



1 General

These operating instructions must be observed before installing and operating THIELE conveyor chains, flight bars or chain belts.

It is also essential to observe the operating and repair instructions for the machines and systems in which the chains are installed.

Please refer to the delivery documents for detailed information on the composition of the delivered chain strands or chain belt sections.

2 Safety Notes

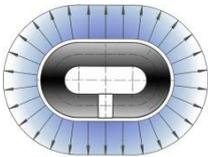
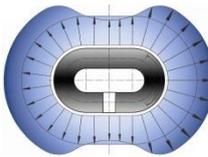
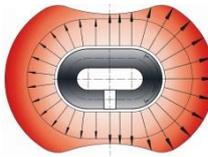
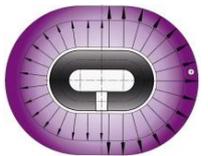
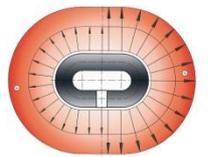
- All activities with or on conveyor chains and associated systems may only be carried out by trained and qualified persons.
- Observe the safety instructions of the mine, the local accident prevention and industrial safety regulations and the operating instructions of the conveyor system and any other connected machines!
- Wear your personal protective equipment!
- Do not wear loose clothing, jewellery or rings during all work, as there is a risk of them getting caught.
- Working under the influence of drugs, medications impairing the sense and/or alcohol consumption (including residual alcohol) is strictly prohibited!
- Operators must inspect the safety devices before each use and, if necessary, carry out a functional test.
- Operate machines and systems only in a technically perfect condition.
- Make sure that all safety devices on machines and systems are present and functional.
- Immediately rectify any malfunctions that affect the safety of people or machines and systems.
- Access to the chain conveyor, e.g. for inspection work, is only permitted if it is ensured that
 - the conveyor is shut down,
 - the conveyor is secured against unintentional operation,
 - the upper zone is secured by shields or shield caps,
 - there is no danger of material suddenly breaking out from the side of the coal seam.
- Conveyor chains must not be used as lifting equipment, chain slings, hoisting means or equivalent, therefore no working load limit is assigned to them.
- Subsequent welding on chain links can lead to significant reductions of the technical properties. Welding is only permitted for the sake of properties and warranty claims after prior consultation and written approval by THIELE.
- Conveyor chains may only be used for use in chain conveyor systems! Applications as load handling attachments, slings, load-bearing equipment, pulling equipment or securing equipment are not permitted! Used chains must be scrapped immediately to prevent misuse. #

3 THIELE Chain Grades

The conveyor chain is a robust machinery element perfectly suited to transmit the high forces arising in the rugged environment of sub-surface mining facilities. Moreover, it remains unharmed when impacted by material to be conveyed and is also insensitive to shock and dirt.

Wear caused by corrosion attacks can be reduced by selecting the best suited chain for the relevant service. As a general rule, the higher the strength of the chains the more easily they are prone to corrosion.

For technical data and standards, please refer to the THIELE works standards (TWN) or the THIELE catalogues, which are available for download on the THIELE homepage www.thiele.de.

			Crown hardness 1)	Leg hardness 1)
THD chains The preferred choice for face conveyors	TWN 0102		345 - 375 HBW	345 - 375 HBW
TSC chains The preferred choice for plough drives	TWN 0026, TWN 0100		385 - 414 HBW	345 - 375 HBW
TSD chains The preferred choice for roadway conveyors	TWN 0024, TWN 0025		424 - 453 HBW	345 - 375 HBW
TIP chains Very high quality chain for tougher applications			355 - 383 HBW	355 - 383 HBW
TRQ chains ²⁾ Preferred for a high proportion of rock, especially for tunnelling			424 - 453 HBW	424 - 453 HBW

1) Brinell hardness measurement

Conversion to tensile strength according to DIN EN ISO 18265, Tab. B.2, deviations during hardness.

2) The maximum chain speed of 0.5 m/sec must be strictly observed.

The correct selection of the chain for the application determines the service life of the chain significantly.

In order to achieve an optimum service life of the chain, these operating instructions should be strictly observed. #

4 Storage and Handling Prior to First Use

To suit the conditions prevailing underground and depending on how long the chains are to be stored above ground THIELE offers the following corrosion protection:

- Tectyl dipped – for short-term storage under good storage conditions
- Hot-dip galvanized – for long-term storage or corrosive operating conditions

All chains must be stored in a dry location for maximum corrosion protection.

