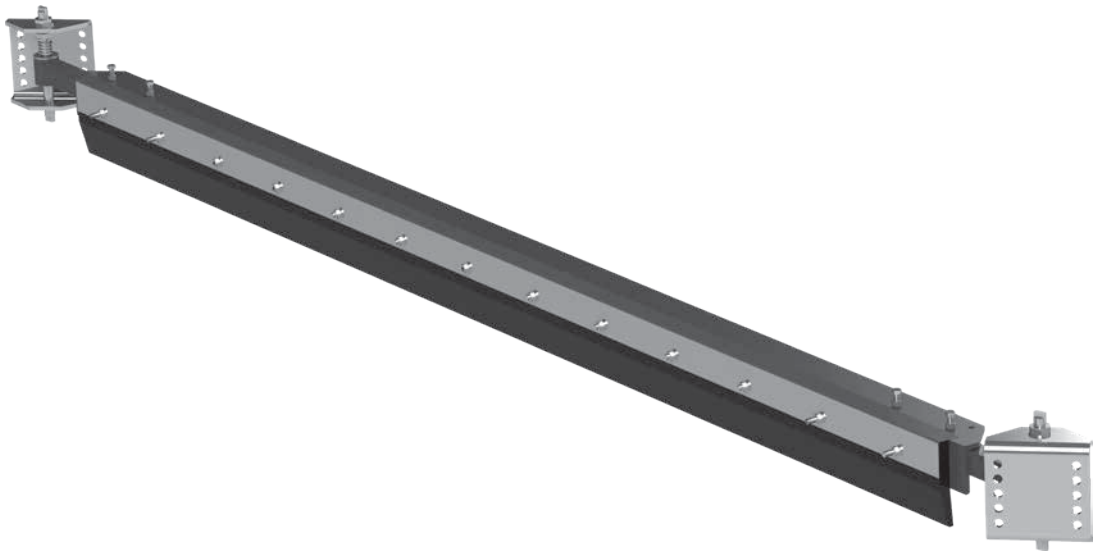
Heavy-Duty Diagonal Plough with Spring Tension

Installation, Operation and Maintenance Manual



FLEXCO

Heavy-Duty Diagonal Plough with Spring Tension

Serial Number: _____

Purchase Date: _____

Purchased From: _____

Installation Date: _____

Serial number information can be found on the Serial Number Label included in the Information Packet found in the cleaner carton.

This information will be helpful for any future inquiries or questions about belt cleaner replacement parts, specifications or troubleshooting.

Table of Contents

Section 1 – Important Information

1.1 General Introduction

The Heavy-Duty Diagonal Plough is a "belt cleaner" for the conveyors tail pulley or gravity take up area. It was designed for Heavy-Duty, high speed applications which require blade to belt contact at all times. It features the same exclusive blade design that is standard on all "Deflector Belt Plough" models and is angled across the belt to dump the materials to one side of the conveyor for easy clean-up.

We at Flexco are very pleased that you have selected a Heavy-Duty Diagonal Plough for your conveyor system. This manual will help you to understand the operation of this product and assist you in making it work up to its maximum efficiency over its lifetime of service.

It is essential for safe and efficient operation that the information and guidelines presented be properly understood and implemented. This manual will provide safety precautions, installation instructions, maintenance procedures and troubleshooting tips.

If, however, you have any questions or problems that are not covered, please visit our web site or contact our Customer Service Department:

Customer Service: 612-8818-2000

Visit www.flexco.com for other Flexco locations and products.

Please read this manual thoroughly and pass it on to any others who will be directly responsible for installation, operation and maintenance of this product. While we have tried to make the installation and service tasks as easy and simple as possible, it does however require correct installation and regular inspections and adjustments to maintain top working condition.

