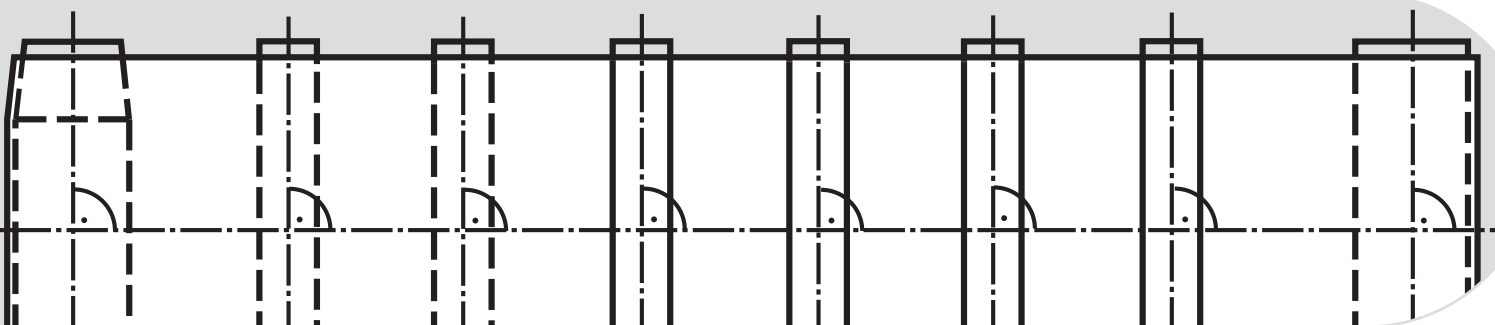
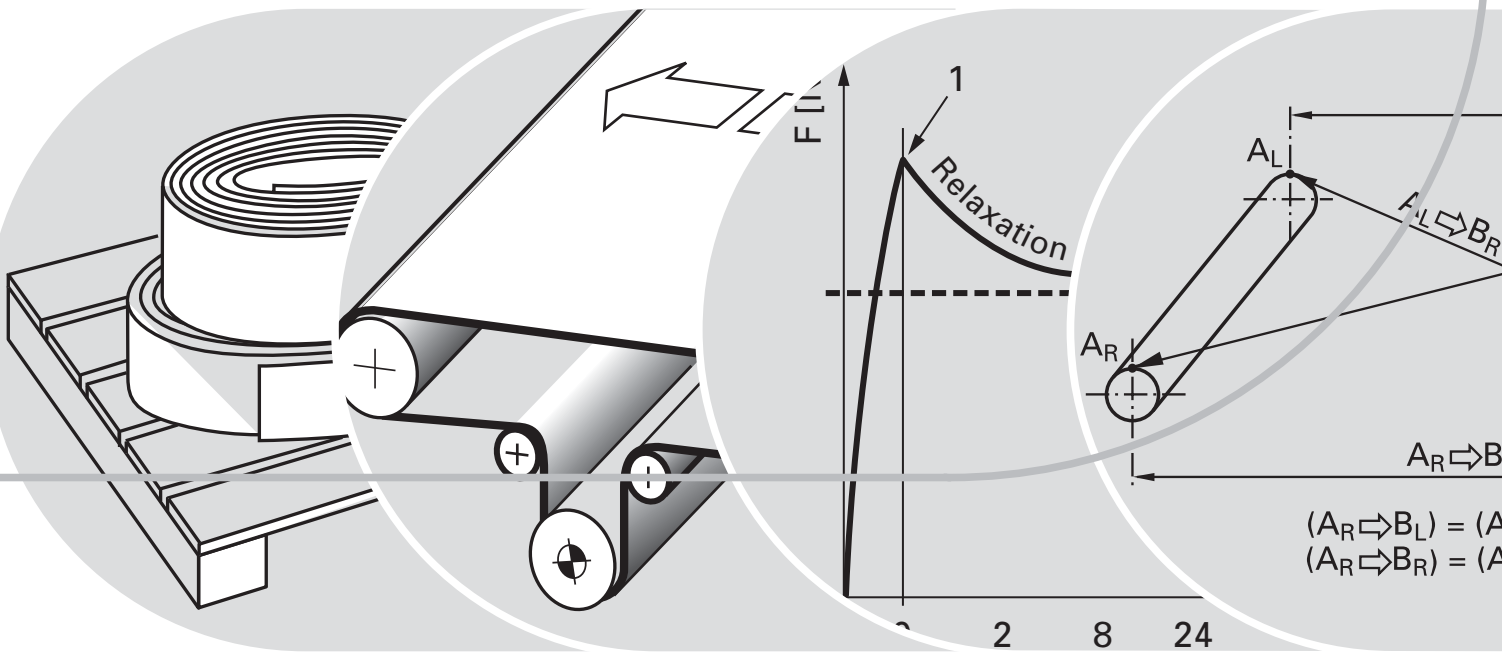


