CORRUGATOR BELTS
Custom solutions for smooth operation of your production processes
Mühlen Sohn corrugator belts are specially developed for use in the heating and tracking section of corrugators. Their four tasks are smooth transport, straight running characteristics, pressure and contact with the heating plates and best possible drying of the corrugated board.

The belts are exposed to considerable stress in the form of temperature, ballast system pressure, friction, tension and moisture. Mühlen Sohn corrugator belts consist of high-tensile, heat and abrasion-resistant fibers that give the belts excellent pulling and transport characteristics. This guarantees safety and reliability during your production process.

Mühlen Sohn corrugator belts are universally applicable – on all machine types known to us worldwide! They are used particularly successfully on modern high-performance corrugators. Moreover, our corrugator belts were developed specially for machines with balast rolls, air hoods or surface pressure loading systems. No matter what your production requires – Mühlen Sohn offers the suitable product for every application.

YOUR ADVANTAGES DURING THE CORRUGATED BOARD PRODUCTION PROCESS

- Insensitivity to external influences
- Enhanced moisture regulation thanks to high moisture absorption and moisture evaporation capability through the use of hygroscopic fibers
- High friction coefficient = excellent board pull
- Better and evenly spread bonding of the corrugated board
- Good straight running characteristics
- Good running smoothness – less noise
- Universal application options
- Reparable in case of damage
- Less edge trimming
- Higher speeds
- For every product mix
- Up to 50 % less waste
Our customers can always rely on Mühlen Sohn’s quality management. We employ a comprehensive quality management system in all company divisions and were certified according to the internationally recognized ISO 9001:ff quality standard in 1995. Mühlen Sohn – this is quality with a seal of approval.

We use exclusively high-grade materials in accordance with the DIN 60910 standard, which we import from all renowned quality manufacturers worldwide in addition to the domestic market. The raw materials always undergo a receiving inspection, directly followed by a quality inspection. All tests are performed using the latest measuring equipment.

Mühlen Sohn was founded in 1880, and we are still benefiting from the many years of experience. Our machinery is among the most modern in the world, and it is operated exclusively by qualified staff with long professional experience. Continuity in our production is one of our objectives. Our unique weaving process, continuous monitoring and documentation of our production and periodic quality checks safeguard the high quality of our products.

Many further developments and patented inventions stem from our company and contributed to making us the market leader. Ongoing innovations secure this position. Accompany Mühlen Sohn into a successful future.

Founded in 1880, Mühlen Sohn has been making technical advances in product development for well over a century. Today we develop, produce and sell high-quality heavy-duty fabrics for technically demanding applications. We see ourselves primarily as a manufacturer but also as a skilled and innovative development and service (OEM) partner in mechanical and plant engineering. Our combination of tradition and innovation is the key to our success. We have been bringing new momentum to our sector ever since the firm was first established. In today’s highly competitive mechanical and plant engineering market this makes us not only a constant presence but synonymous with quality and technology leadership.
CUSTOMER-FOCUSED PRODUCTION & EXCELLENT SERVICE

As the technological market leader for corrugator belts and fluidizing fabrics, Mühlen Sohn stands not only for innovative products of the highest quality. Our flexibility in development and production allows us to expand the existing product range by special products according to customer requirements.

In addition to ongoing further development and enhancement of our products in our in-house research and development department, tailored solutions to suit your requirements are at the forefront of our work. We believe in constant dialog, and close cooperation here. Our customers’ requirements are also always incorporated into the development of our products. Furthermore, we are the technological partner of all important machine manufacturers.

Our representatives in more than 100 countries worldwide – and our branches in the USA and China – ensure direct contact with you.

Customer-focused conduct is incidentally one of our most important corporate principles – from the very beginning. From the initial contact through to comprehensive after-sales service. A short response time, 24-hour service and multilingual employees at the branches are a matter of course for Mühlen Sohn.

Our many years of activity in the corrugated board sector also allow us to support our customers with advice. For example, we can provide valuable assistance in case of quality problems in production and use our expertise to support customers in the ideal design of the heat and traction sections.

