



INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS



Model RA Rectangular Aerator

Thank you for purchasing the Model RA rectangular aerator flow-aid product from BlueLevel Technologies. We realize you have a choice when purchasing rectangular aerators and we sincerely appreciate your business.



These instructions have been written to ensure the safe and successful installation and operation of your Model RA aerator. Please read and comply with all instructions before attempting installation.



Care should be taken when working with compressed air for this could result in eye or ear injury.



Before discarding shipping container, please inspect it thoroughly and verify that all parts ordered are accounted for. Sometimes smaller parts become stuck under carton flaps and other packaging materials.

In the event that information contained herein does not completely satisfy your requirements or answer your questions, you may contact our customer service and technical support team by telephone at 888-61LEVEL(53835) (815-625-2224). Alternately you may contact us by email at bluelevel@blueleveltechnologies.com or review the information at our website at www.blueleveltechnologies.com.

Should your Model RA rectangular aerator ever require service either in or out of warranty, please contact us to obtain an RMA number prior to shipping the unit to us.

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SAFETY TERMS & SYMBOLS



WARNING: Warning statements identify conditions or practices that could result in injury or loss of life.



CAUTION: Caution statements identify conditions or practices that could result in damage to this product or other property.

RECEIVING AND STORAGE

Your Model RA rectangular aerator from BlueLevel Technologies has been designed, manufactured and tested to ensure meeting the specifications as shown in this Installation, Operation and Maintenance manual. However, damage may have occurred during shipment. Therefore, the aerator should be inspected when received. If any damage is found, it should be reported to the carrier. If the aerator is to be stored before installation, keep it in a dry area away from dust, dirt and water.

WARRANTY

All BlueLevel Technologies products are covered by a one-year limited warranty. Contact our customer service group and request details.

PRINCIPLE OF OPERATION

The Model RA rectangular aerator is a flow-aid device that is designed to continuously introduce air into a body of dry powder material contained within a bin, hopper, silo or other vessel, thereby fluidizing the material and promoting its flow. This is an effective approach to promote and ensure material flow of powders. When a powder is first introduced into the storage vessel it is an aerated mixture of the material particulate and air. In this aerated state the material will flow readily.

However, as the powder settles within the vessel the air escapes and the particulate packs. The de-aerated material will therefore behave like a single large mass rather than like a fluidized mixture. By using a series of aerators to replace the lost air, the material is fluidized and flow is promoted.

Use of an aerator product will provide best results on materials with a particle size of 60 mesh (250 micron, 0.0098", 0.250mm) or smaller and a moisture content of no more than 3%. Specific materials that respond well to aeration include: Portland cement, fly ash, lime, carbon black, flour, diatomaceous earth, soda ash, gypsum, soap powders, pigments, bentonite, bran, detergents and many other materials.

MECHANICAL INSTALLATION

Air Quality

The quality of the air supply to the Model RA aerators can affect their operation and longevity. The air supply must be clean and dry. A minimum of a filter and moisture trap should be installed on the aerator feed lines to prevent fouling. Consult with a supplier of air conditioning equipment to ensure your supplied air to the aerators is “clean and dry”.

Air Volume

A large volume of air may be required, depending upon the number of aerators employed to resolve the specific material flow problem. A positive displacement blower system may be required for large quantities of aerators. However, a small quantity of aerators may be able to be operated using a compressor.

Air Supply

The aerators will be most effective when operated continuously to promote and maintain the flow of material within the bin. The aerators should also be operated whenever there is a rise in internal pressure within the bin, such as what occurs during vessel filling using a pneumatic conveying system.



The operating pressure of the aerators must exceed the internal bin pressure to prevent possible material back flow.

Table 1: Air Manifold Sizing and Air Consumption Guide

Manifold Piping Size Guide		Air Consumption Guide Per Aerator	
Piping Size	Number of Aerators Per Row	Air Pressure (psi)	Cubic Feet / Minute
¾"	1-5	1	4.2
		2	5.7
1"	6-9	3	6.5
		4	7.1
1-¼"	10-12	5	7.6

Operating pressure is typically 3-5 psid (psi above internal vessel pressure) with air consumption of 4-7 scfm per aerator. Refer to Table 1 for specific rates.