Fabric Conveyor Belts Installation and Maintenance Guide

Habasit – Solutions in motion



The objective of this Installation and Maintenance Guide is to provide both manufacturer and operator with a comprehensive, albeit summarized overview of the most important aspects of the installation of conveyor systems as it pertains to fabric conveyor belting. Emphasis has been placed on recommendations on installation procedures, belt maintenance and cleaning as well as on storage of the conveyor belt itself.

A comprehensive trouble-shooting checklist supports fitters and service personnel in taking the right measures if tracking problems arise.

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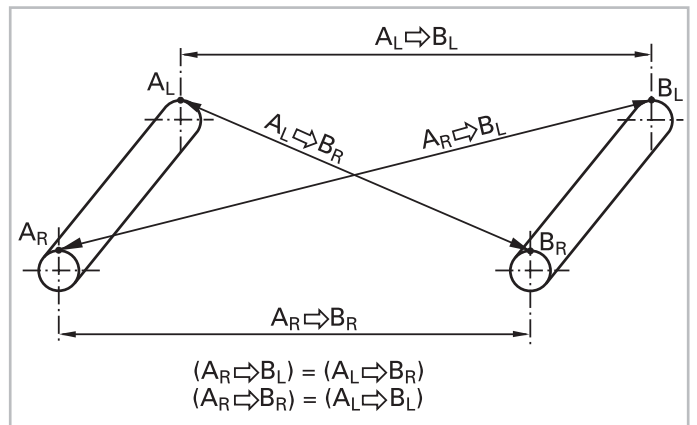
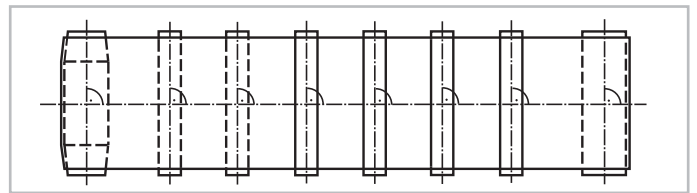
The installation of a conveyor belt consists of the following steps: Checking the conveyor installation, belt installation, putting it into operation and aligning the belt.

Checking the installation

Prior to belt installation it is highly important to check the conveyor installation thoroughly and to rectify any faults immediately.

- Make certain that the drive is switched off and ensure that it cannot be accidentally switched back on
- Ensure that all parts of the installation in contact with the belt are clean and free from oil, grease and dirt, etc.
- Ascertain that the supporting structure is not distorted and is accurately aligned in all planes
- Ascertain that all pulleys and rollers and nosebars are set axially parallel and exactly at right angles to the belt running direction
- Check that the installation dimensions are correct. The best method is to measure across the diagonals and is done by marking the ends of the pulleys/rollers exactly at the verticals to the shaft axis (A_R, A_L, B_R, B_L). The diagonal distances of points $A_R \leftrightarrow B_L$ and $A_L \leftrightarrow B_R$ must be exactly identical as well as distances between centers $A_L \leftrightarrow B_L$ and $A_R \leftrightarrow B_R$.

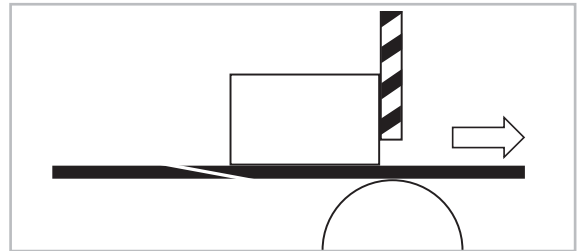
Note: Identical distances between centers ($A_L \leftrightarrow B_L$ and $A_R \leftrightarrow B_R$) alone are no guarantee of the rectangular arrangement of the pulleys/rollers!



