WALINGA®
INC.

OPERATOR'S MANUAL
FOR
DROP-THROUGH
ROTARY AIRLOCKS
MODELS: AL 1314 , AL 1618 , AL 2224

Notes

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Walinga
Rotary Airlock

Operator's Manual
Model AL 1314 , AL 1618 , AL 2224

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1 INTRODUCTION

1.1 Operating Principles

Walinga Rotary Airlocks use a multi-bladed rotor to move material. The rotor picks up material in the pocket between each 2 blades as it rotates past the top feed inlet area. It then transfers the feed through the airlock casing to either a ‘blow-through’ or ‘drop-through’ chamber at the bottom.The airlock often features low clearance wear tips on each rotor. These are both adjustable & replaceable and usually made of high-wear material. Other tip materials and designs may be used for specialized applications. The tips deliver a high degree of sealing between the material supply chamber and the outlet area.During operation the multi-bladed rotor fills with material at the inlet (top) side of the unit. This material moves with the rotating blades and drops through to either the' blow-through' or 'drop-through' chamber below. ‘Blow- Through’ designs use a pressurized air-stream entering the inlet port to move material through the chamber to a pneumatic transfer line connected to the outlet port. ‘Drop- Through’ designs drop the product out of the airlock under gravity through a large rectangular discharge port under the unit.

1.2 Airlocks & Rotary Seals

The terms ‘airlock’ / ‘rotary valve’ and 'rotary seal' are sometimes used to describe the same item of equipment. In general an ‘airlock' provides a higher level of sealing and is more easily adjusted than a 'rotary seal'. Their heavy duty cast construction and high level of sealing suit them well to commercial applications - especially when using pressurized delivery line.

2 KEY OPERATING GUIDELINES

2.1 Direction of Rotation

The airlock rotor **MUST MOVE COUNTER - CLOCKWISE WHEN VIEWED FROM THE DRIVEN END.**

Do not operate for extended periods in reverse direction.

PROLONGED OPERATION IN REVERSE DIRECTION OF ROTATION RESULTS IN HIGH WEAR RATES IN THE CASING AND LOSS OF PERFORMANCE.

Operating for short periods in reverse direction is acceptable but only to assist in clearing objects jammed between the blades and casing. Reverse operation also increases product damage because the flexible tip wiper is not effective when the rotor moves in a clock-wise direction (viewed from the driven end).

2.2 Tip Clearances

MODEL	1314	1618	2224
Maximum	0.014	0.016	.020
Minimum	0.005	0.006	.008
Preferred	0.006	0.007	.009
Max. Reset	0.009	0.010	.010

An adjustable tip fits at the outer edge of each rotor blade. These tips provide a seal as the rotor transfers material from the intake to the outlet area. Efficient operation requires a close fit between the top of each blade tip and the airlock casing. Excessive clearance allows ‘blow-back' of air through the airlock causing uneven flow and reduced performance. Check and adjust airlock blade tip clearances regularly as part of a scheduled maintenance program. Routine maintenance of tip clearances is especially important in materials with high abrasion characteristics.

2.3 Rotor Clearances

Airlock rotors are not adjustable, so clearances can not be changed. If the clearance between the rotor and the endplate is too high, no amount of tip adjustment will improve performance. If the rotor/endplate clearance total is at or greater than the total clearance in the chart below, the airlock should be replaced.

Model	1314	1618	2224
Clearance/side	0.010	0.012	0.015
Total Clearance	0.020	0.024	0.030

2.4 Flexible Tip Wiper (If applicable)

The intake chamber has a flexible tip wiper bolted to the left hand side (viewed from the driven end). The tip wiper levels material as it moves out of the intake area *into* the casing. This leveling action ensures even flow, reduces wear rates and avoids' out-of-round' wear within the casing.

- Check the flexible tip wiper during every scheduled tip servicing –

2.5 Rotor Bearings (ball bearing or tapered bearing type)

Ball bearing type: Each rotor shaft bearing is housed in a sealed housing. The housing must remain sealed and slightly lubricated to prevent corrosion that will prevent these bearings from floating. **Remove the cover plate only if operational problems are suspected.** Ensure that the housing is slightly lubricated before replacing the cover.

Tapered bearing type: Each rotor shaft bearing is housed in a sealed grease box and does not require routine lubrication. **Remove the cover plate only if operational problems are suspected.** Ensure that the grease box is fully packed with grease before replacing the cover.

3 SCHEDULED MAINTENANCE

The intervals suggested on the schedule below are **typical only.** Adapt it to suit the existing scheduled maintenance program.

3.1 Commissioning Period

Perform commissioning checks within the first 2 hours of operation and again within 10 hours. Step through the' 500-hour' maintenance items at both the 2 hour and 10 hour commissioning checks.

