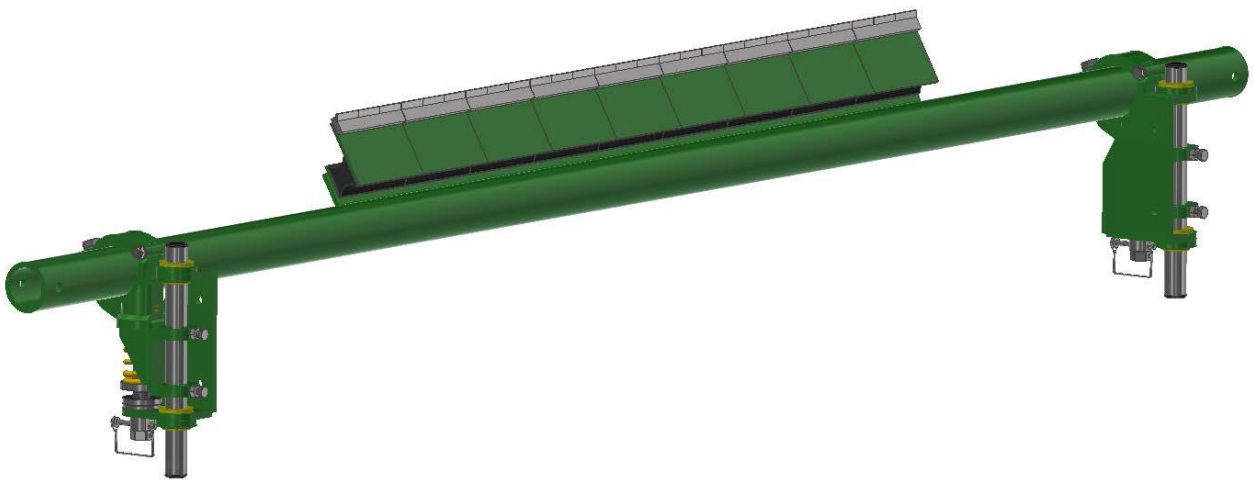


Installation, Operation and Maintenance Manual



P Belt Cleaner c/w Spring Tensioner

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Contents

1	General Information.....	3
1.1	Overview	3
1.2	Advantages.....	3
1.3	Safety	3
1.4	Assistance.....	3
2	P Belt Cleaner Components	4
2.1	Entire Cleaner.....	4
2.2	Side Assembly	4
3	Tools & Equipment.....	5
3.1	Installation	5
3.2	Maintenance	5
4	Mounting Location and Chute Modifications	6
4.1	Pole Position.....	6
4.2	Mounting Bracket Position	7
4.3	Chute Wall Modification	8
5	Installation	8
5.1	Installing the Pole/Blade assembly	9
5.2	Set Up.....	9
6	Operation	10
6.1	Visual Inspections.....	10
7	Maintenance	11
7.1	Physical Inspections	11
7.2	Checking Correct Tip Alignment.....	12
7.3	Evaluating Tip Condition	12
7.4	Measuring Tip Wear.....	12
7.5	Replacing Tips.....	13

1 General Information

1.1 Overview

The Belle Banne P Belt Cleaner is designed to be positioned on a flat, stable section of belt, in close proximity to the head pulley or a flat return and/or hold-down roller. It is typically referred to as a “secondary” cleaner, as it is usually installed in conjunction with a “primary” belt cleaner that is located at the material discharge point. The P Belt Cleaner comprises a set of mounting brackets, a pole and a series of “blades”, each comprising a rubber cushion and a tip. The blades are 150mm wide.

Tip tension is applied by adjusting the belt cleaner to the point where the tip touches then applying further tension so tension is stored in the rubber cushions and the springs. For all belt widths the pole is 73mm diameter. For belt widths 1800mm wide and above the pole is braced with a section of equal angle.

P Belt Cleaners cannot handle reversing belt applications.

For more challenging applications, multiple P Belt Cleaners can be installed in close series. Also, a water spray can be incorporated separately, or within the belt cleaner pole, known as a P Spray Belt Cleaner. Contact Belle Banne Conveyor Products for more information.