Belt installation

After the checks described before have been completed and any faults rectified, the belt assembly can start.

- The tensioning device must be fixed on the lowest setting of the take-up
- The belt ends must be protected from soiling and damage during assembly. The belt should not be twisted or kinked at any time during assembly.
- Great care must be taken in feeding the belt into the installation
- In the case of skived and glued joints (Thermofix), care needs to be taken to ensure that goods will not damage or tear the joint. This is particularly important when accumulation takes place.
- If the belt is to be joined on site, the joining instructions must be carefully followed
- When tensioning the belt, ensure that the tension pulley is adjusted exactly in right angle to the belt running direction



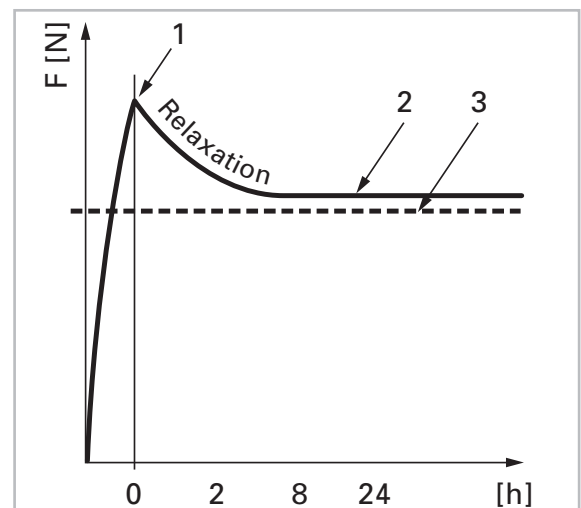
First-time tensioning

Although in practice conveyor belts are often tensioned by feel, it is important to make sure that the driving pulley can drive the belt without slipping even under maximum load.

Because synthetic conveyor belts relax after the first elongation, the effective tensile force decreases during a running-in time of several hours, until the force remains constant.

It is important that the belt has been sufficiently tensioned already at the installation in order to guarantee slippage-free operation after the relaxation phase.

Therefore, the correct tensioning procedure and the observation of a minimal initial elongation are important.



- F Tensile force [N]
- 1 Tensile force immediately after tensioning
- 2 Effective tensile force after relaxation
- 3 Required tensile force for slippage-free operation after relaxation

Recommended initial elongation

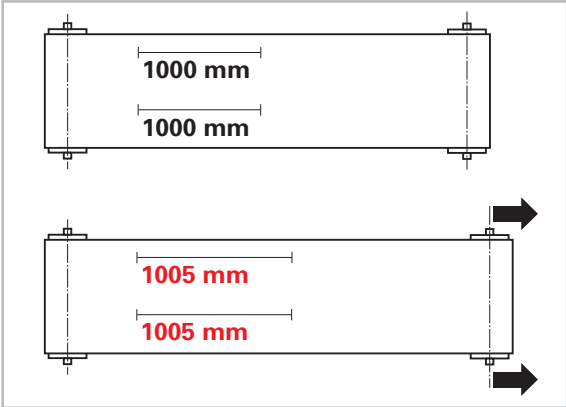
The minimum and maximum admissible initial elongation ϵ_0 vary according to the material used for the traction element:

Traction layer material	Min. initial elongation ϵ_{0min}	Max. initial elongation ϵ_{0max}
Polyester fabric	0.3%	around 1%
Polyamide fabric	0.5%	around 1.5%

The optimal initial elongation can be calculated by help of the Habasit CONVEY-SeleCalc program. If the calculated initial elongation is available, this figure should be used.

Procedure for first-time tensioning

1. Place two measuring marks on a distance of 1000 mm on each side of the untensioned belt
2. Tension the belt with the tensioning device to the required initial elongation ϵ_0
3. At for example 0.5% initial elongation, the correct tension is achieved, if the distance of the marks has increased to 1005 mm
4. Rotate the belt at least one circuit and measure the distance between the marks again. Retension the belt to the required initial elongation when necessary.



