



EQUIPMENT INSTRUCTION MANUAL
ACS Rotary Airlock Valve/Feeders



DR-S



MD



CI

Heavy Duty Extra Tough



DANGER

ANCASTER CONVEYING SYSTEMS FINGER GUARDS

Rotary Airlocks have slow moving blades inside the valve that can easily sever fingers. The equipment leading up to and immediately after the valve must be fully enclosed, so that it is impossible to reach the valve internals. Exposed inlets and outlets must be fully guarded to prevent injury. If this is not the case, then a finger guard must be installed whether it is the inlet or outlet. The valve in no circumstances should be accessed or touched without first locking out power. It is the responsibility of the end user to insure that the valve is installed safely. Pricing for guards is available upon request.

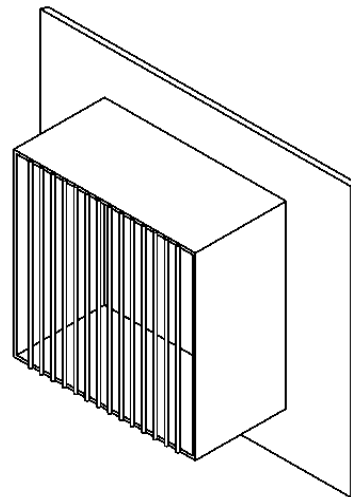
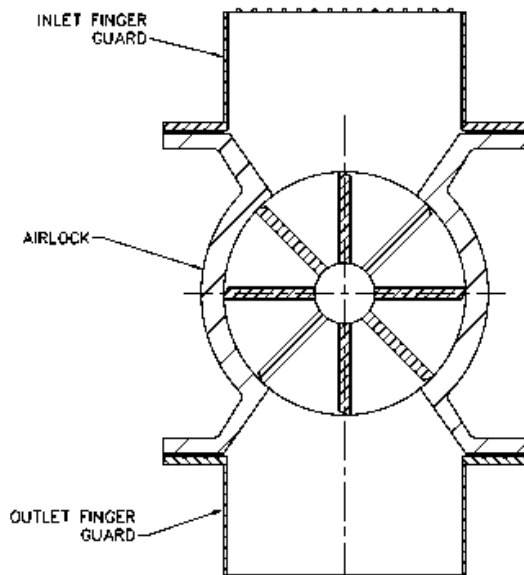
SAFETY FIRST

WARNING/CAUTION

DO NOT INSTALL ROTARY AIRLOCK VALVES & FEEDERS IN AN APPLICATION, WHICH LEAVES THE INLET OR THE OUTLET FLANGE OPENING EXPOSED.

INLET & OUTLET FLANGE GUARDS ARE MANDATORY IF EITHER THE INLET OR OUTLET FLANGES ARE EXPOSED.

THESE FLANGE GUARDS ARE AVAILABLE APON REQUEST



Congratulations on your selection of an “ACS” Rotary airlock. The unit will require very little attention to keep it in good operating condition.

Safety Precautions



This Safety alert symbol is used to call your attention to an important safety message on equipment, safety decals and in manuals, to warn you of possible danger to your personal safety. When you see this symbol, be alert; your personal safety or the safety of the other persons is involved. Follow the instructions in the safety message.

The following definitions for identifying hazard levels are:



DANGER (RED) – Danger is used to indicate the presence of a hazard that WILL cause SEVERE personal injury, death, or substantial property damage if the warning is ignored.



WARNING (ORANGE) – Warning is used to indicate the presence of a hazard that CAN cause SEVERE personal injury, death, or substantial property damage if the warning is ignored.



CAUTION (YELLOW) – Caution is used to indicate the presence of a hazard that WILL or CAN cause MINOR personal injury or property damage if the warning is ignored.



WARNING: All owners and operators should read this manual, or be instructed in safe operating and maintenance procedures, before attempting to uncrate, install, operate, adjust, or service this equipment.

RECEIVING YOUR AIRLOCK

As soon as the equipment is received, it should be carefully inspected to make certain the unit is in good condition and all items listed on the packing list are received. Even though the equipment is mounted on heavy shipping skids at our plant, it is possible for it to be damaged in shipment. All damages or shortages should be noted on the Bill of Lading. Purchaser should take immediate steps to file reports and damage claims with the carrier. All damages incurred to the units in transit are the responsibilities of the common carrier since it is the manufacturer's policy to make shipment F.O.B. its factory: i.e., Ownership passes to purchaser when the unit is loaded and accepted by trucker. Any claims for in transit damage or shortage must be brought against the carrier by the Purchaser.

If the unit is not going to be installed soon after arrival, it should be stored in a warm, dry location to protect from corrosion to the machined surfaces.



CAUTION: Read All Instructions contained in this manual before installing and operating this equipment.

WARNING



FIGURE 1



ONCE PROTECTIVE FLANGE COVER IS REMOVED FROM VALVE, DO NOT PLACE HANDS OR FEET IN THE VALVE OR ATTEMPT TO TURN ROTOR ASSEMBLY BY HAND. TO TEST ROTATE THE ROTOR, USE A SOFT PUSH BAR (2 x 4) AS SHOWN IN FIGURE 1. WE RECOMMEND ALL OWNERS AND/OR OPERATORS OF THIS EQUIPMENT READ THIS MANUAL. FOLLOW SAFE OPERATING & MAINTENANCE PROCEDURES. SAFETY COMES FIRST!



OPERATING INSTRUCTIONS FOR ACS ROTARY AIRLOCK PACKAGE

Rotary Airlocks

The Rotary Airlock is one of the most important units in your material handling system. The function of the airlock is to hold pressure or vacuum in a pneumatic system, and also to meter products into conveying lines, or storage areas, (bins, tanks, hopper, etc.)

The airlock operates by filling each rotor pocket with material at the high point of rotation and then empties into conveying lines or storage areas at the low point of rotation.

In the case of conveying line, a blow-thru is used to allow the velocity of the air to move the material through the conveying line. After each rotor pocket has emptied into the blow-thru it still contains pressurized air. With some products, this air is allowed to escape up through the bulk material as soon as the edge of the rotor blade passes the edge of the inlet opening. The release of this pressurized air assists in maintaining a continuous flow of product to the airlock inlet. With some products, this air must be vented to atmosphere or to a dust collector, as it tends to hinder rather than help the flow of material into the airlock.

