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Return Belt Cleaner (RBC)

Installation, Operations and Maintenance Manual





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WARRANTY

ESS WARRANTS the **Return Belt Cleaner (RBC)** to be free of defects both in materials and workmanship for a period of 12 months from the date of despatch of the product from the ESS factory. The warranty given by ESS in this regard will extend only to replacing or repairing product shown to be defective.

The warranty also is subject to the following restrictions:

Installation of the product contrary to the instructions contained in the supplied manual will void such warranty absolutely;

The warranty will not extend to any liability for injuries incurred and which result from the use of the product contrary to the instructions in the manual;

Save as prescribed by law, ESS will not be liable for any damage sustained by a purchaser or a third party by way of consequential loss arising out of defects in the product.

You are asked to note that ESS offers purchasers a service whereby either:

It will install the product and certify the correctness of such installation, or

Certify the correctness or otherwise of the installation of the product by third parties.

This certification service is designed to ensure that you obtain the full benefit of the ESS warranty hereby provided. If you would like to take advantage of the installation certification service provided, please contact ESS regarding the service.

Refer to the Final Checklist at the back of this manual.

Visit the ESS website www.esseng.com.au to register your product warranty.

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Information contained herein is for use in the operation of the Return Belt Cleaner (RBC), purchased from ESS and cannot be passed on to any other party without express permission, in writing, from ESS.



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1.0 SAFETY

All equipment installed on or around a conveyor belt, including access doors and cut-outs, must comply with AS 1755 – 2000, Conveyors – Safety Requirements.

Ensure that only suitably qualified and trained personnel install and service this product, and that all site and statutory safety procedures are followed.



The conveyor belt drive and any associated equipment must be shut down and locked out according to plant safety procedures before attempting work requiring access to or opening of the chute or conveyor enclosure. Contact with a moving conveyor belt and its drive components can result in serious injury or death.

The Return Belt Cleaner is designed to be quickly and easily serviced by appropriate personnel.

Under no circumstances should servicing or installation of the cleaner be carried out whilst the belt is in operation. The conveyor must be shut down and locked out before any person enters or reaches into the conveyor enclosure.

Ensure that only suitably qualified and trained personnel install and service this product. Ensure that all site and statutory safety procedures are followed.

The following hazards are some that may be present when installing this equipment:

	Hazard		Hazard
X	Moving Conveyor - ISOLATE		Other:
	Hot Work		Other:
	Working at Heights		Other:
	Heavy Lift		Other:
	Persons Working Overhead		Other:
	Persons Working Below		Other:
	Electrical & Cabling		Other:
	Pinch Points		Other:
	Trip Hazards		
	Confined Space Entry		

Once hazards have been identified, the installer should undertake and document a comprehensive Job Hazard Analysis according to site requirements and good safe-working practice.

The installer must identify all hazards and apply appropriate controls before proceeding with the installation or servicing of this equipment.

1.1 SAFETY LABELS

Pictograph labels are used to show graphically where potential safety hazards exist around this product. These labels do not represent every possible hazard. They are not intended to be a substitute for safe work practices and good judgment. These labels and *ESS* technical manuals use specific words to identify the severity of the hazard. They are described below. Take time to read and understand the meaning of these words and symbols.



Danger labels call attention to imminently hazardous situations that will result in serious personal injury or death if not avoided. Injury from these hazards is immediate in nature and has a high probability of resulting in a serious or fatal accident if proper precautions are not followed.



Warning labels call attention to potentially hazardous situations that could result in serious personal injury or death if not avoided. Injury from these hazards is usually serious in nature, and a severe or fatal accident can occur if proper precautions are not followed.



Caution labels call attention to potentially hazardous situations that may result in minor or moderate personal injury if not avoided. Injury from these hazards is normally less serious than those from Danger or Warning hazards. However, there is still the potential for an accident resulting in serious injury if proper precautions are not followed.



2.0 INTRODUCTION

The *ESS* RETURN BELT CLEANER (RBC) is a return belt cleaner designed to remove fugitive material from the inner side of the return run of a conveyor belt.