Belt alignment

Since the conveyor belt is following the alignment of the structure and components on which it is operating, it is essential that the conveying installation itself is accurately aligned and that the belt is properly fitted by trained personnel.

- At first, run the conveyor belt only slowly or intermittently with frequent stops and starts, so that any run-off tendency can be detected quickly and rectified before any damage occurs
- Make the first corrections at locations where potential for damaging the belt is greatest
- Carry out adjustments in small steps, working on only one pulley at a time. Adjustments to multiple pulleys or rollers can adversely affect the tracking characteristics of the belt, causing the system to become unstable and vary with different operating conditions.
- If guiding pulleys are present, it is recommended to use these elements to align the belt run
- After each adjustment, allow the belt to rotate a few times to position itself to the new alignment before making any further corrections
- Bear in mind that each tracking adjustment may result in further adjustments being necessary elsewhere on the installation
- Cylindrical pulleys which are not at right angles to the belt running direction are not self-tracking and so, with changes in run-off tendency, will need to be reset. That's why, with reversing operations, the position of cylindrical pulleys should remain exactly at right angles to the belt running direction.
- In the case of belts with guiding profiles, the belt is to be aligned under no-load conditions so that the profile can run in the grooves without running against the groove walls

Note: Design measures with regards to belt tracking are explained in the "Fabric Conveyor Belts Engineering Guide" (Media No. 6039)

Proper untensioning and retensioning

Special care has to be taken when a conveyor belt needs to be untensioned (and possibly removed in order to perform maintenance work) and finally installed and tensioned again.

Note: Retensioning of a released conveyor belt with the described method for first-time tensioning (see page 4) results in overtensioning, as the new elongation will be added to the not yet fully released initial elongation.

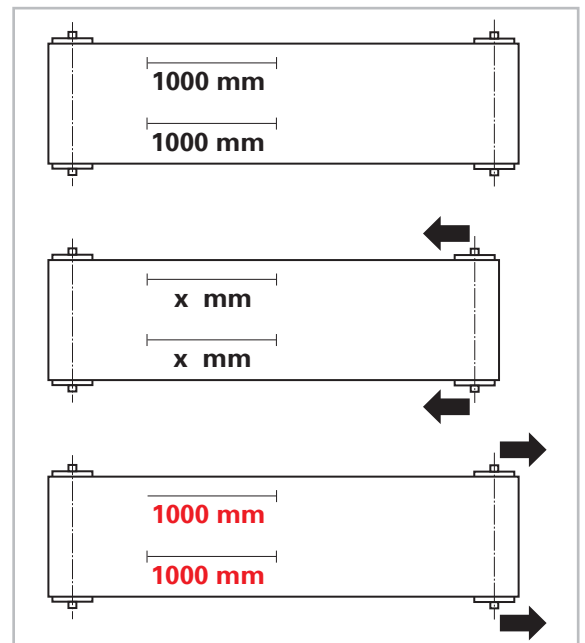
The correct procedure, therefore, is the following:

Before (!) slackening the belt, place measuring marks on a distance of for example 1000 mm on each side of the tensioned belt. If the marks of the first tensioning are still visible, these can be used as well.

Memorize or take a note of the original distance between the measuring marks of the tensioned belt!

Slacken the belt by releasing the tensioning device. The distance of the measuring marks gets shorter, however, the released length (x) is not of interest.

After the maintenance work is finished, reinstall the belt and tension it until the measuring marks reach the previously noted distance (for example 1000 mm).



Apart from cleaning, conveyor belts made of synthetic materials require little maintenance.

Check of the belt tension

A periodic check of the belt tension is recommended, particularly where operating conditions are harsh, e.g. frequent starts under full load, significant temperature fluctuations, etc.

If the tension is too low, retension the belt until it works again properly. Do not exceed the maximum admissible elongation of the conveyor belt.

Cleaning

It is important that all parts of the installation that come into contact with the belt are kept as clean as possible. Oil, grease, moisture, rust, dirt, traces of conveyed products, etc. on pulleys, rollers, slider bed and other parts of the installation in contact with the belt may cause operational and belt performance problems and will certainly shorten belt service life.

