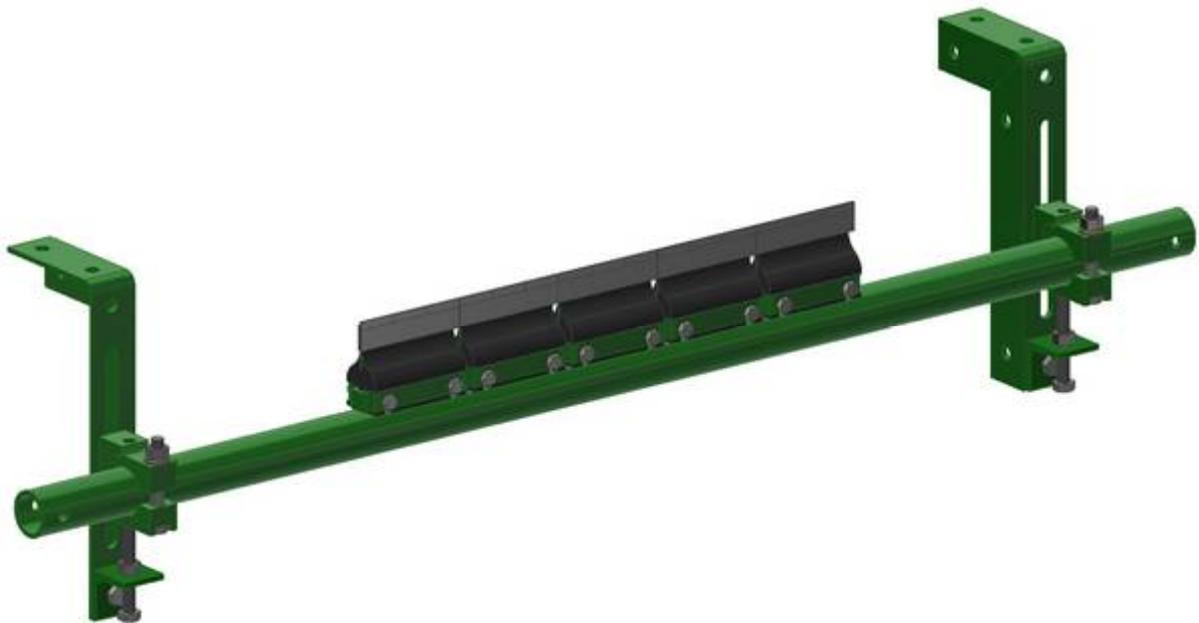


Installation, Operation and Maintenance Manual



R Belt Cleaner

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1 General Information

1.1 Overview

The Belle Banne R 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 R 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 towards, and slightly beyond, the point where the tip touches the belt surface so tension is stored in the rubber cushions. For belt widths up to 1200mm the pole is 60mm diameter. For belt widths greater than 1200mm the pole is 73mm diameter. For belt widths 1800mm and above, the 73mm pole is braced with a section of equal angle.

R Belt Cleaners are designed to handle reversing belt applications.

For more challenging applications, multiple R Belt Cleaners can be installed in close series. 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 or competent personnel.

