

Cross Flow Aeration Manual



NOTE: Gatco Manufacturing believes in continuous improvement and as such, manuals, brochures and specifications are subject to change without notice.

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Manual Part# MANUAL CF

This product has been designed and constructed according to general engineering standards ^a . Other local regulations may apply and must be followed by the operator. We strongly recommend that all personnel associated with this equipment be trained in the correct operational and safety procedures required for this product. Periodic reviews of this manual with all employees should be standard practice. For your convenience, we include this sign-off sheet so you can record your periodic reviews.					
Date	Employee Signature	Employer Signature			

a. Standards include organizations such as the American Society of Agricultural and Biological Engineers, American National Standards Institute, Canadian Standards Association, International Organization for Standardization, EN Standards, and/or others.

Table of Contents

1.0	Introduction		
2.0	Safety9		
2.1	General9		
2.2	Safety Harness/Restraint9		
2.3	Ladder10		
2.4	Maintenance10		
2.5	Assembly		
3.0	Installation		
3.1	General Installation		
3.2	Assmbly Tools Required11		
3.3	Flat Bottom Grain Bin12		
3.4	Hopper Bottom Grain Bin21		
4.0	Operation		
5.0	Maintenance		
6.0	Troubleshooting		
7.0	Specifications		
8.0	Warranty		

Warranty Registration Form



Box 515, Swift Current, SK S9H 3W3

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Name:
Mailing Address:
Phone:
Email:
Dealer Name:
Installed By:
Installer Phone:

Terms:

- 1. I have read and understood the installation instructions and the warranty policy.
- 2. Third Party Installers must be Gatco Certified.
- 3. Sales receipt required for warranty claim.
- 4. Warranty is provided for two (2) year from date of sale.

Equipment Purchased:

I hereby acknowledge that I have read and agree to the warranty terms listed above.

Signature

Date

Cut to remove and mail, fax or email to Gatco Manufacturing to register.

1. Introduction

Thank you for purchasing a Gatco Manufacturing Cross Flow Aeration System. This system will dry grain using natural grain aeration drying by pushing air horizontally from the bin wall to the center GrainAir Tube. The air can then quickly exhaust up through the GrainAir Tube through the bin lid. When the fan(s) aren't used, the center GrainAir tube will continue to allow any excess heat to continue to exhaust out of the bin all year long without any power required through the Vent-a-lid.

By following the instructions and procedures in this manual you will be able to safely store grain, prevent grain clumping, mold and insect problems and ensure the long, trouble free use of this system. Ensure all people using this system have read and understood this manual. Ensure that the manual is always available for future reference.

Note: This system can only be used with grain. It cannot be used with fertilizer as damage to the system will occur.



2. Safety

2.1.General

This manual contains information that is important for you, the owner/operator, to know and understand. This information relates to protecting *personal safety* and *preventing equipment problems.* It is the responsibility of the owner/operator to inform anyone operating or working in the area of this equipment of these safety guidelines. To help you recognize this information, we use the symbols that are defined below. Please read the manual and pay attention to these sections. Failure to read this manual and its safety instructions is a misuse of the equipment and may lead to serious injury and/or death.

DANGER - indicates an imminently hazardous situation which, if not avoided, will result in in serious injury or death.

WARNING - indicates a potentially hazardous situation which, if not avoided, could result in serious injury or death.

<u>CAUTION</u> - indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE - indicates a potentially hazardous situation which, if not avoided, may result in property or equipment damage.

- Use this equipment for its intended purposes only.
- Do not modify this equipment in any way as it may impair its safety, function and longevity and will void the warranty.
- Wear appropriate protective equipment (i.e. gloves, glasses, foot wear, hearing protection, etc.)

2.2.Safety Harness/ Restraint

- Follow all local safety regulations in the use of a safety harness and fall restraint system.
- Do not use equipment that has missing and/or damaged safety decals and instructions.
- Do not use equipment that is damaged in any way.

2.3.Ladder

- Follow all safety instructions provided with the ladder. If not legible, please contact the ladder manufacturer directly to ensure that you have all safety instructions.
- Do not use equipment that has missing and/or damaged safety decals and instructions.
- Do not use equipment that is damaged in any way.