The importance of belt cleanliness with regard to drive, proper tracking response and belt life cannot be overemphasized. Dirt on the conveying side of the belt may also lead to process breakdowns. Obviously hygiene is of particular significance in the food sector where a number of special cleaning measures must be implemented.

Listed below a few general points on the cleaning of synthetic conveyor belts:

- Cleaning should, wherever and whenever possible, be carried out when the installation is at rest (safety aspect)
- In the case of light dirt deposits (dust, etc.), clean with a soft cloth; dry or moistened with cold or warm water
- Oily, greasy soiling can be removed with hot water and a general, non-abrasive household detergent (low foaming types can aid the rinsing process)
- Spot cleaning can be performed via a damp rag application of a suitable solvent (see table)
- Heavy soiling can be removed by scrubbing with hot soapy water or washing with a mild solvent (see table)

The following table shows the relative suitability of common detergents and solvents for cleaning of synthetic conveyor belts:

Habasit category of resistance		1	2	3	4	5	6	7	8	9	10
Material cover (conveying side)		PA	NBR PUR Hamid	PVC*	EPDM	NBR PUR SI	TPU PUR+TPU NBR+TPU SI+TPU	PVC**	PTFE	TPO	Habilene
Material traction layer (fabric)		PA	PA AR Hamid CEL	PET	PET	PET Glass	PET AR BW	PET	AR	PET	PET
Cleaning agent	Neutral ¹⁾	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺
	Alkaline ²⁾	☺	☺	☺	◆	☺	☺	☺	☺	☺	☺
	Acid ³⁾	○	○	☺	☺	☺	☺	☺	☺	☺	☺
	Chloric ⁴⁾	◆	◆	◆	◆	◆	◆	◆	☺	☺	☺
	Alcohols ⁵⁾	☺	☺	◆	☺	☺	○	☺	☺	☺	☺

List of materials

AR	Aramide
BW	Cotton
CEL	Cellulose
EPDM	Ethylene propylene terpolymer rubber
NBR	Acrylonitrile-butadiene rubber
PA	Polyamide
PET	Polyester
PTFE	Polytetrafluorethylene (Teflon)
PUR	Polyurethane cross-linked
PVC*	Polyvinylchloride (monomer softener)
PVC**	Polyvinylchloride (polymer softener)
SI	Silicone
TPO	Polyolefin thermoplastic
TPU	Polyurethane thermoplastic

Explanation of characters

- ☺ Resistant under standard climatic conditions: 23 °C/73 °F, 50% relative humidity
- ◆ Contingently resistant
Depending on concentration, duration of impact, thermal and mechanical strain, discoloration, swelling, embrittlement or abrasion are possible
- Not resistant also at low concentration

Examples of cleaning agents

- 1) Water
- 2) Soap water, soda, ammonia solution
- 3) Phosphoric acid (diluted 1%)
- 4) Javel water (sodium hypochloride solution <1%)
- 5) Isopropanol, ethanol, methanol, methylated spirit

Maintenance and cleaning

- **Unsuitable** solvents are:
 - Aromatic compounds (benzene, toluene, xylene)
 - Chlorinated hydrocarbons (trichloroethylene, tetrachloroethylene, carbon tetrachloride)
 - Ketones (acetone, methylethyl ketone)
- When working with flammable and/or noxious chemicals, it is vital for you to observe all applicable safety precautions (refer to the corresponding safety data sheets for the chemicals to be employed)
- Please consult our list “Chemical resistance” for suitability prior to using chemical substances for cleaning our belts
- When cleaning with hot water or steam, take care not to exceed the maximum permitted temperature for the belt
Caution: Inappropriate cleaning with high-pressure cleaning apparatus may damage the belt
- The belt should be dried after being cleaned with water
- Do not immerse belts in water or other fluids for long periods. This can result in irreversible dimensional changes (shrinkage), camber, color changes, degradation of the materials, layer separation or premature splice failure, etc.
- Where brushes are used for cleaning, use only those with soft bristles
- Special and statutory requirements apply for the cleaning and disinfecting of conveyor belts in the food industry. These regulations must be complied with.
- To find products that fulfill chemical requirements go to the “Chemical Resistance Information” on [www.habasit.com/Services/Chemical resistance](http://www.habasit.com/Services/Chemical%20resistance)
- For further information, please contact your Habasit specialist