The RBC is normally located before the tail pulley, gravity take up, mid-drive unit or any other position where fugitive material can become trapped between the belt and pulley, causing damage or wear to the belt, pulley or pulley lagging.

The *ESS* RBC features a urethane blade for long-life and efficient cleaning, and can also be supplied in Mines Department approved FRAS urethane for underground coal and similar applications.

The main feature, however, of the *ESS* RBC, is the unique urethane torsion strap suspension. This suspension arrangement allows pre-tensioning of the RBC onto the belt by simply rotating the support pipes.

The RBC is held lightly against the belt surface, and “floats” with the belt movement, eliminating the “chatter” commonly associated with gravity-type Vee Ploughs.

NOTE: The *ESS* RBC is directional, and is not suitable for reversing belts.

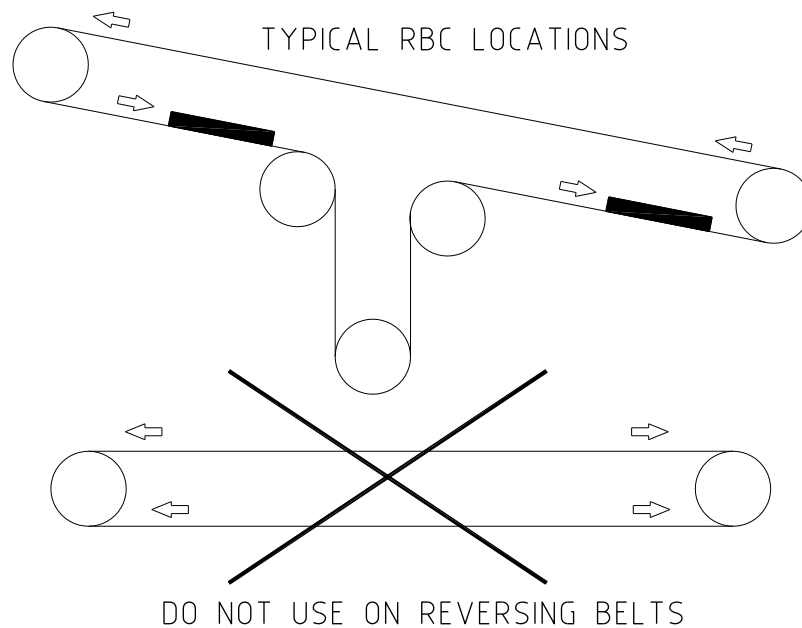


Figure 1 - Where to use an RBC

Location of the Return Belt Cleaner should be carefully considered so that the material removed from the belt does not create a hazard as it falls or where it accumulates. Also the consideration should be given to having the ability to observe the cleaner during operation. The cleaner should be installed so that it is positioned between return rollers and not on top of a return roller.



2.1 PREPARATION FOR INSTALLATION

1. DETERMINE INSTALLATION POSITION

As previously noted, the **ESS** RBC is intended to be installed on the inside return conveyor belt, just before the tail pulley, gravity take-up or similar.

The position selected for installation should have a flat, taut belt, and good access for installation and maintenance. Suitable support structure for attachment of the RBC mounts is also required.

2. OBSERVE BELT CONDITIONS

- Does the belt reverse or roll back on stopping? If so, do not use this RBC. An **ESS** Diagonal Plough is used on reversing belts.
- Is the belt flat and taut or does it sag or cup
- Does the belt bounce or vibrate?
- The RBC will operate best on a flat, vibration free belt. Achieve these conditions by appropriate use of flat rollers.
- If a flat, stable belt cannot be achieved contact ESS before proceeding with the installation.

3. TRIAL ASSEMBLE RBC

Familiarise yourself with the parts and operation of the RBC. Plan the installation. Measure and pre-manufacture any mounting brackets that may be required.