2.4.Maintenance

- Use only genuine Gatco replacement parts. Use of unauthorized parts will void the warranty.
- Do not modify any components without authorization from Gatco. Modifications can result in serious personal injury and/or equipment damage.

2.5.Assembly

- Read and understand the instructions before proceeding to assembly of this product.
- Some of the components can be heavy and/or difficult to handle so always use proper tools, lifting devices, support stands for the job.
- Always have two or more people assembling this equipment.

WARNING



Components are heavy and create a crushing hazard if improperly handled. Be sure to use proper hoisting equipment and procedures, and ensure lifting apparatus is secure. Lock out the lifting apparatus before working around or under the raised components; failure to do so may cause serious personal injury.

NOTICE

Do not modify equipment.

Unauthorized modification may impair the function or safety of the equipment, could affect the life of the equipment, and will void your warranty.

3. Installation

3.1.General

Before beginning installation ensure all assemblers have read and fully understood this manual.

3.2.Assembly Tools Required

- Electric drill and impact driver
- Level
- Tape measure 100ft
- Steel cutting tools (i.e. metal reciprocating saw)
- Socket and wrench set
- Hammer
- Drill bit 9/32" for bin wall self-threading screws (is supplied)
- Drill bit 11/32" for 5/16" bolts on inlet bolt holes (not supplied)
- Marker
- Caulking gun
- Ladder
- Lifting device (i.e. rope, slings) with minimum 500lb rating
- Fall restraint if required by local regulations
- Ground fault interrupt protected electrical cord(s)
- Eye, foot, head, and hand protection (safety glasses, steel-toed boots, hard hat, work gloves)
- First-aid kit
- Wire cutter to cut rubber hose steel helix

3.3.Flat Bottom Grain Bin

Caution: use proper eye and hand protection when handling parts to prevent injury to yourself and others.

3.3.1. Column Assembly, Flat Bottom Bin

- 1. See Figure 3.3.1 below. Join the pre-assembled upper column assembly to the lower column assembly using 4=SELF-DRILLING SCREWS (per joint).
- 2. Once assembled, move column assemblies into the grain bin and set on the floor.



Figure 3.3.1: Flat Bottom Bin Column Assembly

3.3.2. Column Location and Hole Placement Layout

- 1. See Figure 3.2.2a below. Mark the location of the fan transition opposite the grain bin door. For other fan locations, contact Gatco Head Office.
- 2. Measure the entire outside circumference of the bin.

IMPORTANT: Be aware of the location of any bolted seams on the grain bin. The column must be able to be pressed tightly against the inside bin wall. Any protrusions such as bolts may prevent this. Because of the curvature of the grain bin, it may be possible to line up the column with the row of bolts and still have it press tightly against the bin wall.

- For a <u>4 column system</u> use the circumference divided by 4 to give you the distance between the columns. From the fan transition, measure over 1/8 of the circumference to get the first column measurement. The next column will be 1/4 of the circumference from there.
- 4. For a <u>6 column system</u> use the circumference divided by 6 to give you the distance between the columns. From the fan transition, measure over 1/12 of the circumference to get the first column measurement. The next column will be 1/6 of the circumference from there.
- 5. For an <u>8 column system</u> use the circumference divided by 8 to give you the distance between the columns. From the fan transition, measure over 1/16 of the circumference to get the first column measurement. The next column will be 1/8 of the circumference from there.



Figure 3.3.2a: Hole Placement in Flat Bottom Bin (4 column shown)

Bin Circumference (in feet)=		Example 56 feet	
Bin Circumference (in inches)=	circumference (ft) x 12	56 feet x 12	= 672 inches
Number of Columns=		4	
Distance from Transition to 1st Column=	circumference 2 x (# of columns)	672 inches 2 x 4 columns	= 84 inches
Distance between remaining columns	circumference	672 inches	= 168 inches
	(# of columns)	4 columns	

Caution: use proper eye and hand protection when cutting metal to prevent injury to yourself and others.

6. Using INLET HOLD TEMPLATE, cut holes in the grain bin wall at the locations indicated in Figure 3.2.2b below.

IMPORTANT: If the grain bin has a fixed bin sweep installed, the holes in the bin walls may need to be located higher for bin sweep to pass under column.