3.2 Maintenance Recommendation

Typical Interval	Maintenance Items
Every: ***500 hours*** total operation ***or*** ***500 tonne*** wheat equivalent ***or*** **3 *months*** intermittent operation which-ever occurs first.	(1) Tighten Bolts/fasteners. (2) Adjust drive tension/alignment & lubricate if necessary. (3) Listen for excessive noise from bearings and rotor. (4) Check temperature levels around bearings/drive motor/rotor casing. (5) Inspect for air leaks at all inlet and outlet flanges.
Every: ***2000 hours*** total operation ***or*** ***2000 tonne*** wheat equivalent ***or*** **12 *months*** intermittent operation which-ever occurs first	(1) Inspect wear tips on blades and replace if damaged. (2) Inspect flexible tip wiper and replace if damaged . (2) Adjust clearances on all blade tips.

4 TROUBLESHOOTING

The Walinga airlock delivers long periods of trouble-free operation when operated and serviced correctly. This trouble-shooting guide will help identify and solve operating problems if they occur.

WARNING -
ISOLATE THE AIRLOCK FROM YOUR POWER SUPPLY
BEFORE CLEARING OR ADJUSTING

Operating Problem	Possible Cause & Recommended Action
4.1 Rotor Grinds During Operation	It is normal to hear a light grinding noise for several hours after adjustment of the airlock tip clearances. This noise will disappear after the tips seat fully on the casing.
4.1.1) Rotor Blade Tips not fully seated after adjustment	If the noise is excessive the tips may be adjusted too tight against the casing. Re-adjust tip clearances as described in the Maintenance section.
4.1.2 Incorrect Direction of Rotation	The airlock is designed to operate continuously in one direction only. **Check that the shaft rotates in an counter clockwise direction when viewed from the driven end** of the unit. Continuous operation in reverse will cause excessive wear and may damage the rotor tips, tip wiper, casing and bearings.
4.1.3 Bearing Failure	Remove bearing cover plates at each end of the airlock .Follow normal ball bearing replacement practices. If equipped with tapered bearings, ensure that the bearings and housings are fully packed with grease before replacing covers. **Always re-check clearances between end of rotor blades and end plates after replacing bearings. See maintenance section for guidance.**
4.2 Airlock Stalls Or Motor Overloads	(a) For units with Reversible Speed Controller: Change the rotational direction of the airlock briefly then return to correct direction. Repeat this several times until the object (for example, bolts or metal) falls sideways into the blade area and clears. If this fails, move to (b) ...
4.2.1 Obstruction in Airlock Prevents Blade Rotation	*Caution: Changing the direction of rotation by reversing the wiring on 3-phase electric motors is not recommended. Impact damage may result.* (b) For units without Reversible Speed Controller: Isolate the power supply to the unit - **Essential**! Remove obstruction manually. Access obstruction through an inlet or discharge opening (after removing piping or ducting) or via an inspection hatch if provided. If still unable to clear the obstruction, remove the complete airlock unit for attention.

Operating Problem	Possible Cause & Recommended Action
4.2.2 Prolonged Operation in Reverse Direction	The Walinga airlock operates in an counter-clockwise direction when *viewed* from driven end. Damage to rotor blades and tips due to prolonged operation in the opposite direction may cause jamming. The unit may need to be removed to assess rotor and casing damage - repair or replace.
4.2.3 Tip/Casing Clearances too Tight	Re-set clearances between blade tips and casing as described in maintenance section.
4.2.4 Drive-line adjusted Incorrectly	If fitted with chain/sprocket drive check tension, alignment and flexibility of links.
4.2.5 Faulty Drive Motor	Service drive motor.
4.3 Air Blow-Back Restricts Feed Inlet **4.3.1 Blade Tips and Casing**	Remove airlock and adjust tips to correct clearance as described in maintenance section. Excessive clearance causes operating problems including bridging and erratic flow. Prolonged operation with high clearances wears the casing unevenly - this will result in lower performance even after adjustment of tips.
4.3.2 Airlock Casing not Pressure-vented *Note: Venting is not usually needed in free-flowing materials with high bulk densities eg cereal grain.*	Quick test while operating a) Loosen vent plug in end plate - item on diagram. (b) Operate airlock to transfer feed -first with plug in end plate and then removed. (c) Check whether flow improves with plug removed. If flow improves fit a pressure-vent kit. Custom-designed vented hoppers may be used for fine materials like milled meals. **CAUTION; Both air AND excess feed may blowout of vent hole during test. KEEP YOUR FACE WELL CLEAR OF VENT HOLE.**
4.4 Airlock Tip Or Flexible Tip Wiper Breaks (if applicable) **4.4.1 Prolonged Operation in Reverse Direction of Rotation**	Airlock must operate in counter-clockwise direction when viewed from driven end. Change direction and service tips or flexible tip wiper if necessary.(only applicable if tip wiper is used)
4.4.2 Tip Wiper Fouling on Blade Tips	Re-adjust clearance of flexible tip wiper - see Maintenance Section 5

