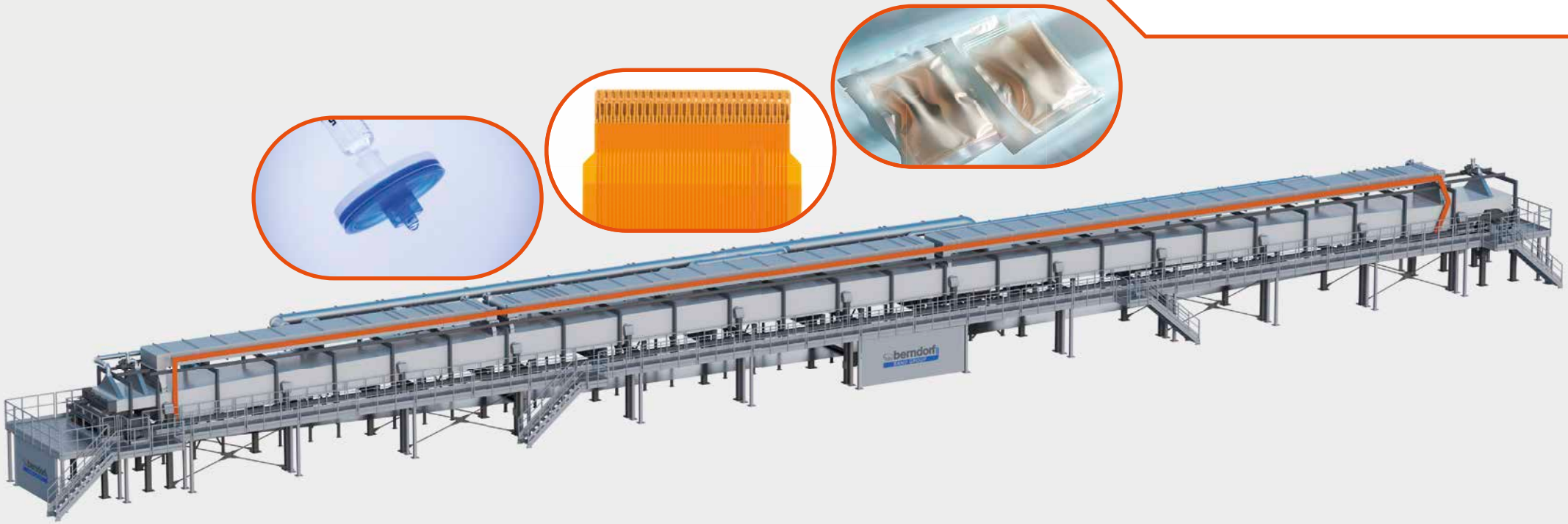
berndorf BAND GROUP

CASTING & DRYING SYSTEMS FOR FILMS & MEMBRANES



ALL-IN-ONE PARTNER

With more than 100 years of experience, Berndorf Band Group is a global leader in Steel Belt manufacturing, Belt System development, and premium service - ensuring reliable system performance across industries. The journey started in 1923 with the first endless Steel Belt used in a Casting & Drying System. In 1992, we reached a major milestone with the installation of our first high-tech Casting & Drying System. Since then, we have continued to shape the industry through innovation and advanced technology. Manufacturers for films and membranes trust our expertise to meet the growing demands for energy efficiency and high quality.

Whether you are looking to upgrade existing systems with high-performance Steel Belts or need a complete Casting & Drying System, we deliver customized systems designed for your success. Choose Berndorf Band Group for proven expertise and top-quality solutions.



HISTORY

1843
Foundation of Berndorf Metalware factory

1923
1st Film casting Belt (copper)