Figure 3.3.2b: Hole Cut-out Flat Bottom Bin- INLET HOLE TEMPLATE

3.3.3. Column Mounting on Flat Bin Wall

1. Position all column assemblies on the inside of the bin

Important: column assemblies are best handled with a minimum of 2 people. Longer columns will require more people to hold in place while fastening column to the bin wall.

- 2. Position electric driver with ½" socket, electric drill with 9/32" bit and the 5/16 X 1" SELF-THREADING SCREWS where they can be easily reached.
- 3. Lift and insert the inlet (round pipe at bottom) of the pre-assembled column through hole in bin wall.
- 4. Level and the column assembly to the bin wall and have first person hold column in place.
- See Figure 3.3.3a below. Second person will pick the column side hole that aligns with the bin wall corrugation and drill through the bin wall with the electric drill and 9/32" bit.
- Once hole is drilled then use electric driver with socket to install 5/16 X 1" SELF-THREADING SCREWS. Ensure that there is a tight seal and the bin wall is not dimpled or dented when the bolt is tightened up. <u>Do not overtighten bolts</u>. If overtightened, you may need to install 5/16" UNC nut on the outside of the bin (not supplied).



5/16 X 1" SELF-THREADING SCREWS (yellow plated)

Figure 3.3.3a: Top of Column Assembly & Mid-joint of Column Assembly

7. Repeat for both sides of the column assembly at each joint/top to complete install of 5/16 X 1" SELF-THREADING SCREWS (yellow plated).

See Figure 3.3.3b below. Once the column assembly has been secured to the bin wall, the INLET can be bolted through the bin wall. Use an electric drill with 11/32" bit (not supplied). From the inside of the bin, drill all 4 holes through the inlet plate.



Figure 3.3.3b: Inlet Assembly

- 9. On the outside of the bin, install FOAM between the bin wall and the outer CF INLET PLATE 8".
- 10. Install the 4=5/16 X 2-1/2" CARRIAGE BOLTS from the inside of the bin. Have second person on the outside of the bin install 5/16" NUTS & WASHERS on the outside of the bin wall.
- 11. Tighten each nut a little bit at a time to ensure that the foam is being compressed uniformly. Foam can be compressed to 1/8 to $\frac{1}{2}$.
- 12. On the inside of the bin, use MINIMUM EXPANSION SPRAY FOAM to seal the column to the bin wall.

3.3.4. Flat Bottom Bin Transition Assembly

- 1. See Figure 3.3.4 below, loosely assemble all components.
- 2. Once all components are installed, tighten all hardware.
- 3. Place the FAN TRANSITION against the bin wall. You will require at least 2 people to lift and block FAN TRANSITION in place. Double check to ensure that the center of the FAN TRANSITION is the same height as the 8" inlet holes in the bin walls.
- Once confirmed that the FAN TRANSITION is positioned properly in relation to the 8" inlet holes, use electric drill and 3/8" bit and drill 6 holes through the bin wall and bolt the FAN TRANSITION to the bin using bolts, locknuts and washers.
- 5. Tighten all bolts.
- NOTE: For heavy aeration fans, the customer may need to add cable/chain (not supplied) to provide adequate support to the FAN TRANSITION and aeration fan.