CORRUGATOR BELTS – TO YOUR ADVANTAGE

- Maximum quality
- High durability
- Optimal moisture regulation
- Maximum flexibility
- Customer-specific solutions
- Wide range of accessories
- Worldwide availability
- Accessories
- Expert consultation
SERVICE HOTLINE: +49 7304 801-97

24 hours a day, 365 days a year – you can always reach us, and a fast reaction time is guaranteed.

Localized organization of service engineers ensures that we react to customer queries and send engineers within the shortest time.
PRODUCT RANGE

AQUA PULL S
Thicknesses: 8.5/10 mm
Specially for use in the heating and tracking section of a corrugated board system.

AQUA PULL AE
Thicknesses: 8.5/10 mm
With inwoven aramid edge reinforcement, particularly for frequent changes of width.

AQUA PULL S features
- Can be used on all corrugators
- Long life
- Patented lacing
- Suitable as a top and bottom belt

AQUA PULL AE features
- Inwoven armoured aramid edges ensure extra-long life
- Particularly suitable as a top belt
- Patented weave

AQUA RUN
Thickness: 8 mm
Patented open structure.

AQUA RUN AE
Thickness: 8 mm
With inwoven aramid edge reinforcement, particularly for frequent changes of width.

AQUA RUN features
- Highest production speeds and demands
- Corresponds to latest corrugator technology
- For heavy corrugated boards and double wall
- Particularly suited to micro flutes

AQUA RUN AE features
- Particularly suitable as a top belt
- Edge reinforcement substantially reduces wear
- Excellently suited to double wall as well
- Generally for heavy boards
- Patented open structure

AQUA ULTRA
Thickness: 7 mm
Can be used as top & bottom belts, patented open web structure for faster drying of the corrugated board.

AQUA ULTRA AE
Thickness: 7 mm
With inwoven aramid edge reinforcement, particularly for frequent changes of width.

AQUA ULTRA features
- Can be used on all corrugators
- Particularly suited to high-speed machines
- Very high moisture absorption, moisture release and steam permeability
- For all micro flutes
- Can be used as a top belt
- Extremely long life thanks to inwoven edge reinforcement

AQUA ULTRA AE features
- Particularly suitable as a top belt
- Highest production speed and demands
- Corresponds to latest corrugating technology
AQUA PULL S Antistatic
Thickness: 8 mm
With antistatic fibers.

MAX PULL S
Thickness: 9 mm
With silicone coating, can be used as bottom belt.

MAX PULL Antistatic
Thickness: 8 mm
With silicone coating adapted to the web structure, ensures good discharge of electrostatic charges.

AQUA PULL AE Antistatic
Thickness: 8 mm
With inwoven aramid edge reinforcement and antistatic fibers.

AQUA PULL AE Antistatic features
- Specially developed antistatic function prevents static charging
- Patented weave and inwoven edge reinforcement ensure extra-long service life
- Can be used as a top belt

MAX PULL Antistatic features
- Specially developed silicone coating prevents static charging
- Use for heavy board or smooth surfaces
- No adhesion of the corrugated board
- Bottom belt for the most extreme demands

HOT JAW lacing AQUA PULL AE
Patented lacing method for marking-free production.

HOT JAW lacing AQUA ULTRA AE
Patented lacing method for marking-free production.

HOT JAW lacing features
- No contact of the hooks with the corrugated board, heating plates or pressure loading system thanks to special press-in technique
- Flocking protects the corrugated board from marks or blistering
- No weakening of the fabric, because no cutting is required
- Lasts for the entire belt life thanks to being applied below the belt wear limit and manufactured with high-quality components
- Ideal rolling characteristics
- Less noise emission
- Adequate breathability
- Repairable
## PRODUCT OVERVIEW & TECHNICAL FEATURES