1960
1st High mirror polished Steel Belt

1965
Longitudinally welded Steel Belts

1992
1st PI Casting & Drying System

1992
1st PVOH Casting & Drying System

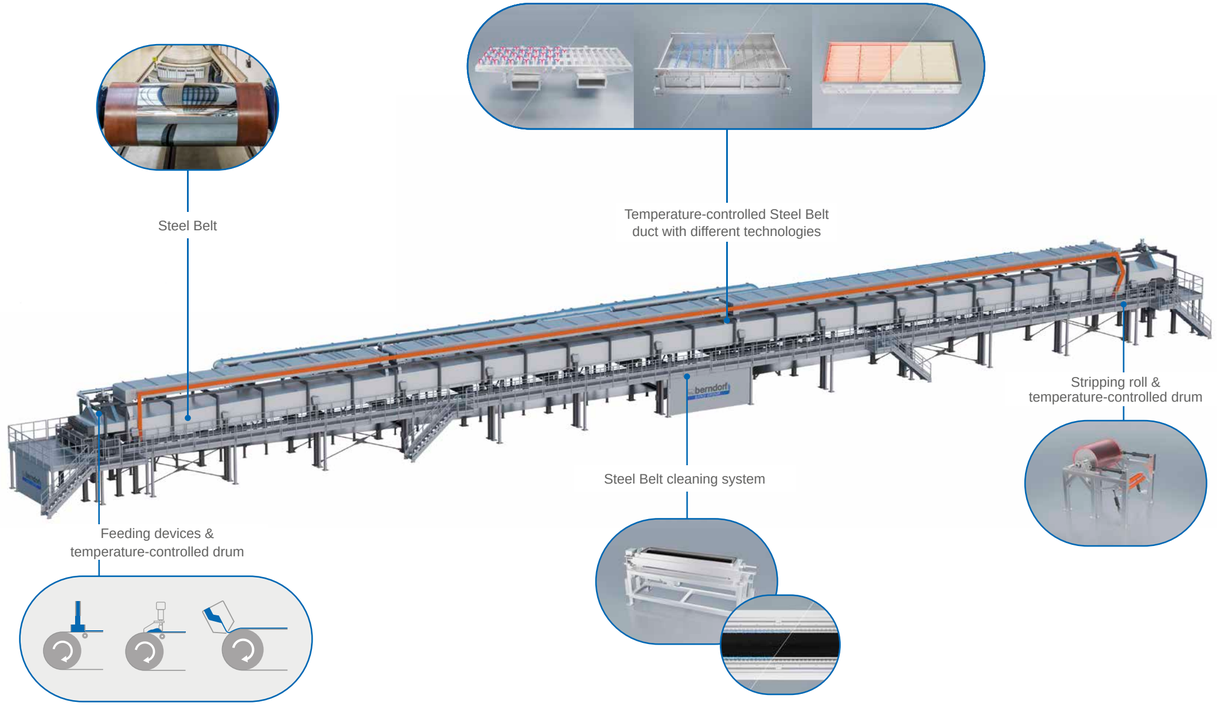
1999
1st PMMA Casting & Drying System

2004
1st TAC Casting & Drying System

2012
1st Filter membrane Casting & Drying System

2018
Establishment of the R&D Center in Berndorf, AT for all Belt Systems

2025
Enlargement of the R&D Center in Berndorf, AT with pre-series production & extended sample production



CASTING & DRYING SOLUTIONS FOR THE WATER-BASED FILM INDUSTRY

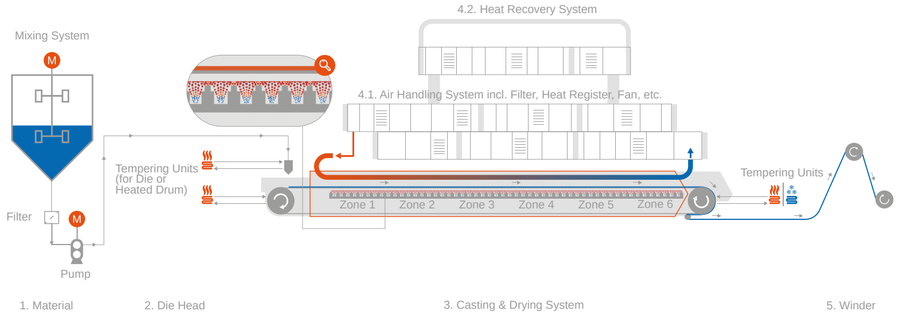
At Berndorf Band Group, we set the industry standard with our cutting-edge casting and drying technology, designed specifically for the demanding requirements of water-based film production. Our machines and high-quality Steel Belts offer unrivaled efficiency, reliability, and performance.

» **Most Powerful Dryer Technology**
Our advanced Casting & Drying Systems outperform conventional market alternatives by delivering maximum output and capacity within the same drying length. This ensures superior drying performance while maintaining optimal space efficiency.

» **Energy & Cost-Optimized Technology**
Water evaporation requires a significant amount of energy. Our technology is engineered to handle these high energy demands efficiently, ensuring cost-effective operation.

