

NOTES & RECOMMENDATIONS

# MAINTENANCE MANUAL FOR CORRUGATOR BELTS

Instructions and tips for  
Muhlen Sohn corrugator belts and drum laggings





## BRIEF OVERVIEW

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This manual is intended exclusively for users who already own Muhlen Sohn products. The information in this manual (e. g. about running or storage times) is not part of the contract, unless otherwise expressly agreed, and also does not represent a guaranteed or otherwise owed characteristic. The contents of this maintenance manual is legally protected. Mühlen Sohn GmbH & Co. KG reserves all rights thereto. The manual is intended exclusively for internal use by the customer. It may not be passed on to third parties, made available on the Internet or reproduced in any other way.

Our Muhlen Sohn corrugator belts have been specially developed for use in the heating and tensioning section of a corrugator. During use on a corrugator, the belt is subjected to considerable stresses such as temperature, contact pressure, friction, tensile stress and moisture. For this reason, our belts are made of tear-resistant, heat-resistant and abrasion-resistant fibers that give the fabric extremely high tensile and transport properties. Nevertheless, the different load factors influence the belt behavior as well as the running performance. Here you will find all important information for a long running time. If you have any questions, please contact our service department.

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GENERAL INFORMATION

# BELT PERFORMANCE – BASIC ELASTICITY

Muhlen Sohn corrugator belts have significant advantages or properties (see below). To achieve these characteristics, our corrugator belts are produced on specially developed machines and from specially selected raw materials. During production, our weaving machines simulate the tension conditions that typically prevail later on the corrugators, i.e. the belts are woven under huge preload. This gives the belts their good strain values and dimensional stability as well as good tensile strength. Our corrugator belts (except MAX PULL) are not coated, thermoset or treated by any other means, but only cut to length and laced. Thus we create a "living belt" which adapts on any corrugator.

This basic elasticity of the belts leads at the same time to a shrinkage during the storage depending on storage time and storage conditions<sup>1</sup>:

- approx 1.0 %<sup>2</sup> storage shrinkage with a storage time of 6-8 months<sup>2</sup>
- up to 2.0 %<sup>2</sup> bearing shrinkage with a storage time of more than 8 months<sup>2</sup>

The shrunk belt expands again on the machine under tension:

- up to 1.5 %<sup>2</sup> of the produced cut-to-length belt length

Therefore, the Muhlen Sohn belts are supplied with the minimum machine length plus defined additional length of up to 2.5 %<sup>2</sup>.

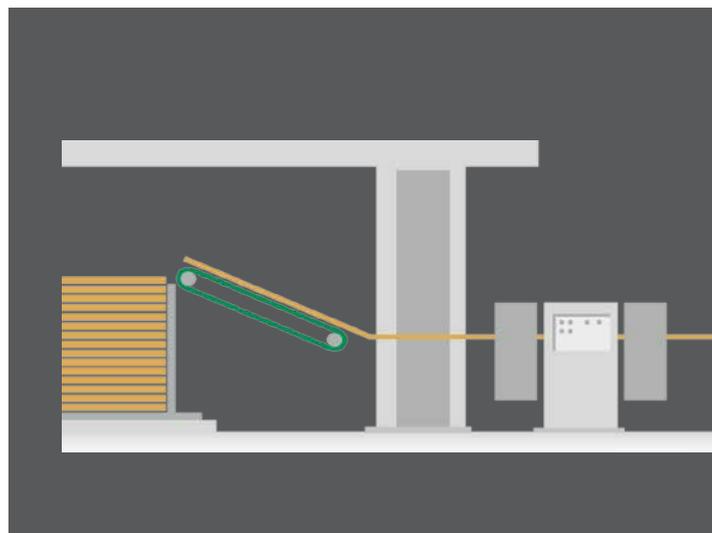
If required, an installation aid "Dutchman" can be supplied for installation, which is removed again after the test run once the belt has stretched appropriately. The running-in procedure results in optimum straight running by adjusting the belt on the machine under production conditions. The width of the belt may shrink by up to max. 1 %<sup>2</sup> during the first one to two weeks<sup>2</sup> after installation under normal use.