*The above procedure is endlessly repeated to produce a continuous flow of material at the discharge end of the conveying line.

The airlock rotor is precision machined to obtain the desired high degree of accuracy and close tolerance. Rotors may be supplied either with fixed or adjustable tips.

The airlock rotor is mounted on bearings at each end of the rotor shaft. Rotor clearance is small to prevent excessive air leakage back to the product inlet.

Installation of Airlock Packages

After airlock packages are uncrated, disconnect the chain drive and rotate the airlock with a soft push bar, the rotor should be able to rotate freely without binding.

Check clearance between rotor tips and valve housing. Clearance should not be greater than that specified on the invoice. If adjustable tips are provided and have shifted out of adjustment during shipping, re-adjust as per instructions found in maintenance section of this manual.

If airlock clearances and rotations are correct, replace chain drive, position an anchor package.

See Figure 1



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Numerous types of bulk materials feeding devices can be connected to the inlet opening of an airlock. Bins, hoppers, mixers, sifters, screw conveyors, etc. all can be adapted for attachment to the airlock. In all cases, except sifters, rigidly attach the feeding device to the airlock flange, using silicone caulk to obtain an air-tight connection. Be sure all seams in the feeding device are air-tight.

If the airlock package is to be hung from a hopper, storage tank, etc. it may be necessary for some type of structural steel support. However, in most cases, the hopper or tank flange will have sufficient strength to support the weight of the airlock package.

Normally, it is not good practice to use the airlock to support equipment loads either in compression on the top flange or in tension from the bottom flange. Excessive loads will cause the housing to distort, which will result in the loss of precise clearances. Loss of clearance between the rotor and housing can result in excessive noise, binding and galling.

Flanges of components, which attach to the airlock must be flat and “square” with the airlock flanges. The machines flanges of cast airlock housing must not be forced or conform to warped or twisted fabricated flanges. This practice can result in broken airlock housing or loss of clearance as noted above.



If the airlock is to be installed with either the **inlet or discharge exposed**, **a guard must be mounted to the appropriate flange** in order to reduce the risk of personal injury to operators, maintenance personnel, or others who may be near the equipment. Any object placed in the inlet area or discharge area of the airlock will be sheared off. Inlet and discharge guards are available from **Ancaster Conveying Systems**.

Air Purge Kit - Optional

The optional air Purge Kit may be used to provide compressed air the shaft seal area on airlocks with either open or closed end rotors. This kit may also be used to provide compressed air to the end plate cavity on the airlocks with closed end rotors.

The Air Purge Kit should included a Filter/Regulator, 0-30 psi pressure gauge, tubing and miscellaneous fittings. Depending on the airlock model and what ports are to be purged, certain fittings supplied in the kit may not be required.

Air Purge Pressure Adjustment



Shut off the compressed air supply and bleed off air pressure before attempting to install or service the air purge assembly.

After installation is complete and while the filter/regulator is shut off completely, the air supply should be turned on.

After verifying that all connections are tight the regulator should be adjusted to provide the appropriate purge pressure to the airlock using the following guidelines.

1. Initial setting, prior to conveying product through the airlock or system should be 5 psig.
2. If the airlock is either receiving product from or discharging product to a pressure system the regulator should be set at 5 psig above the system conveying pressure.
3. If the airlock is used in a gravity flow application or is receiving or discharging only to a vacuum system the regulator should remain set at 5 psig.

*Air Purge Assembly For Airlocks
With Open or Closed End Rotors*

ITEM	P/N	QTY	DESCRIPTION
1	128961	1	Filter/Regulator with gauge & bracket
2	128937	1	3/8" Male Branch Tee Poly-Flo fitting
3	128929	4 ft.	3/8" O.D. Nylo-Seal Tubing
*4	120022	2	3/8" Poly-flo to 1/8" MNPT Connector
5	112895	1	0-30 PSI, 2" Face, 1/4" CTR Back Gauge
°6	128945	2	3/8" Poly-flo to 3/8" MNPT Connector
°7	102733	2	3/8" Poly-Flo Union Tee
°8	125539	2	3/4 x 3/8 Hex Bushing
	400726	1	Air Purge Kit (includes items 1 thru 8)

Please Note: * Fittings for purging shaft seal

° Fittings for purging end plate cavity



Airlock Maintenance And Adjustment

Airlock maintenance is just as important as the unit is to the system. Type “CI” airlocks are assembled with sealed bearings, therefore requiring no lubrication.

Blade clearance should be checked as part of the maintenance program. Blade clearance should be within the allowable clearance range of the appropriate service. (See table). Each airlock is built to a standard, which is determined by its size and design operating conditions. The appropriate standard established for any airlock can be determined by checking the order acknowledgement.

Fixed tip airlocks obviously have no adjustment at tips, but should be checked to determine if the airlock is functioning in the system properly. Airlocks equipped with adjustable tips have a definite advantage. If clearances do not fall within rotor clearance range for the airlock, the tips can easily be adjusted. Adjusting tips of an airlock should be done as follows after electrical power is turned off.



Disconnect all electrical power to airlock before performing any maintenance.

1. Disconnect drive chain.
2. Access through either inlet or outlet.
3. Mark blades one through eight (assuming it is an 8-vane rotor).
4. Loosen bolts on number one blade.
5. Using two feeler gauges, insert between blade and housing, one at each end.
6. Push blade up tight against feeler gauges and tighten bolts.
7. Rotate blade and measure clearance on both sides of housing. This will determine which is tight side of housing.
8. Repeat steps 4, 5, & 6 on all blades settings them against tight side of housing.

NOTE: As each blade is adjusted, make sure clearance is held uniformly by spinning rotor 360 degrees after completing steps 4, 5 & 6, and also by re-measuring with feeler gauge.

Disassembly of an airlock can be done quickly and efficiently by following the proper procedures.