Note! Dimensions shown here are for the RBC

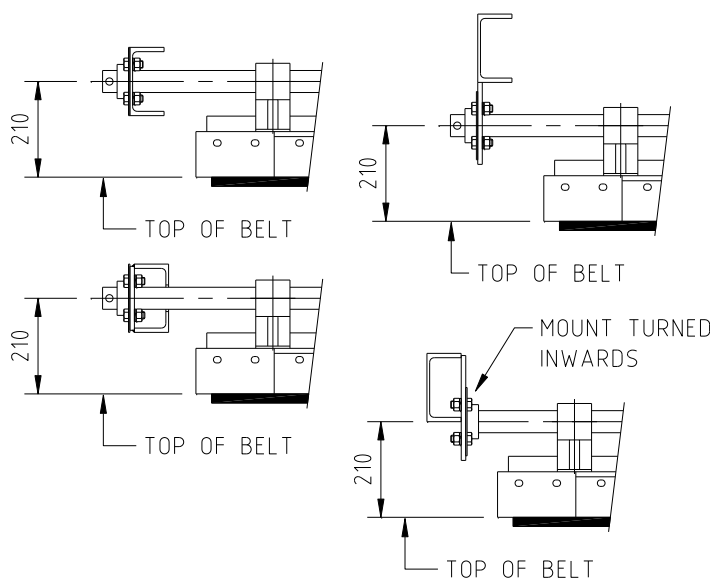


Figure 2 - Typical Mount and Stringer Arrangements

4. ASSEMBLE THE NECESSARY TOOLS AND SAFETY EQUIPMENT REQUIRED FOR THE JOB.



3.0 INSTALLATION



BEFORE PROCEEDING WITH INSTALLATION, ENSURE THAT THE CONVEYOR BELT DRIVE IS FULLY ISOLATED AND LOCKED OUT. CONTACT WITH A MOVING CONVEYOR CAN RESULT IN SERIOUS INJURY OR DEATH.

NOTICE: DO NOT ALTER SPECIFIED RBC INSTALLATION DIMENSIONS TO AVOID SITE OBSTACLES. THE RBC WARRANTY WILL BE VOIDED IF NOT INSTALLED TO SPECIFIED DIMENSIONS.

Note: In 2014, ESS introduced a new method of manufacture for RBC mainframes for some models. The new frames are laser cut and folded from a single piece of steel plate.

These frames are easily identified by the lack of any welded joints, the ESS logo laser cut into the upper frame and by the absence of a front nose support section. (The urethane nose actually self supports once it is bolted in place, so this section is not required.)

The frames are installed in exactly the same way as previous versions and do not require any changes in operation or commissioning. The main benefit to the end user is lighter weight, reducing manual handling hazards during installation.

One difference with this frame is that the lug for attachment of the safety chain is bolted in place instead of being welded. The RBC will normally be shipped with the lug attached, but the installer should be aware to check this. If not in place, the lug is simply bolted to the frame using fasteners supplied.

The installer should ensure that the attachment bolts are fitted with locking nuts or spring washers and are adequately secured.