<sup>1</sup> See chapter Bearing recommendation.

<sup>2</sup> These values are based on long-term experience and can't be finally guaranteed.

## MUHLEN SOHN – YOUR ADVANTAGES

- Excellent moisture management
- Excellent paper entrainment
- High quality for a long lifetime
- Firm bonding and fast drying of the corrugated board
- Universal application possibilities



## GENERAL INFORMATION

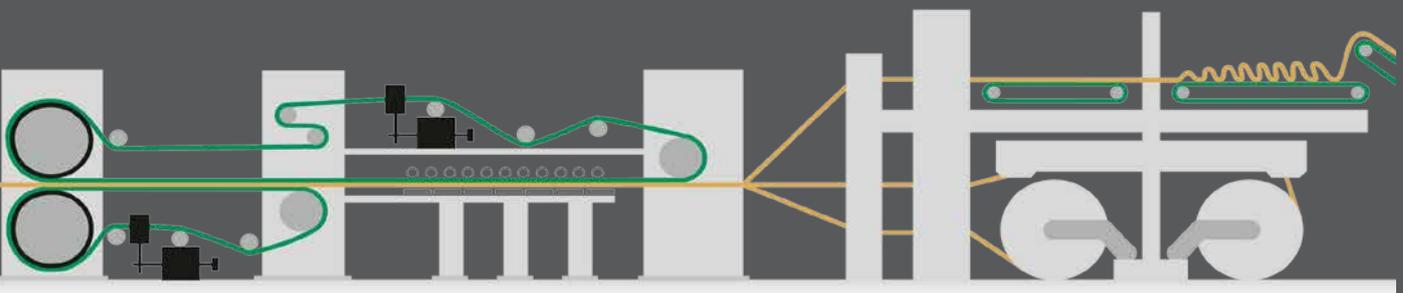
# STORAGE RECOMMENDATION

Our Muhlen Sohn corrugator belts can be stored. However, as a high-tech product, they require careful handling. Please refer to our storage instructions. In addition, the shrinkage of the belt length increases with the duration of the storage period. We therefore recommend not to exceed the storage time of max. 24 months.

In case of storage of the belts, please consider the following directions:

- Storage exclusively in dry, ventilated rooms (not outdoor)
- Storage exclusively in the delivered and unopened original packaging from Muhlen Sohn
- Store protected from UV light / geschützt vor UV-Strahlung
- Storage protected from the effects of heat (e.g. from the corrugator or sunlight) and cold
- We recommend to store within this temperature range: 5 - 50 °C (41 - 122 °F)
- Storage protected from dirt and dust
- Storage protected from vermin e.g. mice or rats
- Storage protected from shunting damage

## UNIVERSAL USE OF OUR PRODUCTS



GENERAL INFORMATION

# EXPECTED BELT RUNNING PERFORMANCE

Muhlen Sohn cannot give any guarantee on the running performance of the belts. The running performance is determined by many different factors (see below) which Muhlen Sohn cannot influence. With correct maintenance and operation of the system and the corrugator belt (in accordance with the manufacturer's specifications), we assume the following expected running performance (benchmark) per meter of belt length for our top and bottom belts used.

## BOTTOM BELTS

- AQUA PULL S approx. 3 million running meter / running feet per m / ft belt length
- MAX PULL S approx. 5 million running meter / running feet per m / ft belt length
- AQUA PULL Antistatic approx. 1 million running meter / running feet per m / ft belt length
- MAX PULL Antistatic approx. 5 million running meter / running feet per m / ft belt length

## TOP BELTS

- AQUA PULL AE approx. 1.5 million running meter / running feet per m / ft belt length
- AQUA ULTRA AE approx. 1.5 million running meter / running feet per m / ft belt length
- AQUA RUN AE approx. 1.5 million running meter / running feet per m / ft belt length
- AQUA PULL S<sup>3</sup> approx. 1 million running meter / running feet per m / ft belt length