<table>
<thead>
<tr>
<th>Product name</th>
<th>Material</th>
<th>Thickness DIN 53655</th>
<th>Temperature resistance in °C</th>
<th>Max. width (mm)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>± 0.3 mm</td>
<td>Min.</td>
<td>Max.</td>
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<tr>
<td><strong>AQUA PULL S</strong></td>
<td>100 % synthetic</td>
<td>8.5 mm</td>
<td>a)  up to 150 °C</td>
<td>1,000 mm</td>
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<td>b)  200 °C</td>
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<td></td>
<td>c)  254 °C</td>
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<tr>
<td><strong>AQUA PULL S</strong></td>
<td>100 % synthetic</td>
<td>10 mm</td>
<td>a)  up to 150 °C (250 °C)</td>
<td>1,000 mm</td>
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<td>b)  200 °C (350 °C)</td>
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<td>c)  254 °C (450 °C)</td>
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<tr>
<td><strong>AQUA PULL AE</strong></td>
<td>100 % synthetic, Para-aramid (Kevlar/Twaron)</td>
<td>8.5 mm</td>
<td>a)  up to 150 °C (250 °C)</td>
<td>1,000 mm</td>
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<tr>
<td><strong>AQUA RUN</strong></td>
<td>100 % synthetic</td>
<td>approx. 8 mm</td>
<td>a)  up to 150 °C</td>
<td>1,000 mm</td>
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<tr>
<td><strong>AQUA ULTRA</strong></td>
<td>100 % synthetic</td>
<td>7 mm</td>
<td>a)  up to 150 °C</td>
<td>1,000 mm</td>
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<tr>
<td><strong>AQUA PULL S Antistatic</strong></td>
<td>100 % synthetic</td>
<td>8 mm</td>
<td>a)  up to 150 °C</td>
<td>1,000 mm</td>
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<td>c)  254 °C (450 °C)</td>
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<tr>
<td><strong>MAX PULL S</strong></td>
<td>100 % synthetic, Silicone</td>
<td>9 mm</td>
<td>a)  up to 150 °C</td>
<td>1,000 mm</td>
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<td>c)  254 °C</td>
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<td><strong>MAX PULL Antistatic</strong></td>
<td>100 % synthetic, Silicone</td>
<td>8 mm</td>
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<td>c)  254 °C</td>
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<tr>
<td><strong>AQUA Climber</strong></td>
<td>100 % synthetic</td>
<td>5.5 mm</td>
<td>a)  up to 150 °C</td>
<td>80 mm</td>
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<td>b)  200 °C</td>
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<td></td>
<td>c)  254 °C</td>
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</tbody>
</table>

1 In dry heat conditions  
2 Belts shrink approx. 1% in width  
3 Up to 3,500 mm wide on request  
4 Edge reinforcement of aramid/Kevlar
ACCESSORIES & MAINTENANCE

SUPER GRIP DRUM LAGGING
Thickness: 8 mm
Consists of high-strength PES fabrics with silicone coating on the top and rubber coating on the bottom. High temperature resistance (260 °C) and high friction coefficient, good chemical resistance.

MULTILAG DRUM LAGGING
Thickness: 8 mm
Consists of temperature and chemical-resistant (oils and greases) rubber. Better force transfer through higher friction coefficient.

MS BELT GUIDES
Guarantee the operational reliability of corrugator belts and save costs by preventing edge abrasion.

AQUA CLIMBER
Thickness: 5.5 mm
For the transport from the single facer up to the bridge and also as a bridge transport belt or as a transport belt in the stacker.
TEST RESULTS – ABRASION TEST

The abrasion resistance is a measure of the abrasion resistance and thus for the service life of materials. Mühlen Sohn corrugator belts possess a verifiably higher life expectancy under identical production conditions.

Implementation conditions:
Textile abrasion testing in accordance with DIN 53863 using the “FRANK” abrasion tester type 666.