Air Connections

A 1/8" NPT air inlet nipple is used to connect each aerator to its air supply. Each aerator will need to be connected to an air supply using this fitting. Multiple aerators should be fed from a properly sized manifold as shown in Table 1. The air manifold will ensure that each aerator is fed a reasonably uniform air pressure and volume.

Bin Shape

Vessels with a diameter of less than 12' may require additional gasket material to seal the flat, low profile design of the Model RA aerator against the interior walls of the round bin. The use of industrial vibrators or other types of flow-aids may also be considered on small diameter bins.

Location

For best results, locate the aerators as close to the discharge outlet as possible. If the powder material is held within the bin for long periods of time and/or is compacted during transport, we recommend the aerators be located on 12" centers. The typical effective area of a single aerator is 10" radius around the center of the aerator.

The aerators should be spaced and located in the problem area accordingly. Understanding the source and root cause of the material flow problem is beneficial to the effective application of the Model RA aerators. Once the location of an obstruction within the bin is known, a small number of aerators can be installed to fluidize the material, and promote and maintain material flow.

Generally four rows of aerators on 12" or 15" centers are recommended. Refer to Figure 1. On round bins these rows will be equally spaced. On rectangular bins with pyramidal cone sections, rows are spaced equally on sloping sides or in valleys if the material tends to hang up in these areas. Refer to Table 2 for a guide to determining the number of aerator rows required.

Table 2: Aerator Rows

Aerators on 12" Centers		Aerators on 15" Centers	
Length of Sloping Bin Wall	Number of Aerators Per Row	Length of Sloping Bin Wall	Number of Aerators Per Row
1' 8" – 2' 7"	2	1' 11" – 3' 1"	2
2' 8" – 3' 7"	3	3' 2" – 4' 4"	3
3' 8" – 4' 7"	4	4' 5" – 5' 7"	4
4' 8" – 5' 7"	5	5' 8" – 6' 10"	5
5' 8" – 6' 7"	6	6' 11" – 8' 1"	6
6' 8" – 7' 7"	7	8' 2" – 9' 4"	7
7' 8" – 8' 7"	8	9' 5" – 10' 7"	8
8' 8" – 9' 7"	9	10' 8" – 11' 10"	9
9' 8" – 10' 7"	10	11' 1" – 13' 1"	10

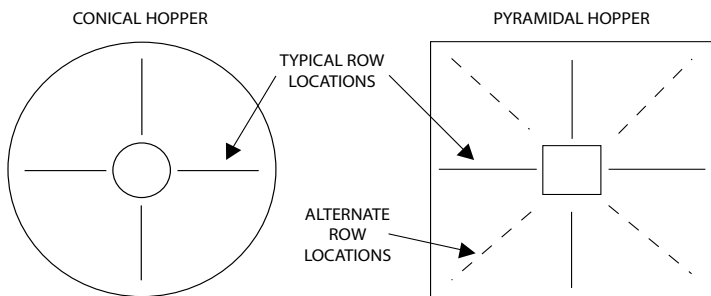


Figure 1: Typical Row Location Layouts

Internal Installation

The Model RA rectangular aerator is designed to be mounted from within the bin. Alternately, the accessory external mounting kit may be used to allow for installation and replacement from outside of the bin. Refer to the section titled “External Installation”.

Drill a 7/16” diameter hole through the bin wall for each aerator on predetermined centers (12” or 15” or your preference). The aerator is supplied with hardware for use in mounting it from inside of the bin, including a 1/8” air inlet nipple, a washer/gasket, two flat washers and a jam nut. Refer to Figure 2 for the assembly sequence. Insert the air inlet nipple into the back side of the aerator and tighten. The end with the fewer threads goes into the aerator.

