



Operation and Maintenance Instructions



Air-Powered Mixers

MX1-GAM-2G 2 gal, #1 rotary vane, 7.75" length with air motor adapter

MX1-GAM-5G 5 gal, no lid, #1 rotary vane

MX12-GAM 2 gal, lid, #1 rotary vane, 7.75" length

MX15-GAM 5 gal, lid, #1 rotary vane, 12" length

MX2-GAM 10,20,30 gal, #2 rotary vane, 9.5" length with mounting plate

SAFETY WARNINGS

You will find various types of safety information on the following pages and on the labels attached to Graymills equipment. The following Safety Statements explain their meaning:

! This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER **DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury.

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

CAUTION **CAUTION**, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

CAUTION **CAUTION**, used without the safety alert symbol, indicates a situation that could result in damage to the equipment or components not related to personal injury.

CAUTION

Never work with equipment you feel may be unsafe. Contact your Supervisor immediately if you feel a piece of equipment is in an unsafe condition.

INTRODUCTION

The Graymills Air-Powered Ink and Coating Mixers were developed to use with our on-press peristaltic and diaphragm pumps, providing the level of in-tank agitation traditionally supplied by centrifugal pumps. By continuously blending the pigments, solvents, and additives, your viscosity and print quality remain more stable, making your process more predictable. Variable speed adjustment of the mixer allows you to adjust to the needs of your inking system, while conserving compressed air and avoiding any risk of foaming.

UNPACKING

Remove mixer from carton. The carton should contain the air motor mounted on a shaft, 1 mounting plate, 1 propeller, muffler and air speed valve. Mixer is assembled except for mounting hardware.

Unpack and inspect carefully. Contact shipper or Graymills if you suspect damage or missing parts. Follow instructions and put into use.

AIR MOTOR GENERAL INFORMATION

The air motor is designed to be driven by compressed air and under NO circumstances to be driven by any other gases. The air motor must not be driven by fluids, particles, solids or any substance mixed with air, particularly combustible or flammable substances likely to cause explosions.

WARNING

Do not run mixer air motor with flammable or explosive gases or operate the unit in an atmosphere containing them.

CAUTION

The air motor is designed for compressed air only. Do not allow corrosive gases or particulate material to enter the motor. Water vapor, oil-based contaminates, or other liquids must be filtered out.

EYE PROTECTION IS REQUIRED. Keep face away from exhaust port.

PRODUCT USE CRITERIA

Normal conditions: Operate mixer at temperatures up to 250°F (121°C).

- Protect air motor from dirt and moisture.
- Use ONLY compressed air to drive air motor.
- Air lines connected to air motor should be the same size or the next size larger than the inlet port for efficient output and speed control.
- Protect all surrounding items from exhaust air to avoid oily build-up on components.
- Bearings are grease packed. No maintenance is required.
- Use a detergent SAE#10 automotive engine oil for lubricating.

SAFETY INSTRUCTIONS

DANGER

When mixing flammable or combustible materials, a Static Protection Kit must be used. Order Graymills Part No. 790-100835.

WARNING

- Improper environment, installation and operation can result in severe personal injury and/or damage to property.
- Qualified personnel must perform all work to assemble,
- When using mixer, be aware of what liquid is/has been mixed previously. If liquid is potentially harmful, take appropriate precautions, including wearing personal protective clothing.

CAUTION

- Read and follow all safety instructions supplied with the fluids/inks you will be mixing.
- This mixer has rotating parts. Use caution.
- Air motor must have filtered and lubricated compressed air. For proper operation, maintain the correct air volume and do not exceed 100 PSI (7 bar).
- Be sure all fittings and connections are properly tightened before use.
- Shut off and then remove air supply before doing any service on mixer or motor.

- Wear eye protection and appropriate safety gear when using mixer.
- Do not operate mixer or allow others to operate mixer until the instructions and warnings have been read and are understood by all people involved.

Never work with equipment you feel may be unsafe. Contact your Supervisor immediately.

- Check the site to make sure that the air motor will be adequately ventilated and that there is no external heat input. The cooling air may not exceed 104°F/40°C.
- Check that the air motor is not damaged.

INSTALLATION AND OPERATION

Correct installation is your responsibility. Make sure you have the proper installation conditions. Contact Graymills Customer Service (773-248-6825) if you have any questions.

