but a full-grown specialist in its class.

Efficiency World-Record Gas Engine

The development of the Kawasaki Gas Engine series is based on 100 years of experience in the construction of diesel engines. They have been developed since 2007 using new computer-based design, flow simulation and strength-calculation programs. These Gas Engines are used for stationary generation of electricity, but for peak-load-controlling, primarily used as combined heat and power plants. Due to the high electrical efficiency of the **Kawasaki** Gas Engine family, highly efficient electricity is generated. The waste heat from exhaust gas and



■ Gas Engine.

cooling water can be treated as process heat or e.g. used as thermal heat. The engine range includes the four models KG-12, KG-12-V (5.2 MW_e), KG-18 and KG-18-V (7.8 MW_e). The number indicates the number of cylinders, which are arranged V-shaped in two cylinder banks, the V in the model designation, however, characterizes the turbocharger (variable nozzle) with increased efficiency. As the flagship of the Kawasaki Gas Engine range, the KG-18-V achieves the highest electrical efficiency in its class, with **49.5%** at the generator terminal.
Noteworthy here is its large control range of 30% to 100% of the electrical output power and that he achieved a very high efficiency even at partial load. Already over 143 of these engines were sold in Southeast Asia and the USA. In Europe, Kawasaki engines have been available in the market since the beginning of 2017.

■ Gas Engine.

Hydrogen perspective

While the use of photovoltaic and wind power plants is establishing itself for the CO_2 neutral generation of electricity, the regenerative provision of high-temperature heat for industrial processes has been somewhat behind. As a solution, for example, the use of pure hydrogen in Gas Turbines and the flexible switching between the natural gas and hydrogen fuels have been further developed.
This is done in close cooperation with European research institutions such as RWTH Aachen University. Three processes were examined in more detail: the fully flexible switching of the natural gas and hydrogen fuels in the Gas Turbine's diffusion combustion chamber, the addition of hydrogen to the Gas Turbine's DLE combustion chamber with approx. 30% of the calorific value and the Micro-Mix combustion chamber, especially designed for hydrogen combustion. Those compromising developments will be ready for the market in 2020. ●

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Consumer Tissue: global opportunities, local challenges

In 2018, global retail sales of consumer tissue products grew by 2% in constant US dollar terms to reach USD 78 billion, with projected compound annual growth (CAGR) of 2.6% at constant 2018 prices over 2018-2023 to reach estimated USD 88 billion, or 28 million tonnes. On the whole, global untapped potential for retail consumer tissue is estimated to stand at USD 51 billion, and 18 million tonnes.