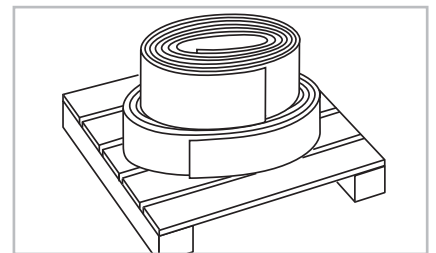
Unfavorable storage conditions or improper handling result in changes in the physical characteristics of most synthetic products. Such changes can, among other things, shorten the service life of the product.

The belts should be protected against damage, contamination, moisture, extreme temperatures and UV light, ideally they should be stored in a dark room or in opaque plastic wrap which will also protect the belt against dust and other contaminants. Products containing polyamide should always be wrapped airtight, to avoid undesirable absorption of humidity or drying out.

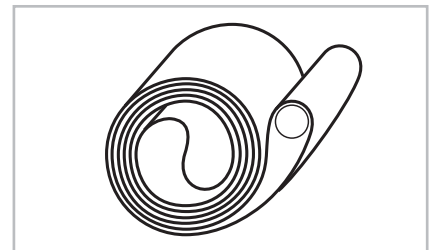
Habasit belts should preferably be stored in their original packaging.

Storage

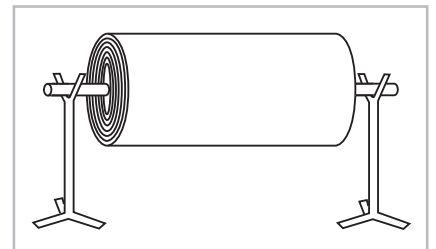
Rolls of narrow belts can be stored horizontally on boards or pallets. Several rolls of such products can be stacked as long as the resulting weight does not crush or deform the belts.



Joined belts should be rolled on a hard tube. The tube diameter must not be smaller than the recommended minimum pulley diameter for the belt as this will prevent them from crimping.



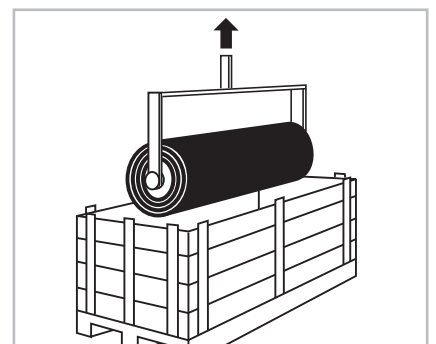
Heavy rolls should preferably be stored suspended with the aid of a steel bar or laying on a thick, soft rubber foam bedding.



Handling of heavy rolls

To lift a large roll of belts, insert a steel bar through the hole at the core of the roll and attach it to a hoist with two rope slings or chains attached to a crossbeam. To prevent damage to the belt edges by the ropes or chains, the crossbeam must be longer than the width of the roll.

Belt rolls can also be transported using forklift trucks. Take care that the outer belt layers are not damaged by the fork edges.