Unloading and reloading must be done in an appropriate manner so that the identification markings, especially those used to pair-off the chain strands, are not lost or damaged. Avoid dragging the chains across the ground.

Handle chains very carefully at temperatures below minus 20° C because they are particularly sensitive to shock or impacts under low temperature conditions and may suffer incipient damage resulting in premature chain failures.

In case of the TSC and TSD chains also note that their use in wet operating locations or under aggressive service conditions is not recommended since their high-strength properties make them sensitive to corrosion.

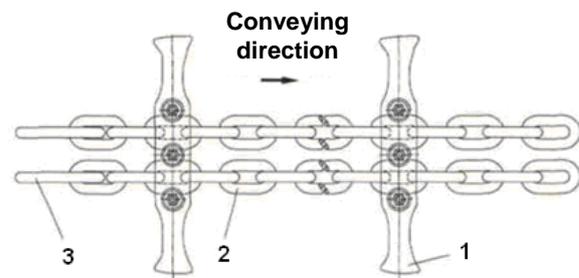
If anything is unclear, contact THIELE before commissioning.

5 Assembly

5.1 Mounting the chain belt

The new chain belt comprises completely assembled paired single chain strands consisting of the following components:

1. Flight bars (scrapers) with fixing elements
2. Chain links (in pairs)
3. Connectors



The scrapers are attached to the horizontal links of the chains. For most types of scrapers, the installation direction, i.e. the direction of movement, must be observed during installation. #



Attention!

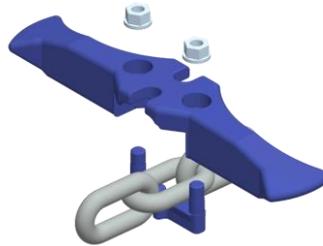
During unloading/loading make sure the chain strands are arranged in pairs and the connecting elements are complete and correctly attached!

5.2 Flight bar spacing

The distance between flight bars depends on the conditions of use, but should not exceed a distance of approximately 1 meter.

5.3 Flight bars for single-strand chain conveyors

The flight bars for single-strand chain conveyors are usually directional and must be mounted according to the marking.



5.4 Flight bars for double middle chain conveyors

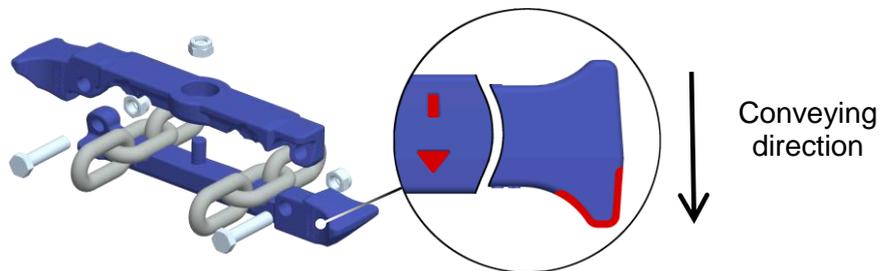
The following pictures show three different types of scratches:

a) Single-strand flight bar

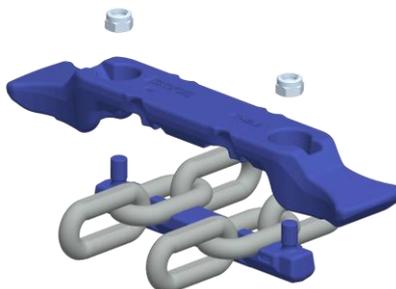
With split flight bars, the correct conveying direction must be ensured!

The correct conveying direction is indicated by a direction arrow and the shape of the flight bar tips (marked in red in the diagram). Make sure that the screw heads point in the conveying direction.

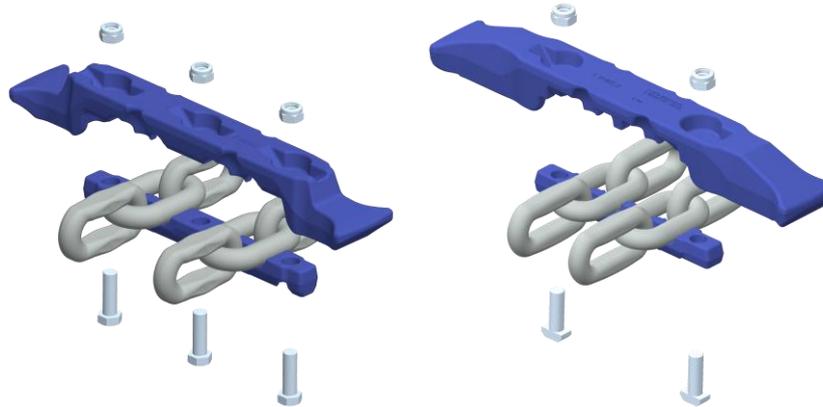
If you are using 'Huckbolts' (Huck lockbolts) as an alternative to screw connections, please contact THIELE if you are unclear. #



