

BARMAG

FDY spinning

Sustainable solutions and technologies



From Melt to Yarn

Your benefits

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From Melt to Yarn

Solutions along the textile value chain

Place your business ideas in professional hands! Consulting, engineering, plant construction, high-tech machinery and lifecycle management – the whole package from a single source. Many years of experience in textile machine construction and our strong global network form a solid basis and the perfect prerequisites for us as your solutions provider.

Define your yarn properties from the very outset

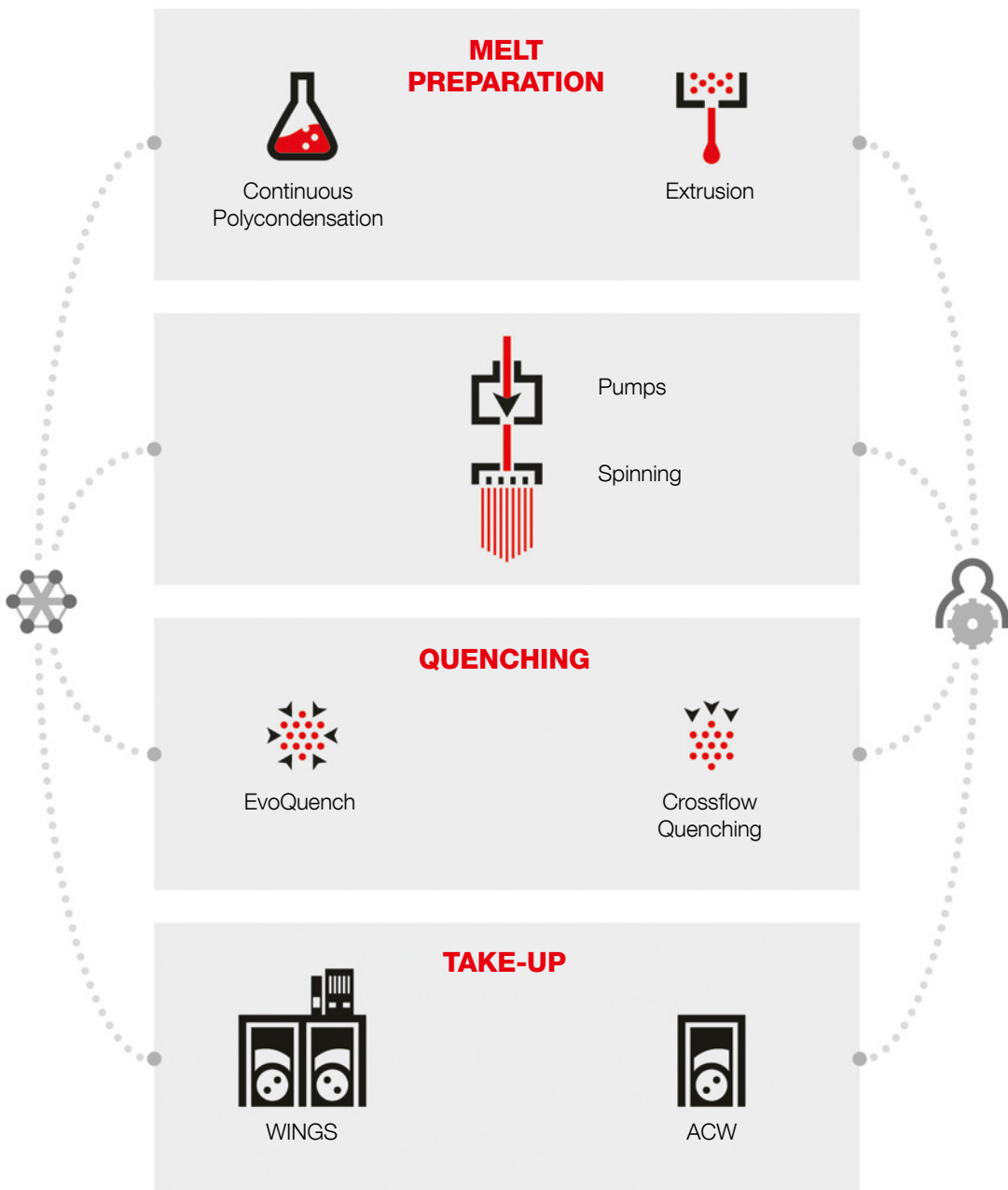
From chemicals to manmade fibers, from melt to yarn, from polycondensation to the fully-drawn yarn package – we have your value-added chain under control. And you increase your profits. Because an optimized manufacturing process encompassing all production steps provides you with the greatest-possible influence on the quality of your end product.