WARNING

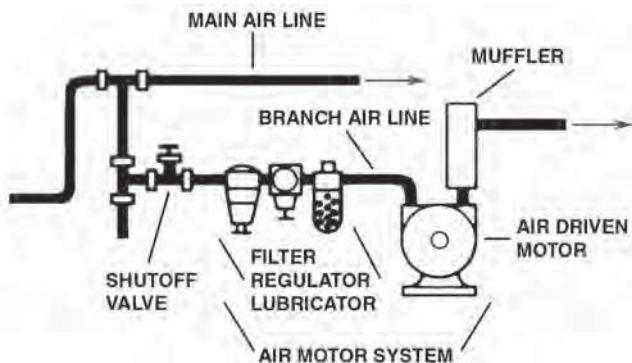
- Check the site environment for potentially explosive oils, acids, gases, vapors or radiation.
- Improper environment, installation and operation can result in severe personal injury and/or damage to property.
- Qualified personnel must perform all work to assemble, install, operate, maintain and repair air motor.
- Follow these instructions and the warning and information labels on the motor and all other drive configuration documents, startup instructions and circuit diagrams.
- Follow all current applicable national and regional specifications regarding explosion protection, safety and accident prevention.
- Check the ambient temperature of the site and the ability to maintain proper ambient temperature.
- Air stream from product may contain solid or liquid materials that can result in eye or skin damage.
- Wear hearing protection as needed. Sound level from motor may exceed 85 db(A).
- Failure to follow these instructions can result in eye injury or other serious injury.

CAUTION

- Place mixer in liquid before starting.
- Make sure mixer is firmly attached to container before starting. We recommend that you obtain the Graymills lid made specifically for this mixer system.
- Do not attach air line until mixer is in fluid and you are ready to begin mixing.
- Operator should wear eye protection (and appropriate personal protective clothing).
- Do not use mixer with liquids containing solids that could damage propellers or motor.
- Ensure unit has adequate access to airflow for motor cooling.

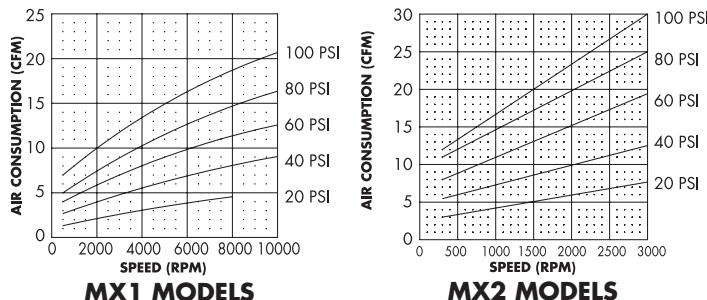
1. Mixer is assembled except for mounting hardware.
2. Remove propeller if necessary to insert shaft through tank lid.
3. Reattach propeller and tighten locking set screw when in place.
4. Immerse mixer propeller in liquid to be mixed, ensuring it is submerged sufficiently to prevent splashing.
5. Secure motor mounting plate to tank lid.
6. Connect lines to motor in the proper direction.

Connection



7. Check the direction of the motor airflow. A single rotation motor will operate properly only in one direction. Single rotation motors require a sound absorber to be connected to the air port. Remove the plastic shipping plugs from the ports. Save plugs for future use during shutdown.
8. Install a 5-micron filter in the air line before the connection to the motor. Next install an air pressure regulator to control motor speed and torque.
9. Install a moisture trap and filter in the air line ahead of motor (Graymills Part No. FRL-2). Use a 1/4" air line for efficiency of output and control of speed.
10. An automatic air line lubricator should be installed in the air line as close as possible and no more than 18 inches (1/2 meter) from the air motor. Install the lubricator level with or above the air motor so that the oil mist will blow directly into or fall down into the motor.
11. Fill the oil reservoir to the proper level with SAE 10W high detergent or non-detergent motor oil. Adjust inline oiler to feed 1 drop of oil per minute for high speed or continuous duty usage. DO NOT overfeed oil or exhaust air may become contaminated.
Check intake and exhaust filters after first 500 hours of operation. Clean filters and determine how frequently filters should be checked during future operation. This one procedure will help assure the motor's performance and service life.
12. Clean the compressed air connection with low pressure air to remove any dirt from the line before connecting to the ports. **Use the proper sized air supply.** For the most efficient output and control of speed, use air lines that are the same size as the motor inlet port if the connection is less than 7 feet (2 meters). For longer connections, use the next pipe size larger than the motor intake port.