b) Flight bar with bow

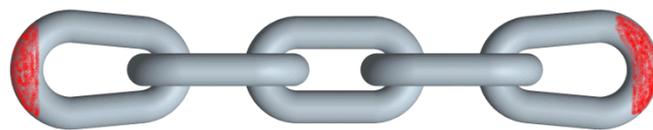


c) Flight bar with strap (Version with hexagonal bolts or hammer-head bolts)



5.5 Outboard chain assemblies

In case of outboard chain assemblies the crowns of the chain link outer ends are slightly wider (about 1 mm - shown enlarged in the sketch) and marked in color so as to facilitate mounting of chain connectors.



(Shape not shown to scale in the sketch)

5.6 Screws and nuts

When mounting the screw connection, make sure that the screw head is not tilted and lies flat on the contact surfaces in the strap.

Observe the following instructions for scraper mounting. #

1. Tighten all nuts without torque until the components are correctly positioned.
2. If present, first tighten the middle nut followed by the outer nuts to the pre-assembly tightening torque according to Table 1.
If different values are presented, e.g. if flight bars from other manufacturers are used, please note these.
3. Then tighten the nuts again from the inside to the outside with the tightening torque MA.

The use of a torque adjustable screwdriver or a torque wrench is recommended. If non-adjustable tools are used, there is a risk of screw damage due to excessive torques or the risk of loosening at excessively low torques.

The following table shows the standard tightening torques for the flight bar nuts:

Screw dimensions (strength class 10.9)	Preassembly torque [Nm]	Final torque $M_A (\pm 10\%)$ [Nm]
M20	400	517
M20 x 1,5	450	558
M24	700	890
M24 x 2	750	949
M27	1000	1304
M27 x 2	1100	1378
M30	1400	1775
M30 x 2	1600	1912

When using security locknuts, the tightening torques shown in the table must be applied. The screw ends should project 0.5 to 2 thread pitches.

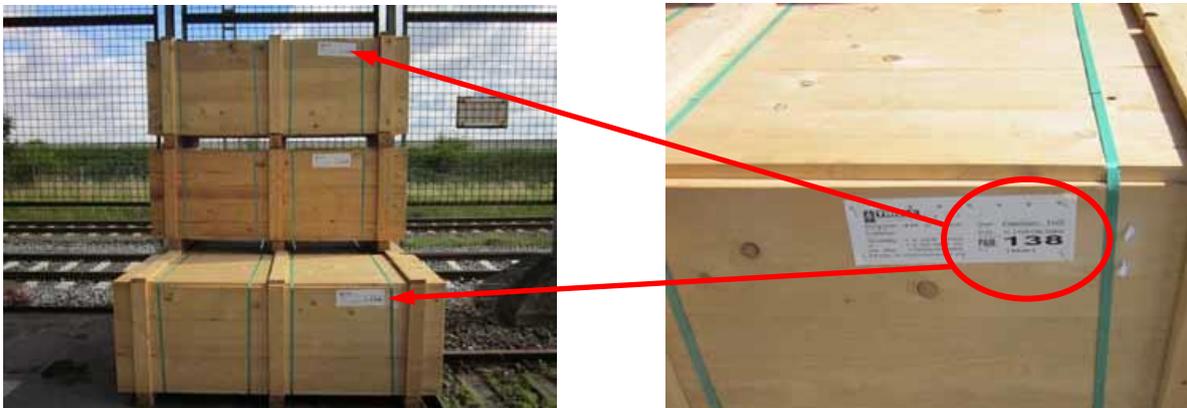
Check the tightening torques of the screws at every fifth flight bar and document them. Extend the control if you notice an accumulation of too low tightening torques.

After approximately 2 - 4 weeks, recheck the correct seating of the screw connections and retighten them, unless they have been secured otherwise, e.g. by Loctite or welding.

5.7 Paired chain strands

The pair number applicable to identical chain strands can be detected as follows:

a) It is marked on wire tags attached to the chains and additionally on shipping box labels.