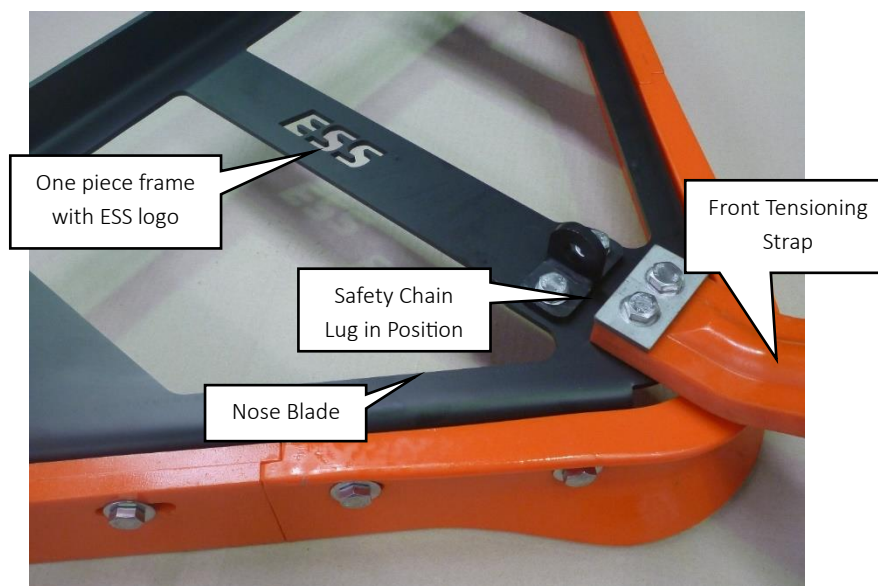


Figure 3- New Mainframe Lug Arrangement

- Step 1** Place the RBC without support pipes or tensioning straps on the belt at the selected position. Ensure that the RBC frame rear cross member is perpendicular to the belt.
- Step 2.** Measure 100mm forward from the front of the RBC, and 210mm perpendicular upwards from the belt surface. Mark this point on the stringer or conveyor structure on each side of the belt, ensuring that the line between the points is at 90° (square) to the belt. These points represent the centre lines of the front support pipe and front mount sets.
- Step 3** Install the front support pipe and mounts at the above point. For belts less than 1500 wide, ensure that the mount with the locking collar attached is located on the access and service side of the conveyor. Installation may involve cutting holes or attaching brackets to conveyor structure (see typical mount arrangements **Figure 2** in previous section, and cutout details below). Seek site Engineer’s approval before modifying conveyor structure.

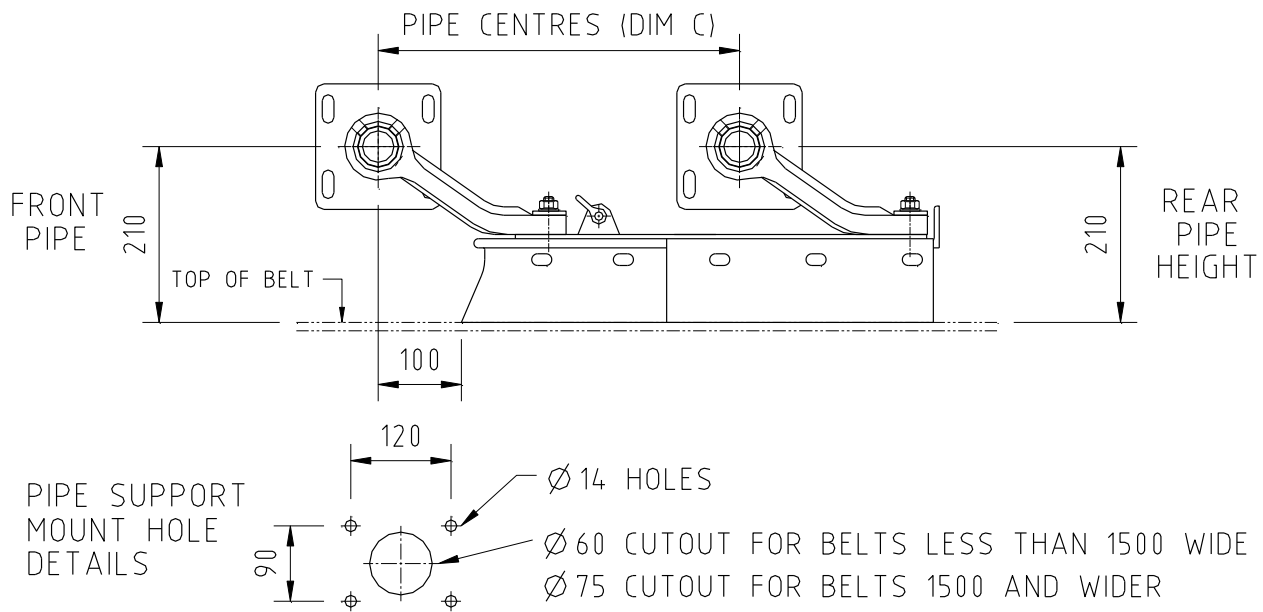


Figure 4 - RBC Mounting Dimensions

Table 1 – Dimension C Values

Belt Width	600	750	900	1050	1200	1350	1500 1600	1800	2000	2200	2400
Pipe Centres (Dim C)	202	277	381	433	497	591	685	784	883	982	1081

Step 4 Measure back from the above point a distance equal to dimension “C” from above table, and parallel to the belt (ie. 210mm from belt surface). This point represents the centre line of the rear support pipe and mounts.