5. AIRLOCK MAINTENANCE

Wear tip and wiper blade adjustment are on-going maintenance items. They must be scheduled for attention at regular intervals. Correct adjustment of tip and wiper blade clearances is essential to ensure efficient operation. Excessive clearances between rotor tips and airlock casing wilt reduce performance and increase both the rate and non-uniformity of wear. By following the procedure below you will achieve a consistent result each time the airlock is adjusted. Don't be tempted to take short cuts - performance will suffer.

- WARNING-
ISOLATE THE AIRLOCK FROM POWER SUPPLY
BEFORE CLEARING or ADJUSTING

Ensure that you have clear access into the top inlet of the airlock unit before attempting to adjust wear tips. Remove the unit from its mounting point if necessary. Note that two (2) sets of feeler gauges will make airlock tip adjustment easier, faster and more accurate. You can also use shim metal of the specified thickness as an alternative to feeler gauges.

5.1 Tools Needed For Servicing Blade Tips

• 3/8" Socket Ratchet Arm • 3/8" Socket Extension (30cm) • ¼ inch allen key to suit Tip Retaining Screws • Wear Tip Retaining Screws (phillips head) & Washers if existing screws are damaged. • 3/8" socket driver to suit ¼ inch allen key • Feeler Gauges (2 sets) or Shim Metal Sheet of specified thicknesses. • Permanent Marker Pen	• Small Pry Bar 20 in (50 cm) long • 2 x 1/2" (50mm x 13mm) ring/open end spanner • Scraper (to remove flange sealant) • Flange Sealant (eg silicone-based) or Gaskets. *Ensure that silicone-based sealants are accepted for use in your industry.* *Note:Tip Retaining Screws, Shim Metal & Spring Washers are available from Walinga Inc.*

5.2 Replacing Damaged Blade Tips

If one edge of an airlock blade tip is damaged it may be possible to *reverse* it and use the other edge. Stainless steel tips may be re-ground to a 'true' edge - this may be repeated until no adjustment is left in the screw slots.
If tips are badly damaged - replace them. Always check the condition of replacement tips before installing. They must not be bent and all four edges must be true and undamaged.

(a) Loosen and remove tip retaining screws using the ¼" allen key then remove tip from casing – bottom ports on Blow-Thru units are a convenient removal point.

(b) Insert new or reversed tip and measure clearances between tip ends and end plates.
File or grind the ends of new tips if necessary to ensure that the tips are not longer than the rotor blades.

(c) Fix tips loosely to rotor blade with tip retaining screws. Follow the adjustment method in following section to set correct clearances between tip edge and casing.

5.3 Adjusting Tip Clearances

1. Place an identifying number on the leading side of the first blade e.g .. #1'. This is important - it is easy to miss a tip unless every blade is marked as it is adjusted.

2. Loosen the retaining screws holding the wear tip on blade #1. You wilt need a ¼" allen key.

3. Rotate the blade until it is about 1" (25mm) inside the airlock casing opposite the flexible tip wiper. **Note: Blades are angled slightly on the shaft so one end will be further inside the casing than the other.**

4. Place a feeler gauge (or shim) between the tip and casing 4" (10 cm) from each end of the blade tip (2 feelers or shims needed) - use 0.008" (8 thousandths of an inch)

5. Gently *lever* the blade upwards until it contacts the feeler gauges or shims.

6. Tighten tip screws ... CENTRE SCREW FIRST!

7. Rotate the airlock counter-clockwise for a full revolution *(viewed from driven end*) and listen for binding noise between the tip and the casing. A light grinding noise is normal and will disappear as tips seat fully during first few hours of operation.

8. **Repeat the Tip Adjustment Steps for Each Blade.** Mark each blade with its number (i.e. #2, #3 etc) as you work on it to ensure that none are missed.

9. Adjust the Flexible Tip Wiper. Each tip should contact the flexible tip wiper lightly as the rotor turns. Replace if Wiper is worn excessively or damaged .