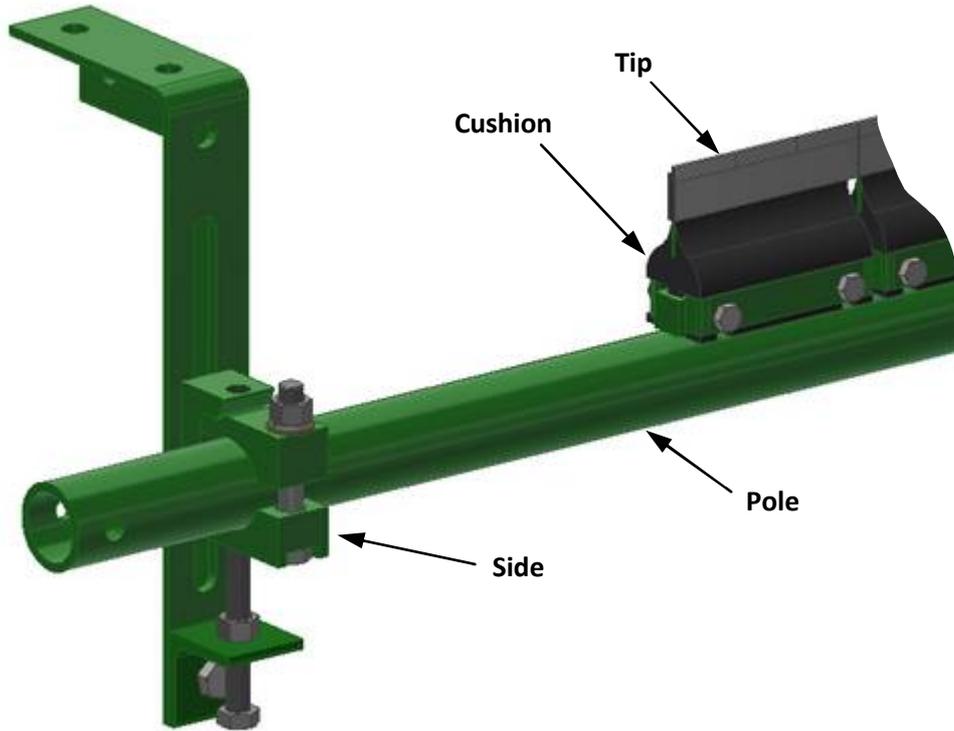
Ensure all personnel utilise appropriate personal protective equipment as required.

1.4 Assistance

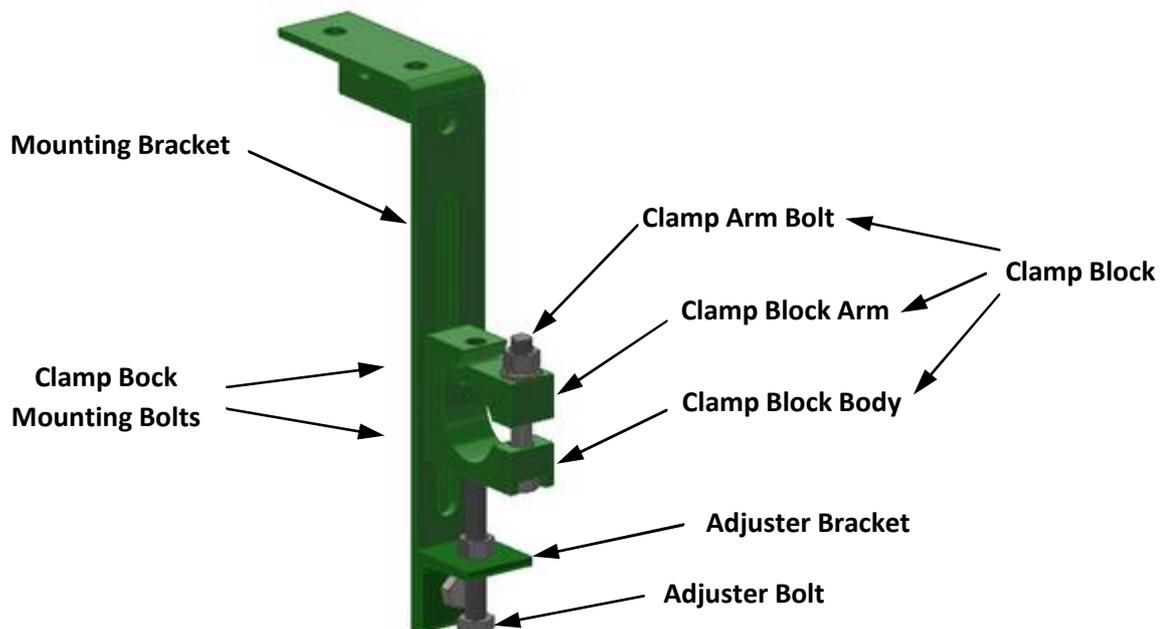
If assistance is required through any stage of the process: belt cleaner selection, design, drafting, installation and/or maintenance, Belle Banne Conveyor Products have personnel that are able to provide support.