1.2 User Benefits

Correct installation and regular maintenance will provide the following benefits for your operation:

- Cleans the bottom side of the belt on the return strand of the conveyor, keeping lumps, rocks and fines from getting between the pulley and the belt which can result in damage to the belt, pulley, lagging and Flexco splices.
- Installed on a 45 degree angle across the belt to discharge the fugitive material to one predetermined side of the conveyor.
- The spring tension design eliminates the bouncing problem experienced with some floating style ploughs.
- Uses the exclusive "Deflector" angled blade design to enhance its cleaning performance and material discharge ability.
- Easy to install and set up.
- Blade replacement is quick and low cost.
- Simple screw tensioning system adjusted from the top of the mounting bracket.

1.3 Service Option

The Heavy-Duty Diagonal Plough is designed to be easily installed and serviced by your on-site personnel However, if you would prefer complete turn-key factory service, please contact your local Territory Manager of Flexco distributor.

Section 2 – Safety Considerations and Precautions

Before installing and operating the Heavy-Duty Diagonal Plough, it is important to review and understand the following safety information.

There are set-up, maintenance and operational activities involving both stationary and operating conveyors. Each case has a safety protocol.

2.1 Stationary Conveyors

The following activities are performed on stationary conveyors:

- Installation
- Tension adjustments
- Blade replacement
- Cleaning
- Repairs

⚠ DANGER

It is imperative that OSHA/MSHA Lockout/Tagout (LOTO) regulations be followed before undertaking the preceding activities. Failure to use LOTO exposes workers to uncontrolled behavior of the plough caused by movement of the conveyor belt. Severe injury or death can result.

Before working:

- Lockout/Tagout the conveyor power source
- Disengage any takeups
- Clear the conveyor belt or clamp securely in place

⚠ WARNING

Use Personal Protective Equipment (PPE):

- Safety eyewear
- Hardhats
- Safety footwear

Close quarters, springs and heavy components create a worksite that compromises a worker's eyes, feet and skull.

PPE must be worn to control the foreseeable hazards associated with conveyor plough. Serious injuries can be avoided.

2.2 Operating Conveyors

There are two routine tasks that must be performed while the conveyor is running:

- Inspection of the cleaning performance
- Dynamic troubleshooting

⚠ DANGER

Every plough is an in-running nip hazard. Never touch or prod an operating plough. Plough hazards cause instantaneous amputation and entrapment.

⚠ WARNING

Ploughs can become projectile hazards. Stay as far from the plough as practical and use safety eyewear and headgear. Missiles can inflict serious injury.

⚠ WARNING

Never adjust anything on an operating plough. Unforseeable belt projections and tears can catch on ploughs and cause violent movements of the plough structure. Flailing hardware can cause serious injury or death.

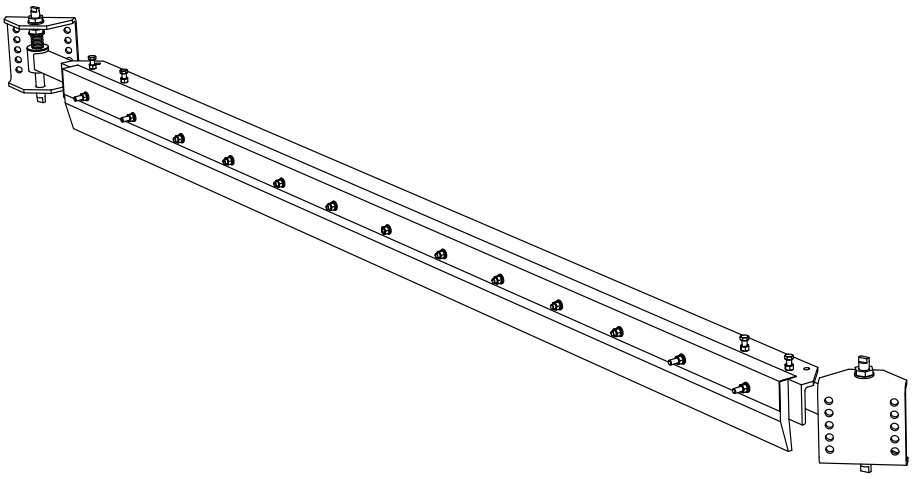
Section 3 – Pre-installation Checks and Options

3.1 Checklist

- Check that the plough size is correct for the beltline width
- Check the product carton and make sure all the parts are included
- Review the "Tools Needed" list on the top of the installation instructions
- Check the conveyor site:
  - Are there obstructions that may require cleaner location adjustments
  - Ensure proper clearance is available between return side belt and structure

Section 4 – Installation Instructions

4.1 HD Diagonal Plough Installation



Heavy-Duty Diagonal Plough

Physically lock out and tag the conveyor at the power source before you begin plow installation.