Remove Rotor:

1. Determine which side rotor is to be pulled from. Normally clearance permitting, drive side is pulled to avoid dismantling of sprocket and re-alignment.
2. Disconnect drive chain
3. Loosen and remove bearing lock-collar at bearing opposite the drive side.
 - a) Remove allen set screw from collar and peen down groove formed by set screw using a small flat punch.
 - b) Loosen collar by rotating collar in the same direction as the shaft rotation. Use drift pin in the plain hole (not threaded set screw hole) and tap with hammer to rotate collar.
 - c) Slide collar off shaft.
4. Airlocks with packing gland seals, loosen the packing gland bolts (2 ea.) opposite the drive side.
5. On type "CI" Airlocks loosen the shaft seal collar, located within the end plate bearing port.
6. Remove the bolts on end cover (side to be pulled).
7. On all models place wheel puller at end opposite the drive end, hooking it at back of bearing port. Place puller bolt at the shaft and push rotor through until it slides freely.
8. Remove rotor from housing gently to keep from forming burrs on rotor or housing.

Replacing Rotor

1. Carefully check to see if rotor or housing have burrs. (Blade tips, shrouds, and housing matching surfaces). If burrs are found, file them smooth using a fine file and then polish with emery paper.
2. Check rotor shaft, file and sue emery paper on any rough surface found.
3. Blow off rotor and shaft to clean any foreign material. Also check end cover to see that matching edges to housing are clean.
4. Gently slide rotor into housing. Rotor normally will not slide the last few inches easily. Use a large rubber hammer to pound rotor far enough to start end cover bolts, and tighten evenly.
5. Make sure rotor is centred in housing. If not, loosen bearing lock collars, and centre with rubber mallet by tapping end of shaft.
6. Tighten bearing lock collars in the direction opposite to shaft rotation.
7. Tighten packing gland bolts evenly or tighten shaft seal collar.
Note: If rotor does not turn freely, loosen end cover bolts. Centre rotor with feeler gauges and retighten bolts evenly.
8. Turn rotor by hand. Check clearances and see that rotor turns freely in housing.



Removing End Covers

1. Remove bolts that attach end cover to housing
2. Loosen and remove bearing lock collar
 - a) Remove allen set screw from collar and peen down groove formed by set screw using a small flat punch.
 - b) Loosen collar by rotating collar in direction opposite shaft rotation. Use drift pin in the plain hole (not threaded set screw hole) and tap with hammer to rotate collar.
 - c) Slide collar off shaft.
3. Loosen packing gland bolts or shaft seal collar, if applicable.
4. Attach wheel puller.
5. Tighten slowly until cover slides off shaft. If cover tends to bind on shaft, tap puller bolt with rubber mallet as you tighten.

Remove Press-Fit Bearings

1. Remove end cover.
2. Press bearing in the appropriate direction to remove from end plate.

Replacing Press-Fit Bearings

1. Align bearing with machined hole in end cover.
2. Be sure the eccentrically machined end of the inner bearing ring will be at the outer face of the endplate so that matching bearing lock collar can be properly installed.
3. Press the bearing in place.

Installing Press-Fit Bearing Lock Collar

1. Check to see that bearing has been pressed into endplate with eccentrically machined face of inner bearing ring facing outward toward the end of the shaft.
2. Slide collar on shaft with eccentrically machined, recessed face against the inner bearing ring. Rotate the collar in the opposite direction of shaft rotation until eccentric faces of collar and inner bearing ring engage.
3. Continue to rotate the collar in the opposite direction of shaft rotation until snug. Complete tightening by inserting pin in drift pin hole of the collar and tap with lightweight hammer.
4. Tighten allen set screw.



Chain Drive Adjustment and Maintenance

Airlock drive chain tension. Check tension of airlock drive chain every 200 hours as follows:

- A. Remove chain guard. Airlock drive chain should have no noticeable sag between gearmotor and valve sprockets. However, chain should be loose enough to allow a slight up and down motion with hand pressure applied midway between sprockets.
- B. To adjust airlock drive chain, loosen two bolts securing gearmotor and change position of gearmotor to obtain desired degree of tightness. Tighten mounting parts and reinstall chain guard.
- C. Clean and re-grease chain every 500 hours.

Inspection and Repair

Inspection and repair procedures given below provide sufficient information for restoring the package to peak operation. In most cases, repair simply consists of component replacement.

- A. If airlock is not operating efficiently or satisfactory, remove from system, inspect and repair in accordance with preceding information.
- B. Inspect airlock drive chain and sprockets for wear, loose links, and damage. Replace chain and sprockets if damage is noted. Be sure the same size sprockets are replacements for original sprockets.
- C. Inspect base structure, chain guard, and brackets, for damage and deformation. Replace defective parts.
- D. Check all accessory equipment to assure proper operation. Replace any components found to be defective.

When requesting service assistance, please have the following information at hand prior to calling system engineer.

- 1. Blower speed.
- 2. Vacuum or pressure gauge reading.
- 3. Pressure switch setting.
- 4. Blower motor amperage reading.
- 5. Airlock speed.
- 6. Method of feeding the valve.
- 7. Gearmotor amperage reading
- 8. Conveying line length
 - a) Horizontal run
 - b) Vertical run
 - c) Number of elbows



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Airlock Rotor Clearances

Model & Size	Standard Temperature Application	High Temperature Application
CI 6 x 6 CI 8 x 8 CI 10 x 10 CI 12 x 12	.004" - .007"	.007"-.010"
CI 14 x 14	.004" - .007"	.007" .010"
CI 16 x 16	.007" - .010"	.012" - .016"
CI 18 x 18	.012" - .016"	.012" - .016"
CI 22 x 22	.012" - .016"	.024" - .035"
CI 26 x 26	On Application	On Application
CI 30 x 30	On Application	On Application
MD 6 MD 8 MD 10 MD 12	.004" - .007"	.007" - .010"
MD 14 MD 16	-- .007" - .010"	--- .012" - .016"
AF-A AF-B	.004" - .007" .004" - .007"	.007" - .010" .007" - .010"
AF-C AF-D	.004" - .007" ---	--- ---
CDC-CI 6" CDC-CI 8" CDC-CI 10" CDC-CI 12"	.004" - .007"	.007" - .010"