For packaging reasons paired strands may be packed in 2 boxes:

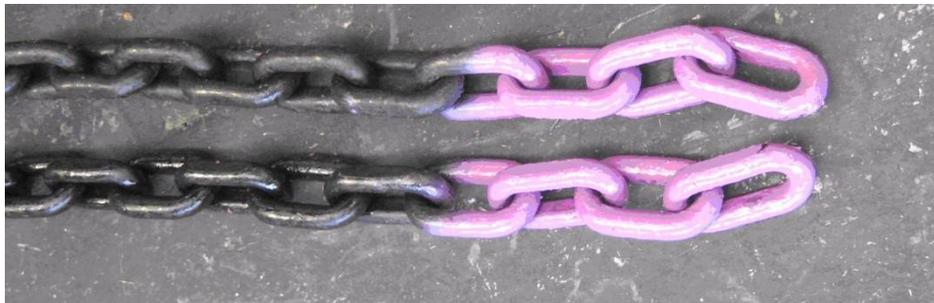
The boxes contain the two strands of pair No. 7.

As shown, the pair number is indicated on both boxes so as to be clearly visible from outside.

b) The 5th link from the end of the strand (end marked in color) has been stamped with the same number.



c) The ends of chain pairs are marked in the same color.



Mount the chain pairs as shown in the photo (colored ends go together).

6 Fitting Chains

Fitting chains, which usually consist of a set of chain strands with a length of 5, 7, 9, 11 or 13 links, enable the exact adjustment of the length of the chain band in 2 link steps.

Fitting chains can be used for the following reasons:

- Shortening of the chain belt due to excessive hanging chain formation
- Shortening of the chain belt due to increased wear in the running-in phase
- Shortening of the chain belt due to setting behaviour of the channels
- Shortening of the chain belt due to wear
- Extension of the chain band, e.g. if damaged areas need to be replaced

7 Chain Sprockets

Always use new sprockets for new chains, as new chains wear out faster when used sprockets are used.

Observe the operating instructions for the chain connectors or sprocket assembly.

8 Chain Connectors

The individual chain strands are connected with chain connectors. New locking elements (e.g. dowel pins, lock nuts) must be used for each installation of locks (even after opening in use / when reusing).

The reuse of locking or safety elements is expressly prohibited.

Observe the operating instructions for the chain connectors.

9 Flight bars (Scrapers)

When connecting the flight bars to the chain take special care to prevent any possibility of crevice corrosion affecting the chain links lying within the flights.

THIELE's long lasting experience shows, that crevice corrosion can be effectively prevented by ensuring a loose fit of the chain (air gap between flight bar and chain).

This enables a relative movement between chain and flight bar and prevent corrosion pittings. Another advantage is a positive effect on the chain behaviour in case of proceeding wear on flight bars and wheel.

If the requirement is to have a tight chain fit (force fit; the chain is clamped within the flight bar) it is essential to use a hot-dip galvanised chain.

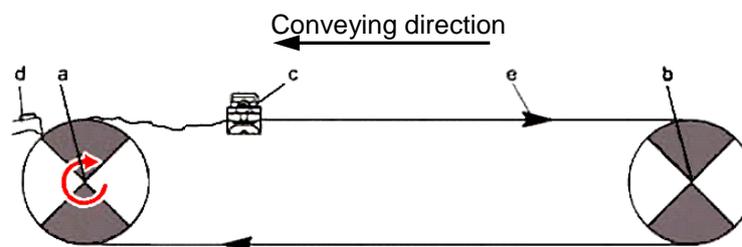
Broken or bent flight bars must be replaced immediately to avoid the risk of derailing of the chain conveyor and blockages in the lower run.

As soon as a derailed flightbar has been detected, the conveyor must be stopped and the flight bar removed and replaced if necessary.

10 Tensioning the Chain Assembly

Make sure to exert a pretension force that suits the relevant operational situation. Note that an inadequate pretension force will result in a slack chain and this in turn will increase the risk of kinking. On the other hand, an excessive pretension force will cause increasing wear and may result in frictional oscillation in the system.

In this context, our service personnel is prepared to submit a proposal based on your operating parameters.



- a) Main drive b) Auxiliary drive c) Chain securing device d) Blocking pawl e) Conveyor running direction during tensioning



Note that the conveyor manufacturer's instructions on chain tensioning are to be strictly observed at all times.

Further information can be obtained on request from our service personnel.