Before You Begin:

- Installation specs and instructions are based on the assumption •Isolate the conveyor at the power source as per the Isolation procedures for the site you the conveyor is located at. If unsure of the procedure, contact your site representative for instructions.
- Ideally the plough should be positioned in a flat area on the return side of the belt and as close as possible to the tail pulley as practicable.
- For optimum cleaning performance, the plough leading and discharge ends should be located directly above or as close as possible to a return idler.

Tools Needed

- Tape measure
- 300mm steel rule
- Combination Square
- 300mm Level with angle adjustment
- Scribe or engineers chalk
- 5 in. grinder
- Magnetic base rotor broach or Large hand drill
- 18mm broach or drill bit
- 24mm ring/open end spanner x 2
- 19mm ring/open end spanner
- Oxy cutting equipment if drilling is not possible

Section 4 – Installation Instructions

4.1 HD Diagonal Plough Installation

1. **Position the plough body on the conveyor.** Slide the plough body into position on the belt ensuring there is sufficient clearance between the belt and the conveyor structure. Position the cleaner in the direction that the discharge material is to be placed. Also, check for structure interference at both ends where mounting brackets will contact the frame of the conveyor. The plough should generally be installed at a 45 deg angle; this may vary depending on the structure width. The leading edge of the plough should be positioned above a return idler as well as the discharge end. This will ensure the plough is working on a good flat belt surface.

2. **Mark and drill mounting holes into conveyor structure.** Once the installation position has been determined, marking out and drilling of the mount holes can take place. If the conveyor structure or stringer configuration does not accept the mounting channels, modification to the structure may be required. Consult the site contact before proceeding with any structural modifications. The mounting channel has been supplied with staggered mounting holes to suit varying mounting positions. The bottom edge of the mount bracket has a fixed dimension of 50mm from the belts surface to the bottom of the mount bracket. The first mount holes are then 40mm above the bottom edge of the mount bracket and the following 4 holes are at 30mm intervals on the horizontal and the vertical centre is 150mm. Mark the position of the mount holes on the structure for the leading end of the diagonal plough and drill to 18mm to suit the 16mm mount bolts.

3. **Install the leading edge mount bracket into the plough.** Slide the 50mm x 50mm box section with the assembled mount bracket into the receiver on the Diagonal plough. Place the plough into position on the belt and bolt the mounting bracket into place with the supplied M16 x 50 mount bolts. Once the leading edge is bolted in place, move the discharge end towards the centre of the belt. Then slide the assembled mount bracket into the receiver. Shuttle the plough back to the edge of the belt and position the mount bracket onto the conveyor structure. Centre the plough in relation to the belt by sliding on the box sections on the mount brackets. Once it is in position mark the corresponding holes for the mount bracket on the discharge end and drill.

4. **Bolt the discharge mount bracket into position.** Once the discharge mount bracket is fixed into position, and the plough is centrally located to the belt, tighten and lock down the grub screw bolts in the adjustable receivers on the plough body. Then screw down the adjustable tension shaft to compress the tension spring 8mm and lock of the shaft with the lock nut on top of the mount bracket.

5. **Check performance.** Run the belt and check that the plough runs smoothly and has an effective cleaning action. A final adjustment may be required. Refer to step 4 for adjustment.

Section 5 – Maintenance

Flexco belt ploughs are designed to operate with minimum maintenance. However, to maintain superior performance some service is required. When the plough is installed a regular maintenance program should be set up. This program will ensure that the plough operates at optimal efficiency and problems can be identified and fixed before the plough stops working.