2 R Belt Cleaner Components

2.1 Entire Cleaner



2.2 Side Assembly



3 Tools & Equipment

3.1 Installation

The tools and equipment required to install an R Belt Cleaner are:

- Measuring equipment – for marking out 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.
- 2 x spanners (or a socket and a spanner) – for tightening side assembly fasteners:
 - 19mm for 60mm pole
 - 24mm for 73mm pole
- 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 R Belt Cleaner.

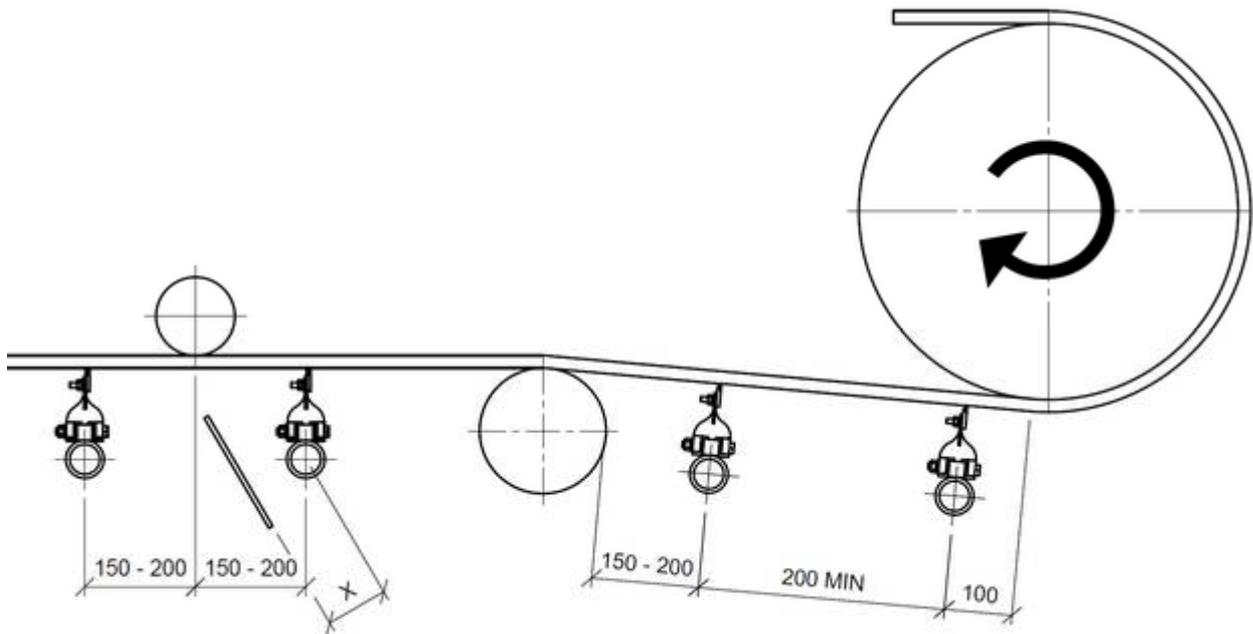
- Paint scraper / wire brush – for cleaning away material build-up.
- 19mm (60mm pole) or 24mm (73mm pole) spanners (or a socket and a spanner) – for side assembly fasteners.
- 17mm socket or spanner – for cushion and arm nuts.
- 13mm socket or spanner – for tip nuts.
- Anti-seize – recommended for coating 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.

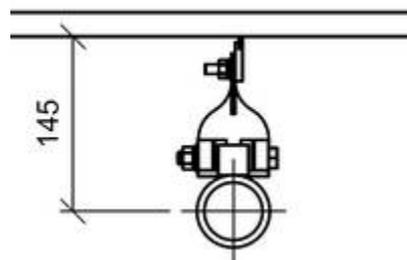
4 Mounting Location and Chute Modifications

4.1 Pole Position

The R 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. Note that dimension X is dependent on a number of factors including belt speed, material type, moisture content, etc. Contact Belle Banne Conveyor Products for more information.