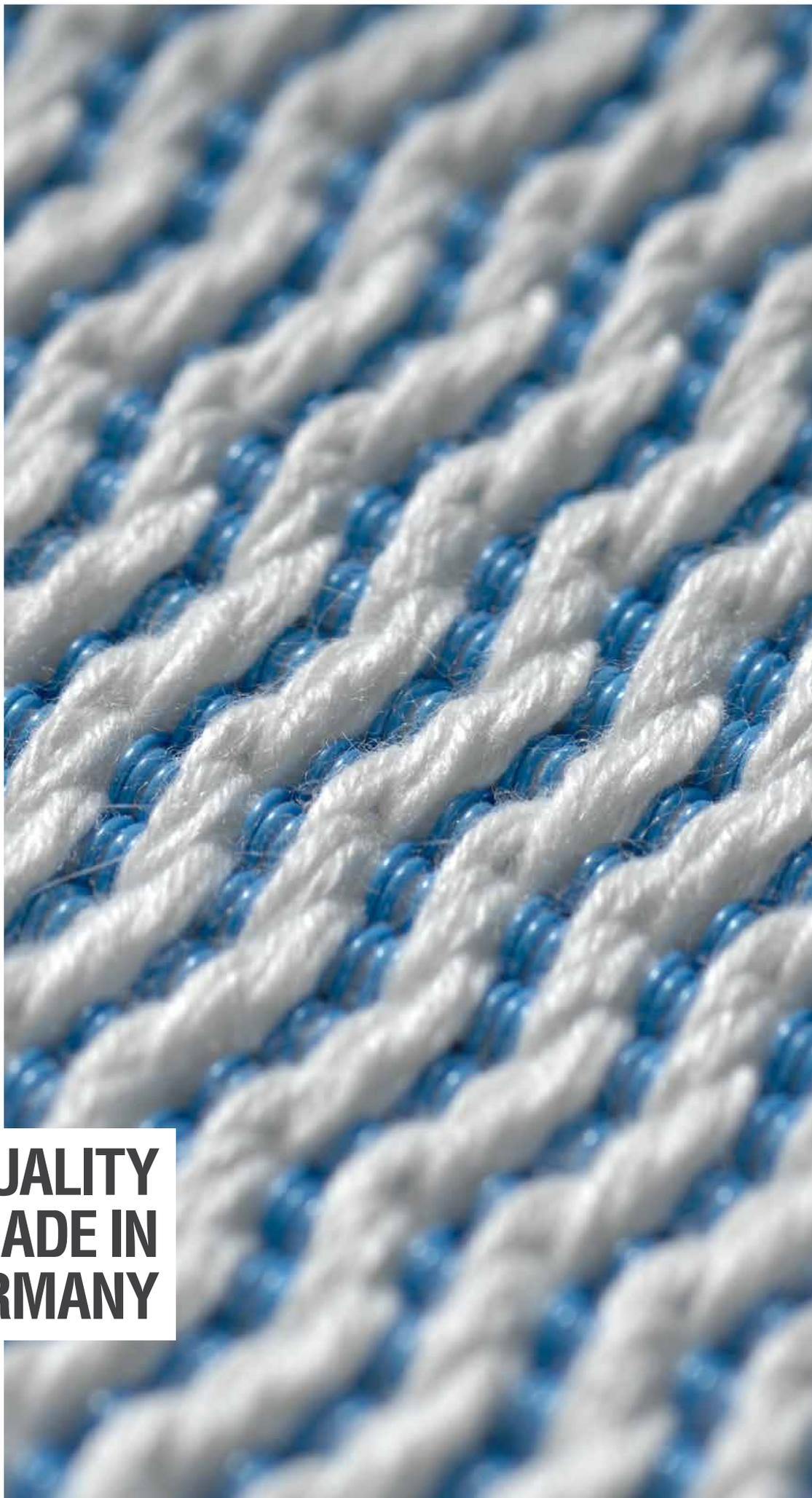
<sup>3</sup> Our universal basic belt AQUA PULL S is primarily a bottom belt. As a standard top belt, we recommend our AQUA PULL AE with woven-in aramid edge for higher temperature and abrasion resistance at the edges.