And your production costs. Add to this the fact that our brand strength will make financing your project a profitable investment.

Extensive experience and engineering and management competencies help us deliver even complex projects and processes on time. You can rely on that!



INDUSTRIE 4.0



CUSTOMER SERVICES
Consulting, Lifecycle Management, Technical Support

What is FDY production with the WINGS concept?

Higher, faster, further – this is more applicable to the FDY process than to any other textile spinning process. Yarn manufacturers – whether providers of standard qualities or niche products – are faced with increasing pressure on efficiency. In demand are methods and means that increase the performance, quality and efficiency of the production process. This is the starting point for WINGS FDY.

The idea

Developed with the objective of increasing the productivity and efficiency of FDY systems, the revolutionary concept bears the solution in its very name: **W**inding **I**Ntegrated **G**odet **S**olution – in short WINGS. The winder as a complete take-up machine removes the spatial separation of godets and winders.

The WINGS FDY concept scores even higher when it comes to sustainable yarn production and convinces in conjunction with smart core components in the spinning system with

- Reliable technology
- Particularly gentle yarn path
- Consistently good yarn quality
- Outstanding package build
- Low energy consumption
- Ergonomic component layout
- Compact design

The benefits

Your success is very important to us. For this reason, we always maintain a focus on the benefits to you when developing our products. Profit from

- High yarn quality
- Savings in Opex
- High efficiency
- Easy handling
- Large operation window

e-save

comprehensive efficiency

e-save provides you with a competitive edge

With e-save, Barmag introduced a label for particularly energy-efficient systems, machines and components back in 2004. Over the past years, e-save has established itself as the trademark of a comprehensive efficiency program. This underlines the preeminent role of Barmag when it comes to commercial success and sustainability.

FDY spinning systems with WINGS are setting standards. Compared to conventional concepts, this solution convinces in terms of

- **Energy**; with up to 46 % lower energy consumption
- **Economics**; with up to 20 % fewer operating staff, more than 25 % shorter string-up times
- **Environment**; with up to 50 % less waste
- **Ergonomics**; due to the reduction in system levels by one and the resulting simpler system operation.



Producing premium yarns with EvoQuench, WINGS and co.

Would you like to manufacture premium yarns? We will help you – with our high-performance spinning system components; from the extruder and the spinning pump, the spin beam and the spin packs all the way through to the quenching system. Because the quality of the yarn is determined by the spinning system.

EvoQuench for polyester and polyamide yarns

Within the complex spinning process, the quenching unit ensures even cooling of the liquid filaments at the outlet of the spin pack. And therefore guarantees excellent yarn evenness. Our patented EvoQuench radial quenching unit covers polyester yarns from 40 to 150 den with up to 2 dpf. EvoQuench also is applicable for polyamide yarn spinning at a titer range from 20 to 100 den with a dpf range of 0,4-1,25 for round luster. For extremely low spacing at a high number of ends we recommend EvoQuench zigzag. The zigzag design allows for a higher number of spin packs at the same position pitch. However, for coarse and standard titers you can rely on our cross-flow quenching system.

WINGS gently places the yarn on the package

The quality yarn has been spun, now it has to be wound. To ensure it is subjected to the correct treatment in this stage, we place the yarn in the hands of WINGS. Decisive for gentle yarn handling are tried-and-tested core components and an innovative yarn guidance concept in the WINGS draw unit. The proven HF godet technology ensures even temperature transfer within the drawing process. Furthermore, the sophisticated yarn guiding system with its minimum deflection angle guarantees that your yarn maintains the high quality it had upon exiting the spinning system. How can you tell? Your yarn shows itself from its best side in further processing: perfect yarn evenness, yarn tension and CV% values have a positive impact on its dyeability. Needless to say, the package build is also perfect and ensures excellent further processing properties for the downstream processes. In this way, WINGS FDY yarn is also convincing when deployed in the challenging warp-knitting process.



Cost-efficient manufacturing – also in the premium segment

Competition within the yarn markets is becoming more intense. The consequence: constantly rising pressure on costs. The solution: optimized production processes, efficient systems, sustainable technologies. All these are provided by our FDY technology with WINGS.