» **Exceptional Heat Transfer Efficiency**
Our Casting & Drying Systems, including the Berndorf impingement jet nozzel air dryer, are engineered for exceptional heat transfer efficiency, precise temperature uniformity, and maximum productivity.

» **Market Leadership & Proven Reliability**
With years of industry expertise and a strong track record of success, our Casting & Drying Systems - alongside our premium Steel Belts - are trusted by customers around the globe. Their consistent performance ensures high-quality production of water-based films.



VERSATILE RANGE OF END PRODUCTS







Our state-of-the-art Casting & Drying Systems and durable Steel Belts enable the production of a diverse range of products for the water-based film industry. Thanks to a wide range of Steel Belt surfaces and tailored release options, Berndorf Band Group can offer solutions that are specifically designed to meet the unique characteristics of your product, ensuring optimal performance and results.

FILMS FOR FOOD & PACKAGING
Edible films, sustainable and biodegradable packaging films, etc.

WATER SOLUBLE FILMS
Polyvinyl alcohol films, single-dose detergent delivery products (pods, laundry sheets), sustainable materials (MFC, algae protein, natural proteins, other bio-based materials), etc.

OTHER FILMS FROM WATER-BASED MATERIALS
Films made from renewable resources such as natural fibers and proteins, reconstituted and reduced-risk tobacco products, etc.

YOUR PRODUCT IS NOT IN THE LIST? GET IN TOUCH WITH US AND WE CAN DEVELOP A SPECIAL SOLUTION FOR YOUR NEEDS.

CASTING & DRYING SOLUTIONS
FOR THE SOLVENT-BASED FILM INDUSTRY

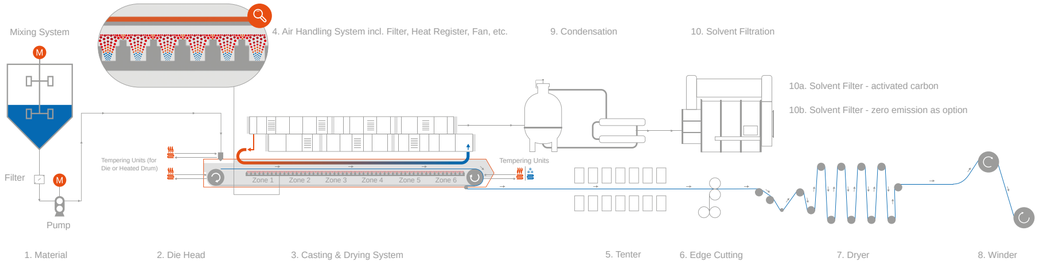
For decades, Berndorf Band Group has been the trusted partner of the solvent-based film industry, delivering high-precision Steel Belts and advanced Belt Systems that ensure high-quality production processes and premium end products. As market leader since the 1990‘s we meet the highest safety standards for our Casting & Drying Systems, which is a crucial aspect in the production of solvent based cast films. With your decision for a Berndorf Band Group solution, you invest in quality, efficiency, and innovation - ensuring the highest level of availability for your film production.

» **Unmatched Surface Quality for Optical Films**
Our diverse portfolio of polished Steel Belts with an invisible weld seam guarantees superior aesthetics and functionality - essential for high-quality optical films.

» **Decades of Expertise in the Optical Film Industry**
As market leader, the Berndorf Band Group brings unique experience in producing high-precision Steel Belts and Belt Systems that meet the most demanding industry standards.

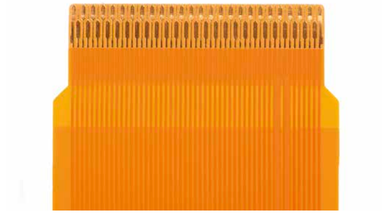
» **Exceptional Thickness Uniformity**
Our Steel Belts deliver outstanding thickness consistency in both longitudinal and transverse directions, providing the highest level of precision required for solvent-based film manufacturing.

» **Exclusive Endless Belt Installation**
Unlike conventional systems, our endless Steel Belt installation eliminates the need for on-site welding and grinding.This innovative approach reduces downtime and minimizes contamination risks, resulting in a cleaner, more efficient, and highly precise production environment.