All safety procedures for inspection of equipment (stationary or operating) must be observed. The RDP1 Diagonal Plough operates near the tail pulley and is in direct contact with the moving belt. Only visual observations can be made while the belt is running. Service tasks can be done only with the conveyor stopped and by observing the correct lockout/tagout procedures.

5.1 New Installation Inspection

After the new plough has run for a few days a visual inspection should be made to ensure the plough is performing properly. Make adjustments as needed.

5.2 Routine Visual Inspection (every 2-4 weeks)

A visual inspection of the plough and belt can determine:

- If the blade has optimal tensioning
- If the belt looks clean or if there are areas that are dirty
- If the blade is worn out and needs to be replaced
- If there is damage to the blade or other belt plough components
- If fugitive material is built up on the plough or in the transfer area
- If there is cover damage to the belt
- If there is vibration or bouncing of the plough on the belt
- Check for build-up on the leading return roll.

If any of the above conditions exist, a determination should be made on when the conveyor can be stopped for cleaner maintenance.

5.3 Routine Physical Inspection (every 6-8 weeks)

When the conveyor is not in operation and properly locked and tagged out a physical inspection of the belt plough to perform the following tasks:

- Clean material buildup off of the belt plough blade and frame
- Closely inspect the blade for wear and any damage. Replace if needed.
- Ensure full blade to belt contact
- Inspect the belt plough frame for damage
- Inspect all fasteners for tightness and wear. Tighten or replace as needed.
- Replace any worn or damaged components
- When maintenance tasks are completed, test run the conveyor to ensure the belt plough is performing properly

Section 5 – Maintenance

5.4 Blade Replacement Inspection

Physically lock out and tag the conveyor at the power source before you begin plough inspection.

1. **Loosen mounting shaft nuts.** They should be loosened so that the spring is no longer compressed and the worn blade will have no tension to the belt. Do so on both sides.
2. **Remove blade from plough.** Loosen and remove all bolts securing the worn blade to the plough main frame. After removing the worn blade, clean off all fugitive material on the plough.
3. **Install new blade.** Use current bolts to secure the new blade to the belt plough main frame.
4. **Position diagonal plough to the belt.** Ensure the new blade is making constant contact with the belt. Retighten top nut above spring to ensure the new blade maintains constant contact with the belt.
5. **Test run and inspect.** Run the belt and check that the plough runs smoothly and has an effective cleaning action. To raise or lower the unit, adjust the top nut above the spring to apply more or less tension.

Section 5 – Maintenance

5.5 Maintenance Log

Conveyor Name/No. _____

Date: _____ Work done by: _____ Service Quote #: _____

Activity: _____

Date: _____ Work done by: _____ Service Quote #: _____

Activity: _____

Date: _____ Work done by: _____ Service Quote #: _____

Activity: _____

Date: _____ Work done by: _____ Service Quote #: _____

Activity: _____

Date: _____ Work done by: _____ Service Quote #: _____

Activity: _____

Date: _____ Work done by: _____ Service Quote #: _____

Activity: _____

Date: _____ Work done by: _____ Service Quote #: _____

Activity: _____

Date: _____ Work done by: _____ Service Quote #: _____

Activity: _____

Section 5 – Maintenance

5.6 Plough Maintenance Checklist

Plough: _____ **Serial Number:** _____

Beltline Information:

Beltline Number: _____ Belt Condition: _____

Belt Width: ☐ 900mm ☐ 1050mm ☐ 1200mm ☐ 1350mm ☐ 1500mm ☐ 1800mm ☐ 2100mm ☐ 2400mm

Head Pulley Diameter (Belt & Lagging): _____ Belt Speed:_____m/s Belt Thickness: _____

Belt Splice:_____ Condition of Splice:_____ Number of splices:_____ ☐ Skived ☐ Unskived

Material conveyed: _____

Days per week run:_____ Hours per day run:_____

Blade Life::