• Check that Rotor turns COUNTER-CLOCKWISE after Connecting Power· (viewed from driven end)

5.4 Out-Of-Round Casing Wear

An airlock that has excessive out-of-round wear in casing will operate poorly. Airlocks wear rate and out-of-round wear increase greatly if the rotor is operated in the incorrect direction. It MUST rotate counter-clockwise when viewed from the shaft (*driven*) end.
To check for excessive out-of-round wear in the casing:

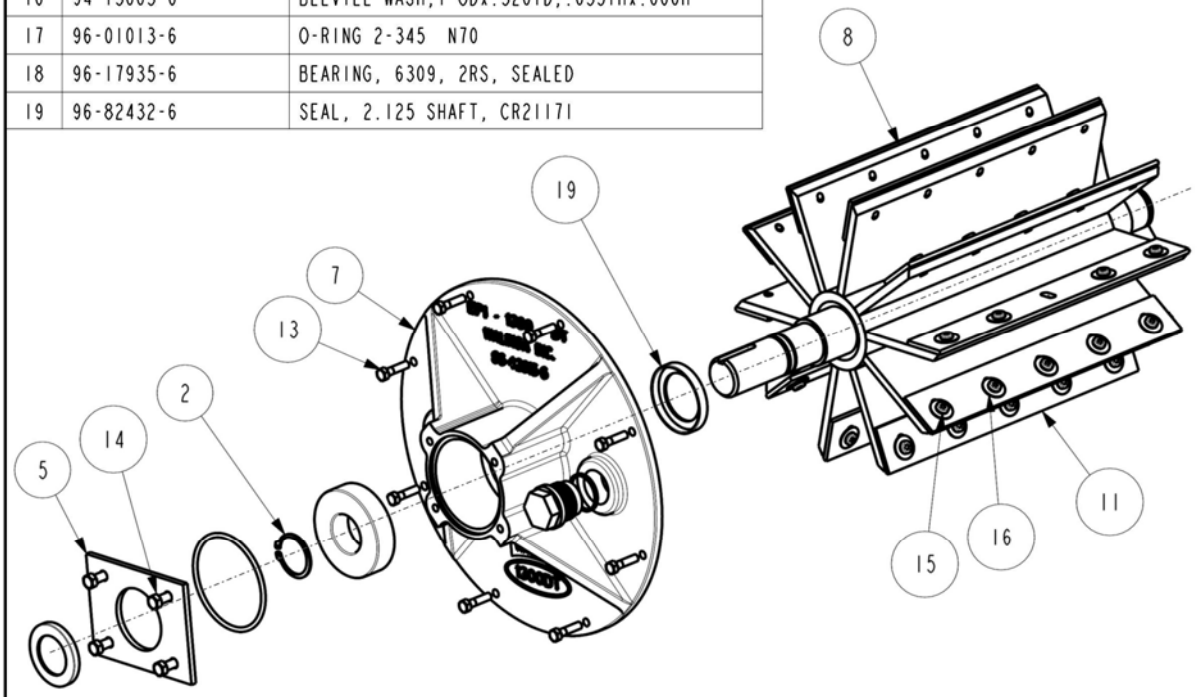
1. Adjust airlock tip clearances as per 5.3
2. Any clearances above .020" will reduce performance.
3. If tips need setting at higher than .11" performance may be unacceptable especially in light feeds. The out-of round casing will need machining.

Airlocks must be re-machined by tool shops with experience in this type of work. Inaccurate alignment of end-plates and casing is the most common error in a re-machining job. They MUST align on the same shaft centre-line. End-plates would normally be dowelled to the casing after machining to ensure correct alignment.

Notes

6.1 ROTARY AIRLOCK MODEL AL 1314 COMPONENTS

LIST OF ITEMS		
ITEM	NUMBER	DESCRIPTION
1	30-09035-4	DUST PLATE
2	30-17982-6	SNAP RING, EXTERNAL, D1400-0450
3	30-20471-4	WIPER BLADE, 1314
4	30-36866-4	WASHER PLATE, 1314 TIP WIPER SUPPORT
5	30-40015-5	SEAL PLATE ASSY, 1618BB
6	30-42012-4	CASING, MACH, 1314 DROP THRU
7	30-42014-4	ENDPLATE, MACH, EP1-1300-DT, RIGHT
8	30-48060-5	ROTOR, 1314 A/L, DT, FR
9	30-49203-5	PLUG - SAE20 - w/O-RING
10	30-57201-4	ENDPLATE, MACH, EP1-1300-DT, LEFT
11	30-65702-4	A/L TIP, 450 STL, FLAT, 1314
12	94-05284-6	MB 5/16-18-1 GR8 HH PLTD
13	94-05286-6	MB 5/16-18-1 1/4 GR8 HH PLTD
14	94-05317-6	MB 3/8-16-1 GR8 HH PLTD
15	94-08781-6	CS BTNH PLTD 5/16-18x5/8 TRX
16	94-13003-6	BELVILE WASH,1"ODx.3201D,.035THx.060H
17	96-01013-6	O-RING 2-345 N70
18	96-17935-6	BEARING, 6309, 2RS, SEALED
19	96-82432-6	SEAL, 2.125 SHAFT, CR21171