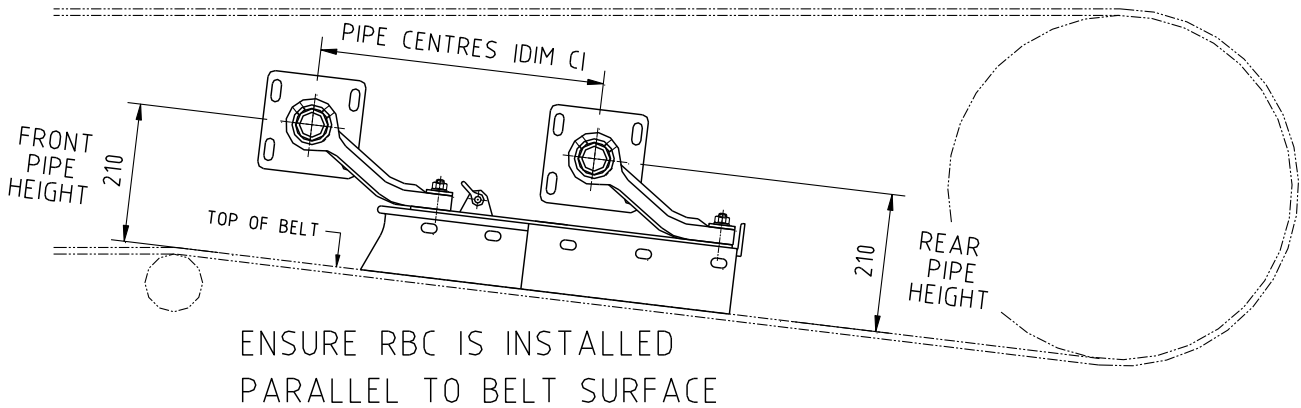


Figure 5- RBC Alignment with Belt Angle

Step 5 Install rear support pipe and mounts as previously described.

STOP: At this point, check that the two support pipes are exactly 210mm from centre of pipe to top of belt. Check that the two pipes are exactly Dim C apart from centre to centre. Check that the two pipes are square to the belt and parallel to each other.

Step 6 If not already done, withdraw the pipes through one mount and slide on the urethane tensioning straps – one on the front pipe and two on the rear. Centralise the RBC and pipe supports to the belt and/or stringers, and align the straps to the holes in the RBC frame. The holes should easily align without force. Insert bolts and bolt the strap ends to the RBC frame. Ensure that correct fasteners with locking nuts or spring washers are used.

If the strap holes do not align with the frame holes, **DO NOT** bend or distort the strap to align them. Re-check pipe installation dimensions to correct the misalignment. Distorting the straps may result in vibration and failure of the RBC and the straps.

If after re-checking the holes in the straps do not match the holes in the frame immediately contact ESS.

Step 7 There are two options for attaching the safety chain, however option 2 should only be used where option 1 is not possible.

Option 1 – Attach one end of the safety chain by shackle to the RBC frame lug. Loop the other end around a part of the conveyor structure strong enough to arrest the RBC in the event that it becomes detached. Ensure the chain is parallel/central to the RBC.



Connect the chain to itself with the other shackle, allowing approximately 70-80mm of slack for blade wear.

Option 2 – Attach one end of the safety chain by shackle to the lug on the RBC frame. Loop the other end around the front support pipe and connect to itself with the other shackle, allowing approximately 70-80mm of slack for blade wear. **Refer to start of this section for details of models with separate bolt-on chain lug.**

Tighten the lockscrews securing the tensioning straps to the support pipes.