Less is more

FDY processes with EvoQuench quenching systems and WINGS take-up concepts are more profitable than conventional FDY processes. Why is this? Less is more: up to 20% fewer operating staff as a result of the reduction in system height by one level, the optimized and automated string-up process. Up to 46% lower energy consumption of the take up due to a new spinning process, energy-efficient components and lower air-conditioning requirements. Up to 50% less waste compared to conventional FDY processes as a result of easy handling and shorter string-up times.

Reduced heat loss: SP8x

Heat is a very considerable factor in polymer spinning systems. The polyester melt, for example, is conveyed from the polycondensation unit to the spinning system at temperatures of between 280 and 290 degrees Celsius. This harbors potential for energy optimization: in our SP8x spinning head series, we have considerably reduced the heat-radiating surface, while simultaneously substantially improving the insulation compared to the predecessor models. The result: more than 40% less heat loss. What does this mean in concrete figures? For a system with 36 positions, this generates an energy saving of around 200,000 kWh per year.



Sustainable technologies – less is more

Reduced production costs: double-in-one (DIO)

The double-in-one (DIO) spin pack reduces your production costs. How that works? Simply by increasing productivity. Because the DIO unites two independent spin packs in single housing, hence providing the same performance as two single-end spin packs with simultaneously 25% less space requirements. A beneficial side effect of the DIO is reduced energy consumption due to the lower heat loss.

Reduced air consumption: EvoQuench

Cooling air is the main energy consumer when it comes to quenching. Our solution is the EvoQuench: this radial quenching concept from Barmag consumes up to 80% less cooling air compared to cross-flow quenching. Convinced?

Reduced energy consumption: WINGS

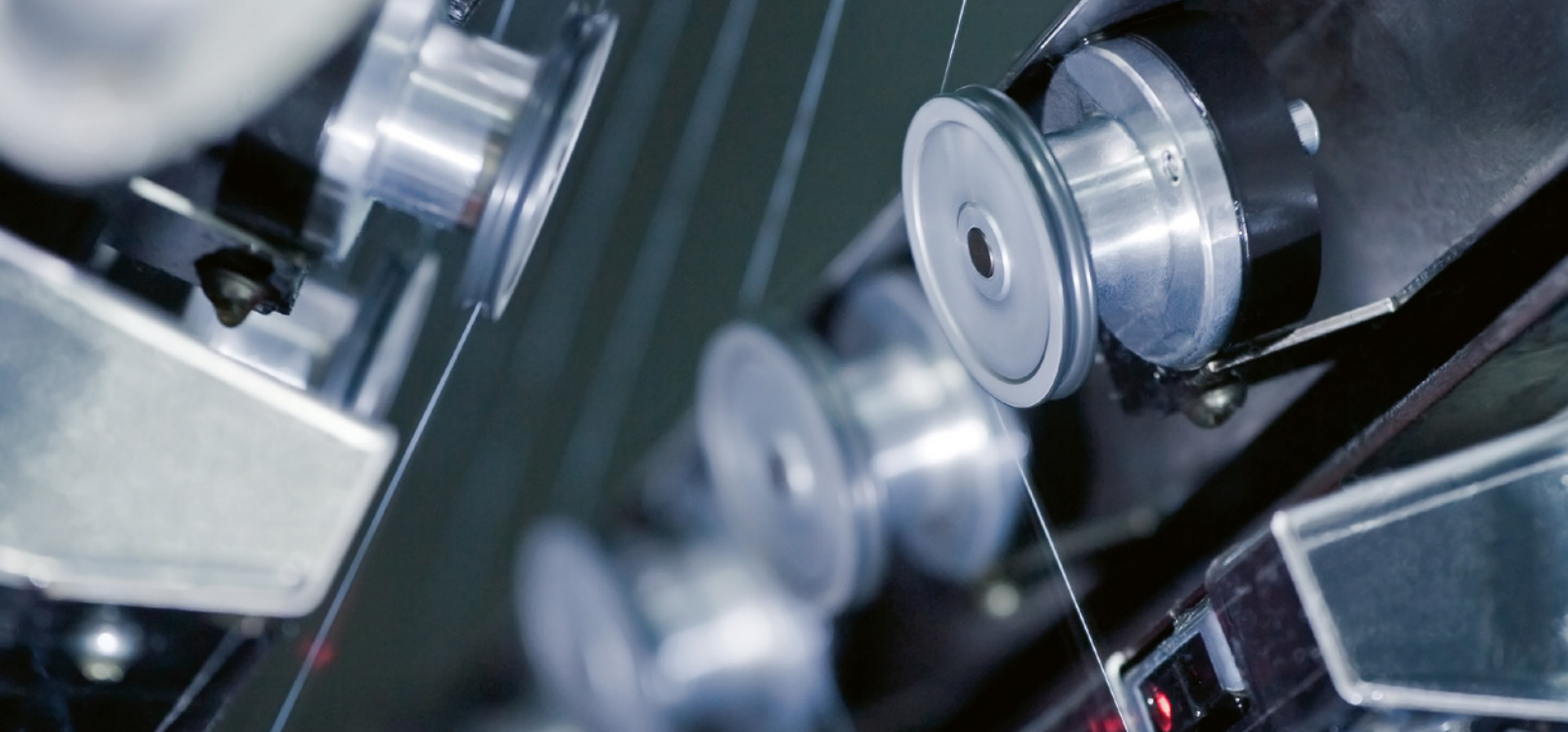
With its multi-stage energy concept, WINGS FDY offers numerous advantages. The specific WINGS PET process control system requires approximately 20 to 35% less heating power than conventional system configurations.