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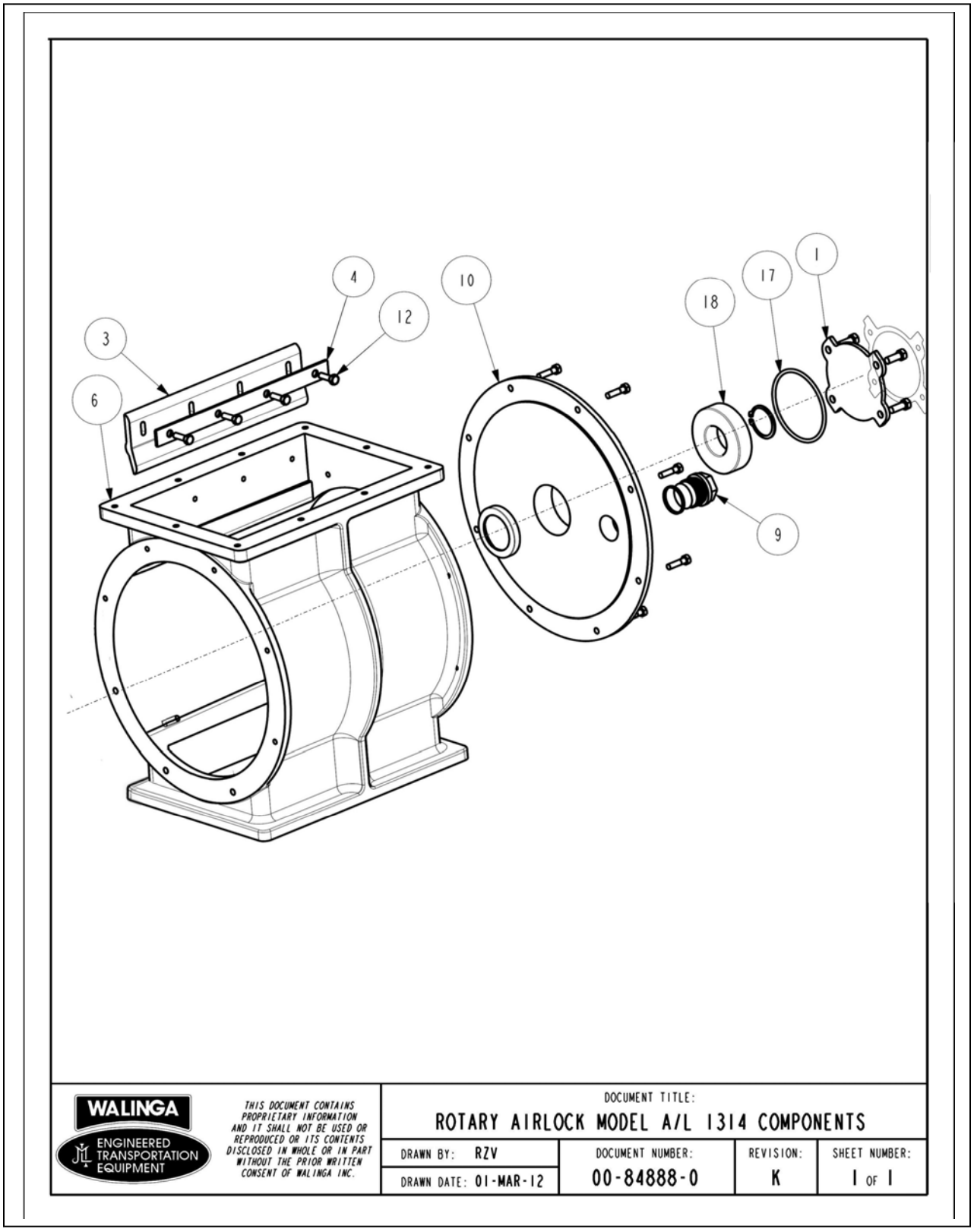
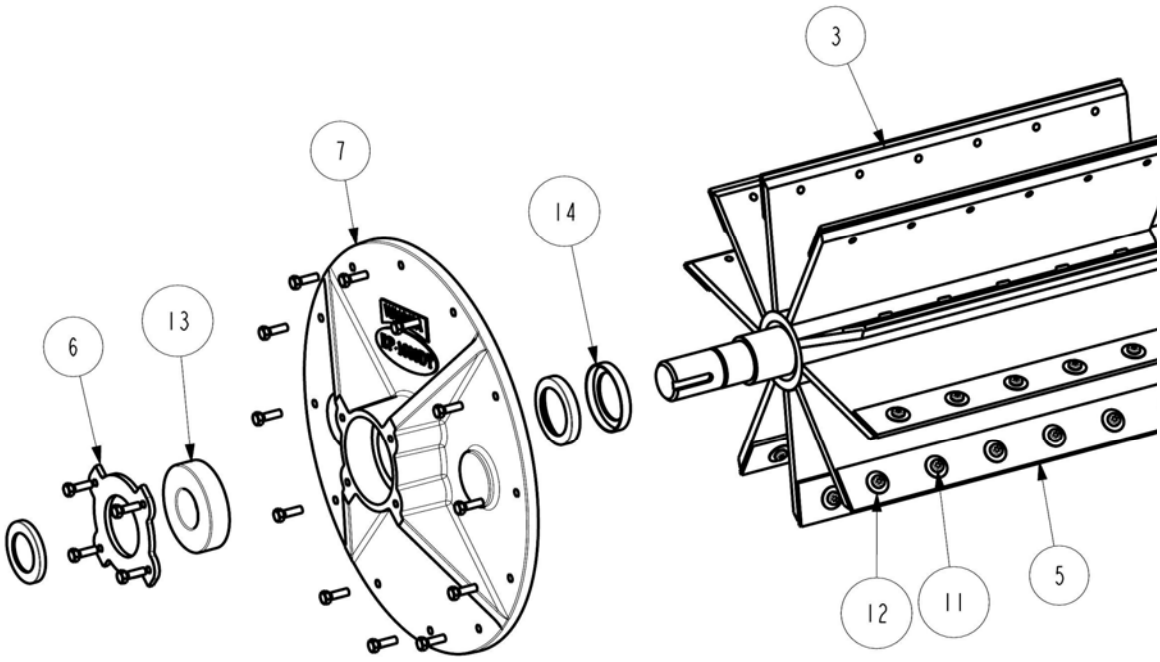
6.1 ROTARY AIRLOCK MODEL AL 1314 COMPONENTS CONT'D