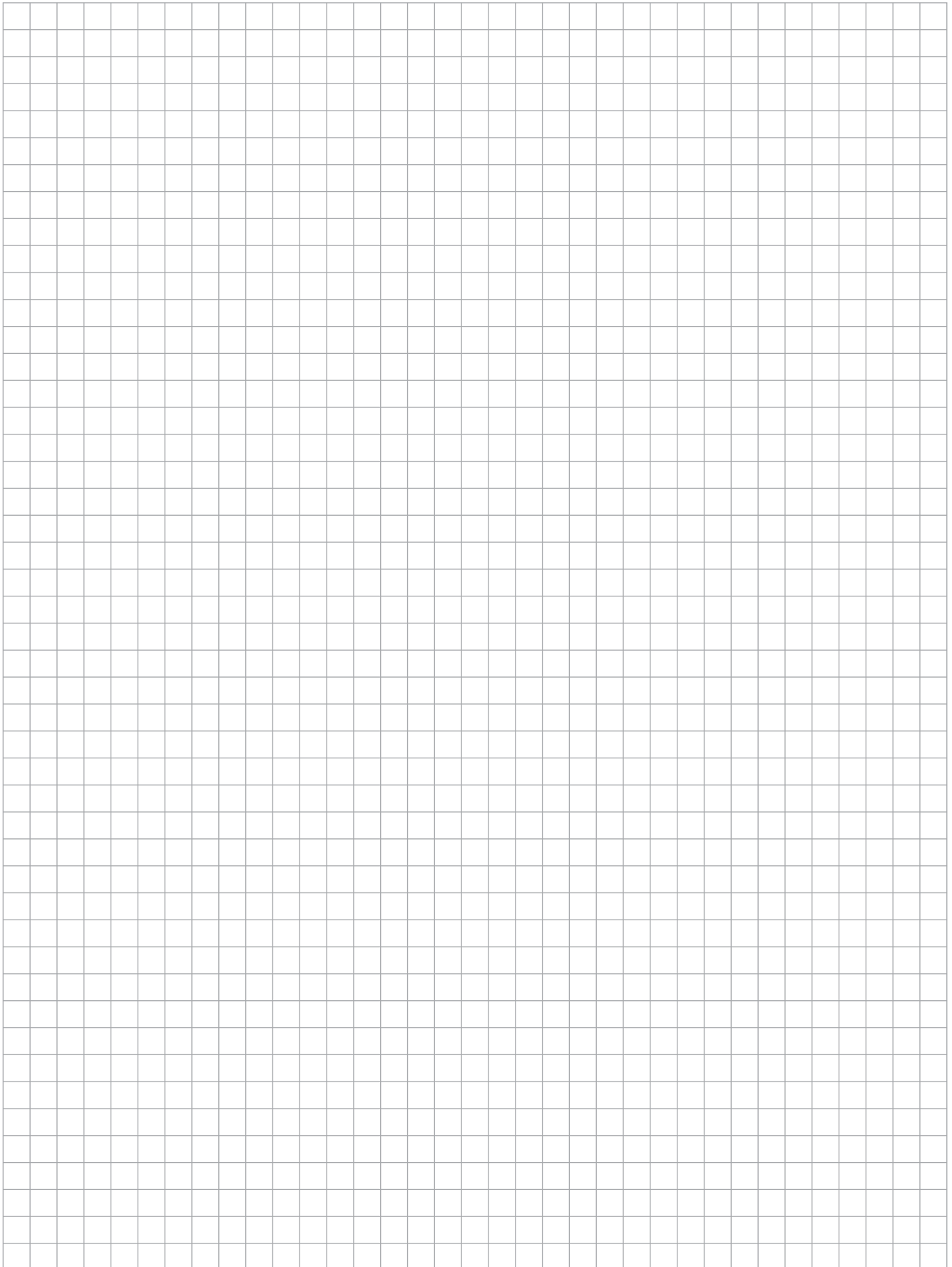
Tracking problems in fabric belt conveyors are only in minor cases caused by the belt. Missing or insufficient tracking measures on the installation design, incorrect installation, bad maintenance or wrong countermeasures if tracking problems arise are usually the source of the problems.

The following checklist supports fitters and service personnel in taking the right measures if tracking problems arise.