Step 8 At one end of each support pipe (the same end as the locking mounts) as per “Tensioning Hole Details” see drawing F0031 [Installation Arrangement Drawing](#) (see back page) drill a hole large enough for insertion of an appropriate tensioning bar (say Ø20 hole). As an alternative, a pipe wrench may be used for tensioning.

Step 9 If support pipes are excessively long, trim off the appropriate amount, remembering to leave enough pipe exposed for tensioning (see Step 8 above).

Step 10 From outside the conveyor enclosure, rotate the front support pipe to just place a slight downward load on the front tensioning strap, but without inducing any visible deflection in the strap. Tighten the lock screw(s) on the support pipe mounts to retain the adjustment, and to prevent movement of the pipe. Repeat for the rear pipe and straps.

Installation of the RBC is now complete. The conveyor can be returned to service and commissioning of the RBC can commence.

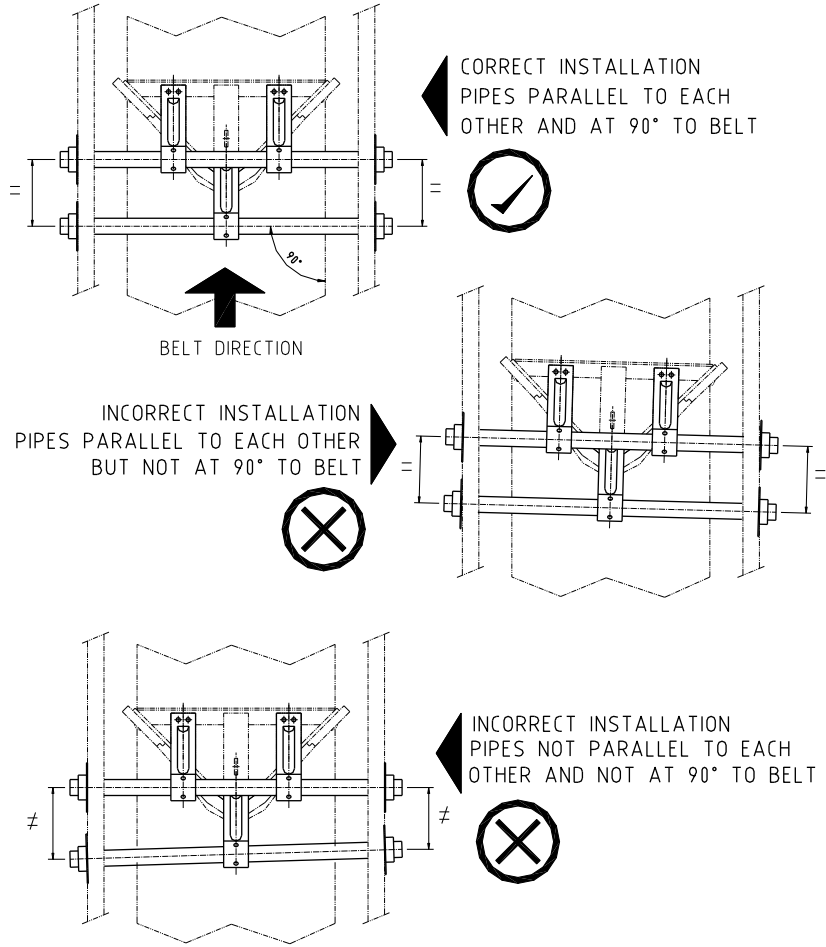


Figure 6 - – Correct and Incorrect Installations



4.0 COMMISSIONING

Step 1 Ensuring that all personnel are clear and following all appropriate safety procedures, start the belt. Observe the action of the RBC.



Do not undertake any work that requires you to reach into the conveyor enclosure when the conveyor is running. If the adjustment points of the RBC are within the operating enclosure of the conveyor belt, first shut down and lock out the conveyor before adjusting the RBC. Contact with a moving conveyor belt can result in serious injury or death.