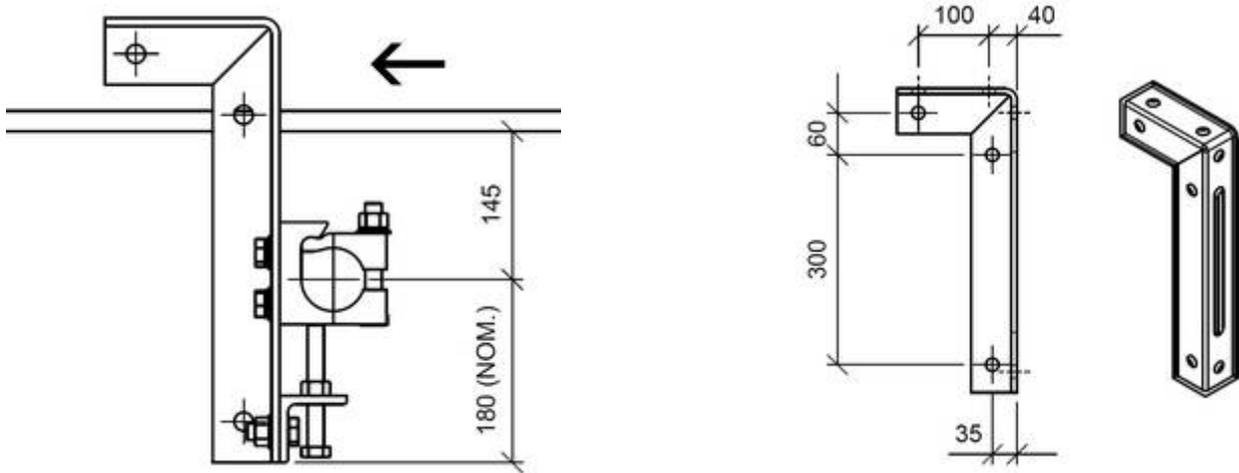
For installation set-up purposes, the location of the pole is 145mm from the belt, as shown in the diagram below. (The distance between the belt and the pole when the belt cleaner is operating is slightly less than this.)



4.2 Mounting Bracket Position

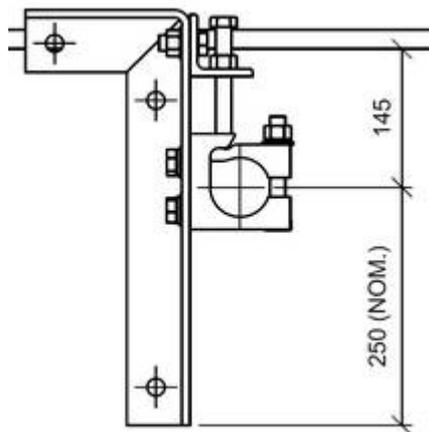
The ideal orientation of the mounting brackets is perpendicular to the belt line. If the belt line is on an incline or decline, the mounting bracket can still be installed vertically, for ease of installation, however the angular variation will need to be taken into consideration when adjusting the cleaner up to the belt (i.e. more turns of the adjuster bolt may need to be applied to account for the angle).

The mounting brackets should be installed in a position so they are “trailing” the pole for the majority of the belt travel direction, as shown in the LH diagram below.



The mounting brackets are a LH & RH pair (the RHS bracket is shown in the RH diagrams above). Each bracket has three $\varnothing 14$ mm holes on one face (visible in the LH diagram above). These three holes allow the mounting bracket to be bolted to the chute wall or conveyor structure. There are two $\varnothing 14$ mm holes in the top of the bracket, which allow the bracket to be mounted to the underside of a stringer or beam.