VERSATILE RANGE OF END PRODUCTS







Our Steel Belt Casting & Drying Systems are scientifically engineered for the production of solvent-based films, ensuring unmatched energy efficiency and productivity. Designed to achieve higher maximum output than conventional drying systems, they optimize both performance and resource utilization. Additionally, our unique drive technology eliminates vibrations, ensuring smooth operation and chatter-free, high-quality results across all end products in this industry.

FUNCTIONAL FILM
Cellulose triacetate (CTA or TAC), polyimide (PI), polyethersulfone (PES), renewable materials (NFC, MFC, other), etc.

OPTICAL FILM
Cast film for optical applications, e.g., clear polyimide (cPI), cellulose triacetate (CTA or TAC), etc.

TECHNICAL FILM
Electrical insulation film, PI, etc.

CAST SHEETS
Partitions, shower cabins, acrylic glass (PMMA,), etc.

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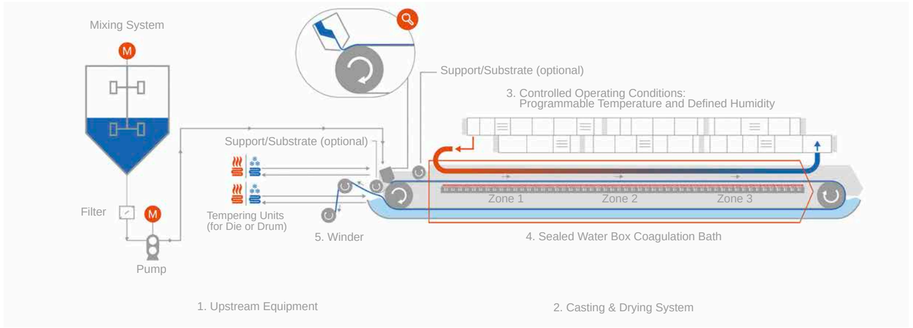
CASTING & DRYING SOLUTIONS FOR THE MEMBRANE PRODUCTION

The Berndorf Band Group has a track record when it comes to designing high-end manufacturing lines that meet the most severe standards in the global membranes industry. For over a decade, Berndorf manufacturing lines for the production of flat sheet membranes across end-markets have been synonymous of quality, reliability and productivity. With in-house pilot-scale capabilities and our deep process understanding, we are your preferred partner for the development and production of differentiated next-generation products.

FULL PROCESS FLEXIBILITY

Our expertise spans the full spectrum - from solvent evaporation lines to phase separation processes triggered by temperature steps (TIPS), vapor exposure (VIPS), and non-solvent coagulation (NIPS). Leveraging our dedicated team and pilot-scale infrastructure, we apply advanced simulation and testing capabilities to design and deliver turnkey production lines tailored precisely to our customers' requirements.

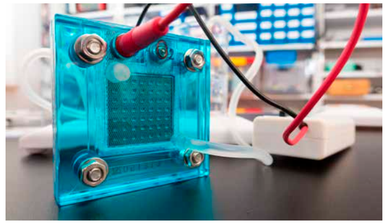
- » Stable casting substrate ensures excellent thickness uniformity
- » Evaporation as well as TIPS, VIPS and NIPS processes possible
- » Suitable for both supported and unsupported membrane production



VERSATILE RANGE OF END PRODUCTS

Membrane Casting & Drying lines serve an array of application domains with very diverse requirements. A robust process, however, always starts with a reliable solution preparation system and a slot die application unit adapted to the specific rheology profile of the casting solution. A stable Steel Belt substrate ensures optimum wetting and best-in-class thickness uniformity of the cast film.

Depending on the process, drying can be driven by evaporation or temperature changes, while phase inversion can be triggered by controlled vapor exposure or water bath coagulation. After casting, membranes are rinsed and either sent to post-processing or edge-trimmed, dried, and wound. In-line analytics and real-time data logging ensure a continuous quality monitoring throughout production and guarantee full product traceability.





MEDICAL & BIOTECH
Sterile filtration, diagnostic assays, protein purification, virus removal, etc.

FOOD & BEVERAGE
Clarification, fractionation, concentration of juices, dairy products, etc.

LIQUID FILTRATION
MF/UF/NF, pervaporation, organic solvent nanofiltration, wastewater, etc.

ENERGY STORAGE
Battery separators, fuel cell, VRF, electrolysis ion-exchange membranes, etc.

GAS SEPARATION
Biogas purification, hydrocarbon separation, CO_2 concentration, H_2, etc.