Date blade installed:_____ Date blade inspected:_____ Estimated blade life:_____

Is blade making complete contact with belt? ☐ Yes ☐ No

Distance from wear line: Left _____ Middle _____ Right _____

Blade condition: ☐ Good ☐ Grooved ☐ Smiled ☐ Not contacting belt ☐ Damaged

Was Plough Adjusted: ☐ Yes ☐ No

Frame Condition: ☐ Good ☐ Bent ☐ Worn

Lagging: ☐ Slide lag ☐ Ceramic ☐ Rubber ☐ Other ☐ None

Condition of lagging: ☐ Good ☐ Bad ☐ Other_____

Cleaner's Overall Performance: (Rate the following 1 - 5, 1=very poor - 5= very good)

Appearance: ☐ Comments:_____

Location: ☐ Comments:_____

Maintenance: ☐ Comments:_____

Performance: ☐ Comments:_____

Other Comments:_____

_____

_____

_____

_____

_____

_____

_____

_____

Section 6 – Troubleshooting

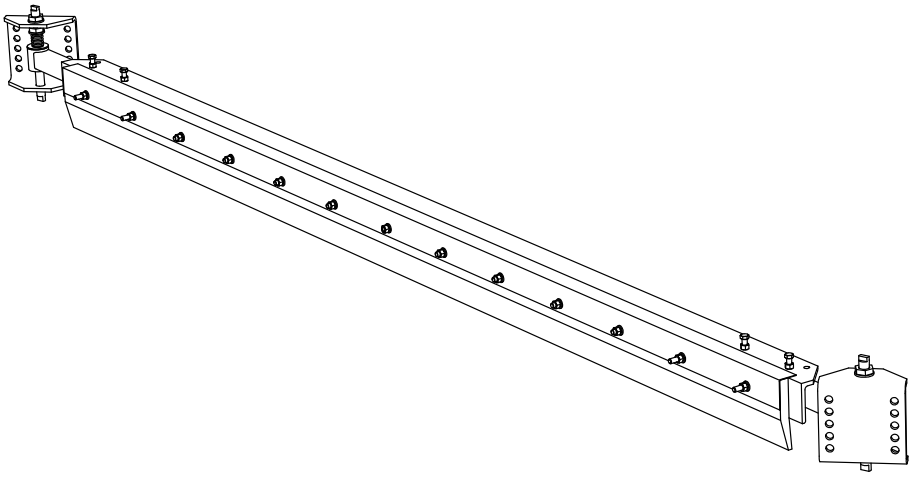
Problem	Possible Cause	Possible Solutions
Material building up behind plough/not falling off belt	Angle of blade not steep enough	Ensure 45° blade angle
Material getting through	Worn blade	Replace blade
	Lack of blade coverage	Check blade angle (45°)
	Space between blade and belt	Reposition height
	Mechanical splice damaging blade	Repair, skive or replace splice
Unequal blade wear	Mounting bolts not level	Check and adjust height of mounting points

Section 7 – Specs and CAD Drawings

7.1 Specifications and Guidelines

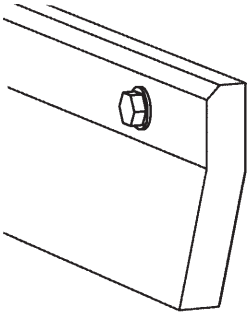
SIZE	BELT WIDTH (Min-Max)
	mm
Medium	900-1050
Large	1200-1500
X-Large	1600-1800
XX-Large	2000-2400

Use next larger size for belt widths between ranges.



Diagonal Plough Blade Specifications

Material	Polyurethane
Durometer	90A
Working Temperature	
°C	-40° to 71°
Grease & Chemical Resistance	Excellent
Sticky Material Performance	Excellent