Figure 3.3.4: Flat Bottom Fan Transition Assembly

3.3.5. Outside Ducting Assembly

- 1. See Fig 3.3.5a for 4 vertical columns.
- Starting at the Transition 18", go to first COLUMN INLET and install TEE OFFSET 12x8x8 into inlet on column (12" end facing TRANSITION 18"). Fasten with 3= SELF-DRILLING SCREWS and silicone TEE to INLET. Repeat on other side of transition.
- **NOTE:** If there are 6 COLUMNS on the bin see Fig 3.3.5b, install TEE 12x12x8 on first inlet, TEE OFFSET 12x8x8 on second inlet and ELBOW 90deg 8" on third inlet.
- **NOTE:** If there are 8 COLUMNS on the bin see Fig 3.3.5c, then install TEE 12x12x8 on first and second inlet, TEE OFFSET 12x8x8 on third inlet and ELBOW 90deg 8" on fourth inlet.
 - 3. On the second COLUM INLET, install the ELBOW 90deg 8". Fasten to the COLUMN INLET using 3= SELF-DRILLING SCREWS. Silicone ELBOW to INLET.
 - 4. Install the ADJUSTABLE ELBOW 12" onto the FAN TRANSITION using self-drilling screws.
 - 5. Direct the ADJUSTABLE ELBOW 12' to point to the TEE OFFSET 12x8x8.
 - 6. Attach a 5ft piece of SPIRAL DUCTING 12" onto the ADJUSTABLE ELBOW 12'. Fasten with 3= SELF-DRILLING SCREWS.
 - 7. Measure, cut and install RUBBER HOSE 12" to connect the SPIRAL DUCTING 12" to the TEE 12x12x8. Use 2=GEAR CLAMP 12" to secure the RUBBER HOSE.
 - Attach a 5ft piece of SPIRAL DUCTING 8" onto the TEE 12x12x8. Fasten with 3= SELF-DRILLING SCREWS.
 - 9. Attach an ADJUSTABLE ELBOW 8" onto SPIRAL DUCTING 8". Fasten with 3= SELF-DRILLING SCREWS.
 - 10. Attach a 5ft piece (trim if required) of SPIRAL DUCTING 8" onto the ADJUSTABLE ELBOW 8". Fasten with 3= SELF-DRILLING SCREWS.
 - 11. Measure, cut and install RUBBER HOSE 8" from the SPIRAL DUCTING 8" to the ELBOW 90deg 8". Use 2=GEAR CLAMP 8" to secure the RUBBER HOSE.
 - 12. Level the SPIRAL DUCTING 8" and install a HANGER STRAP 8" to hold the pipe in place.
 - 13. Seal all INLETS with silicone.
 - 14. Seal all ELBOWS and SPIRAL DUCTING ends with Duct Sealant.



Figure 3.3.5a: Flat Bottom Outside Ducting (4 vertical columns)



Figure 3.3.5b: Flat Bottom Outside Ducting (6 vertical columns)



Figure 3.3.5c: Flat Bottom Outside Ducting (8 vertical columns)

3.4 Hopper Bottom Grain Bin

CAUTION: use proper eye and hand protection when handling parts to prevent injury to yourself and others.

3.4.1. Column Location & Hole Placement

- 1. See Figure 3.4.1a below, shows how the fan transition mounting frame will be in the hopper bottom framework. The location of the fan mount and transitions should be opposite the hopper manhole.
- 2. On the outside of the bin, on the bin mount ring, mark the location of the fan transition opposite the hopper manhole. Ensure that the transition is not located where it will interfere with where you position your unloading auger/conveyor.
- 3. On the outside of the bin, on the bin mount ring, measure the total circumference of the hopper. Use the following table to calculate where the columns will need to be positioned.



Figure 3.4.1a: Hole Layout (4 column)

4. On the bin mount ring mark out the positions of all the columns. Check at each mark if the 8" inlet hole will interfere with any braces, joints, etc. Also check above each mark to see the bottom row of bin bolts. You will want the mark centered on one of these bolts (prevents interference when installing columns). You can shuffle the mark either way by 4-6" and not affect the performance of the system or the fit of the parts.



- 5. See Figure 3.4.1b, on the <u>outside</u> of the bin, use supplied INLET HOLE TEMPLATE. Then use a marker to mark the large 8" hole. Don't drill small mount holes at this time.
- 6. See Figure 3.4.1c, use a metal cutting tool to make the hole in the hopper cone. Before proceeding with creation of other holes, lay the COLUMN HOPPER 4FT assembly inside the hopper cone and rough fit into the hole. Check to ensure that the COLUMN HOPPER 4FT fits up tight against the bin wall and that it sits down flat on the hopper cone.



Fig ure 3.4.1b: Inlet Hole Template



Fig. 3.4.1c:Column Hopper 4ft Install

- 7. Trim 8" hole as required to get COLUMN HOPPER 4FT to fit properly. Once fitting is done proceed with cutting remaining holes.
- 8. Once all holes are complete, install all the COLUMN HOPPER 4FT through the holes.