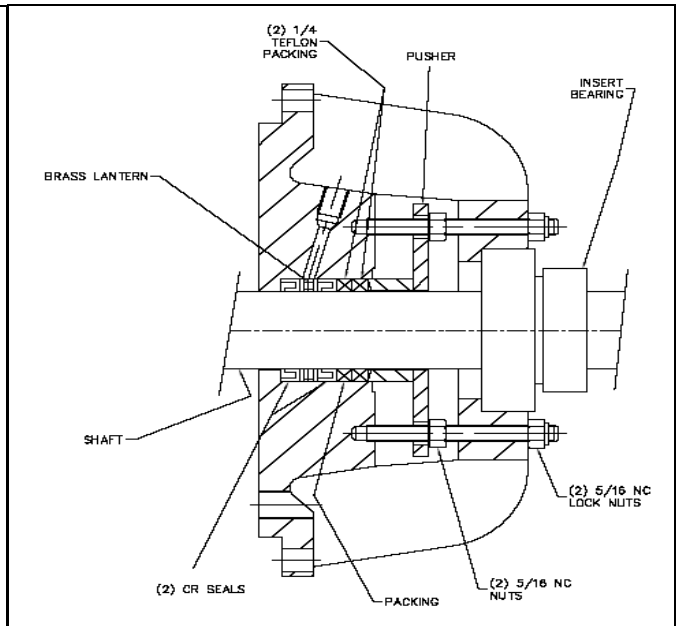
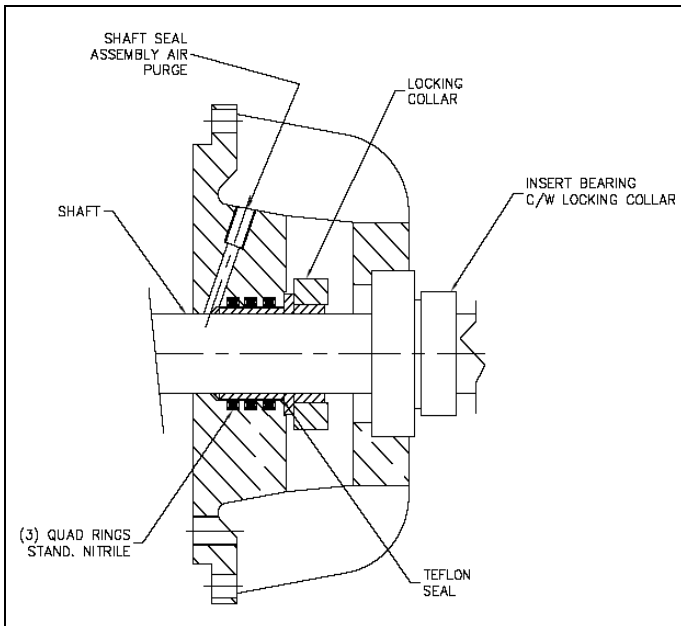
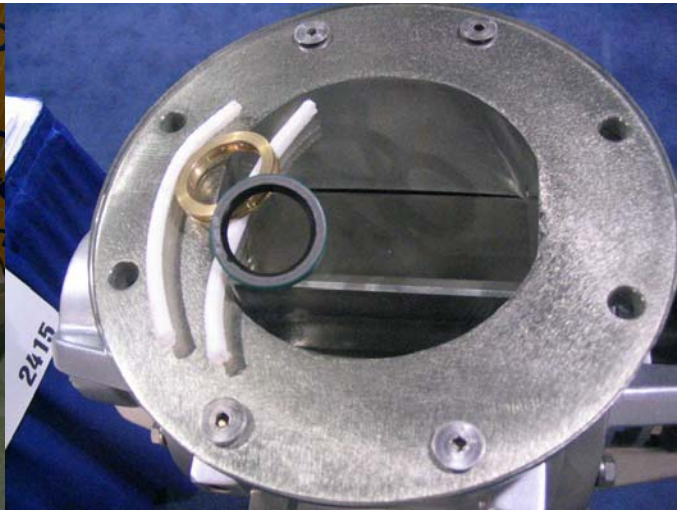
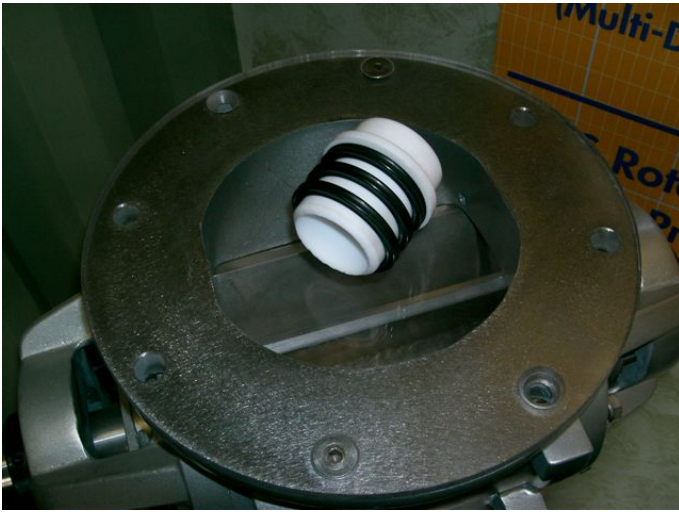
BEST TO CONSULT FACTORY FOR CLEARANCES BEST SUITED TO YOUR SIZE ROTARY VALVE & APPLICATION.