## IMPORTANT NOTE

These figures represent the average running performance determined worldwide and can vary significantly depending on the plant, product mix and maintenance. The service life is negatively influenced by the following factors, among others:

- Incorrect tension of the belt
- (Partly) incorrect function of the pressure system
- Contamination of the belt or faulty cleaning
- Bad condition of the drum lagging
- (Partly) incorrect function of the belt guider
- Different belt speeds from upper to lower belt
- Frequency of emergency stops
- Mainly production of heavy board
- Frequently changing paper widths
- Frequently changing board qualities
- Frequently changing glue qualities
- Frequently changing orders





**QUALITY  
MADE IN  
GERMANY**

# INSTALLATION INSTRUCTIONS

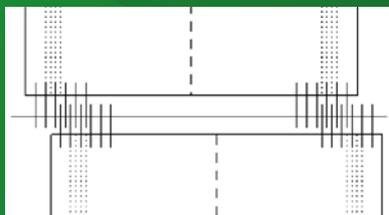
**For installation, please preferably contact our experts from the service team. Installation may only be carried out by trained specialists. The following notes do not represent complete installation instructions and therefore do not replace professional installation by our service staff.**

1. If a bottom belt is mounted, additional preparations must be made. The belt should be placed on the clean floor so that it can be unwound from there. Make sure that the floor is clean from oil and grease. If necessary, use a piece of corrugated board between the belt roller and the floor to facilitate unwinding of the belt.
2. Before the old belt is removed, the path of the belt through the double backer should be documented. This helps to install the new belt correctly on the machine.
3. The condition and wear of the drum lagging must be checked. Checking the shore hardness is only required for rubber laggings. Replace the drum lagging if necessary to ensure uniform power transmission.
4. The double backer must be checked for cleanliness and possible damaged areas. Glue deposits, paper and other residues (e. g. oil, fat, dirt) must be removed from and between the heating plates as well as from the lifting system.
5. During installation the temperature of the hot plates should not exceed 60 °C (140 °F), otherwise the belt will shorten considerably and the surface properties may change.
6. Check if all rollers are parallel to each other, especially to the drive and tail drums. Then place the belt between the tensioning unit and the drive drum. Therefore, release the tensioning system.
7. Open the old lacing. Connect the old belt with the new one using a wire across the entire width. Note the correct placement of the paper and pressure side of the belt. Run the corrugator very slowly to pull the belt through the machine. It is important to ensure that the lacing is not damaged during this process. Stop when the lacing arrives the starting position.
8. After pulling in the belt, please check the positioning of the alignment marks to each other (see illustration). Pull in the plug-in wire supplied. The belt buckle should be completely free of tension, otherwise the wire may break. In addition, only lacing wires that are approved for this type of belt may be used. -Do not tuck the lacing wire back into the lacing. Ensure the edge in contact with the belt guide is even.

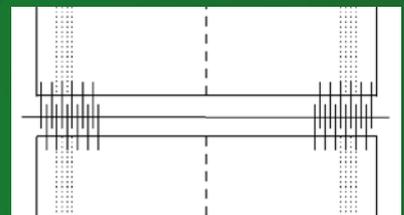


## IMPORTANT NOTE

Before you insert the lacing wire, align the middle tracer thread (colored yarns) with one another. The alignment marks must point exactly to each other.



■ WRONG



■ CORRECT

## USE AND MAINTENANCE

# COMMISSIONING OF THE BELTS

A prerequisite for smooth production and the manufacture of proper corrugated board is the correct commissioning of our belts. Please observe the following recommendations regarding tension and test run when commissioning our belts. In addition, please consider the instructions of your machine manufacturer. If you have any questions, please contact our experienced service team.

## TENSIONING

- Our woven belts can be stretched excessively when cold. Therefore, it is important to use only the tensioning pressure needed for smooth production (as low as possible). Later, the pressure can be increased or reset to the value prescribed by the manufacturer.
- The tensioner should be positioned between 25 % to 75 % of the total take-up.
- Please apply the settings according to the manufacturer (machine manual).