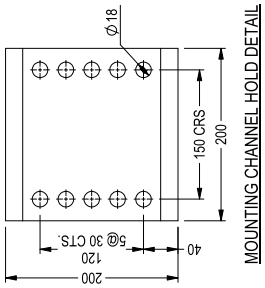
Application Guidelines

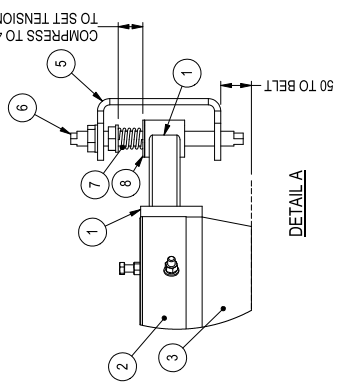
- Belt Splice..... Mechanically Fastened/Vulcanized
- Belt Speed..... 6 m/s for HD Diagonal Plough with Spring Tension
- Belt Direction..... One Way

Section 7 – Specs and CAD Drawings

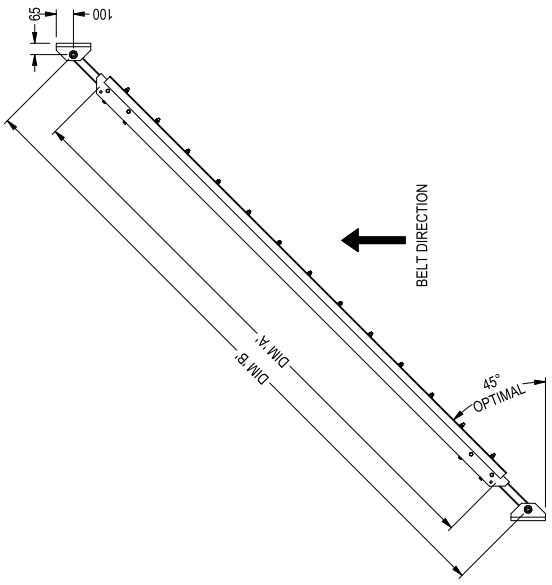
8.2 CAD Drawing - HD Diagonal Plough

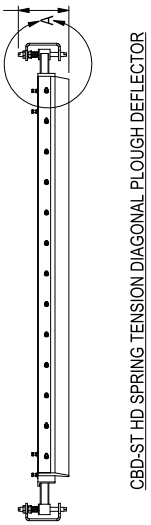
HEAVY DUTY SPRING TENSIONED PLOUGH REPLACEMENT COMPONENTS								
				MILD STEEL		STAINLESS STEEL		
ITEM No.	DESCRIPTION	BELT WIDTH	ITEM CODE	ORDER CODE	ITEM CODE	ORDER CODE
1	MAINFRAME	900-1050	61105	CBD-ST-M-MF	61108	CBD-ST-M-MF-S/S
		1200-1500	61106	CBD-ST-L-MF	61109	CBD-ST-L-MF-S/S
		1600-1800	61107	CBD-ST-XL-MF	61110	CBD-ST-XL-MF-S/S
		2000-2400	63749	CBD-ST-XXL-MF	63750	CBD-ST-XXL-MF-S/S
2	FACE PLATE	900-1050	61112	CBD-ST-M-FP	61112	CBD-ST-M-FP
		1200-1500	61113	CBD-ST-L-FP	61113	CBD-ST-L-FP
		1600-1800	61114	CBD-ST-XL-FP	61114	CBD-ST-XL-FP
		2000-2400	63751	CBD-ST-XXL-FP	63751	CBD-ST-XXL-FP
3	BLADE	900-1050	61111	CBD-ST-M-B	61111	CBD-ST-M-B
		1200-1500	A2218	CBD-ST-L-B	A2218	CBD-ST-L-B
		1600-1800	A1784	CBD-ST-XL-B	A1784	CBD-ST-XL-B
		2000-2400	63752	CBD-ST-XXL-B	63752	CBD-ST-XXL-B
4	ADJUSTING ARMS	ALL	61096	CBD-ST-AA	61097	CBD-ST-AA-S/S
5	MOUNTING CHANNEL	ALL	B0092	CBD-ST-MC	A2630	CBD-ST-MC-S/S
6	THREAD BAR	ALL	A2629	CBD-ST-TB-S/S	A2629	CBD-ST-TB-S/S
7	COMPRESSION SPRING	ALL	A2215	CBD-ST-CS-S/S	A2215	CBD-ST-CS-S/S
8	BUSHING	ALL	64310	CBD-ST-BB	64310	CBD-ST-BB