The RBC should ride smoothly on the belt with no chatter or vibration. If vibration is present, repeat the tensioning procedure in Step 10 of Section 4, but slightly increase the contact pressure. Do not over-tension the RBC - it will not increase cleaner efficiency but will increase blade wear.

If vibration is present after moderate tensioning, contact **ESS** on **1800 074446** from anywhere within Australia.

Step 2 Demonstrate the system to the operating supervisors and crew. Ensure that all operators and service personnel are trained in safety procedures and the safe operation and maintenance of the RBC.

Step 3 Secure the system for production

Follow plant procedures to secure the conveyor for actual production.

5.0 ROUTINE MAINTENANCE AND SERVICE

Although the RBC requires only minimal maintenance, regular inspection and servicing is the key to effective conveyor belt cleaning. It is recommended that the cleaner be inspected once per week. Actual service intervals will vary considerably from plant to plant.



DO NOT REACH INTO THE CONVEYOR UNDER ANY CIRCUMSTANCES WHILST THE CONVEYOR IS RUNNING. Contact with a moving conveyor can result in serious injury or death.

5.1 ROUTINE EXTERNAL INSPECTION

- Step 1** Visually inspect the condition of the RBC. Observe the condition and action of the cleaner with the belt running. If vibration or other unusual conditions exist, shutdown the conveyor and carry out a Shutdown Service as described below.
- Step 2** Observe the condition of the blade. If necessary (and if plant rules allow it), hose any material build-up from the blade. **DO NOT REACH INTO THE CONVEYOR WHILST IT IS RUNNING.** If the blade is excessively worn or blade to belt contact is not even, shutdown the conveyor and carry out a Shutdown Service as described below.

5.2 SHUTDOWN INSPECTION / SERVICE

- Step 1** Shut down and lock out the conveyor.
- Step 2** Visually inspect the blade. Check the condition of the urethane torsion straps, looking for cracks, cuts or any damage. Check that all fasteners are secure.
- If the blade is not excessively worn, and straps and fasteners are in good condition, check the tension of the cleaner and if necessary, re-tension as described in Section 4, Step 10. Service completed.
- If the blade or torsion straps are excessively worn or damaged, proceed.
- Step 3** Release the lockscrews on the RBC mounts to release tensioning pressure on the RBC.
- Step 4** Remove the bolts securing the tensioning straps to the RBC mainframe. Remove the RBC frame and blade assembly from the conveyor enclosure and place in accessible area.
- Alternatively, if it is easier to access the RBC in-situ, place appropriate packing under the RBC frame to allow removal and replacement of the RBC blade.
- Step 5** Clean and inspect the RBC blade, and replace if necessary. Inspect the tensioning straps closely and replace if damaged. See section 4 for description of RBC assembly.
- Step 6** Re-install all parts, ensuring that all fasteners are adequately secured. Re-tension the RBC as described in Section 4.
- Step 7** Remove locks and return the conveyor to service.



8.0 FINAL CHECKLIST

Site: _____ Number: _____ Date: _____

Site Equipment No./Location: _____ Site Contact: _____

Completed By: _____ (Circle Yes or No Below)

1. Was equipment to ESS Specification? _____ Yes/No

Drawing No. Ref: _____ Attached? Yes/No

If No, WHY _____

Will this affect performance? Yes/No

If Yes, WHY _____

2. Was this a standard service inspection installation? Yes/No

If No, WHY _____

3. Was work carried out as per procedure and JSA? Yes/No

If No, WHY _____

4. Is equipment fit for commissioning? Yes/No

If No, WHY _____

5. Was a final inspection carried out while plant was running? Yes/No

If No, WHY _____

6. Has anything changed from previous service / inspection / installation? Yes/No

If Yes, WHAT _____

7. Is equipment performance to Client expectations? Yes/No

If No, WHY _____

ESS Signature: _____ Client Signature: _____