The basis for the reduced energy consumption of WINGS FDY PLUS and PLUS ECO lies in the process: The sophisticated process guiding system and an extremely gentle yarn path allow the application of the spin finish oil after the hot stage of the process. This means that the water-based spin finish emulsion does not need to be heated and water evaporated at the same time, thus no energy is required for this process.

WINGS FLEX reduces energy consumption by using neat oil instead of water-based emulsion.

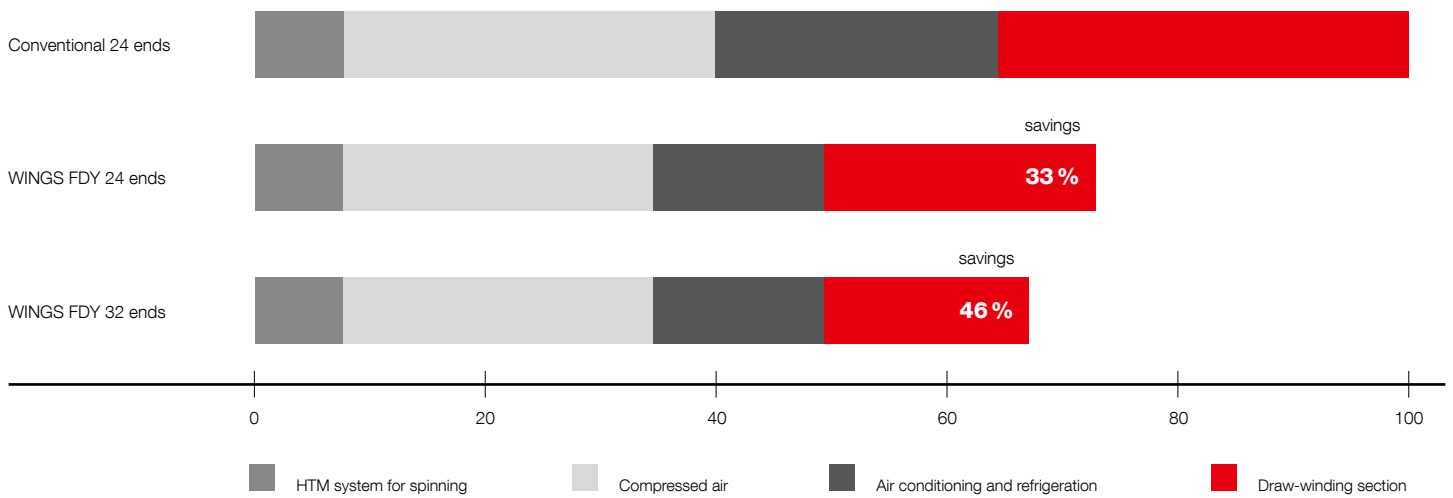
A further feature of the concept is to retain the generated energy within the system. In other words, systematically separating 'hot' and 'cold' within the FDY process with WINGS. By cleanly separating the heat treatment and the mechanical treatment (spin finish and tangling) process stages, the unavoidable energy loss common to conventional systems is now a thing of the past.