Shaft Seals

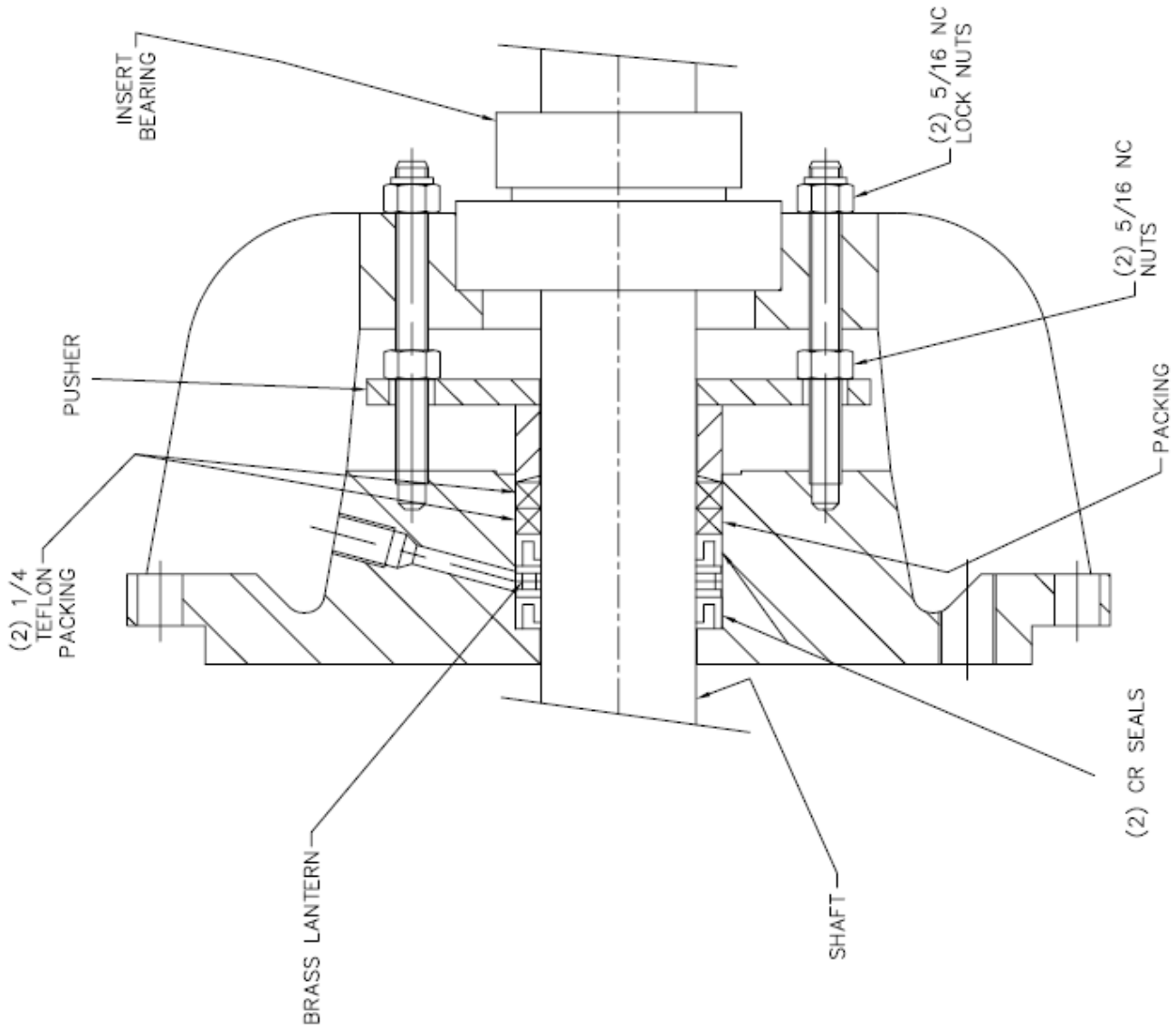
- ACST-4 shaft seals are used on both ends of the rotor shaft for superior sealing
- Each shaft seal assembly consists of one virgin teflon sleeve and three quad rings, which fit snugly over the teflon sleeve
- The teflon sleeve has a smooth self lubricated surface creating a tight seal with the quad rings
- Also available in a packing gland style shaft seal air purge assembly consisting of a lantern ring, 2 lip seals, lot teflon packing and a adjusting pusher plate
- Air purge seals connection option for severe applications

ACST-4 Shaft Seal

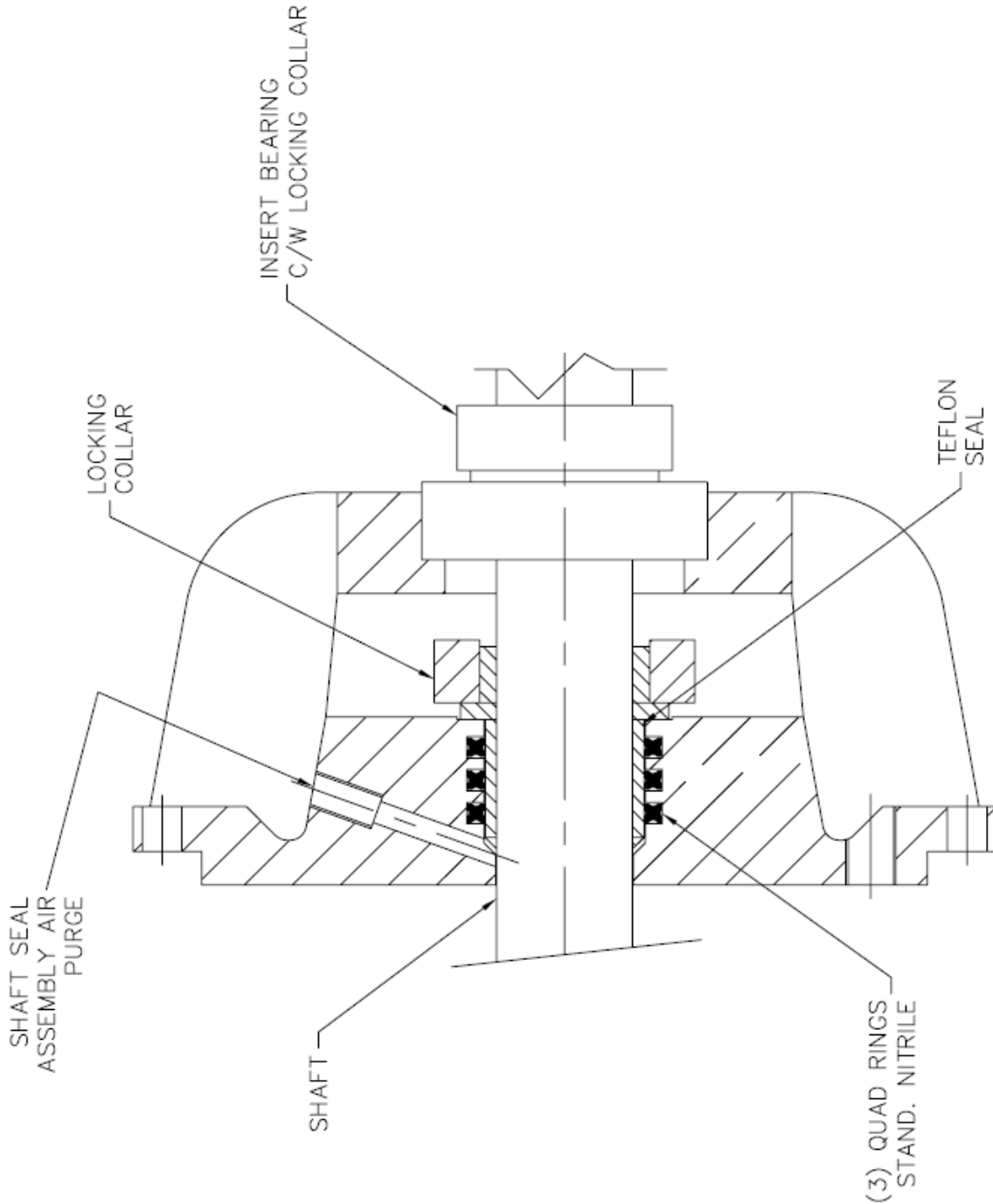
ACS Packing Gland Style Shaft Seal with Lantern Ring