## START-UP

- The test run should be started when the corrugator is cold and carried on until the production heat is achieved. This will stabilize length and width.
- The test run should be done only short-term (a few minutes) in cold condition.
- Once the belt has stabilized, the belt guider has to be checked, since a reduction in width may require adjustments. The belt should run centered on the driving drum.
- The test run should be done with a max. speed of 200 m/min (656 ft/min) and not more than 70 % of the maximum load at the heating section.
- Avoid unnecessary stops as well as emergency stops.
- The belt movement from side to side should be not more than 1.5 cm (0.59 ").
- Any change to the tensioning station or controller should be made in small steps.
- After the installation, it is recommended to avoid, if possible, initially sensitive qualities directly after the assembly a new belt (especially qualities that are intended for the printing system) in order to avoid marks of the lacing.
- Our corrugator belts have different noise level. Depending on the machine configuration, higher noise levels cannot be avoided – especially on corrugators with ballast roller systems. Depending on the machine type, systems used and speeds, vibrations and associated noise emissions may occur. These cannot be avoided, but have no influence on the quality of the products. No guarantee can be given for compliance with certain limits. Please ask your contact person of our sales team in case of any uncertainties.
- After installing the belt, there may be a brief increase in power consumption (approx. 2 weeks).
- If necessary, the pressure system has to be re-adjusted due to the new belt calipers.

USE AND MAINTENANCE

# MAINTENANCE RECOMMENDATION

The cleanliness of the equipment including drum lagging and corrugator belts has a significant influence on the quality of the corrugated board. It is therefore essential to ensure regular maintenance and cleaning of our products. Regular maintenance and repairs also help to maintain the running performance of our corrugator belts. If you have any questions, please contact our service department.

## CONTINUOUS

- Remove all glue deposits on the heating plates
- Belt cleaning from obvious contamination (glue residues, paper deposits)
- Avoid oil, grease, dirt on the belts or the drum lagging
- Always adjust the position of the glue dams on the lamination unit to the current web width

## DAILY

- Visual check of belt damages
- Visual check of contaminations/dirt
- Check of belt lifting device (excavation sword)
- Check of belt straight tracking of the belt
- Check of ease of movement

## WEEKLY

- Check of the belt guiding device
- Check of bearings (front side of drum) for excess grease
- Check of the tensioning path / tension distance
- Check of the lacing and flocking

## MONTHLY

- Check of the belt thickness
- Check of the lacing wire
- Check of the pressure system for dirt, rust and damage
- Check of belt functions / penetrations
- Check of drum lagging including the check of silicone coating (thickness) / measurement of shore hardness of rubber drum lagging

# TESTS FOR DETERMINING THE TIME FOR BELT CHANGE

To determine the right time to replace the belt, there are two tests. Firstly, the thickness of the belt is measured to determine the degree of wear or abrasion. Secondly, the moisture test provides information about the belt's functionality in terms of its moisture management. Also consider the delivery time and re-order a new belt in time.

## BELT THICKNESS TEST

Carry out the measurement in accordance with the measurement standard for textiles DIN 5084 and with a suitable thickness gauge for textiles. The measurement must also be carried out in the untensioned state.

The insertion of a clamp joint/seam covered on both sides and pressed in to a defined thickness results in the following thickness limits, provided that damage to either the hotplates or also the loading system should be excluded:

- for AQUA PULL S, AQUA PULL Antistatic, AQUA PULL AE und AQUA RUN AE: 6.5 mm (2.55 ")
- for AQUA ULTRA AE: 4.6 mm (1.81 ")

The belt must not be ran if it is lower than the above thicknesses. For MAX PULL S and MAX PULL Antistatic, the silicone layer is decisive. If there is no more silicone on the belt, it must be replaced.



Belt thickness measurement

## MOISTURE TEST

A simple moisture test can be easily performed by any operator on site. Use a pipe to apply a few drops of water to the corrugator belt which is at normal operating temperature and humidity and lying horizontally (!). Measure the time it takes for the drop to be completely absorbed by the fabric. The time should be max. 30 seconds. At all higher values, a belt change should be considered.