The other face to which the clamp block is mounted has a long slot and two $\varnothing 14$ mm holes. The holes secure the adjuster bracket and the slot allows the clamp block to slide up and down the mounting bracket. The side assembly can be set up so the clamp block is **pushed** up towards the belt (LH diagram above, or the clamp block is **lifted** up (the diagram below). Details about the set up of the adjuster bracket and screw for the **push** or **lift** option are provided in Section 5.2 Set Up.

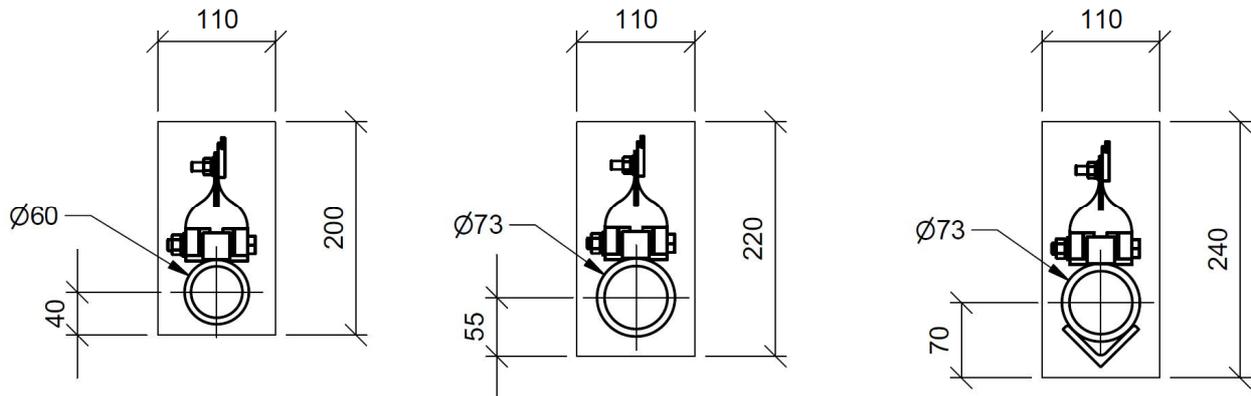


The nominal 135mm & 250mm dimensions shown in the diagrams above locate the bracket in a position that allows ample room for the pole to be installed, adjusted up to the belt, then lowered again for maintenance, with the adjuster bracket mounted in the hole at the end of the slot. In tight situations, the adjuster bracket can be mounted somewhere in the slot, with the clamp block. When using this set up there is a risk that the adjuster bracket slides in the slot when tightening the adjuster bolt.

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

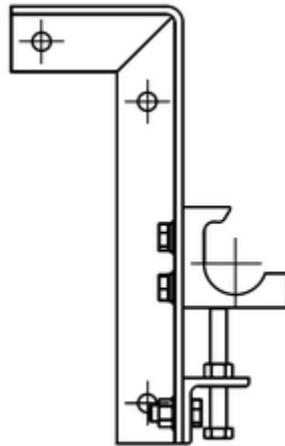


5 Installation

5.1 Installing the Pole/Blade assembly

The following steps are required to install an R 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 adjuster bracket, adjuster bolt and the clamp block body on each mounting bracket, as shown in the diagram below. The clamp block mounting bolts should be loosely tightened (the blocks need to be able to slide up and down along the slotted holes), with the clamp block positioned so the pole centre is roughly 145mm from the belt surface.



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 tips are oriented so the tungsten face of the tips is facing towards of the oncoming belt for the majority of its belt direction travel). 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. Slide each clamp block clamp arm into place and install each clamp arm bolt, 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. Using the adjuster bolts raise the belt cleaner so it approaches the belt, until the tip surfaces are about 5mm from the belt and parallel with it.