1.2 Advantages

Belt cleaners significantly reduce the amount of material build-up on the conveyor belt, known as carryback, which can cause

- material spillage,
- belt tracking problems,
- build up on return idlers,

These issues contribute to unwanted plant downtime, resulting in increased costs.

Installation of appropriate belt cleaning systems (one or more belt cleaners) will minimise these issues.

1.3 Safety

During installation and maintenance of all belt cleaners, ensure all energy sources are isolated in accordance with the relevant site’s procedures.

Ensure all works are conducted by qualified, competent personnel.

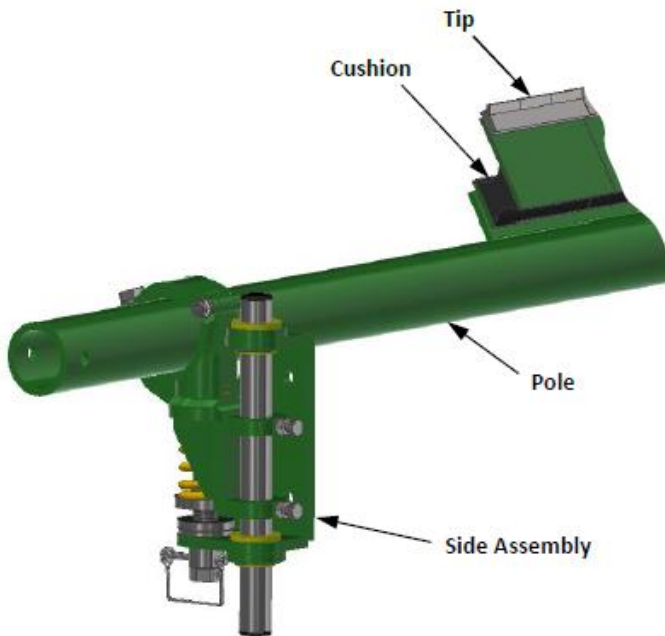
Ensure all personnel utilise appropriate personal protective equipment as required.

1.4 Assistance

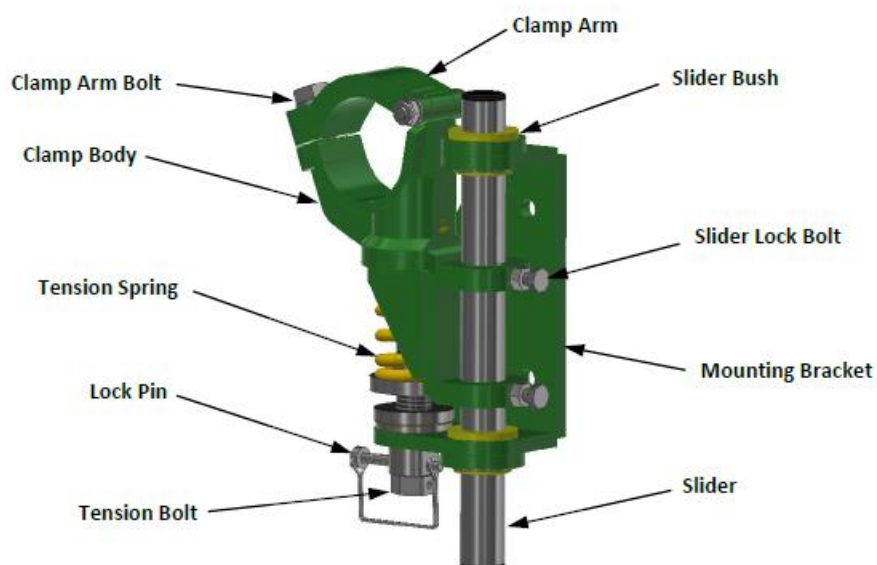
If assistance is required through any stage of the process: belt cleaner selection, design, drafting, installation and/or maintenance, Belle Banne Conveyor Products have personnel that are able to provide support.