SINTERED MEDIA
Flue gas purification, dust & aerosol removal, oil separation, etc.

YOUR PRODUCT IS NOT IN THE LIST? GET IN TOUCH WITH US AND WE CAN DEVELOP A SPECIAL SOLUTION FOR YOUR NEEDS.

FEEDING DEVICES FOR CASTING

A variety of Berndorf feeding devices has been developed to meet different process requirements for a wide range of products. The versatile application possibilities enable the production of materials ranging from low to high viscosities.

Feeding Devices		Explanation	Advantages
Slot Die		The slot die application system is available in various configurations and can be fully customized according to product requirements. Berndorf can supply a slot die in a pre-metered design with fixed lips, known for its ease of use and quick start-up, or slot dies with flexible lip designs for inline adjustments using a thickness measurement system.	» Low to high viscosity products (~ 1 – 50,000 mPa.s) » Flexible lip design allows smooth & precise adjustment » Optional: Support system & vaccum chamber
Casting Knife		Casting knives are used in laboratories and industrial systems for precise and versatile coating applications. With adjustable gap clearance and micrometer accuracy, they ensure consistent results across various uses like ceramic tape casting and battery electrode production. They support the creation of reliable, high-performance films.	» Low to medium viscosity products (~2 – 5,000 mPa.s) » Adjustable gap clearance & large selection of film widths » High-quality material such as stainless steel
Casting Box		The casting box is a four-sided device made of stainless steel. Product thickness is determined by manually altering the distance between the vertically adjustable gate of the casting box and the Steel Belt. In combination with its optimal belt geometry and the support roll underneath, the casting box can accurately maintain product tolerances for thin items and has no limitations on thicker products.	» Low to medium viscosity products (~2 – 5,000 mPa.s) » Vertical gate to regulate product thickness » Typically with electrical heating

MODULAR HEATING SYSTEMS FOR DRYING

At Berndorf Band Group, we deliver customized drying solutions. Choose from a range of advanced drying technologies designed to meet your specific production needs. Our highly qualified experts support you with pre-engineering and simulation services to define the ideal process strategy, dryer length, and best possible machine design for your target output.

Drying Solution	Explanation
	**BELOW BELT:** **Water spray** for highest heat transfer coefficients
	**BELOW BELT:** **Steam** for high heat transfer coefficients and highest efficiency
	**BELOW BELT:** **Powerful impingement jet air stream** for high heat transfer coefficients
	**BELOW BELT / ABOVE PRODUCT:** **Electrical induction** – clean and highly efficient

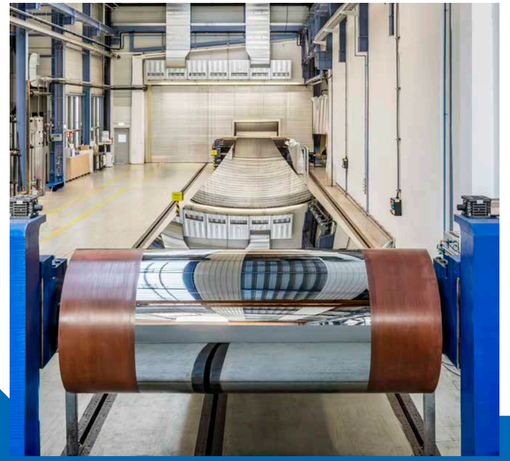
Drying Solution	Explanation
	**ABOVE PRODUCT:** **Air stream in co-flow or counter-flow** to belt movement for gentle vapour discharge
	**ABOVE PRODUCT:** **Impingement jet air stream** for high heat transfer coefficients
	**ABOVE PRODUCT:** **NIR** emitter for deep penetration in absorbent materials

COMBINATIONS OF OUR ADVANCED TECHNOLOGIES TAILORED TO YOUR PRODUCT ARE POSSIBLE – LET OUR EXPERTS GUIDE YOU.

SETTING STANDARDS FOR HIGH QUALITY STEEL BELTS

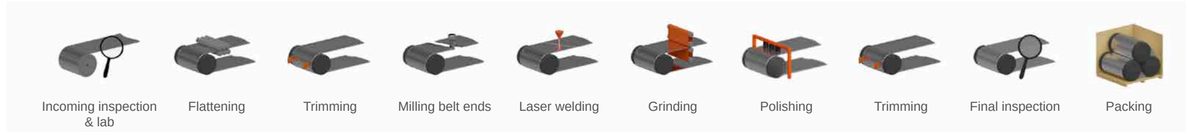
Berndorf Band Group manufactures Steel Belts in endless condition, a distinction that sets us apart in the global market. This unique production process delivers a range of advantages that directly translate into higher productivity, exceptional film quality, and long-term reliability for our customers.

