

PENNINE



**INDUSTRIAL
EQUIPMENT**

Installation and Maintenance of Inverted Tooth Silent Chain

Pennine Industrial Equipment LTD

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Installation

Levelling and Alignment

All components should be level and properly aligned, to give maximum Chain and Sprocket life.

Both Drive and Driven Sprockets should be aligned so that they are parallel to both the Conveyor and to each other.

First align the Sprockets individually at both ends of the Conveyor using a spirit level to make sure the sprocket is positioned square on both the top face and side faces. Contact Original Equipment Manufacturer for further information on the recommended alignment process.

NOTE: Sprocket misalignment is a major cause of Chain and Sprocket failure.

Wear Plates

Inverted tooth Conveyor Chain normally runs on hardened steel wear plates under the full width and length of the Conveyor Chain. It is important to use the correct type of wear plate. Wear plates which are too soft will wear quickly and if the plates are too hard, they will cause excess wear to the bottom of the Chain.

Pennine Industrial Equipment recommend a steel plate of about 40 Rockwell C.

If more than one plate is used, the joint area should be at an angle to give constant support to the belt. There should be no sharp edges or steps at any point on the surface of the wear plates.

It is very important to periodically check the condition of the wear plate because excessive wear or grooving in the plates can cause the chain to wear rapidly and cause problems with bottle stability.

Adjusting Side Guide Plates

Positioning and setting of the guide plates is very important. The guide plates should not interfere or restrict the free movement of the Chain. The guides should be straight and run parallel to the Sprockets and a small gap of about 1mm to 2mm each side should be allowed. This gap can be reduced if using "Pennine" Premium Head Protector Chain.

A new chain should always run for several cycles to confirm smooth operation and any readjustment of the side guides undertaken if required before production starts.

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Chain Connection

When connecting the 2 ends of the Chain it is important that the lacing is correct and that all Chains should line up perfectly.

Do not connect different manufacturers Chain or old and new sections of Chain, due to possible problems with elongation or pin design. It is also important to make sure the riveting of the pinhead is correct.

The riveting needs to be large enough to secure the Chain but must not protrude out beyond the level of the other factory-machined heads.

Pennine Industrial Equipment do not advise welding of pinheads on our Single Pin Conveyor Chain as this can cause problems with the running of the Chain.

Pennine Industrial Equipment produce a Chain-connecting block which will assist in connecting of our chain and save considerable down time.

Videos showing this process can be found at the following locations:

Single Pin Chain: <https://pennine.org/technical/CONNECTING-HPL-CHAIN.mp4>

2 Pin Calibre Chain: <https://pennine.org/technical/CONNECTING-2-PIN-CHAIN.mp4>

Chain Tensioning

This is very important and another area of rapid Chain failure. Pennine Premium Chain is a positive drive Chain therefore, unlike wire belt, cannot slip back. Over tensioning will considerably reduce Chain life.

The chain should be tensioned only to take out the slack on the top running section. I.E. The surface carrying the bottles or containers. The Chain should sag a little on the return.

Although development has been done to considerably reduce chain elongation, all Chains in time will elongate therefore it may be necessary to remove sections of Chain throughout its life.

When a Chain has elongated by 3 to 4%, we recommend replacement.

Chain Lubrication

Pennine Industrial Equipment do not recommend routine lubrication of the Chain, the use of lubricants can cause excessive build-up of debris (oil, glass particles and dirt etc) this can then interfere with the running of the Chain and increase chain wear and reduce container stability.

If lubricants must be used, they should be able to withstand the high operating temperature.

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Maintenance

As with all mechanical moving parts, maintenance is very important to give a good and long life. Lack of maintenance can considerably reduce Chain and Sprocket life and cost your Company time and money.

Sprocket Inspection

Sprockets should be inspected regularly for accumulation and build-up of debris between teeth or in the guide grooves if using Centre Guide Chains.

Sprockets should be cleaned, if required, using a scraper tool and wire brush. You should also inspect for worn or damaged teeth, if major damage has occurred, or the teeth are badly worn, the Sprockets should be changed as soon as possible. Although it is not always necessary to change the Sprockets, consider the condition of Sprockets before installing a new Chain. Damaged or unclean Sprockets can cause rapid damage to a new chain.

Consider the cost of a new Chain against the price of new Sprockets.

Visual inspection of Chain

From time to time you should visually inspect the full length of the Chain looking for the following areas of concern.

1. Pin head wear (If not using "Pennine" DHPL chains)
2. Wear to the height of the chain links.
3. Broken or cracked pins or links, which are evidence of Chain impacting at some point on the Conveyor.
4. General build up of debris (dirt) in the Chain, which may prevent smooth operation.

Re – tensioning of Chains

Throughout the life of a Chain it will be necessary to remove sections of the Chain and re-tension as required due to wear on the joints and components.

Do not over tension this will increase chain loading, increase wear, and reduce chain life.

Once a Chain has elongated by 3 to 4% from its original length it should be replaced.

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Preserving a Chain when the Conveyor is stopped for longer periods of time.

If the Conveyor Chain is stopped for long periods of time and allowed to cool (over a few hours), light oil should be sprayed on to the Chain to prevent rust and carbon build up. It is also advisable to run the Chain every few hours and re-apply the light oil if required.

If you plan to remove and store a part used Inverted Tooth Conveyor Chain, it is important that you follow these instructions. These should be followed within 30 minutes of the production of the last glass container, this will ensure the chain has maximum flexibility.

- 1) Keep the chain running for about 15 minutes and allow it to cool down, it should be around 40 °C
- 2) Using a high-pressure airline, blow away as much of the heavy deposits on the chain as possible, the best place to do this is on the return below the drive sprocket.
- 3) Using a light penetrating oil, pour a generous amount into the chain while it is still running, this is best done over the main drive sprocket, as when the chain runs around the sprocket, the links and pins have maximum movement which allows the oil to penetrate between the link plates and in and around the pins.
- 4) Once the chain is fully lubricated, continue to run the chain for another 10 minutes or at least 10 cycles to allow for maximum penetration. It is vital that the oil gets inside the chain and not just the top surface. This may require several litres.
- 5) Remove the chain and store it in a dry, dust-free area. For extra protection cover the chain with an oil-soaked sheet.

If the chain is really dirty or clogged up, you may require an additional process of soaking the chain for 48 hours in a mixture of 50% oil and 50% Paraffin which will help to clean the chain. Once removed from this bath, the chain should be stood on its side and carefully blown off with a high-pressure airline.

After this, a light penetration oil should be used to preserve the chain, and once again this should be paired with an oil-soaked sheet.

Preserving a Chain during a job change.

During a job change it is important to protect the Chain from damage that can be caused by dropping heavy machine components onto the chain, this is especially important for chains fitted with Head Protector Links. The best way to do this is to cover the top surface of the chain in the working area with a non flammable high temperature material. This has been achieved in the past with high temperature Kevlar/rubber belting and also a thin steel plate.

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How to measure the elongation of Silent Chain

The elongation of silent chain can be measured by the following method:

Measure the length of chain installed on the machine, this can be done by knowing the supplied length and subtracting any excess left over during installation.

When the chain has elongated and requires a section removing to allow for continued smooth operation note the length of chain that has been removed.

The process of cutting the chain will happen numerous times throughout the working life of the chain and a running total of the amount removed should be kept.

Once the total amount of chain removed exceeds 3.5% of the total installed length of chain, it is time to consider replacement.

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