by: Svetlana Uduslivaia, Head of Research, Chicago, Euromonitor International

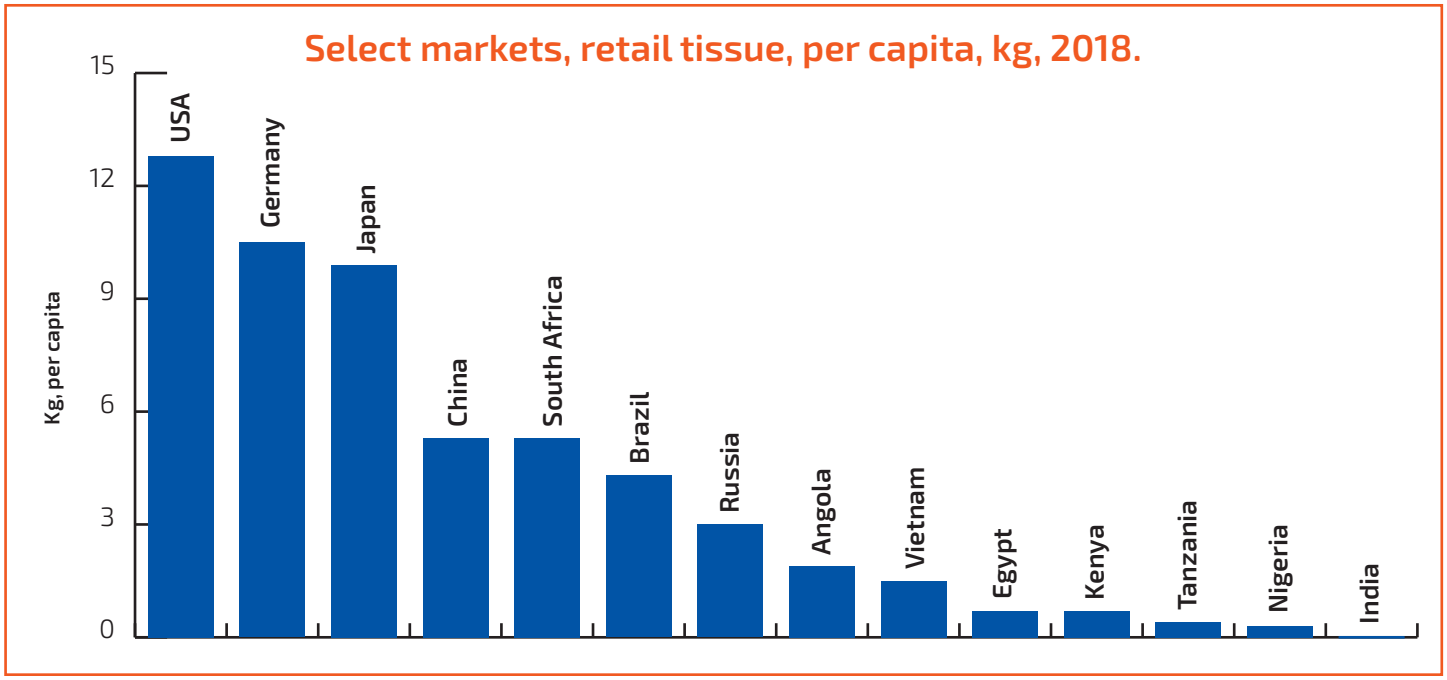
In the developed markets, the industry continues to struggle with already high levels of market penetration, slow population growth, and pricing pressures. High input costs forced branded tissue manufacturers to announce price increases in retail, some of which come at the expense of volume growth as many consumers (especially lower income households) look for lower pricing. The latter trend also creates further opportunities for discounters, which continued to see growth in a number of markets, including developing markets like Turkey. In emerging and developing countries, on the other hand, per capita consumption of tissue products for most part is still low. Thus, there remain opportunities for further industry growth, supported by improved incomes and better product availability.
However, affordability remains an issue for many in developing regions, due to the fact that the majority of untapped potential is found within the vast low-income consumer base.

■ Svetlana Uduslivaia.

Shifting growth frontiers

India and China, both with estimated unmet potential of around four million tonnes, are the two top global markets by unmet potential, followed by Egypt, Russia, Brazil, and Nigeria.The markets show significant differences in per capita consumption; from still quite negligible levels in India to far more evolved Russia, Brazil, and China. Markets with more evolved consumption patterns

■ Tissue products in a supermarket lane.



Source: Euromonitor International.

and higher disposable incomes, such as China, present opportunities for value-added higher-quality products, especially in urban areas. On the other hand, markets such as Russia and Brazil already show a significant level of private label development in retail tissue, in contrast to China, India, Egypt, and Nigeria. Expansion of private label is putting pressure on prices, as consumers increasingly recognize opportunities to purchase quality products at competitive prices. Africa continues to draw attention, and retail sales of consumer tissue in the region have been gaining traction. Retail tissue consumption in South Africa stands at 5 kg per capita, which is about half the per capita retail consumption in developed regions but far ahead of most markets in Africa. Per capita consumption of retail tissue in Angola stood at close to 2 kg in 2018, while most other markets in Africa still show consumption levels well below 1 kg and leave much room for long-term industry expansion in the region.Some of the industry challenges to growth and brand awareness, aside from low incomes and macroeconomic and political instability, also include black market, cheap counterfeits, and low-cost Chinese imports coming into the region.