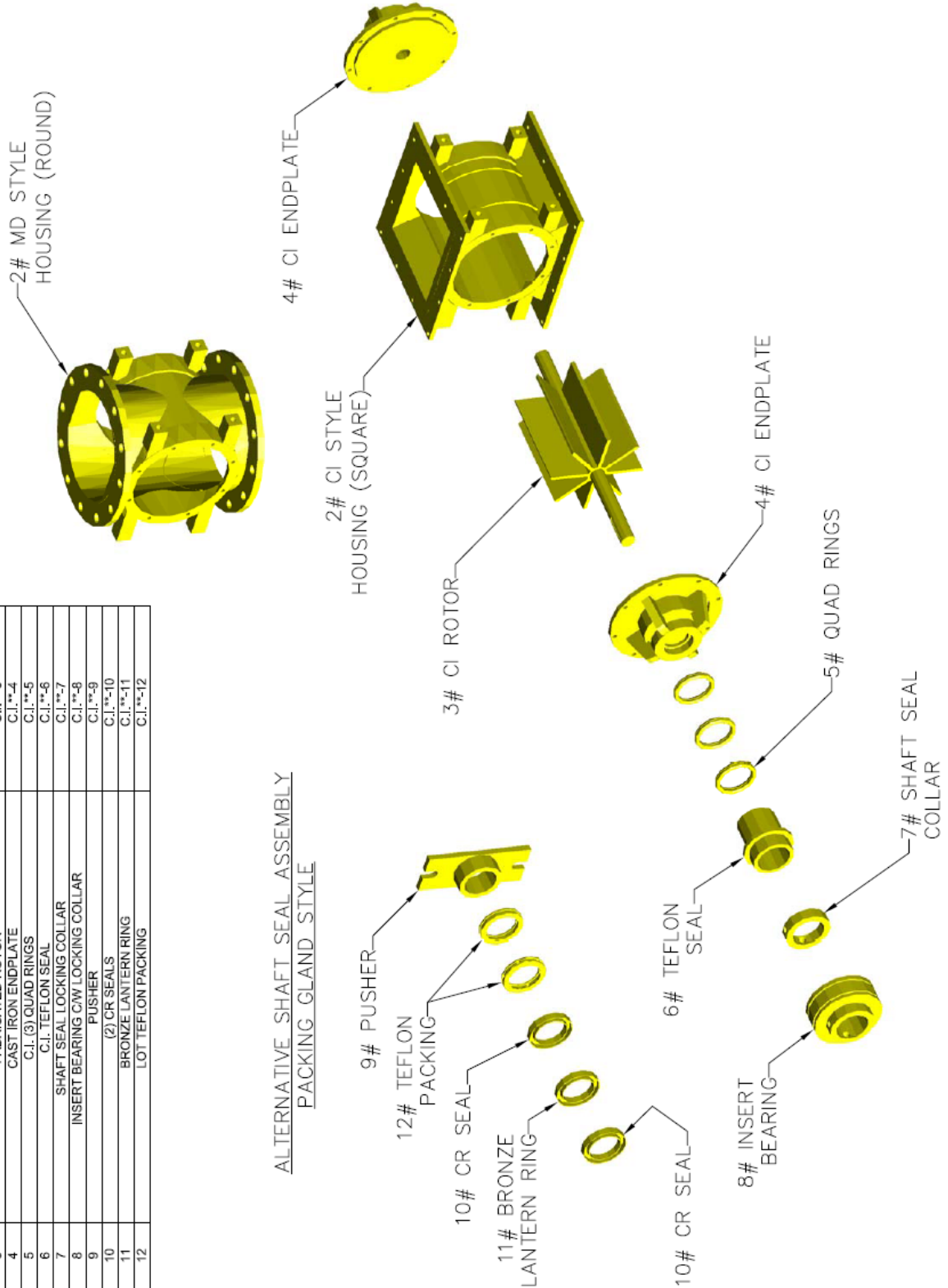
Packing Gland Shaft Seal Assembly



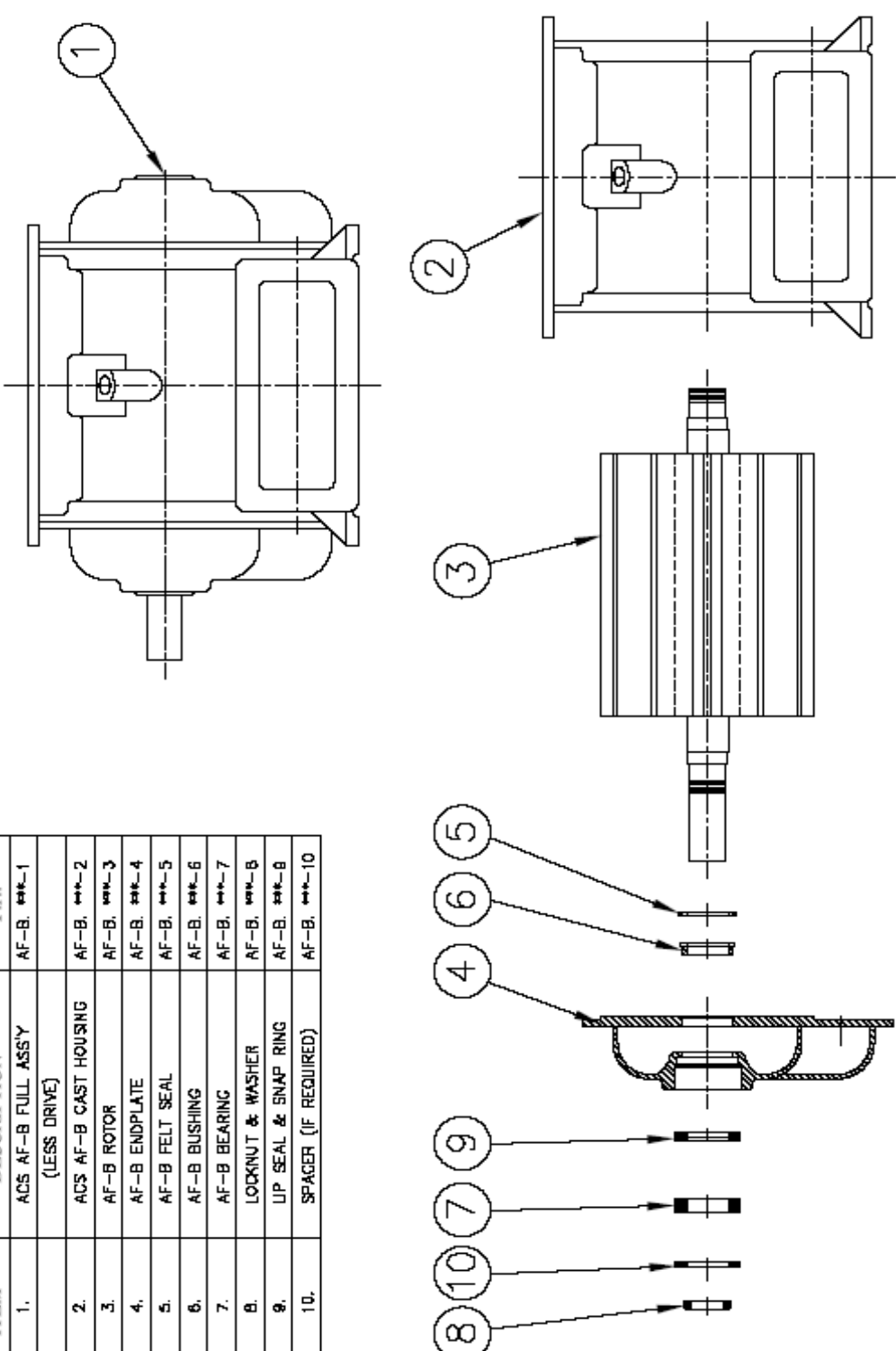
ACST-4 Shaft Seal Assembly



ITEM	DESCRIPTION	PART NUMBER
1	ACS C.I. OR M.D. ROTARY AIRLOCK COMPLETE	CI**-1-DP OR MD**-1-DP
1A	ACS C.I. OR M.D. ROTARY AIRLOCK COMPLETE (NO DRIVE)	CI**-1-BV OR MD**-1-BV
2	CAST IRON HOUSING	C.I.**-2
3	FABRICATED ROTOR	C.I.**-3
4	CAST IRON ENDPLATE	C.I.**-4
5	C.I. (3) QUAD RINGS	C.I.**-5
6	C.I. TEFLON SEAL	C.I.**-6
7	SHAFT SEAL LOCKING COLLAR	C.I.**-7
8	INSERT BEARING C/W LOCKING COLLAR	C.I.**-8
9	PUSHER	C.I.**-9
10	(2) CR SEALS	C.I.**-10
11	BRONZE LANTERN RING	C.I.**-11
12	LOT TEFLON PACKING	C.I.**-12



ITEM	DESCRIPTION	P.N.
1.	ACS AF-B FULL ASSY (LESS DRIVE)	AF-B. ***-1
2.	ACS AF-B CAST HOUSING	AF-B. ***-2
3.	AF-B ROTOR	AF-B. ***-3
4.	AF-B ENDPLATE	AF-B. ***-4
5.	AF-B FELT SEAL	AF-B. ***-5
6.	AF-B BUSHING	AF-B. ***-6
7.	AF-B BEARING	AF-B. ***-7
8.	LOCKNUT & WASHER	AF-B. ***-8
9.	LIP SEAL & SNAP RING	AF-B. ***-8
10.	SPACER (IF REQUIRED)	AF-B. ***-10



NOTES:

1. *** SIZE OF AIRLOCK EG. AF-A, AF-B, AF-C, AF-D.
2. IF POSSIBLE PLEASE PROVIDE AIRLOCK SERIAL NUMBER WHEN CALLING FOR SPARE PARTS (SERIAL PLATE LOCATED ON SIDE WALL OF VALVE HOUSING).
3. IF YOU HAVE ANY QUESTIONS PLEASE DO NOT HESITATE TO CALL

ANCASTER CONVEYING SYSTEMS.
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SCALE: N.T.S. DRAWN BY: G.T.
 DATE: DEC/14/88 CHECKED: A-2313

ISSUE: DATE: REVISION: BY:



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Terms and Conditions of Sale

These General Conditions of Sale are and shall be applicable to all sales of products and services of Ancaster Conveying Systems ("ACS"). No other or inconsistent conditions of sale shall be binding upon ACS unless specifically agreed to in writing by an authorized official of ACS. ACS' distributors and sales representatives