However, the WINGS energy concept goes one step further: instead of the commonly used cooling system that frequently uses electrically-powered air fans, WINGS uses water cooling for its main components. This in turn opens up completely new possibilities: waste heat can be efficiently transferred out of the system. And this has a positive impact on the production hall air-conditioning requirements.



Energy efficient multi-end polyester spinning – a comparison of technologies [kWh/ton]

(%)



All figures are based on own investigation and / or market information without guarantee

Less waste – greater profit

Efficiency is the most important characteristic of WINGS: It can be completely operated from floor level. All elements are laid out at eye level. Consequently, this reduces the time required for machine operation until production start by more than 25 %; time in which top-quality FDY yarn – and not waste – can be produced.

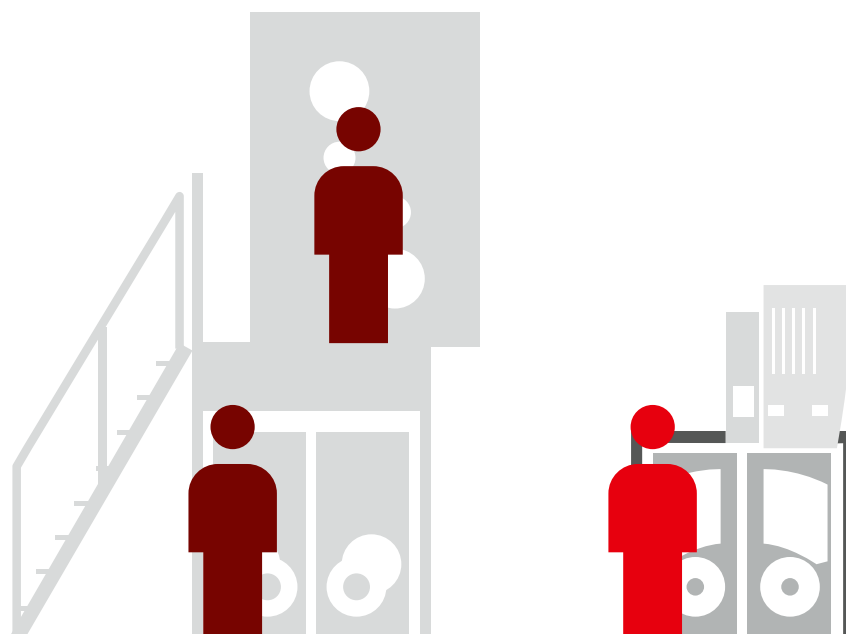
Partially-automated string-up process minimizes the operating error rate

The partially-automated string-up process supports the natural work routine of the operator. And hence optimizes the interaction between man and machine. With this, the take-up system offers the world's fastest and simplest FDY string-up.

Fewer operators required

WINGS moves at eye level. What does this mean? One level less than conventional FDY manufacturing solutions, for example. For your operating staff, this means solo string-up. What is the benefit to you? You require fewer members of operating staff for the successful operation of your FDY system. Which has a positive impact on the cost-efficiency of your yarn production.

FDY spinning with WINGS (picture right) has one operating level less than conventional FDY spinning solutions (picture left). This saves operating staff.





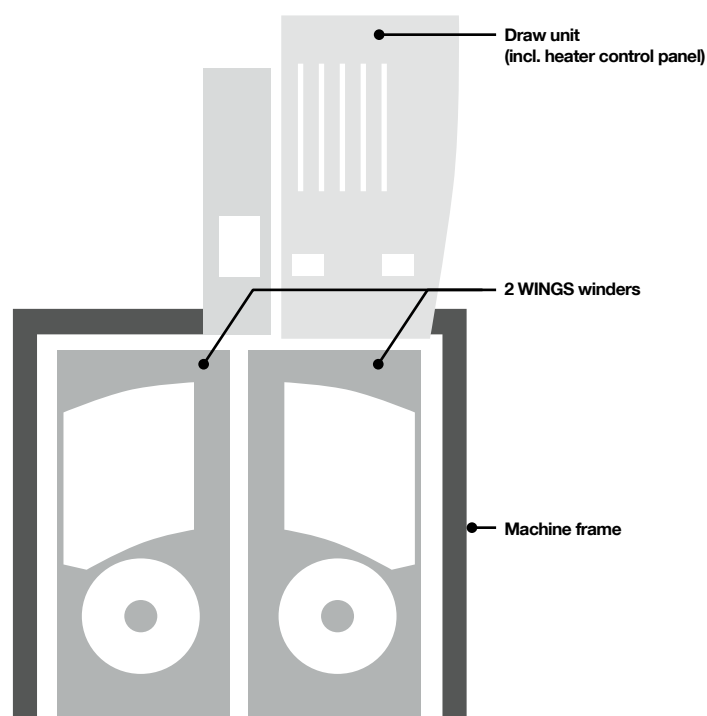
Less and easy maintenance saves you time