2. Rotate the pole and/or adjust the clamp blocks up or down as required until the tip faces are perpendicular to the belt surface.
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 adjuster bolts, lifting the belt cleaner towards the belt, until light contact is made between the tips and the belt across the entire width of the belt cleaner. Note: if the edges of the belt are sagging, raise the belt cleaner until the central tips are making contact with the belt.
5. Give an additional two turns to both adjuster bolts then securely tighten both sets of clamp block mounting bolts and wrap with them Denso tape.
6. Tighten both the adjuster bolt lock nuts and wrap the bolts and nuts with Denso tape.
7. Double check that all nuts and bolts are tight, and wrapped in Denso tape.
8. The R Belt Cleaner is now ready for operation.
9. 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 raising or lowering the belt cleaner. 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 R 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 7.2).
4. Estimate and record tip wear (see Section 7.3).
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 side assembly fasteners are all tight.
9. Record all observations and estimates (eg. tip wear).

7 Maintenance

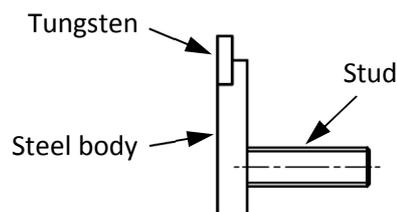
7.1 Physical Inspections

Physical Inspections can only be done when the conveyor is isolated. The following steps are recommended to perform a physical inspection on an R 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 5.2, Step 2).
5. Check tip condition (see Section 7.2).
6. Measure tip wear (see Section 7.3). Replace any tips if required (see Section 7.4).
7. Check cushion condition.
8. Check pole for straightness.
9. Check side assembly fasteners are all tight.
10. Record all observations and measurements (eg. tip wear, tip tension).

7.2 Evaluating Tip Condition

R tips comprise a 150mm wide steel body with a strip of 3mm wide tungsten elements as shown on the adjacent diagram. The height of each tungsten element varies depending on the tip type – 10mm is the minimum height.

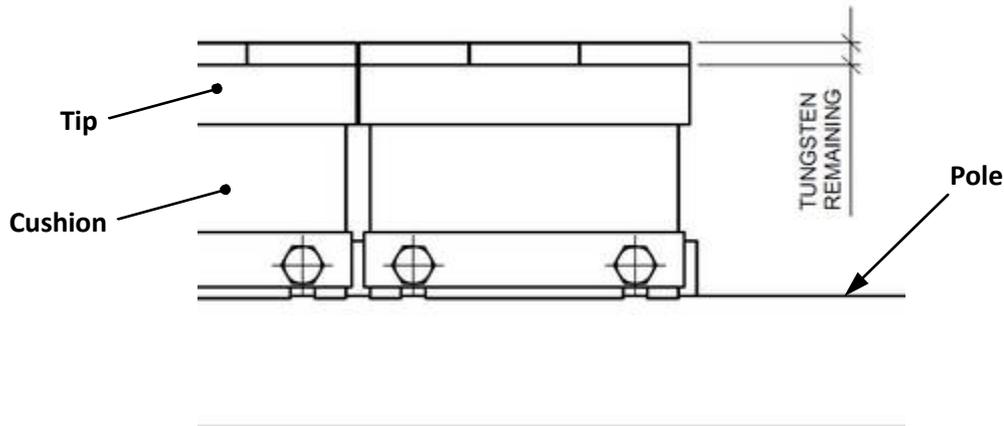


During normal tip wear the protruding section of tungsten wears to the point where both the tungsten and the steel body begin wearing away. Refer to Section 7.3 for details on how to measure the tip wear.

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.

7.3 Measuring Tip Wear

The amount of tungsten on a new tip is 10mm, 15mm, etc., depending on the tip type. 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).



7.4 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. Remove the Denso tape from the clamp block mounting bolts.
3. Loosen the clamp block mounting bolts so the clamp blocks can slide on the mounting brackets.
4. Loosen the adjuster bolt lock nuts.
5. Back off the adjuster bolts until the belt cleaner 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.
6. Remove the worn or damaged tip(s) and replace with new tips.
7. Ensure the tips are all aligned.
8. Ensure the gap between tips is adequate to ensure adjacent tips do not bind with each other.
9. Tighten up the tip nuts.
10. Reinststate belt cleaner tension (refer to Section 5.2, Steps 4-8).