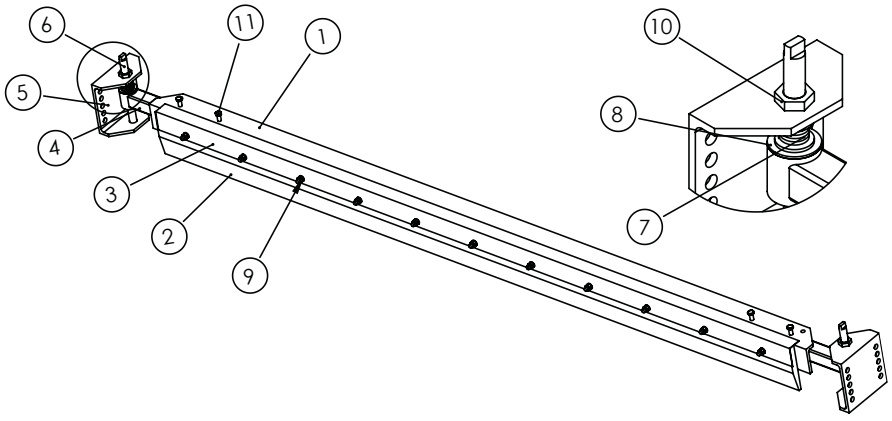
HEAVY DUTY SPRING TENSION DIAGONAL PLOUGH									
		MOUNTING CENTERS DIM 'B'		MILDSTEEL		STAINLESS		REPLACEMENT BLADES	
BELT WIDTH	BLADE WIDTH DIM 'A'	MIN.	MAX.	ITEM CODE	ORDER CODE	ITEM CODE	ORDER CODE	ITEM CODE	ORDER CODE
900-1050	1750	1930	2430	61077	CBC-ST-M	61079	CBD-ST-M-S/S	61111	CBD-ST-M-B
1200-1500	2250	2430	2930	61050	CBC-ST-L	61080	CBD-ST-L-S/S	A2218	CBD-ST-L-B
1600-1800	2750	2930	3430	61051	CBC-ST-XL	A2138	CBD-ST-XL-S/S	A1784	CBD-ST-XL-B
2000-2400	3250	2430	3930	63747	CBC-ST-XXL	63748	CBD-ST-XXL-S/S	63752	CBD-ST-XXL-B