are not authorized officials of ACS for purposes of this provision. Any failure by ACS to object to any inconsistent condition or other communication from a buyer of production or services from ACS shall not be construed as an acceptance of such other inconsistent provision or as a waiver of these General Conditions of Sales

PRICES: Published prices on standard products and services are subject to change without notice. Verbal quotations on custom productions or special services expire at the close of the business day they were made, if not first accepted in writing or withdrawn. Written quotations for custom productions or special services expire 30 days from the date which they bear, unless earlier withdrawn or unless the quotation specifically provides another expiration date.

OFFICIAL CORRESPONDANCE: All official correspondence to include, but not limited to Purchase orders, Specifications, Samples, Construction Drawings, Approval Documentations, Shipping Status, Reports, Shortages of Incorrect Equipment Claims and/or Warranty Claims must be made and addressed to ACS at its principal office in Caledonia, Ontario.

ACCEPTANCE: No purchase order shall be valid and/or binding upon ACS unless first accepted by ACS at its principal office in Caledonia, Ontario.

TERMS OF PAYMENT: Unless otherwise agreed to in writing, payment is due:

- a) Net within 30 days from the date of invoice from buyers whose credit has been approved by ACS.
- b) Upon delivery for all other buyers. ACS with charge a 1 ½ % per month service and carrying charge with respect to all balances which are not paid when due. If a shipment of ACS' products is delayed by the acts of omissions of a buyer, payment shall become due at the time such products would have been shipped and the products will thereafter be stored by ACS at the buyer's expense and risk.