6.2 ROTARY AIRLOCK MODEL AL 1618 COMPONENTS

LIST OF ITEMS		
ITEM	NUMBER	DESCRIPTION
1	30-20472-4	WIPER BLADE, 1618
2	30-36796-4	WASHER PLATE, 1618 TIP WIPER SUPPORT
3	30-53864-5	ROTOR, 1618 A/L, DT, FR
4	30-62787-4	BEARING COVER, A/L
5	30-62788-4	TIP, HARDOX 450, 1618DT, 18.296LG
6	30-62789-5	SEAL PLATE ASSY, 1618DT
7	30-62790-4	ENDPLATE, M/C, 1600DT, CHR
8	30-62799-4	CASING, M/C, CHR, 1618DT
9	94-05284-6	MB 5/16-18-1 GR8 HH PLTD
10	94-05286-6	MB 5/16-18-1 1/4 GR8 HH PLTD
11	94-08781-6	CS BTNH PLTD 5/16-18x5/8 TRX
12	94-13003-6	BELVILE WASH,1"ODx.3201D,.035THx.060H
13	96-17935-6	BEARING, 6309, 2RS, SEALED
14	96-82432-6	SEAL, 2.125 SHAFT, CR21171



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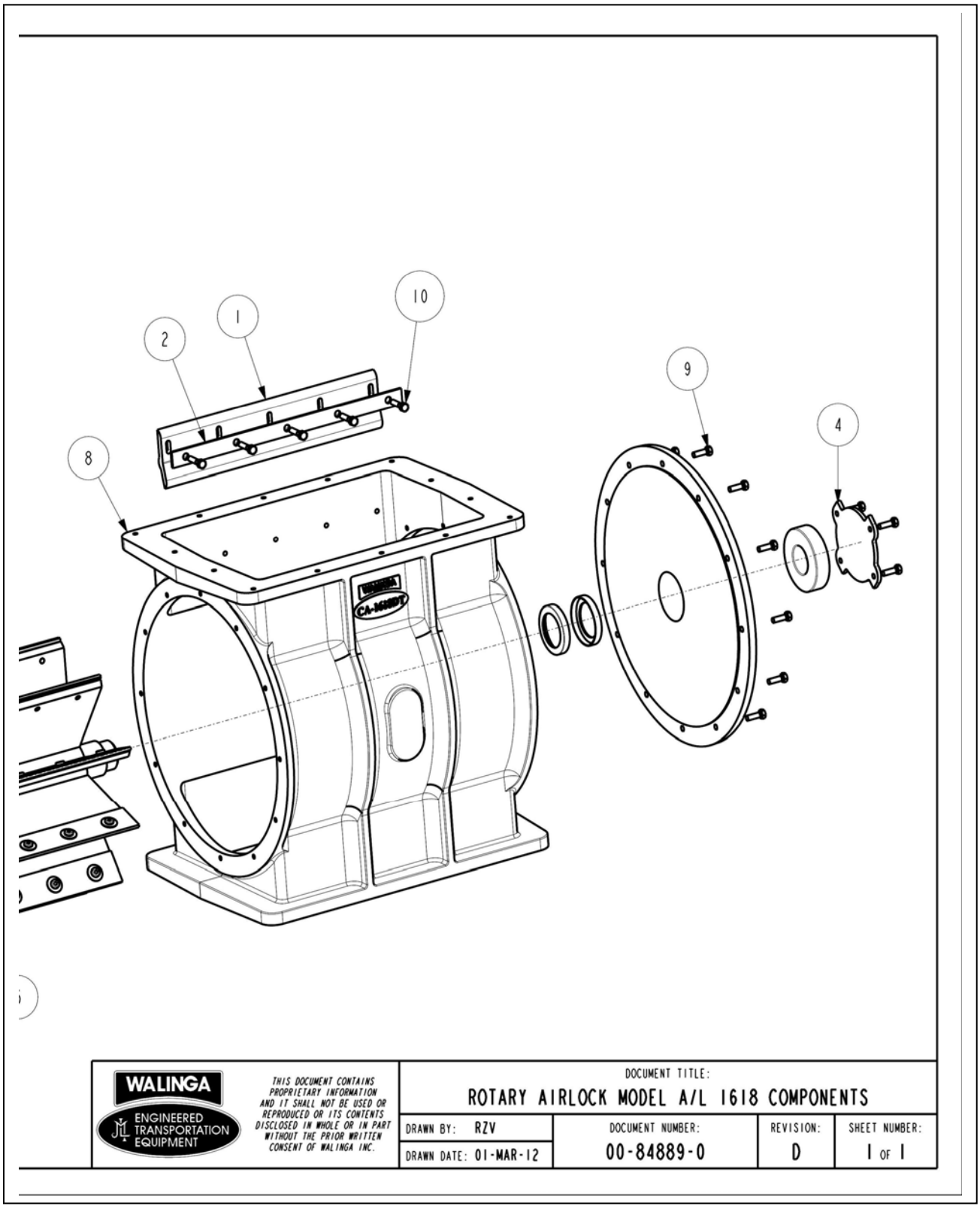
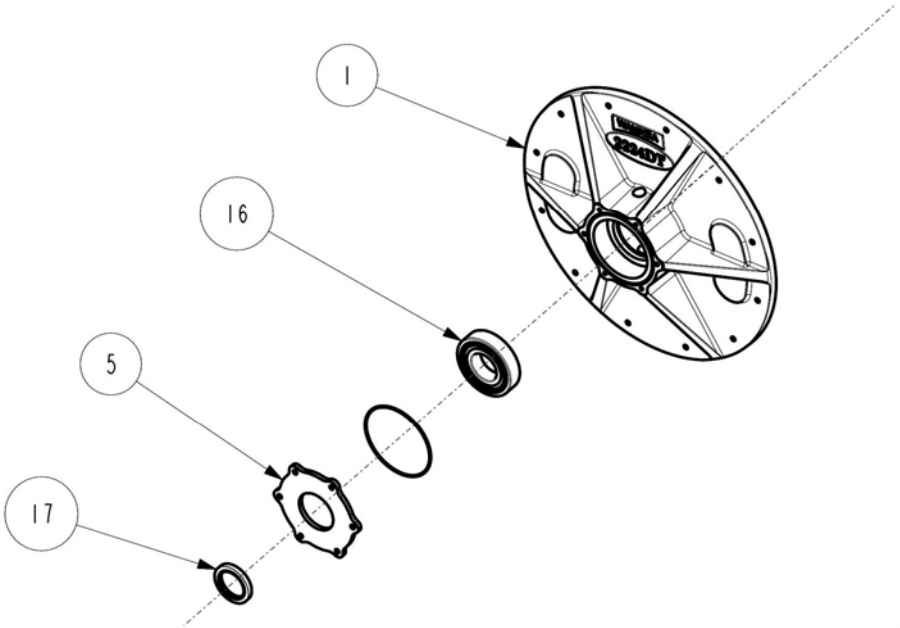