2 P Belt Cleaner Components

2.1 Entire Cleaner



2.2 Side Assembly



3. Tools & Equipment

3.1 Installation

The tools and equipment required to install a P Belt Cleaner are:

- Measuring equipment – for marking out frame (pole) location, mounting bracket position, and holes in the chute walls (if required).
- Marking pen or chalk.
- Cutting equipment – for cutting holes in the chute walls (if required).
- Drilling equipment – for drilling holes for the mounting brackets (unless they are being welded to the chute wall or structure).
- Welding equipment – for welding the mounting brackets to the chute walls or structure (unless bolted connections are being used).
- Mechanical lifting aids – for lifting larger (heavier) belt cleaners into position.
- 3 x spanners (or a socket and a spanner) – for tightening side assembly fasteners:
 - 17mm for Slider Lock Bolts
 - 24mm for Clamp Arm Bolt
 - 19mm for Mounting Bracket Bolts / Nuts
- P Belt Cleaner template – for confirming correct tip alignment
- Anti-seize – recommended for coating on fasteners prior to installation.
- DENSO tape – recommended for covering exposed thread on the mounting bracket fasteners.

3.2 Maintenance

The tools and equipment required to maintain an existing P Belt Cleaner.

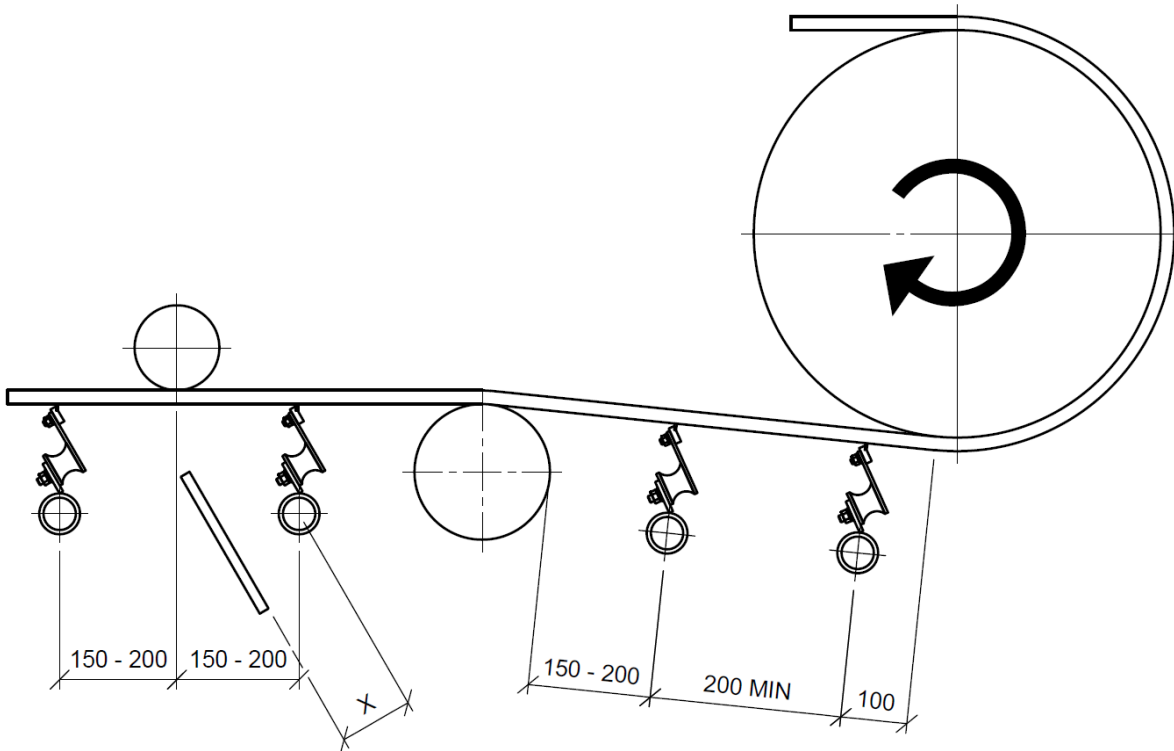
- Paint scraper / wire brush – for cleaning away material build-up.
- 17mm, 19mm & 24mm spanners (or a socket and a spanner) – for side assembly fasteners.
- 17mm socket or spanner – for cushion and arm nuts
- 13mm socket or spanner – for tip nuts
- P Belt Cleaner template – for confirming tip alignment
- Anti-seize – recommended for coating on fasteners prior to installation.
- DENSO tape – recommended for covering exposed thread on the mounting bracket fasteners.