CONFIDENTIALITY: All proposals and price quotations, including any drawings prepared by ACS are confidential and remain the property of ACS. Transmission of all or any part of such information to others, or the use of any such information for the purpose other than considering the purchase of the products described, is prohibited.

TAXES: Any federal, state, provincial or local tax, tariff or charge of duty levied on the sale by ACS of any product or service or on the use or possession of any product after shipment by ACS shall be borne by and paid for by the buyer. If ACS is required by law to collect any such tax, tariff, charge or duty, the buyer will pay the amount thereof to ACS on demand or provide to ACS at the time the purchase order, any applicable exemption certificate or additional documentation.

RESPONSIBILITY FOR DOCUMENTS: Any documents, drawings or samples submitted with a purchase must be picked up by the buyer within a 30-day period. ACS shall no longer be responsible for any such items and may discard them.

ESCALATION: Any price quoted by ACS is calculated on the basis of wage and materials cost in effect at the date of the quotation and may be subject to increase to reflect increases in wage and/or materials cost accordingly.

CHANGES IN SPECIFICATIONS: No specification change shall be valid unless in writing, signed by ACS and the buyer of the product.

LOCAL CONDITIONS: ACS shall not be responsible for determining whether products furnished to any buyer comply with local conditions, codes or interpretations. The buyers of the product shall have the sole responsibility for assuring such compliance.

SHIPPING: Shipping dates are approximate and are dependant upon availability of materials and the cooperation of the buyers. ACS shall not be subject to any liability because of delay in shipping resulting from strike, accident, weather, fire or other conditions beyond ACS' control. ACS shall not be responsible for damage or loss in transit, and the buyer of any product shall have the sole responsibility to pursue any claims against a carrier.

SHORTAGES OR INCORRECT EQUIPMENT: Claims by a buyer of products from ACS for shortages or incorrect products must be made in writing within 10 days after receipt of the shipment by the recipient. Failure to give such written notice to ACS shall constitute in an unqualified acceptance of the shipped products and waiver of any claim by the buyer.

INSTALLATION: Installation of the Products shall be at the expense of the buyer. ACS can provide installation and start-up service.

In any case where ACS is utilized, the buyer shall nevertheless be obligated to furnish all necessary skilled and unskilled labor, tools, rigging and appliances with respect to the erection of a Product, without responsibility or liability of ACS.

If a Product is installed without ACS' assistance, ACS warranties contained in these general conditions shall not be applicable in the event of any claim of damage which, in ACS opinion, results from inadequate or faulty installation.

WARRANTY: ACS warrants its Products on the following terms and conditions only. THESE EXPRESSED WARRANTIES ARE IN LIEU OF ANY OTHER OBLIGATION OR WARRANTY, WHETHER EXPRESSED OR IMPLIED OR ARISING BY OPERATION OF LAW.

- a) ACS warrants that each of its Products shall be free of defects in workmanship and materials for a period up to one year from the date of installation (but not to exceed 18 months from the date of shipment by ACS from its factory)
- b) ACS warrants that any of its custom Products which are manufactured in accordance with specifications, drawings, plans and designs set forth in writing by the buyer shall reasonably conform to all such written specifications, drawings, plans and designs.
- c) The warranties set forth in (a) and (b) above are subject to and limited by the following:
 - I. ACS' warranty with respect to a component of a Product supplied by another shall not exceed the warranty of the other supplier in terms or conditions.
 - II. ACS' warranties shall be inapplicable if in the opinion of ACS, the Product has been mechanically, electrically or environmentally abused or altered, or if the Product was improperly installed.



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III. ACS' warranties are applicable only within the continental boundaries of the United States, Hawaii, Canada and Alaska.

IV. ACS' warranties are limited to the supply of replacements for the defective part(s), FOB factory.

THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, INCLUDING BOTH BUT NOT LIMITED TO THE WARRANTY OF MERCHANTABILITY. THE WARRANTY OF FITNESS FOR USE AND THE WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE AND EXCLUDES ANY CLAIMS FOR INDIRECT OR CONSEQUENTIAL LOSSES OR DAMAGES. BUYER ASSUMES ALL RISK AND LIABILITY FOR LOSS, DAMAGE OR INJURY TO THIRD PERSON OR PROPERTY ARISING FROM THE USE OF GOODS SUPPLIED BY SELLER TO BUYER. BUYER AGREES TO DEFEND, INDEMNIFY AND HOLD HARMLESS SELLER AGAINST LIABILITY OR OBLIGATION THAT ARISE FROM CONTRACT OR TORT, INCLUDING BUT NOT LIMITED TO NEGLIGENCE INCLUDING STRICT LIABILITY OR OTHERWISE WITH RESPECT TO ANY INDIRECT OR CONSEQUENTIAL DAMAGES, LOST PROFITS, OVERTIME, REPLACEMENT EQUIPMENT OR SERVICES, PENALTIES, LOSS OR DAMAGE TO BUYER OR ANY THIRD PERSON. IF THE GOODS THAT ARE THE SUBJECT OF THIS AGREEMENT CANNOT BE IN THE SELLER(S) DETERMINATION, ADEQUATELY REPAIRED OR REPLACED, SELLER(S) LIABILITY SHALL NOT EXCEED REPAYMENT OF THE AMOUNT OF PURCHASE FUNDS RECEIVED FROM BUYER.

GOVERNING LAW: Ontario law shall be applicable with respect to, and interpretation of these General Conditions of Sale.

RETURNS/CANCELLATIONS BY BUYER: Unilateral cancellation of a purchase order to ACS shall constitute a breach of contract and shall be subject to a cancellation/restocking charge. This charge shall be a minimum of 30% of the purchase order value and a maximum charge of the selling price of all materials and labor, purchased or expended by ACS to compensate for the disruptions in scheduling, planned productions and other direct costs. No approval shall be granted for the return of Goods under any circumstances where the original invoice date for such Goods is more than one-hundred eighty (180) days prior to the date that a request is made to ACS for such approval. No credit will be issued for returned Goods where the net amount involved is less than \$100.00, except when an error made by ACS is to be corrected.