The hardly visible welding seams across the Steel Belt results in a perfectly homogeneous surface finish, free from irregularities or disruptions. This consistency ensures optimal belt tracking, reduced vibration during operation, and a significantly extended belt life. Moreover, the uniform surface is essential for high-precision applications such as optical film production, where even the smallest imperfections can compromise the final product.



ADVANTAGES

- VIBRATION-FREE & SMOOTH BELT RUNNING CHARACTERISTICS TO PREVENT PRODUCTION DISRUPTIONS
- HIGH STRENGTH & RESISTANCE FOR A LONG BELT LIFE
- SURFACE PROTECTION DURING TRANSPORT WITH OUR REMOVABLE PROTECTION FOILS WITHOUT LEAVING RESIDUE
- MINIMAL DEVIATIONS IN FLATNESS & THICKNESS FOR PRECISE END PRODUCTS
- CUSTOMIZED SIZES & BELT DIMENSIONS FOR EVERY APPLICATION



Our manufacturing process also guarantees extremely tight thickness tolerances throughout the entire Steel Belt, including the cross-welding area. This level of precision enables the production of films at maximum output while maintaining exceptional quality standards across the entire width and length of the Steel Belt.

In cases where the machine design does not permit the installation of an endless Steel Belt, Berndorf Band Group supplies Steel Belts in open condition. When installed by our experienced service teams, these Steel Belts consistently deliver outstanding performance, ensuring reliable operation and a smooth production process. Our service personnel, especially those handeling high mirror-polished Steel Belts, undergo regular, in-depth training to maintain the highest quality standards.





INDIVIDUAL STEEL BELT SURFACES

The high quality standards in the production of films and membranes require Steel Belts with specially treated surfaces.

Only with a steel of the highest purity class and a structureless polish, the high requirements for the precise production of optical films can be fulfilled. Berndorf Band Group tailors its solutions to the specific requirements of both end products and raw materials, offering Steel Belts with a variety of surface finishes - including mill finished, ground finished, and polished. To protect the sensitive belt surfaces from contamination and damage prior to use, we have developed innovative protective technologies that can be removed without leaving any residue.



VARIOUS SURFACE GRADES
for your application

HIGHEST PURITY CLASS
of the exclusive manufactured materials

HOMOGEN SURFACE POLISHES
for optical requirements

INVISIBLE HOLOGRAPHIC EFFECTS
for films without optical deflections

PRECISE WELDS
for lowest visibility in the final product thanks to innovative technologies

SURFACE GRADES

PHYSICAL & MECHANICAL PROPERTIES. TYPICAL VALUES.

		Nano polished	PC-1	PC-2	PC-3	PGW-0,12 PGW-0,2 PGW-0,3	Ground G-0,63 G-1,0 G-2,5 G-4,0
	Max. permitted pore size	70 µm	70 µm	100 µm	150 µm	150 µm	Not visible to the naked eye (under inspection conditions)
Pore size surface defects	Pore size locally limited	40 - 70 µm max. 5 pcs./m²	40 - 70µm max. 5 pcs. / m²	-	-	-	-
	No pore restriction up to	<40 µm	<40 µm	<100 µm	<150 µm	<150 µm	Not visible to the naked eye (under inspection conditions)
Scratches		Enhanced cleanliness & roughness distortions	No scratches visible to the naked eye	No scratches visible to the naked eye	No scratches visible to the naked eye	Scratches do not stand out from the rest of the surface	Scratches do not stand out from the rest of the surface
Roughness (typical values)	R_z	< 0.050 µm	0.050 µm	0.050 µm	0.050 µm	0.12 - 0.3 µm	0.63 - 4.0 µm
	R_a	< 0.007 µm	0.007 µm	0.007 µm	0.007 µm	0.02 - 0.04 µm	0.08 - 0.6 µm
Applications		Optical film	Optical film Technical film	Optical film Technical film	Optical film Technical film	Technical film Packaging	Membrans Packaging Composites
Typical belt materials		Nicro 12.1V Nicro 22V	Nicro 12.1V Nicro 22V	Nicro 12.1V Nicro 22V	Nicro 12.1V Nicro 22V	Nicro 12.1V Nicro 22V Nicro 52 Nicro 52.6 Nicro 31	All Steel Belt materials