Air Consumption



13. Check all connections before starting motor. It is your responsibility to operate this product at recommended speeds, loads and ambient room temperatures.

CAUTION

Do not run the motor at high speeds with no load. This will result in excessive internal heat that may cause motor damage.

The starting torque is less than the running torque. The starting torque will vary depending upon the position of the vanes when stopped in relation to the air intake port. Rotate air inlet ball valve slowly until desired speed is obtained.

14. Use a pressure regulator (FRL-1 #2 air motor, FRL-2 for #1 air motor) and the supplied valve to regulate the motor's speed and torque. This will provide the required power and will conserve air. Rotate air inlet ball valve slowly. Open the air supply valve to the motor. Set the pressure or flow rate to the required speed or torque. Adjust the lubricator to feed one drop of oil for every 50-75 CFM (1.5-2 M3 per minute) of air moving through motor. Check the oil level daily. The gear reducer does not need lubrication.

MAINTENANCE

WARNING

Wear eye protection when flushing this product.

Disconnect air supply and vent all air lines and muffler.

Air stream from product may contain solid or liquid material that can result in eye or skin damage.

Flush this product in a well ventilated area.

Use any nontoxic, nonflammable industrial cleaning solvent. DO NOT use kerosene or other combustible solvents to flush this product.

Failure to follow these instructions can result in eye injury or other serious injury.

CAUTION

It is your responsibility to regularly inspect and make necessary repairs to this product in order to maintain proper operation.

Lubrication

Use a detergent SAE #10 automotive engine oil for lubricating. Lubricating is necessary to prevent rust on all moving parts. Excessive moisture in air line may cause rust or ice to form in the muffler when air expands as it passes through the motor. Install a moisture separator in the air line and an after cooler between compressor and air receiver to help prevent moisture problems.

Manual Lubrication (if necessary)

Shut the air motor down and oil after every 8 hours of operation. Add 10-20 drops of oil to the air motor intake port.

Automatic Lubrication

Check intake and exhaust filters after first 500 hours of operation. Clean filters and determine how frequently filters should be checked during future operation. **This one procedure will help assure the motor's performance and service life.** See #11 on page 3 for filling instructions.

Flushing

Flushing this product to remove excessive dirt, foreign particles, moisture or oil that occurs in the operating environment will help to maintain proper vane performance. Flush the motor if it is operating slowly or inefficiently.

! DANGER

Use only flushing solvent or nontoxic nonflammable cleaner. DO NOT use kerosene or ANY other combustible solvents to flush this product.

1. Disconnect air line and muffler.
2. Add flushing solvent directly into motor. If using liquid solvent, pour several tablespoons directly into the intake port. If using Gast recommended spray solvent for 5-10 seconds into intake port.
3. Rotate the shaft by hand in both directions for a few minutes.
4. **You must wear eye protection for this step.** Cover exhaust with a cloth and reconnect the air line.
5. Restart the motor at a low pressure of approximately 10 PSI/0.7 bar until there is no trace of solvent in the exhaust air.
6. Listen for changes in the sound of the motor. If motor sounds smooth, you are finished. If motor does not sound like it is running smoothly, installing a service kit will be required. See Service Kit information on page 6 and call Customer Service to order.

Cleaning Muffler

1. Remove the muffler.
2. Clean the felt filter with soap and water.
3. **You must wear eye protection for this step.** Lubricate motor with 3 - 4 drops of oil.
4. Check the air compressor.
5. Listen for changes in the sound of the motor. If motor sounds smooth, you are finished. If motor does not sound like it is running smoothly, installing a service kit will be required. See Service Kit information on page 6 and call Customer Service to order.

SHUTDOWN AND STORAGE PROCEDURE

CAUTION

It is your responsibility to follow proper shutdown procedures to prevent product damage.