Sustainability in focus

Environmentally responsible products and practices are among the core strategies for many leading players in the global tissue industry. Aside from response to consumer and government pressures, these are also an integral part of the industry approach to cost efficiencies and utilisation of the alternative sources of fibre. The trend sees the launch of products positioned as providing sustainable solutions as well as value for money and quality. Latest examples include tubeless Lotus Moltonel by Essity in Europe; the expansion

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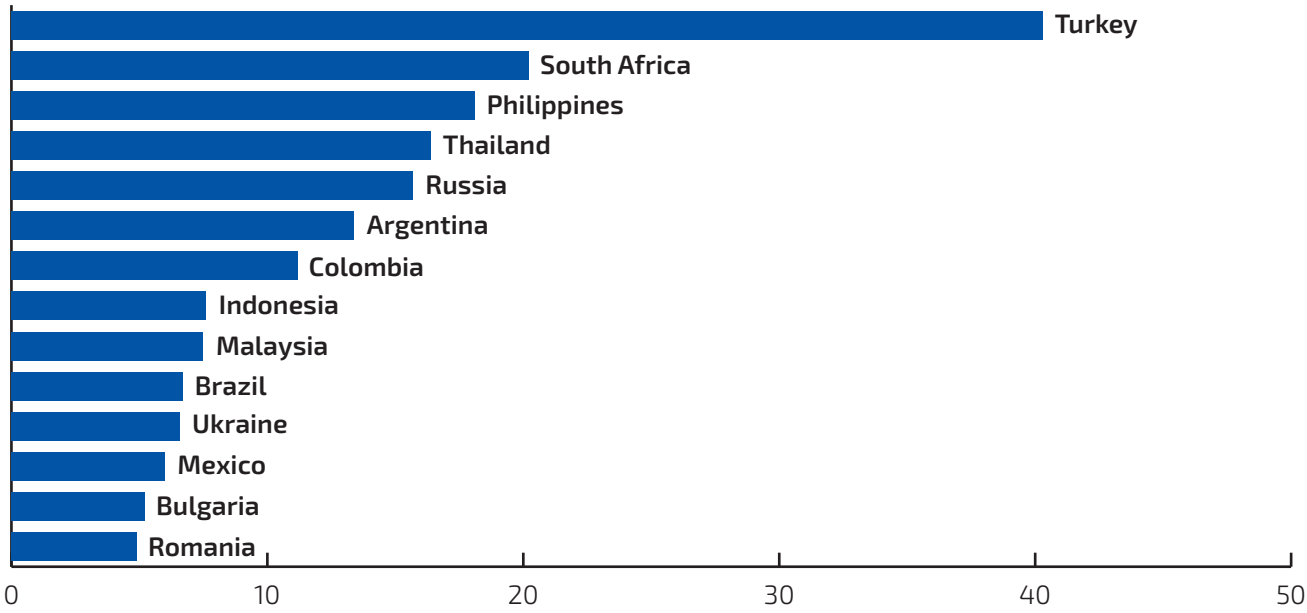
Select developing markets, private label tissue, % retail value share, 2018.



Source: Euromonitor International.

of UK-based The Cheeky Panda bamboo-based products beyond its UK home base, and bamboo-based products under the Mayflower brand by YFY in Taiwan. Unbleached tissue products have also been gaining attention in some markets, such as China, for example. While some of the more premium-priced products with eco-positioning start off by selling products direct to consumers via online channels and in specialised retail outlets with a focus on natural products, such as Whole Foods for example, retail distribution has been expanding, along with product awareness and visibility.

Targeted distribution via subscription platforms

In 2018, online retail accounted for 5% of global consumer tissue sales. While still behind, compared to for instance disposable hygiene products, online tissue sales have nonetheless seen a substantial uptake in sales as more consumers have been shifting towards e-commerce for better price and convenience as well as wider product selection, including private label by leading e-tailers like Amazon with increased focus on its own private label consumer staples like tissue. The evolution of technology, including virtual assistants like Alexa, further facilitates the shift, as it makes it easier to re-order household staples. Interestingly, subscription boxes with a focus on consumer tissue have gained traction in the market. Subscription boxes usually focus on value-added premium products as well as products positioned as sustainable/eco-friendly and ethical. In Germany, for instance, the subscription box Smooth Panda offers bamboo toilet paper in recyclable packaging. Likewise, in markets like Australia, the US and UK, the subscription box Who Gives a Crap has gained some popularity. This Australian company is making its products with environmentally friendly materials, including bamboo and recycled fibers. The company also donates half of its profits to help build toilets in the developing countries, thereby helping to improve health and daily hygiene of the communities it works with. While subscription boxes are not likely to overtake store-based retail and more established forms of online retail, the subscription platforms create opportunities for smaller brands to differentiate themselves from mass market competition and build targeted distribution and consumer loyalty for long term growth. ●

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