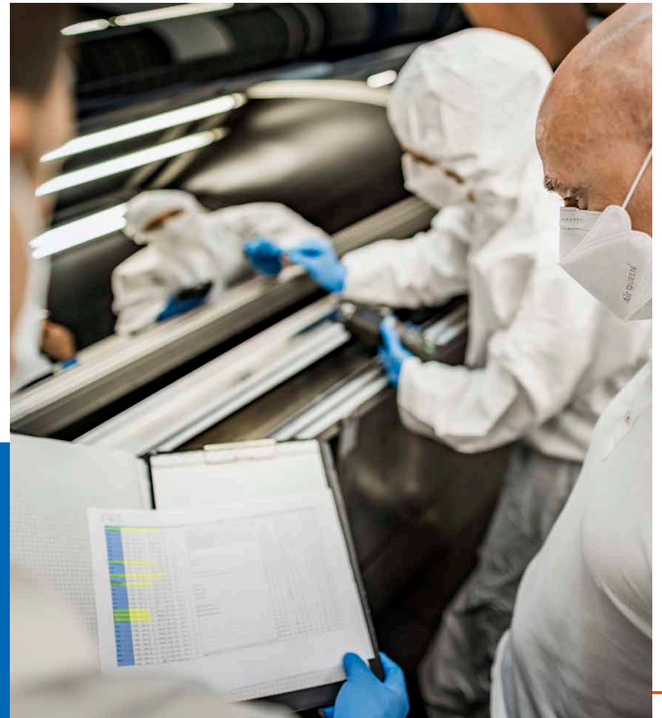
Individual surface grades available upon request.

UNCOMPROMISSING QUALITY FOR UNRIVALED PERFORMANCE

Trusted suppliers under exclusive contracts ensure a consistent supply of premium-grade stainless steel and top-quality consumables, which are forming the foundation for Berndorf Band Group's high-end polished Steel Belts.

Each material undergoes rigorous inspection in our in-house laboratory, where advanced testing methods validate their mechanical, physical, and geometrical properties. This meticulous selection process guarantees that your Steel Belts meet the highest standards of the industry.

From flattening and trimming to laser welding and polishing, our production process is optimized for accuracy and consistency, thanks to our fully certified SO 9001 and ISO 14001 standards. The result is flawless belt geometry, perfect running behavior, and exceptional reliability in continuous operation.



HIGHEST-GRADE STEEL FROM EXCLUSIVE SUPPLIERS

PRECISION MANUFACTURING WITH STRICT QUALITY CHECKS

ADVANCED IN-HOUSE QUALITY INSPECTIONS

STEEL BELTS FOR THE FILMS & MEMBRANES INDUSTRY

PHYSICAL & MECHANICAL PROPERTIES. TYPICAL VALUES.