<table>
<thead>
<tr>
<th>Load</th>
<th>1.0 kp</th>
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</thead>
<tbody>
<tr>
<td>Abrasion agent</td>
<td>“FRANK” abrasion paper, grain size 280</td>
</tr>
<tr>
<td>Number of rubs</td>
<td>10,000</td>
</tr>
</tbody>
</table>

LIFE EXPECTANCY OF THE CORRUGATOR BELTS

The AQUA PULL S has triple the abrasion resistance of needled felt materials.
TEST RESULTS – MOISTURE/STEAM ABSORPTION AND RELEASE

Evaluation of the moisture absorption and release capacity of various belt media under the following assumed production conditions:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top-belt length</td>
<td>39.00 m</td>
</tr>
<tr>
<td>Top-belt width</td>
<td>2,500 mm</td>
</tr>
<tr>
<td>Belt surface</td>
<td>97.5 m²</td>
</tr>
<tr>
<td>Ø production speed</td>
<td>~ 250 m/min.</td>
</tr>
<tr>
<td>Shifts/production time</td>
<td>2 shifts = 16 hours</td>
</tr>
<tr>
<td>Forward feed (belt contacts board)</td>
<td>4 sec.</td>
</tr>
<tr>
<td>Return (steam release)</td>
<td>6 sec.</td>
</tr>
<tr>
<td>Total cycle</td>
<td>30 sec.</td>
</tr>
</tbody>
</table>

MOISTURE/STEAM ABSORPTION & RELEASE

WOVEN MÜHLEN SOHN BELT
- The belt absorbs the moisture better
- Better moisture regulation
- Drier edges of the corrugated board
- Uniform moisture profile
Good steam penetration from the corrugated board into the belt

NEEDLED FELT
- The used felt can take no more moisture = highest electrostatic charges
- The corrugated board remains humid, specially in the edges = The drying process is not yet completed / the starch is not curing completely
- Poor edge bonding
- Warp
- Uneven moisture profile
- More edge trimming
Poor penetration of steam off the board into the felt, the felt gets hot
TRANSPORT CHARACTERISTICS

To transport the corrugated board through the heating and tracking unit of a corrugator, the necessary tractive force must be transferred from the belt to the corrugated board. This is regulated by the loading system via the belt. The type of loading system (roller or pressure loading system) does not play a role here. The loading system ensures reliable transport at low belt friction coefficients to avoid slipping.

EXAMPLE:
A tractive force of 3,000 kg is to be generated by the friction force between the belt and the corrugated board. The AQUA PULL S corrugator belt has a friction coefficient of 0.42 µ and consequently must be loaded with approx. 7,100 kg. The friction coefficient of needled felt materials is 0.33 µ, necessitating a load of approx. 9,100 kg. The higher the load, the higher the friction between the belt and the press system. This results in higher energy consumption, with this effect occurring particularly in the case of surface pressure systems.

- AQUA PULL S
  - Friction coefficient: 0.42 µ
  - Load: 7,100 kg
  - Ttractive force: 3,000 kg

- Needled felt
  - Friction coefficient: 0.33 µ
  - Load: 9,100 kg
  - Ttractive force: 3,000 kg

Firm belt material distributes the roller contact pressure over a large area
- Smoother adhesion/higher quality
- Stiffer and drier board
- Less warp
- Less wear of the heating plates
- Higher temperature transfer
- Higher speed

Soft felt material leads to highly localized pressure due to load rollers on the felt via the corrugated board on the heating plates
- Insufficient heat/temperature transfer and therefore poorer adhesion
- Poorer quality – can result in squeezed corrugated board
- Only low speeds possible
- Originally developed only for paper machines
- Heavily worn heating plates
**ECONOMY – LESS EDGE TRIMMING**

Lack of adhesion – as is frequently seen with needled felt materials – is the most common cause of waste.

Less edge trimming with the AQUA PULL AE thanks to reliable adhesion in the edge area by the patented edge protection, which ensures uniform thickness reduction of the corrugator belt across the whole width of the belt and over the entire life and thereby reduces waste by up to 50%.

**TEMPERATURE PROFILE IN CORRUGATOR BELTS**

Corrugators are usually operated with different paper widths. With small paper widths, the temperature rises significantly at the belt edges. This leads to an extreme temperature and friction load and to higher abrasion at the edges of PES and cotton belts and thereby also to a significantly shorter service life. The woven-in edge reinforcement of aramid fibers used in the AQUA PULL AE withstands the high loads. The inwoven aramid edge reinforcement restores a production output of 60 to 80 million running meters or more.