There is no such thing as a maintenance-free FDY system. However, we supply systems requiring minimum maintenance. And it is once again the WINGS take-up concept that gives you an edge.

Better start-up performance

WINGS simplifies and shortens the installation of the system. The entire WINGS take-up concept is delivered from our technology hub in Germany as a completely pre-installed and tested unit. This makes assembly and commissioning of the FDY system of today child's play. All that is required onsite is the connection of the power and compressed air supplies. With this, we have dramatically reduced the assembly and commissioning times.

The benefit to you: You can start manufacturing FDY sooner.





Unlimited possibilities – the right WINGS FDY for your commodity yarns

Our FDY technology offers you a comprehensive process window – without compromises in terms of the yarn quality. Our spinning and quenching concepts in conjunction with WINGS enable all standard yarn products.

WINGS concept covers virtually all standard processes

The FDY spinning system is a family matter. The WINGS family has increased in variety over the years and meanwhile covers all important processes.

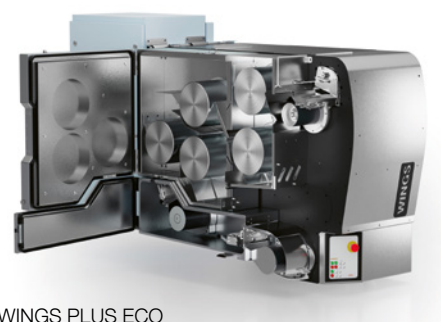
Semi-dull or trilobal bright, 24-, 28- or even 32-end – whatever you wish to manufacture, we have the right WINGS for the job. Each one of them has its own advantage: WINGS FDY PLUS and WINGS FDY PLUS ECO are best in class when producing energy efficient semi-dull and bright products.

WINGS FDY FLEX has the most versatile range of applications and is ideal for processing full dull, cationic dyeable, doped dyed and recyclates in addition to sd and br. And all this with up to 32ends and energy-saving thanks to the use of neat oil.

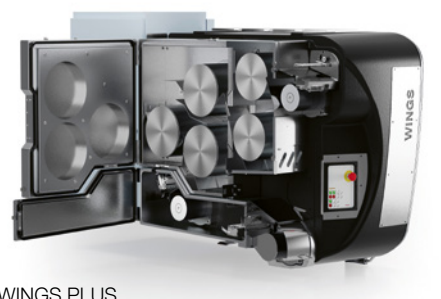
The WINGS FDY PA specializes in the processing of PA6 yarns. Here, 24 PA6 yarn ends can be processed simultaneously with the best possible quality

What if WINGS is unable to help me?

We also have other solutions for you: for example, we have the tried-and-tested ACW winder for processing bicomponent or spundyed yarns or other special requests. We will gladly advise you!



WINGS PLUS ECO



WINGS PLUS



WINGS FLEX



WINGS PA



WINGS

Unlimited possibilities – product diversity for your premium yarns

Microfiber yarns

The finer the yarn, the better it feels. Hardly surprising that virtually half of all yarns manufactured are now made from microfibers. We support you with the right spinning system and the right take-up unit. Regardless of whether polyester or polyamide.

Spun-dyed yarns

Spun-dyed yarns are in demand above all when the end product needs to be colorfast and lightfast. Spun-dyed yarns are standard particularly in the demanding automobile industry. If microfilament yarns are required, our EvoQuench radial quenching system – especially tailored to the requirements of the spinning process for spun-dyed yarns – makes its mark. For manufacturing commodity yarns, we recommend using our cross-flow quenching system.