Note: the above tools & equipment are the recommended minimum. Additional tools (adjustable wrench, screw driver, etc.) may also be required.

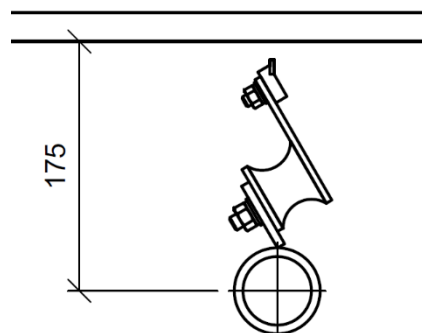
4 Mounting Location and Chute Modifications

4.1 Pole Position

The P Belt Cleaner can be positioned in many locations, and multiple cleaners can be positioned on a conveyor. The diagram below shows some typical installation positions.

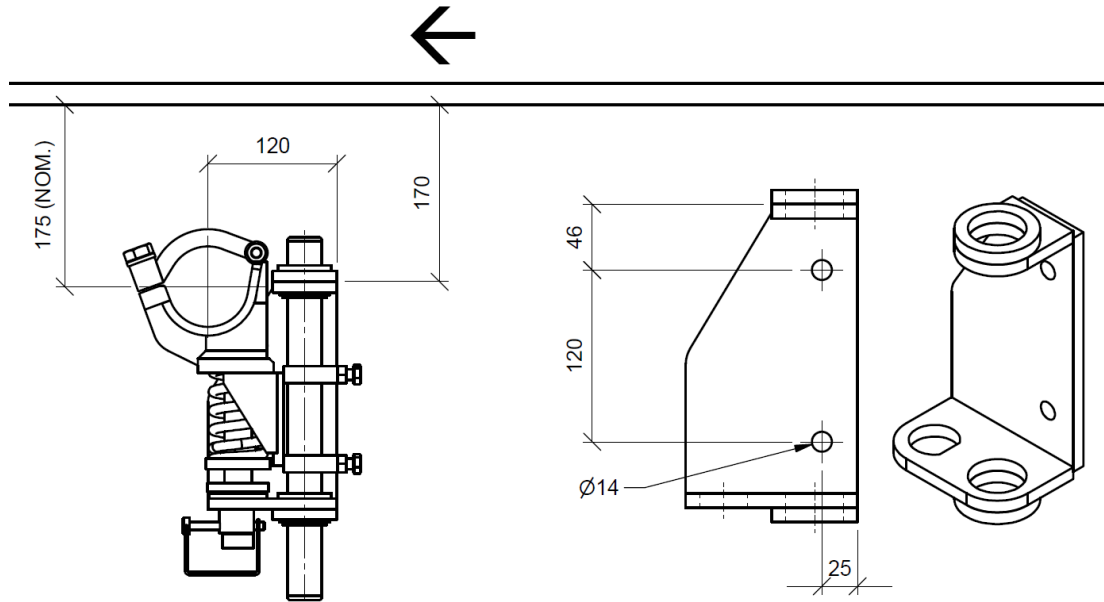


For installation set-up purposes, the location of the pole is 175mm from the belt, as shown in the diagram below. (The distance between the belt and the pole when the belt cleaner is operating is nominally 163mm.)



4.2 Mounting Bracket Position

The side assembly must be mounted perpendicular to the belt line. The mounting brackets should be installed in a position so they are "trailing" the mounting bracket, as shown in the LH diagram below.