11 Starting up the Chain Assembly



No one is permitted to remain in the hazard zone when the conveyor is being started up. Other than during normal operation danger may be imminent when commissioning the system, e.g. due to assembly faults etc. Always keep a safe distance from the conveyor.

Prior to conveyor start-up the following work has to be carried out::

- Align the conveyor.
- Remove all tools, auxiliary items etc. from the conveyor.
- Make sure that the maximum driving force does not exceed the test force in case of collision with the blocked conveyor. Due to possible asymmetrical loads, the driving force of double-centre chains must not exceed approximately 160 % of the test force of the single chain.



It is to be noted in this context that hard blocking with deceleration times of almost zero will in any case cause the chains to be overloaded or even destroyed; such an operation violates the Intended Use Provision of the product and leads to forfeiture of warranty claims.

Having checked the conveyor and eliminated faults that may have been detected the correct interaction of the individual components of the overall system must be verified.

For this purpose, carry out a test run with the conveyor in unloaded condition (short conveyors at least about one hour, longer conveyors of about 200 m and more at least about four hours).

Apply a biologically degradable lubricant (e.g. PLANTOLUBE L 32 GN furnished by Fuchs) to the auxiliary drive to enable the run-in characteristics of the components to be optimized. After the trial run check the pretension of the chain assembly.

Now perform a trial run of the conveyor in loaded condition for a period of approximately 6 hours and during this time:



- Increase the load on the conveyor gradually.
- Check the rolling behavior of the chain on the sprockets.
- Check continuously whether a slack chain system forms.
- Monitor the power consumption of the electric motors.

After the trial run check the empty conveyor as instructed in Chapter 9 - Maintenance / Inspection, para. 1. Provided checks and inspection have not shown faults or defects the conveyor can be released for operational purposes.

12 Material transport

Using a chain conveyor to transport materials and equipment is generally prohibited as such payloads cannot be safely positioned on the chain or chain assembly.

Exclusions to this require the express approval of THIELE GmbH & Co. KG.

13 Maintenance / Inspection

13.1 General

The THIELE chain must be inspected for damage at regular intervals (daily). The inspection interval must be specified by the operator and depends on the operational requirements and conditions, e.g. the degree of abrasiveness of the material to be conveyed or the expected period of use.

Permanently stretched or damaged chain pieces must be replaced in pairs and defective flight bars replaced or missing flight bars added. Loose flight bar nuts must be tightened according to the above specifications. Check sprockets for damage and tightness. The functioning of the chain deflector must be checked.

At least quarterly, check the cold chain for elongation/lengthening using a suitable alignment gauge. The THIELE chain gauge is particularly suitable for this purpose, in which both measuring legs are applied to the chain in the same direction (see figure).



In addition to measurements with the chain gauge, suitable chain pieces (7 links, no fitting chains) can also be sent to THIELE for testing. For the test pieces, it shall be ensured that the specimens have the same running time as the rest of the chain.

The test includes measurements, determination of the breaking force and the assessment of fatigue and corrosion.

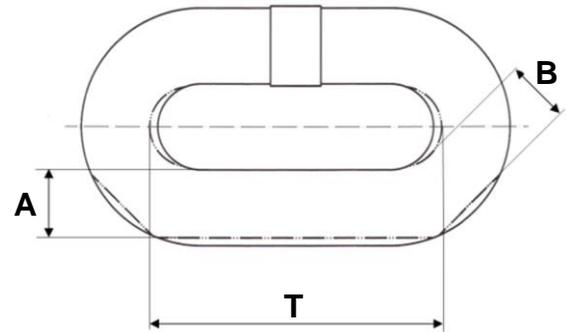
To control the chain, a data sheet similar to the example shown should be kept to document all relevant data.

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13.2 Conveyor Chain

Replace the conveyor chain

- in face conveyors (AFC) with an elongation of the pitch (dimension T) of more than 3.5 % compared to the new condition *,
- in stage loaders (BSL) with an elongation of the pitch (dimension T) of more than 5.0 % compared to the new condition *,
- when the friction wear (dimension A) of the legs is greater than approximately 30 % for round steel chains, approximately 20 % for flat chains or S-flat chains
- when deformation in excess of 15 % (dimension B) has taken place (referred to the nominal diameter of the chain)