Material			Nicro 12.1V	Nicro 22V	Nicro 31	Nicro 52	Nicro 52.6
Type			CrNi 17 7	CrNiMo 17 12 2	CrNiTi 13 4	CrNiCuTi 15 7	CrNiCuTi 15 7
Similar material		DIN AISI	1.4310 301	1.4401 316	1.4313		
Tensile strength	at 20 °C at 68 °F	N/mm² psi	1,150 166,800	1,130 163,900	1,080 156,600	1,150 166,800	1,550 224,800
0.2 %-offset yield strength	at 20 °C at 68 °F	N/mm² psi	950 137,800	1,000 145,000	1,050 152,300	1,100 159,500	1,500 217,600
Hardness		Rockwell HRC Vickers HV 10	37.0 360	33.0 330	33.0 330	37.0 360	48.0 480
Elongation 50 mm | 1.97 in		%	18	12	5	8	6
Welding factor			0.70	0.70	0.95	0.95	0.80
Fatigue strength under reversed bending stress*	at 20 °C at 68 °F	N/mm² psi	480 69,600	440 63,800	480 69,600	500 72,500	700 101,500
Modulus of elasticity	at 20 °C at 200 °C at 68 °F at 392 °F	N/mm² N/mm² ksi ksi	200,000 180,000 29,000 26,100	200,000 180,000 29,000 26,100	205,000 29,700	200,000 188,000 29,000 27,300	200,000 188,000 29,000 27,300
Density		kg/dm³ lb/in³	7.90 0.29	7.95 0.29	7.70 0.28	7.74 0.28	7.74 0.28
Mean coefficient of thermal expansion	20-100 °C 20-200 °C 20-300 °C 20-400 °C 68-212 °F 68-392 °F 68-572 °F 68-752 °F	10⁻⁶m/m°C 10⁻⁶m/m°C 10⁻⁶m/m°C 10⁻⁶m/m°C 10⁻⁶in/in°F 10⁻⁶in/in°F 10⁻⁶in/in°F 10⁻⁶in/in°F	16.0 17.0 8.9 9.4 	16.5 17.5 9.2 9.7 	10.8 11.2 11.7 6.0 6.2 6.5	10.9 11.5 11.7 6.1 6.4 6.5	10.9 11.5 11.7 6.1 6.4 6.5
Specific heat		J/g°C BTU/lb°F	0.50 0.12	0.50 0.12	0.46 0.11	0.50 0.12	0.50 0.12
Thermal conductivity	at 20 °C at 68 °F	W/m°C BTU/lb°F	15 8.7	15 8.7	21 12.1	16 9.3	16 9.3
Specific electric resistance	at 20 °C at 68 °F	Ω mm²/m µΩ in	0.73 28.74	0.75 29.53	0.60 23.62	0.80 31.50	0.80 31.50
Min. permissible operating temperature		°C °F	-196 -321	-196 -321			
Max. permissible operating temperature		°C °F	250 482	250 482	350 662	350 662	350 662
Tensile strength at max. permissible operating temp.		N/mm² psi	940 136,300	900 130,500	970 140,700	900 130,500	1,250 181,300
0.2 %-offset yield strength at max. permissible oper. temp.		N/mm² psi	770 111,700	800 116,000	930 134,900	830 120,400	1,180 171,100

Special materials available upon request. | *50 % of the test specimens withstand 2,000,000 load cycles. If not otherwise specified, the values given apply at room temperature. Subject to change due to technological progress. Errors and omissons excepted.

PRODUCTION TESTS
IN OUR TECHNOLOGY CENTER IN AUSTRIA







Our advanced technology center in Berndorf, Austria provides a comprehensive range of services for product development, process design, and various test abilities. By visiting the Berndorf Band Group, you gain access to innovative and modern technology and the longstanding expertise of highly skilled specialists, ensuring optimal solutions for your specific product applications.

Our experts analyze and optimize individual process steps to boost production efficiency and effectiveness. With dedicated pilot and R&D lines for film, foil, and cast membrane applications, we offer unique testing opportunities for process development, scale-up, and refinement. Using your specific formulations on various Steel Belt surfaces, we can simulate and fine-tune different process techniques, ensuring the best possible results for your application.

Whether you are a start-up, an established company, a private or public research institution, a university, or a funded project, we support you throughout the entire development process. From initial product development and process design to testing, upscaling, and the production of the first batches, we help you bring your innovations safely to market.

- Access to advanced research & development infrastructure
- Tailored process optimization through pilot lines and unique testing capabilities
- Comprehensive innovation support: from initial concept to market launch

GLOBAL SERVICE
THAT NEVER STOPS

To ensure the availability of your production at the highest productivity possible, the Berndorf Band Group offers extensive services and maintenance packages including pioneering service equipment centered around Steel Belts and Belt Systems. From installation management to commissioning, we support and advise you on how to get the best use out of your machine. With our highly qualified service technicians and our innovative methods, we ensure satisfied customers around the globe.

SPARE & WEAR PART MANAGEMENT

INSPECTION & MAINTENANCE FOR BELT SYSTEMS

REMOTE SUPPORT

ON-SITE OPEN & ENDLESS STEEL BELT INSTALLATION

RETROFITTING: UPGRADES & UPDATES

PREVENTIVE MAINTENANCE THROUGH ANNUAL MAINTENANCE CONTRACTS

INNOVATIVE WELDING & REPAIR TECHNOLOGIES, PATENTED EQUIPMENT

ON-SITE REPAIR OF HIGH POLISHED STEEL BELT SURFACES





WORLDWIDE FLEXIBLE & QUICK SERVICE

OUR WORLDWIDE SALES & SERVICE NETWORK

EN



FIND YOUR LOCAL CONTACT

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