Source of tracking problem	Solutions (countermeasures)
Material build-up on pulleys, rollers, scrapers and on the running side of the belt	<ul style="list-style-type: none"> – Remove dirt accumulation – Improve maintenance and cleaning intervals – Install appropriate cleaning devices
Conveyor frame crooked under belt tension, weight of goods or due to uneven floor	<ul style="list-style-type: none"> – Straight the frame in all planes – Reduce the belt tension – Reinforce the installation
Slanted slider bed	<ul style="list-style-type: none"> – Set the slider bed horizontally even
Pulleys, rollers or idlers out of square with the running axis of the belt (overadjusted system, conflict of tracking means)	<ul style="list-style-type: none"> – Release the tension – Straight the frame in all planes – Set all pulleys, rollers, idler, nosebars, etc. exactly at right angles to the belt running axis
Belt distorted permanently by asymmetric tensioning	<ul style="list-style-type: none"> – Tension the belt to the required initial elongation – Let the belt run and carry out necessary adjustments in small steps only – Do not adjust more than one pulley at once
No or insufficient guiding effect of cylindrical-conical pulleys; belt contact with conical parts insufficient	<ul style="list-style-type: none"> – Check if crown height and pulley shape are according to our recommendations; if required remachine the pulley – Belt laterally too stiff; change to a more flexible belt – Increase the belt tension if possible – Install further tracking measures or an automatic belt control
Pivoted cylindrical pulleys or rollers in conveyors with reversal running direction	<ul style="list-style-type: none"> – Set all pulleys, rollers, idlers, nosebars, etc. exactly at right angles to the belt running axis.
Guiding profiles permanently slide on side of the groove; profile and groove worn off	<ul style="list-style-type: none"> – Track the belt by other means, so that the profile does not touch the groove as soon as no lateral forces appear
Pulley deflection too high	<ul style="list-style-type: none"> – Calculate the minimal required pulley diameter with respect to the admissible deflection, e.g. with CONVEY-SeleCalc

Source of tracking problem	Solutions (countermeasures)
Off-center loading	– Install or adjust chute, funnel or the like to place load on center of the belt
Lateral feeding or lateral diverting	– Install or adjust means to keep the belt locally tracked
If it is not clear, whether the source of the tracking problem is the belt or inappropriate installation design	<ol style="list-style-type: none"> 1. Remove the belt 2. Install the belt the other way round 3. Let the belt run and observe the tracking behavior <ul style="list-style-type: none"> – If the belt runs off in the same direction as before, the problem has to be solved on the installation – If the belt runs off in the opposite direction as before, the belt is the problem
Bowed belt (“banana”)	<ul style="list-style-type: none"> – Bow should disappear during running-in – If not, tension the belt a bit more – In rare occasions the belt has to be replaced – Check storage and handling of rolls
Belt has been overtensioned and is out of shape due to unequal high tensile stresses	<ol style="list-style-type: none"> 1. Remove the belt and let it relax 2. Check the circumference on both sides 3. If the length is not equal on both sides, the belt is irreversibly distorted and has to be replaced
Joint area not right-angled	<ul style="list-style-type: none"> – Minimal influence on belt tracking! – If the effect cannot be accepted, rejoin the belt

Detailed information about tracking measures on the installation design can be found in the “Fabric Conveyor Belts Engineering Guide.”





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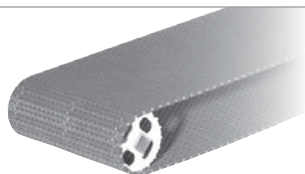


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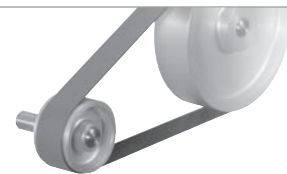
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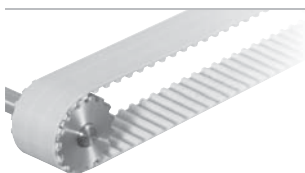
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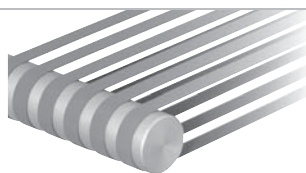
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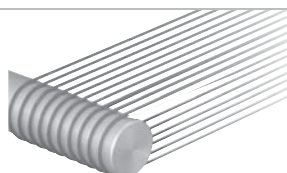
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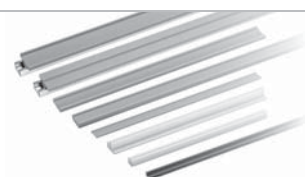
Machine tapes



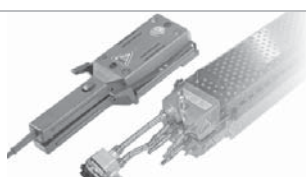
Round belts



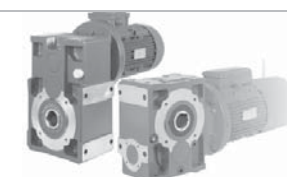
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