1. Turn off air intake supply.
2. Disconnect air supply and vent all air lines.
3. Disconnect air lines.

In hot environments, the electric motor can become warm to the touch. Using caution, remove mixer from service.

4. Remove air motor from connecting machinery.
5. Remove the muffler.

6. Wear eye protection. Keep away from air stream. Use clean, dry air to remove condensation from the inlet port of the motor.
7. Lubricate motor with a small amount of oil into the intake port. Rotate shaft by hand several times to distribute oil.
8. Plug or cap each port.
9. Coat output shaft with oil or grease.
10. Store motor in a dry environment.
11. Clean shaft and propellers by wiping with damp rag or by placing mixer securely over a container full of water or cleaning fluid. Dry, store.
12. To protect unit from damage, do not store mixer leaning on shaft.

ACCESSORIES

! DANGER

Mixing flammable liquids can create static electricity which can cause an explosion and/or fire resulting in injury or death. All flammable/combustible materials must be in metal containers and must be grounded.

STATIC PROTECTION KIT 790-100835 includes:

Qty.	Description
1	4' Grounded Hose with special end
1	Stainless steel hose clamp
1	6' 10" Ground Wire Assembly with Clamp
2	#10-32 plated nut
1	#10 lock washer
1	1/4 - 20x5/8" round head machine screw
1	1/4-20 plated jamb nut
1	#8-32 x 1/4" brass screw
1	#8-32 brass lock washer

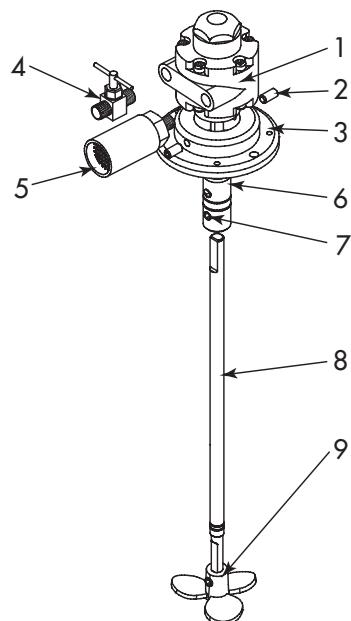
Estimated Ball Bearing Life of Lubricated Air Motor

Air Motor Model	Shaft speed in RPM	Ball Bearing Life Hours (L10)
1AM	10,000	26,000
2AM	3,000	30,000

Based on running pressure of 60 PSI and coupling connection to motor load. The direction, magnitude and location of applied loads to the motor shaft will change expected bearing life. Driving the motor with wet dirty compressed air can reduce expected bearing life. The above are life estimates not warranted minimum values.

TROUBLESHOOTING

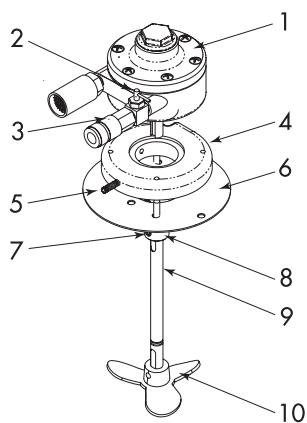
Problem					Reason/Remedy
Low Torque	Low Speed	Won't Run	Runs Hot	Runs well then slows down	
					Dirt or foreign material present. Inspect and flush.
					Internal rust. Inspect and flush.
					Low air pressure. Increase pressure.
					Air line too small. Install larger line(s).
					Restricted exhaust. Inspect and repair.
					Motor is jammed. Have motor serviced.
					Air source inadequate. Inspect and repair.
					Air source too far from motor. Reconfigure setup.

MX1 SERIES PARTS LIST**2 gallon models**

1	385-06145	385-06145
2	753-04215	753-04215
3	533-13088-31	533-13088-31
4	738-02977-41	738-02977-41
5	746-06166	746-06166
6	571-19588-88	571-19588-88
7	753-03138-81	753-03138-81
8	558-36774-88	558-37565-88
7	525-32522-88	525-32522-88
	420-37978-11	420-39570-11
	753-04325-81	753-04325-81