Section 8 - Replacement Parts

8.1 Replacement Parts List



Replacement Parts

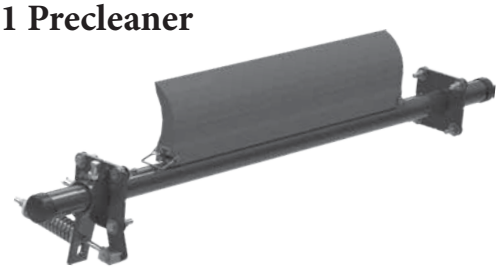
REF	DESCRIPTION	BELT WIDTH mm	BLADE WIDTH mm	MILD STEEL ORDERING NUMBER	MILD STEEL ITEM CODE	STAINLESS STEEL ORDERING NUMBER	STAINLESS STEEL ITEM CODE
1	Diagonal Plough Main Frame	900-1050	N/A	CBD-ST-M-MF	61105	CBD-ST-M-MF-S/S	61108
		1200-1500	N/A	CBD-ST-L-MF	61106	CBD-ST-L-MF-S/S	61109
		1600-1800	N/A	CBD-ST-XL-MF	61107	CBD-ST-XL-MF-S/S	61110
		2000-2400	N/A	CBD-ST-XXL-MF	63749	CBD-ST-XXL-MF-S/S	63750
2	Standard Blade (FRAS)	900-1050	1750	CBD-ST-FR-B	61111		
		1200-1500	2250	CBD-ST-L-FR-B	A2218		
		1600-1800	2750	CBD-ST-XL-FR-B	A1784		
		2000-2400	3250	CBD-ST-XXL-FR-B	63752		
	Polyurethane Blade	900-1050	1750	CBD-ST-B	64620		
		1200-1500	2250	CBD-ST-L-B	64621		
		1600-1800	2750	CBD-ST-XL-B	64482		
		2000-2400	3250	CBD-ST-XXL-B	64622		
3	Stainless Steel Face Plate	900-1050	N/A	CBD-ST-M-FP	61112		
		1200-1500	N/A	CBD-ST-L-FP	61113		
		1600-1800	N/A	CBD-ST-XL-FP	61114		
		2000-2400	N/A	CBD-ST-XXL-FP	63751		
-	Diagonal Plough Shields	900-1050	N/A	CBD-ST-M-S	64784		
		1200-1500	N/A	CBD-ST-L-S	64785		
		1600-1800	N/A	CBD-ST-XL-S	63024		
		2000-2400	N/A	CBD-ST-XXL-S	63791		
4	Adjusting Arm	N/A		CBD-ST-AA	61096		
5	Mounting Channel	N/A		CBD-ST-MC	B0092		
6	Threaded Bar	N/A		CBD-ST-TB-S/S	A2629		
7	Compression Spring	N/A		CBD-ST-CS-S/S	A2215		
8	Poly Bush	N/A		CBD-ST-PB	A2449		
	Bush with Brass Insert			CBD-ST-BB	64310		
9	M12 NYLOC, S/S 316 nut & flat washer	N/A		N/A	N/A		
10	Fasteners kit (M24 half nuts & flat washers - SS304) Qty: 4 each	N/A		CBD-ST-HN-S/S	61100		
11	M12 X40 Hex bolt & nuts (SS316) Qty: 8 each	N/A		N/A	N/A		

Lead time: 3 weeks

Section 9 – Other Flexco Conveyor Products

Flexco provides many conveyor products that help your conveyors to run more efficiently and safely. These components solve typical conveyor problems and improve productivity. Here is a quick overview on just a few of them:

EZP1 Precleaner



- Patented ConShear™ blade renews its cleaning edge as it wears
- Visual Tension Check™ for optimal blade tensioning and simple retensioning
- Quick and easy one-pin blade replacement
- Material Path Option™ for optimal cleaning and reduced maintenance

EZ Slider/Impact Beds

- Adjusting troughing angles for easy installation and adjustability
- Long-wearing UHMW for sealing the load zone
- Offered in both Light & Medium duty designs to affordably fit your application

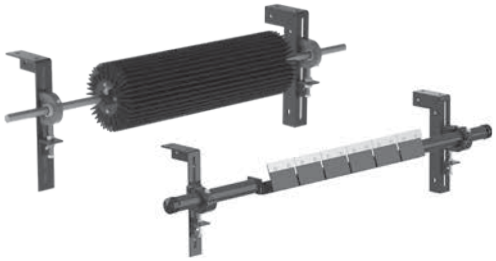
EZS2 Secondary Cleaner

- Long-wearing tungsten carbide blades for superior cleaning efficiency
- Patented FormFlex™ cushions independently tension each blade to the belt for consistent, constant cleaning power
- Easy to install, simple to service
- Works with Flexco mechanical belt splices

PT Max™ Belt Trainer

- Patented "pivot & tilt" design for superior training action
- Dual sensor rollers on each side to minimize belt damage
- Pivot point guaranteed not or freeze up
- Available for topside and return side belts

Flexco Specialty Belt Cleaners



- "Limited space" cleaners for tight conveyor applications
- High Temp cleaners for severe, high heat applications
- A rubber fingered cleaner for chevron and raised rib belts
- Multiple cleaner styles in stainless steel for corrosive applications

The Flexco Vision

To become the leader in maximising
belt conveyor productivity for our customers worldwide
through superior service and innovation.

Flexco (Aust.) Pty. Ltd • 10 Solent Circuit, Norwest • NSW, Australia, 2153 • Australia
Tel: 612-8818-2000 • Fax: 612-8824-6333 • E-mail: salesau@flexco.com

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