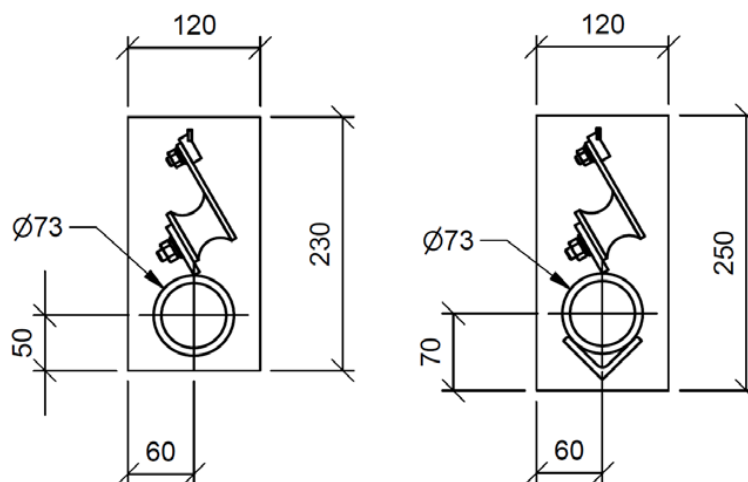


Each mounting bracket, shown in the RH diagram above, has two $\text{Ø}14\text{mm}$ holes. These holes allow the mounting brackets to be bolted to the chute wall or conveyor structure.

4.3 Chute Wall Modification

If the belt cleaner needs to be installed through the side of a chute wall, a hole must be cut into the chute wall to allow the belt cleaner to pass through.

The diagram below provides suggested dimensions for the rectangular hole that will enable the entire pole/blade assembly to pass through the chute wall.

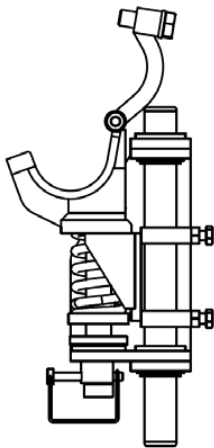


5 Installation

5.1 Installing the Pole/Blade assembly

The following steps are required to install a P Belt Cleaner correctly. They are based on the mounting brackets already being installed.

1. Ensure the mounting brackets are securely fastened to the chute wall or suitable structure by either welded or bolted connection.
2. Coat all fasteners with anti-seize.
3. Install the slider / clamp body / tension spring / tension bolt assembly and adjust the clamp arm up as shown below. Ensure the clamp body travels freely up and down the mounting bracket and that the slider protrudes at least 10mm from the slider bushes.



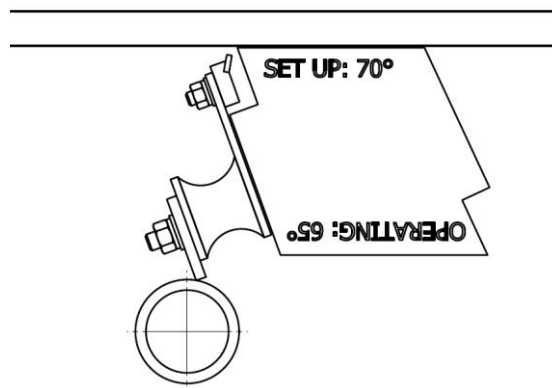
4. Install the belt cleaner so each end of the pole is resting on the clamp block body, and the belt cleaner is hanging upside down (ensure the belt cleaner is oriented correctly). This can be done by:
 - a. sliding the belt cleaner through a hole in the chute wall, or
 - b. lowering the belt cleaner down into the chute, one end first, then feeding that end through the hole in the chute wall, then sliding the other end through the other hole. Note: this may not be possible if the pole is too long. The ends of the pole can be trimmed if required.

Note: whichever method is used, make sure the tungsten tips are protected – they are brittle and will chip easily.