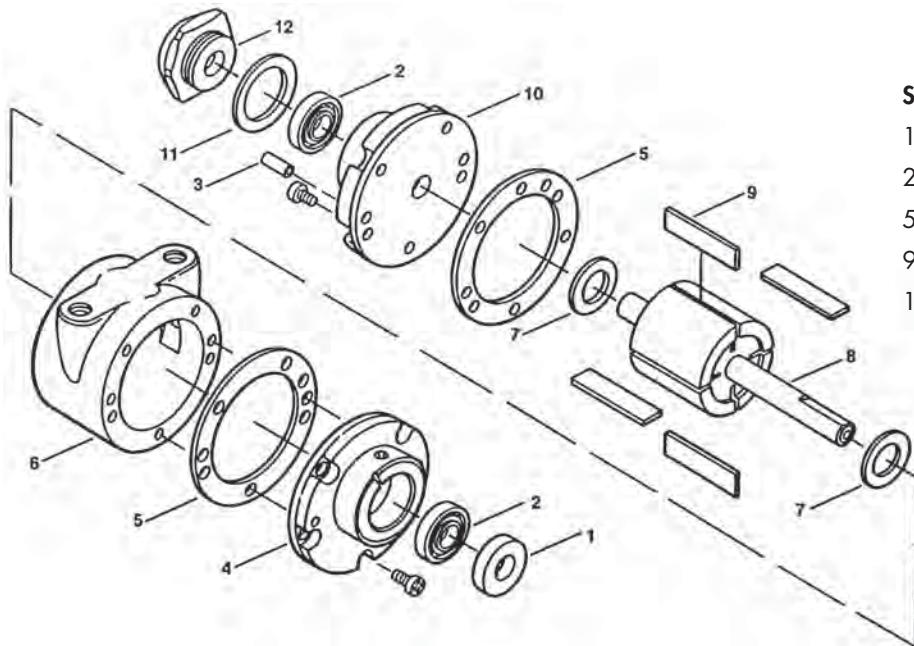
5 gallon models

motor
set screw
motor adapter, cast aluminum
needle valve
muffler
coupling
set screw
shaft
propeller blade
plated lid, not shown
thumb screws (2), not shown

MX2 SERIES PARTS LIST**1****2****3****4****5****6****7****8****9****10****741-08866****motor****needle valve****coupling****motor adapter****set screw (2)****mounting plate****hex screw for mounting plate (2), not shown****set screw (4)****coupling****shaft****propeller blade****air adapter plug**