3.4.2. Column Hopper 4ft Install

- See Figure 3.4.2a below, ensure your electric driver with ½" socket, electric drill with 9/32" bit and the 5/16 X 1" SELF-THREADING SCREWS are positioned where they can be easily reached.
- 2. Level the COLUMN HOPPER 4FT and drill through the hopper cone with the electric drill and 9/32" bit.
- Once hole is drilled, use electric driver with socket to install 5/16 X 1" SELF-THREADING SCREWS. Ensure that there is a tight seal between the COLUMN HOPPER 4FT and the hopper cone. <u>Do not overtighten bolts</u>. If overtightened, you may need to install 5/16" UNC nut on the outside of the bin (not supplied).



Figure 3.4.2a: COLUMN HOPPER 4FT

- See Figure 3.4.2b. Once the COLUMN HOPPER 4FT has been secured to the hopper cone, the INLET can be bolted through the hopper cone. Use an electric drill with 11/32" bit (not supplied). From the inside of the bin, drill all holes through the inlet plate.
- 5. On the outside of the bin, install FOAM between the bin wall and the outer CF INLET PLATE 8".
- 6. Install the 4=5/16 X 2-1/2" CARRIAGE BOLTS from the inside of the bin. Have second person on the outside of the bin install 5/16" NUTS & WASHERS on the outside of the bin wall.
- 7. Tighten each nut a little bit at a time to ensure that the foam is being compressed uniformly. Foam can be compressed to 1/8 to ¼".
- 8. On the inside of the bin, use MINIMUM EXPANSION SPRAY FOAM to seal the column to the bin wall.



Figure 3.4.2b: Inlet Assembly

3.4.3. Wall Column Assembly, Hopper Bottom Bin

Note: You will require at least one person inside and one person outside to maneuver this part Once fully assembled column is inside the hopper bin, use a minimum of 2 people to raise the part up and onto the inside bin wall.

CAUTION: Ensure all safety precautions are taken as the fully assembled unit is heavy and bulky and should be handled with care.

- 1. See Figure 3.4.3 below. Join the pre-assembled upper column assembly to the lower column assembly using 4=SELF-DRILLING SCREWS (per joint).
- 2. Once assembled, move column assemblies into the grain bin and set on the floor.



Figure 3.4.3: Wall Column Assembly

3.4.4. Wall Column Mounting, Hopper Bottom Bin

CAUTION: Ensure all safety precautions are taken as the fully assembled unit is heavy and bulky and should be handled with care.

- You will require at least one person inside and one person outside to maneuver this part Once fully assembled column is inside the hopper bin, use a minimum of 2 people to raise the part up and onto the inside bin wall. Using 2 people, align wall column with COLUMN HOPPER 4FT.
- 2. Drill 2 holes (9/32") through wall column at top of column. (ensure that you are drilling through a corrugation that is touching the wall column). Install self-tapping screws.
- 3. Repeat process at middle joint (if present) and at lower joint. Repeat for subsequent columns.
- 4. The ELBOW CAP can be installed after the column has been bolted to the bin wall and hopper.



Fig 3.4.4: Wall Column Mounting

3.4.5. Hopper Fan Transition Assembly

- 1. Loosely assemble all components.
- 2. Position the fan transition assembly as indicated in the section "LOCATING COLUMNS IN HOPPER BOTTOM BINS".
- 3. Use 2 people to hold FAN TRANSITION ASSEMBLY up to hopper cone to mark mount holes. Align with the TEE OFFSET 12 X 8 X 8.
- 4. Lower FAN TRANSITION ASSEMBLY and drill marked holes.
- 5. Raise FAN TRANSITION ASSEMBLY and rest on support (i.e. barrel, work bench).
- 6. With 1 person inside the hopper and 1 outside, install bolts and nuts.
- 7. Tighten all hardware.

NOTE: Customer may need to add cable/chain (not supplied) to provide adequate support to the transition and aeration fan.