6.3 ROTARY AIRLOCK MODEL AL 2224 COMPONENTS

LIST OF ITEMS		
ITEM	NUMBER	DESCRIPTION
1	30-67836-4	ENDPLATE, M/C, 2224DT, CHR
2	30-67838-4	CASING, M/C, CHR, 2224DT
3	30-67841-5	ROTOR, 2224DT
4	30-67843-4	DUST PLATE, 2224DT
5	30-67844-4	SEAL PLATE, 2224DT
6	30-67970-4	TIP, HARDOX 450, 2224DT, 23.990LG
7	30-73413-4	ENDPLATE, M/C, 2224DT, CHR, W/VENT
8	30-73418-4	INSPECTION PORT - SAE20
9	30-73419-5	INSPECTION PLUG - SAE20 - w/O-RING
10	94-04285-6	LOCKWASHER, 3/8, PLTD, REGULAR
11	94-04292-6	MB 3/8-16-1 3/4 GR8 HH PLTD
12	94-05319-6	MB 3/8-16-1 1/2 GR8 HH PLTD
13	94-68084-6	CS BTNH PLTD 3/8-16 x 3/4 TRX+,NYLOK
14	94-68137-6	BELVILE WASH, 1.1"ODx.4 IDx .059T
15	96-49202-6	O-RING 3-920 - SAE20 - BUNA
16	96-67842-6	BEARING, 6313-2RS
17	96-67849-6	SEAL, 2.5x3.5x.437 25354VTCNI
18	96-67850-6	SEAL,85x110x12 TC/V S085110120TC/V
19	96-75456-6	ORING, 2-260/V1476 6.5X6.75X 0.139



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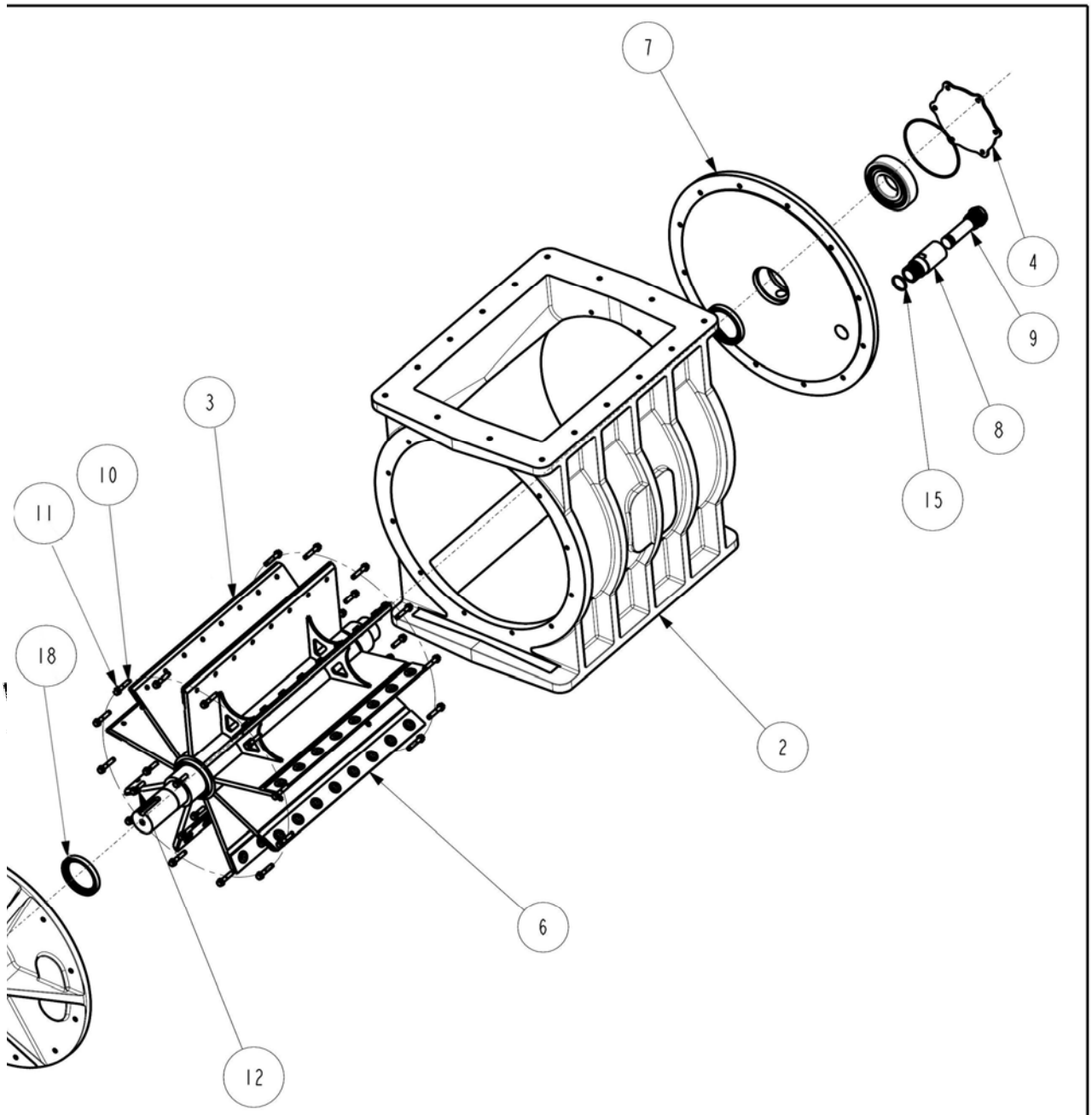

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