MX1-GAM SERIES

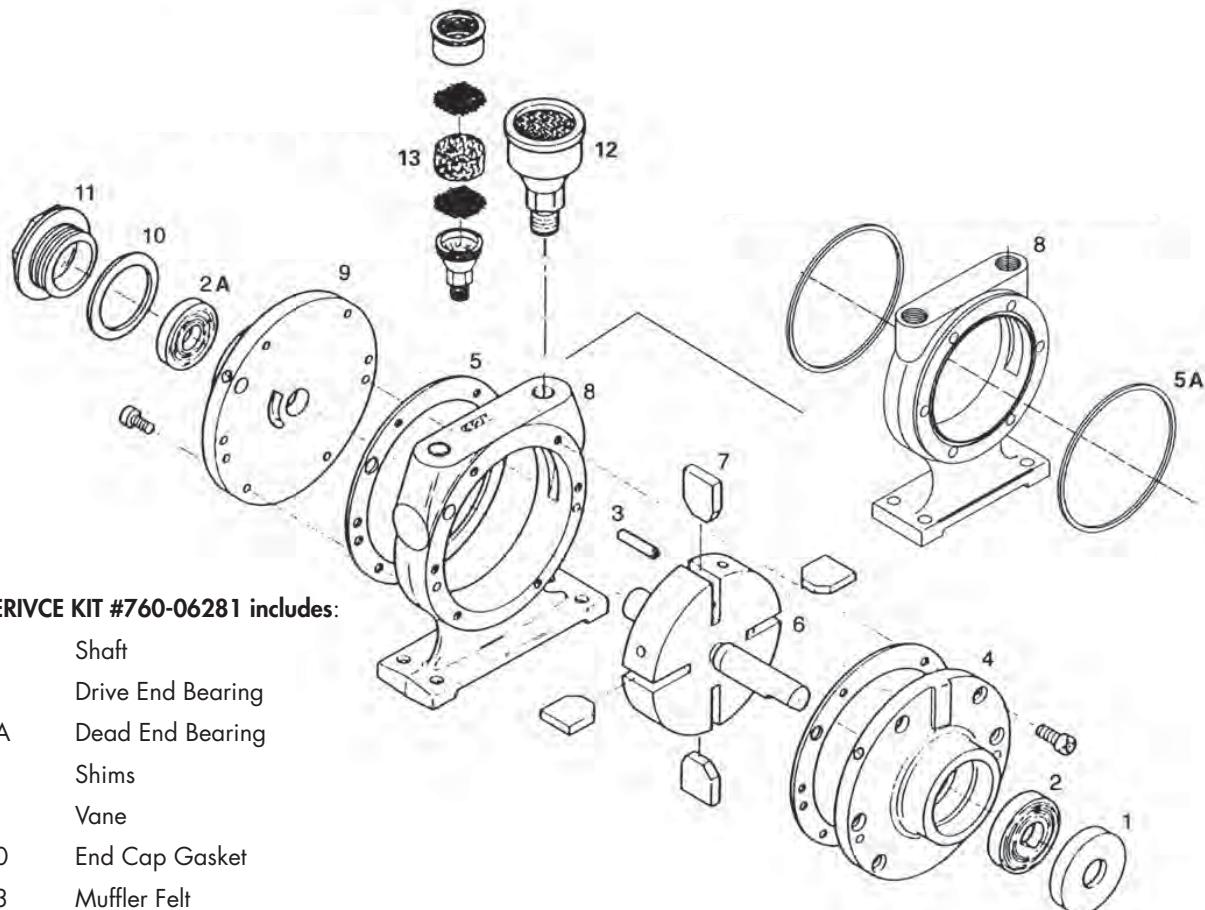
795-92794 04-13 Air Motor Mixer OMI



SERIVCE KIT #760-06280 includes:

1	Seal
2	Bearing
5	Shims
9	Vane
11	End Cap Gasket

MX2-GAM SERIES



SERIVCE KIT #760-06281 includes:

1	Shaft
2	Drive End Bearing
2A	Dead End Bearing
5	Shims
7	Vane
10	End Cap Gasket
13	Muffler Felt

WARRANTY

Graymills Corporation warrants that the equipment manufactured and delivered hereunder, when properly installed and maintained, shall be free from defects in workmanship and will function as quoted in the published specification. **Graymills** does not warrant process performance nor does Graymills assume liability for equipment selection, adaption or installation.

This warranty does not apply to damages or defects caused by operator carelessness, misuse, abuse, improper application, or abnormal use; the use of add-on parts or equipment which damages or impairs the proper function of the unit and modifications made by Buyer.

Graymills' obligation under this Warranty shall be limited to:

- Replacing or repairing (at **Graymills'** sole discretion) any non-conforming or defective parts manufactured by **Graymills** within one year from the date of installation or thirteen (13) months from the date of shipment, whichever occurs first.
- Replacing or repairing (at **Graymills'** sole discretion) thermoplastic parts cleaner tanks or lids that have cracked or split under normal use within five (5) years from date of shipment.
- Replacing or repairing components supplied but not manufactured by **Graymills** to the extent of the warranty given by the original manufacturer.

Buyer must give **Graymills** prompt notice of any defect or failure and satisfactory proof thereof.

This warranty does not apply to expendable parts which need periodic replacement due to normal wear.

This warranty does not apply to rusting of mild steel components or tanks in product used with aqueous (water based) fluids.

A new warranty period shall not be established for repaired or replaced materials or products. Such items shall remain under warranty for only the remainder of the warranty period of the original materials or products.

If you believe you have a warranty claim, contact **Graymills** at 773-248-6825 for a Return Merchandise Authorization number. Any returned material must have its RMA number on the outside of the package and be shipped prepaid or the shipment will be refused. **Graymills** will promptly examine the material and determine if it is defective and within the warranty period.

THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES WHETHER ORAL, WRITTEN, EXPRESSED, IMPLIED OR STATUTORY. IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY SHALL NOT APPLY. **Graymills'** warranty obligations and Buyer's remedies thereunder (except as to title) are solely and exclusively as stated herein. In no case will **Graymills** be liable for consequential damages, loss of production or any other loss incurred because of interruption of service.



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