Bicomponent yarns

Bicomponent yarns have many benefits: here, even finer titers per filament (dpf) are possible than in the case of microfiber yarns, for example. The application possibilities are virtually unlimited. Here, the most varied cross-sections are available – from orange type, side-by-side all the way through to islands-in-the-sea. And what about manufacturing? Let's talk about it!

**More on Barmag
microfiber, spun-dyed and bicomponent yarns**



**Or contact us:
sales.barmag@barmag.com**



Digitalisation optimizes processes

Within the context of the comprehensive digitization of our environment, production processes are increasingly interlinked with modern information and communication technologies.

Today, people, machines, systems, logistics and products are communicating and cooperate with each other, simplifying many processes as a result. Digital transformation is creating whole new dimensions. With a unique combination of experience and knowledge, we are at your side in conquering precisely these new dimensions.

atmos.io

atmos.io is the connectivity platform which provides the hardware infrastructure, software architecture and data models for all digital solutions for Barmag machines. Providing seamless data connectivity between shopfloor and the IT and ERP landscape at each customer, Atmos.io ensures a secure and scalable integration. The platform functionalities can be tailored according to the requirements via the Barmag online solutions.

Reports and Analysis

The Plant Operation Center (POC) has for many years been an established process and production management system for the Barmag machines and systems deployed to manufacture textile yarns. Today, this functionality is included in the modules of the scalable atmos.io platform.

This is made possible by the modular character and the scalability of the system. And retrofitting additional modules is very simple. But atmos.io is capable of far more: the entire installed process chain can be connected ensuring also post doff data visibility. With this, the platform networks the entire production solution and the corresponding workflow.

Quality guarantee

What are the benefits of such a process and production management system? All process values relevant to the quality of your product are continually recorded and form the basis of online quality monitoring. The criteria and rules of quality assessment and warning are defined by you. This applies both to online quality assessment (pre-doffing) and offline quality assessment (post-doffing).

Clear overview

Your manufacturing orders are set up in atmos.io and continually updated and displayed. The MES (Manufacturing Execution System) always provides you with a clear overview of each order and each product. This is valid both for currently running and already completed manufacturing orders. This is including full and centralized transparency for all connected manufacturing sites.

However, not only data integration, but also distributed workflows are possible, such as approval workflows and other tasks. This also includes tasks resulting from continuous condition monitoring, where atmos.io provides real-time notifications and dashboards when something happens or is predicted to happen.

Agile production

atmos.io not only enables the plant management to react fast and target oriented to indicated deviations from expected process settings. Modules such as AIM4DTY also provide clear problem-solving guidelines based on expert know how to automatically detected deviations or lower efficiency. This supports the industry in solving reaction problems, increases profit margins and reduces waste.



Partnering for Performance

Our Customer Services department has one all-embracing mission: we want to make your production increasingly-efficient and productive, and your business increasingly competitive and profitable. To do this, we offer you a close working relationship – partnering for performance.

Our services for your success

Textile technologies are becoming ever more efficient and flexible, opening up great opportunities to enhance your competitiveness. At the same time, this progress accelerates the race in the market. To be able to keep up and react swiftly to a changing market situation, it is important to maintain and expand your technical capabilities and to utilize them properly. To achieve these, we place emphasis on a close, trusting service partnership with you to ensure reliable production and gain a technological edge, to secure your investment and to guarantee success in the future. Together let us exploit the strengths of our technologies for your business.

Our goal: your operational efficiency

Through our partnership we want to increase your operational efficiency to best effect. With this in mind, we focus on optimizing your operating and manufacturing processes, your system and logistics management and the acquisition of further skills by your staff. Your success grows with the interplay of all the factors involved.