Figure 3.4.5a - Hopper Transition Fan Mount Assembly



Figure 3.4.5b - Hopper Transition Fan Mount Assembly 18inch

3.4.6. Hopper Galvanized Fitting Installation

- Install TEE OFFSET 12X8X8" into inlet on column on both sides of the TRANSITION. Fasten with 3=self-drilling screws each. Install the ELBOW ADJ 90deg 8" GALV into inlet on column on last 2 inlets. Fasten with 3=SELF-DRILLING SCREWS each.
- 2. Silicone TEE and ELBOW before installing rubber as easier to access at this point.





Fig 3.4.6: External Ducting Assembly

3.4.7. Hopper Ducting Assembly

- 1. Install TEE OFFSET Hopper Ducting Assembly Measure and cut a length of RUBBER HOSE 12" to run between the TRANSITION AND THE TEE OFFSET 12X8X8".
- Measure and cut a length of RUBBER HOSE 8" to run between the TEE OFFSET 12X8X8" and the ELBOW ADJ 90deg 8" GALV. See table below for approximate lengths.
- 3. Use GEAR CLAMP on each end of the rubber hoses.
- 4. Seal all inlets with silicone.

4. Operation

- 1. When filling the bin, ensure that the top of the wall columns is covered with a minimum of 4 feet of grain. If they aren't covered then the air will take the path of least resistance and exhaust directly out of the top portion of the column and the grain will not be aerated.
- 2. Also ensure that the GrainAir Tube Cone (top) is not covered with grain. If it is, brush the grain to the side to allow it to ventilate properly.
- 3. Before turning on the aeration fan, ensure that the bin lid is fully open.
- 4. Gatco highly recommends using additional roof vents to ensure that there is adequate exhausting of the air out of the bin during aeration. Use of only an open grain bin lid, in most cases, will not provide enough exhausting area.

5. Maintenance

Annually- before use:

- 1. Inspect, and replace if required, all components for any damage (i.e. denting, rusting, etc.)
- 2. Ensure that all fasteners are in place and secured.
- 3. Ensure that all louvers and perforations are cleared off foreign material and/or grain.
- 4. Ensure that all ducting joints are properly sealed to reduce air loss. Apply sealant or tape to any joints that require it.
- 5. Remove inlet inspection door and remove any foreign material that is inside the column.



Figure 5.1 – Clean Out Plate Removal

6. Troubleshooting

Issue	Cause	Solution	
Wall Column or GrainAir Tube is	Not allowing grain to be fully	Use aeration fan (and additional	
covered with material	dried to equilibrium moisture	heat source if required) to dry	
	content	grain fully. Use grain testing	
		and/or moisture cables to	
		ensure that grain is dried fully	
	Not allowing grain to be cooled	Open bin lid and allow GrainAir	
	down sufficiently	Tube to use natural convection	
		to remove excess heat.	

7. Specifications

See Gatco for specific details.

8. Warranty

Gatco Manufacturing ("the manufacturer") warrants to the original purchaser only, that in the event of any defect in material or workmanship in the Cross Flow Aeration system, the subject of this warranty ("the goods") during the warranty period mentioned below the manufacturer will provide the cover specified below.

This warranty is in place of any other warranty or guarantee whether implied or expressed in any conditions of the purchase of the buyer and does not extend to impose any further liability on the manufacturer than set out below.

Conditions:

- 1. Warranty will be good for 1 year from the date of sale.
- 2. Warranty claim must include sales receipt.
- The customer must fill out and submit a warranty registration to be eligible for warranty. Warranty registration forms available upon request from an authorized Gatco dealer, Gatco Head Office or the front of this manual.
- 4. At Gatco's discretion, all warranty work will be repair and/or replacement. Refunds will be not be offered.
- 5. Warranty claims must be submitted to Gatco Head Office for approval before any repair and/or replacement is begun.
- 6. Gatco will have no liability for any product misuses, improper installation, unauthorized modification/alterations or improper maintenance. Warranty covers manufacturer's defects only.
- 7. Gatco is not liable for any commodities lost.
- 8. The customer is responsible for the travel cost of the Gatco certified installer to travel to said property to repair and/or replace the Gatco warranty approved product.
- 9. This warranty shall not be interpreted to render Gatco liable for injury or damages of any kind to person or property.

Gatco Manufacturing

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