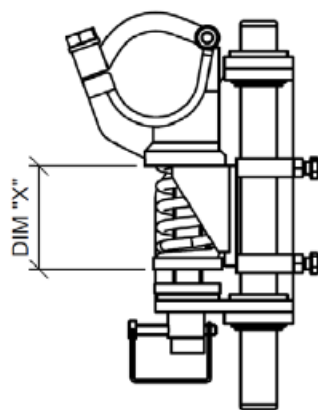
5. Position the belt cleaner so it is central on the conveyor (the belt may not be tracked centrally).
6. Close and tighten each clamp arm into place, then finger-tighten them so the pole is secure but can be rotated in the clamp blocks.
7. Using your hands, or by inserting a screwdriver through one of the holes in the end of the pole, rotate the pole/blade assembly upward so the tips are pointing toward the belt and lightly tighten the clamp block bolts.
8. Now that the belt cleaner is loosely installed, the final set up can be done.

5.2 Set Up

1. Remove the lock pins and use the tension bolts to raise the belt cleaner so it approaches the belt, until the tips are about 5mm from the belt and parallel with it.
2. Use the P Belt Cleaner template to check for correct tip alignment, as shown in the diagram below. Rotate the pole and/or adjust the clamp blocks up or down as required.



3. Once the tips are correctly aligned, securely tighten the clamp block clamp arm bolts and wrap the nuts and exposed thread with DENSO tape.
4. Gradually tighten each of the tension bolts, lifting the belt cleaner towards the belt, until the spring compression matches the values in the table below.



DIMENSION "X"		
BLADE WIDTH	BLACK SPRING	GOLD SPRING
450	90	N/A
600	87	N/A
750	85	90
900	82	88
1050	80	87
1200	77	85
1350	75	84
1500	72	82
1800	67	79
2100	N/A	76
2400	N/A	73

5. Rotate the tension bolt until the hole in the bush aligns with the threaded bolt and insert the lock pin on both side assemblies.
6. Double check that all nuts and bolts are tight and wrapped in Denso tape.
7. The P Belt Cleaner is now ready for operation.
8. Test run the conveyor and observe the belt cleaner for at least 10 minutes, running both empty and conveying material. If the blades vibrate, slightly increase or decrease tip tension by tightening or loosening the tension bolt. Note: this will be a trial and error process that can be influenced by numerous factors.

6 Operation

Once the belt cleaner has been installed and set up correctly, the only operational activities required are regular inspections. The frequency of inspections will depend upon a number of factors including the conveyor duty cycle and the material type. During conveyor operation only a Visual Inspection (looking) can be done. When the conveyor is isolated a Physical Inspection (touching) can be done – refer to Section 7.

6.1 Visual Inspections

Visual Inspections can be done while the conveyor is operating. The following steps are recommended to perform a Visual Inspection on an P Belt Cleaner.

1. Wash away any material build-up on the tips, arms, cushions or pole.
2. Check for correct installation (see Section 5).
3. Check tip condition (see Section 7.3).
4. Estimate and record tip wear (see Section 7.4).
5. Check for any damaged cushions or tips that may:
 - a. damage the belt,
 - b. damage the belt cleaner,
 - c. compromise belt cleaning efficiency.
6. Check for dirty strips on the belt, or signs of excess carryback.
7. Check pole for straightness.
8. Check Spring tension
9. Check side assembly fasteners are all tight.
10. Record all observations and estimates (eg. tip wear).

7 Maintenance

7.1 Physical Inspections

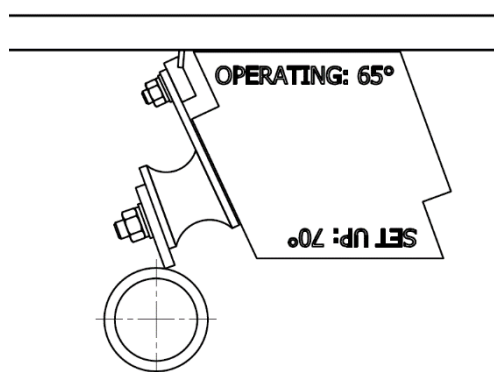
Physical Inspections can only be done when the conveyor is isolated. The following steps are recommended to perform a physical inspection on a P Belt Cleaner.