For our AQUA ULTRA AE and AQUA RUN AE belts, in addition to the drop test, it is primarily the vapor permeability that is decisive for the functional capability of the belt, so that with these two belt types the function is sufficiently present even with reduced drop test values.

For all other belt types, belt exchange is recommended above all if there is a poor moisture test in combination with a low belt thickness. The moisture-absorbing hygroscopic fibers have been already rubbed off on the surface, resulting in a belt that must be replaced.



Drop test AQUA PULL AE



**PRODUCTS  
WITH LONG  
SERVICE LIFE**

# INDICATIONS TO MAINTENANCE / REPAIR WORK

The Muhlen Sohn HOT JAW lacing with flocking protects your corrugator from damage at the loading system (heating plates or pressure system) and avoids marks on the corrugated board. If the flocking and/or the lacing are damaged due to heavy abrasion, this can cause damage to the machine. The Muhlen Sohn lacing can be repaired. Re-lacing is also possible. However, this depends on the belt thickness and the remaining tension path. If you have any questions, please contact our service department.

## FLOCKING SHOULD BE RE-APPLIED

- Flocking is rubbed off in places
- If ridgeline is still available, flocking should be applied
- Caliper of the lacing is still thinner than the rest of the belt



## LACING SHOULD BE RE-APPLIED

- Flocking is mostly rubbed off
- If no ridgeline is available, a cut & lace is required
- Lacing thickness is even with the belt thickness



## RE-LACING IS REQUIRED

- Exposed lacing
- Risk of lacing and hook break
- Damage to machine parts possible due to the exposed lacing



## NEW LACING URGENTLY REQUIRED AND CHECK OF THE PRESSURE SYSTEM

- Grinded laces
- High risk of damage to the pressure system due to the exposed lacing



# FURTHER NOTES ON THE USE OF THE BELTS

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Muhlen Sohn recommends observing the following guidelines regarding the moistening of the belts, the use of a brush cleaning system, and the use of additives and lubricants. If you have any questions, please contact our service department or your machine manufacturer.

## HUMIDIFICATION OF THE BELT

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Muhlen Sohn recommends not to moisten the corrugator belts. Constant moistening of the belt means the exclusion of any warranty and guarantee claims on the part of Muhlen Sohn.

However, if short-term humidification is carried out, the following points must be taken into account:

- The steam spray system must be maintained and cleaned regularly.
- The vapor deposition must take place uniformly over the entire belt width.
- There must be no drop formation on individual glands.
- Do not use heated steam, only saturated steam.
- Do not allow constant moistening!

## BRUSH CLEANING UNIT

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Muhlen Sohn recommends not using a brush cleaning system, as the belt can be damaged by its use. Damage resulting from the use of a brush cleaning system means the exclusion of any warranty and guarantee claims on the part of Muhlen Sohn.

Should you nevertheless use a brush cleaning system, the following points must be observed:

- A brush that is set too low can damage the flocking of the lacing and thus lead to production problems.
- A brush set too high will not achieve a cleaning effect.
- As the belt thickness decreases, the brush must be placed downwards.
- When mounting a new belt, the brush must be placed upwards again.
- A brush cleaning system should not run continuously, only when needed!

## USE OF ADDITIVES AND LUBRICANTS

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All additives (e.g. kerosenes, waxes), but also lubricants, can have a negative effect on the surface texture of Muhlen Sohn belts and drum laggings. As a result, proper functioning cannot be guaranteed. Therefore, do not use any additives in the production process.

The use of additives and lubricants means the exclusion of any warranty and guarantee claims on the part of Muhlen Sohn.

# WORLDWIDE SERVICE - FAST & COMPETENT

Fitting and adjusting belts optimally requires many years of experience. With our highly qualified and regularly trained service team, this is guaranteed. And thanks to their professional qualifications, the Muhlen Sohn service team can also provide important tips and advice on the correct use of corrugator belts. If you have any questions, please do not hesitate to get in touch with your contact at Muhlen Sohn. We will be happy to help you!



**MUHLEN SOHN – SERVICE HOTLINE: +49 175 2909 745**

24 hours a day, 365 days a year -

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