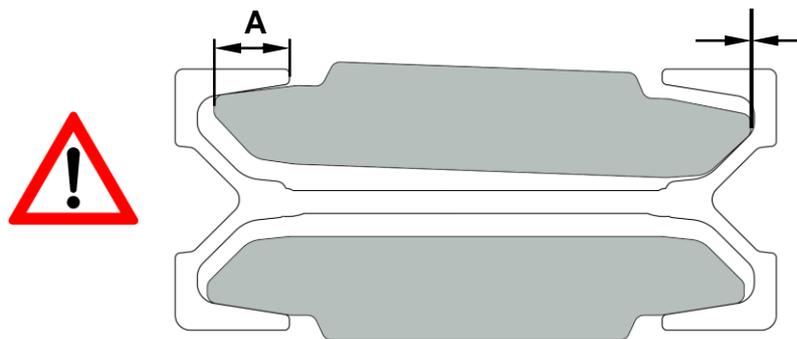
Attention: The wear of the sprocket and the wear of the chain act in opposite directions (and not, as is often assumed, in the same direction). A slightly worn chain runs better over a new sprocket than over a worn sprocket.

* After consultation with THIELE, the chain may continue to be operated with special sprockets.

13.3 Flight bars (Scrapers)

For proper operation of the flight bars, it is important that they are guided safely in the pan profile. Flight bars when ready to discard run the risk of derailing from the pan profile and causing damage.

THIELE recommends a regular check of the overlap (dimension A) of the pan profile and flight bars (see sketch). Note that the overlap depends not only on flight bar wear, but also on wear of the pan profile.



Ask the manufacturer of the conveyor system which minimum overlap is necessary for a safe operation.

The overlap can best be checked in the area of the face conveyor where the flight bars are pressed to one side of the pan profile. Repeat these tests over the entire length of the face conveyor and chain belt as the conveyor moves forward.

14 Intermediate Storage

For intermediate storage, e.g. when a working level is abandoned or for further service, the chain assembly must first be cleaned immediately after dismantling (e.g. by sandblasting) and then preserved.

We recommend dipping in Tectyl or alternatively applying a viscous oil coating (do not use old oil for this purpose).

Underground there is always an increased risk of damage due to corrosion that is not covered by the guarantee or warranty. Underground storage is therefore only permitted with careful corrosion protection and only for a few days.

15 Preliminary Downtime

When operation at a workplace or longwall face is temporarily down for several days the chain assembly should be moved at least once per day for half an hour to prevent corrosion. If necessary, protect the chain and connectors from corrosion by starting up the assembly briefly and applying a coating of oil.

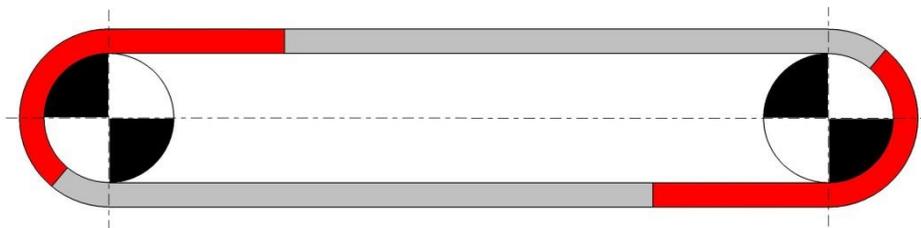
After a longer period of downtime (i.e. in case of a fire) it is absolutely essential to use a new chain. If this is not done there is a very high risk of chain failure.

16 Simultaneous Use of New and Used Chain Strands

Used chains may occasionally have to be run alongside new chain strands, for example when a new face is being started up. This should not present any problems, provided the face length remains unchanged and the individual chain sections are installed into the overall assembly as before. In case of shorter face length take care for a symmetrical shortening of the chain.

When the new face is longer than the previous installation **THIELE generally advises against mixing used chain sections with new chains.**

Where this is unavoidable it has to be ensured that only new or old chain sections passing simultaneously over the main and auxiliary drives at the same time:



Note that when using twin chain assemblies the new or used sections of chain must be installed in pairs.

The drive direction of the chain should be reversed so as to bring the 'flats' out of contact with the sprocket's power transmission points. The chain should be turned by 180° in its longitudinal axis so that friction wear can be transferred to the opposite legs.

New sprockets should also be fitted if the chain has stretched by more than 1.5 %.

17 Environment

Ensure the appropriate and environmentally friendly use of lubricants.

Dispose of discarded steel components and accessories for scrapping in accordance with local regulations.

Dispose of packaging in accordance with local regulations.

18 Impressum

THIELE GmbH & Co. KG, Werkstraße 3, 58640 Iserlohn, Germany

Tel.: +49(0)2371/947-0 // Email: info@thiele.de

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identifies changes to previous edition