1. Follow all plant isolation procedures.
2. Wash away any material build-up on the tips, cushions or pole.
3. Confirm correct installation (see Section 5).
4. Check tip alignment (see Section 7.2).
5. Check tip condition (see Section 7.3).
6. Measure tip wear (see Section 7.4). Replace any tips if required (see Section 7.5).
7. Check cushion condition.
8. Check pole for straightness.
9. Check spring tension
10. Check side assembly fasteners are all tight.
11. Record all observations and measurements (eg. tip wear, tip tension).

7.2 Evaluating Blade Condition & Wear

There are two tip alignments that need to be considered on a P Belt Cleaner: set-up alignment and operating alignment. Set-up alignment is shown in Section 5.2, Step 2 above.

Operating alignment is the position the tips take once the belt has run as shown in the following diagram.

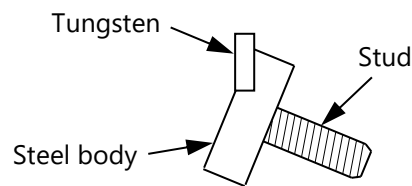


7.3 Evaluating Tip Condition

P tips comprise a 150mm wide steel body with a strip of 3mm x 10mm/15mm tungsten elements as shown on the below diagram.

During normal tip wear the protruding section of tungsten wears to the point where both the tungsten and the steel body begin wearing away.

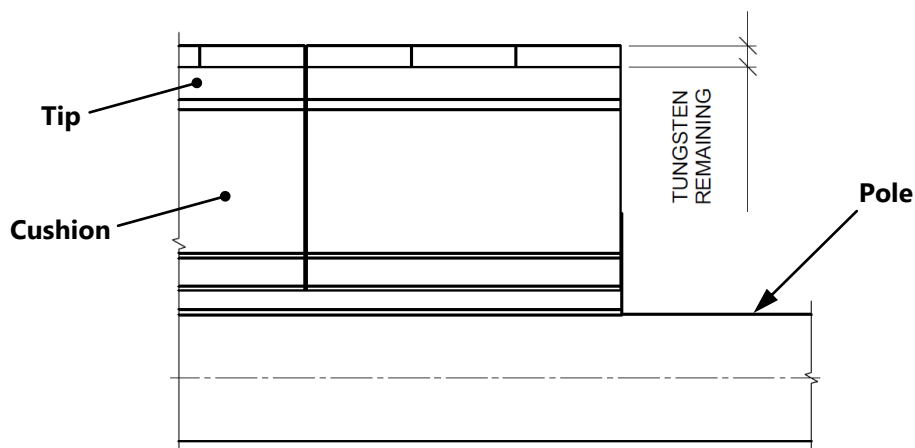
Refer to Section 7.4 below for details on how to measure the tip wear.



Tips may also become chipped. There is no fixed rule on how much chipping is acceptable, rather it needs to be a judgement made based on factors including the condition of the belt, the risk of belt damage, etc.

7.4 Measuring Tip Wear

The amount of tungsten on a new tip is 10mm. The amount of tungsten remaining is measured as shown in the following diagram. This measurement is to be recorded for each tip. If a single tip has uneven wear, the two end measurements are to be recorded (eg. 5mm RHS, 7mm LHS).



7.5 Replacing Tips

In order to replace one or more tips the tension must be backed off the belt cleaner. The following steps should be taken:

1. Remove the Denso tape from the adjuster bolts & lock nuts.
2. Loosen the tension bolts until the scraper moves away from the belt and the tips are ~ 5mm from the belt. Note: If the belt cleaner was set up correctly prior to releasing the tension, the pole will be positioned at the correct angle so there is no reason to loosen the clamp arm bolts.
3. Remove the worn or damaged tip(s) and replace with new tips.
4. Ensure the tips are all aligned.
5. Ensure the gap between tips is adequate to ensure adjacent tips do not bind with each other.
6. Tighten up the tip nuts.
7. Reinstate belt cleaner tension (refer to Section 5.2, Steps 4-8).