**Find out more on
Barmag Customer Services**

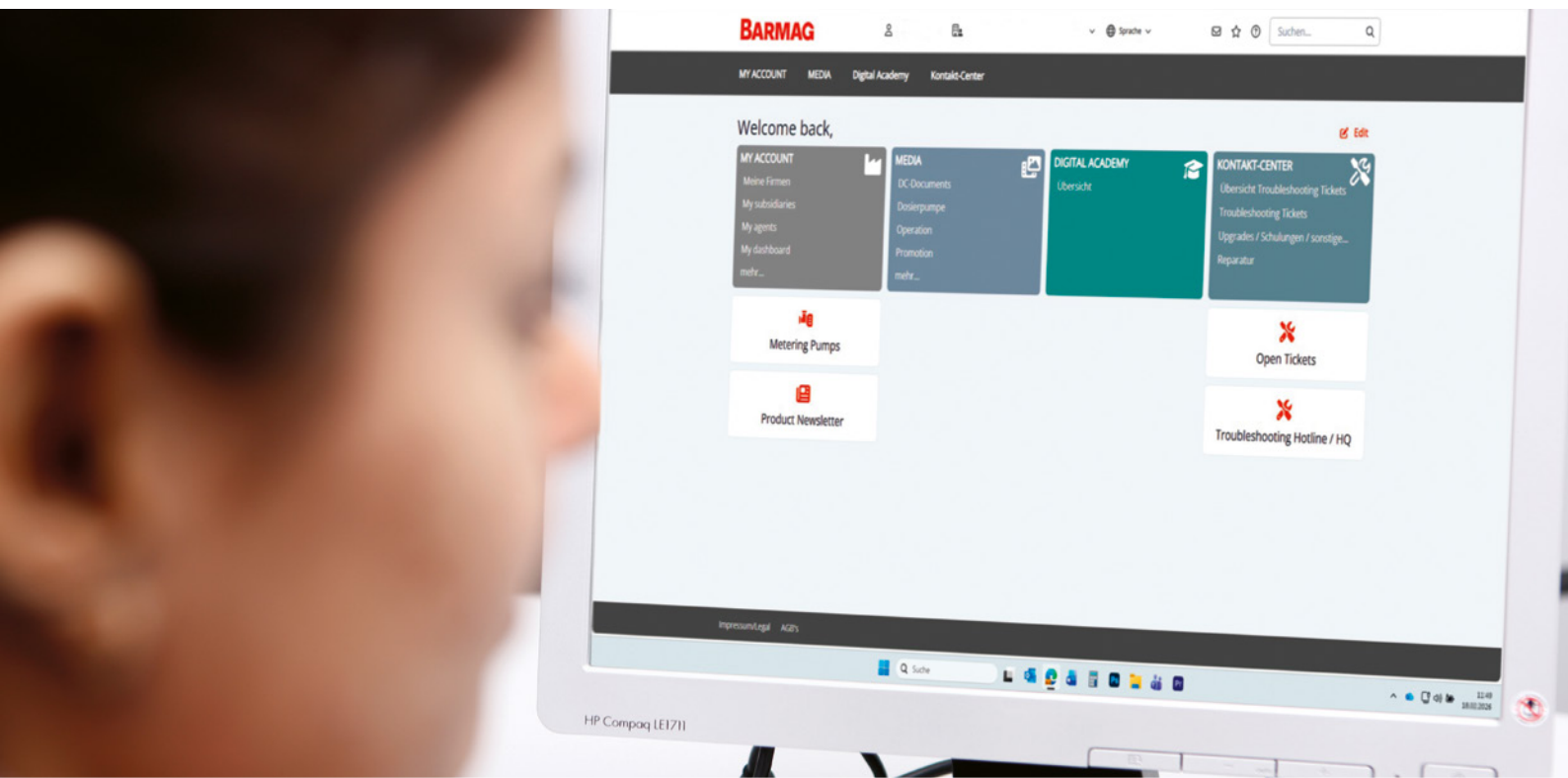


**Or contact us:
customer-services.barmag@barmag.com**

For this we offer you the performance of a technology leader with a unique global service network, along with highly qualified service and engineering experts. We will advise and support you in all phases of your business along the entire value creation chain of fiber production:

- With start-up services for the installation or relocation of your systems,
- With technical support round the clock,
- With modern services for maintenance and repair, performance enhancement and staff training, and
- With modernization and upgrades from the manmade fiber specialist.

Whatever you need, you can select services tailored to those requirements from a service portfolio that is unique in the industry.





Our promises

With our Barmag and Neumag competence brands, we are the world market leader for manmade fiber filament spinning systems, texturing machines, BCF systems, staple fiber systems and nonwovens. As a service provider for engineering and aftersales services, we offer total solutions for the entire textile value added chain. We attach great importance to energy efficiency and sustainable technologies in all our developments.

To what extent do you profit from this? Our market position guarantees you the benefits and quality of leading technologies, our sustainable products save you money and our comprehensive services save you time and hence increase your profit.

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FDY spinning**



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