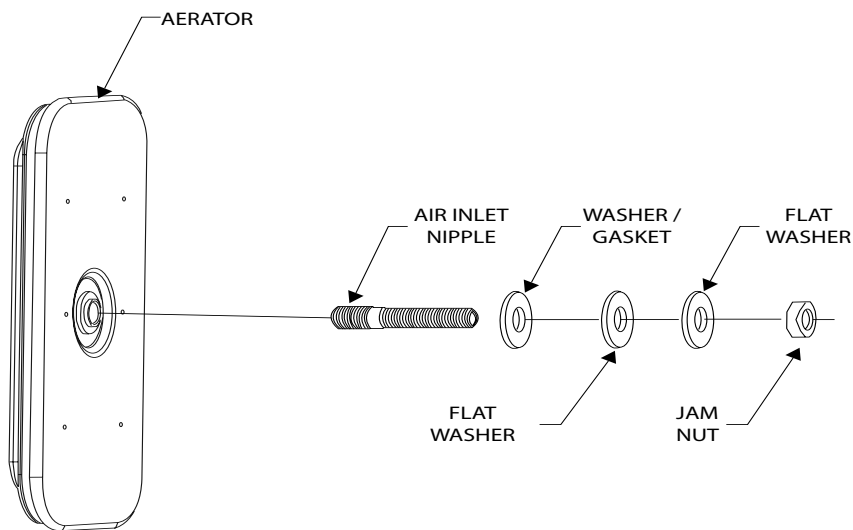


Figure 2: Internal Mounting Assembly Sequence

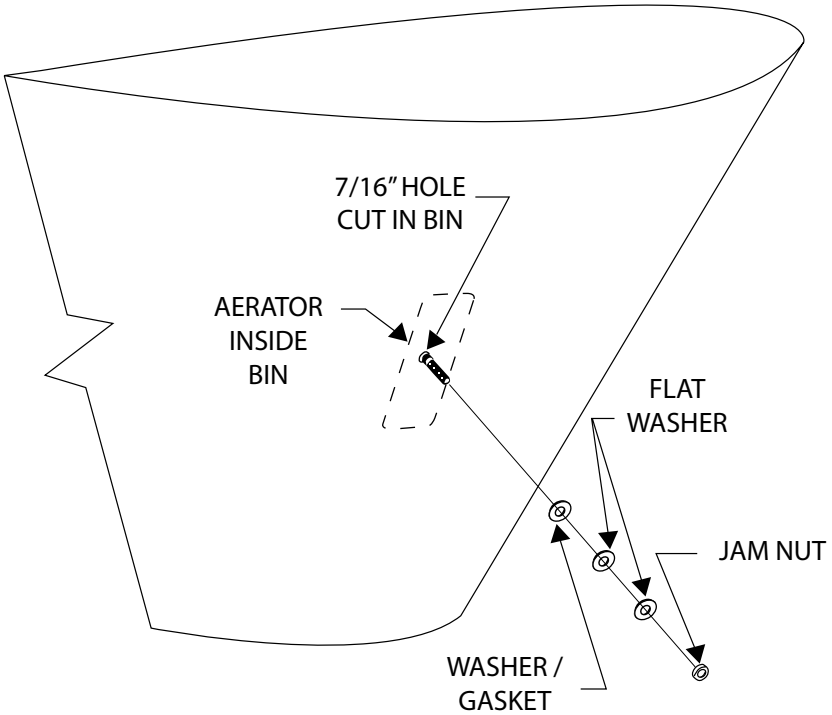


Figure 3: Internal Mounting Assembly

With air inlet nipple installed to the back of the aerator, put the aerator in place and insert the air inlet nipple through the 7/16" diameter hole and secure it in place with the washer/gasket, the flat washers and jam nut. Figure 3 illustrates the assembled aerator mounted in the bin wall.

External Installation

The Model RA aerator can be mounted and replaced from outside of the bin. This requires the use of an external mounting kit accessory item for each aerator. This simplifies the installation. Once the initial rectangular hole is cut, the aerator can be assembled with the external mounting bracket and installed on the bin within a couple of minutes. Refer to Figure 4 for the overall assembly sequence of the aerator and external mounting kit. The air inlet nipple and jam nut from the mounting hardware provided with the aerator will be used to plumb and secure the aerator using the external mounting kit.

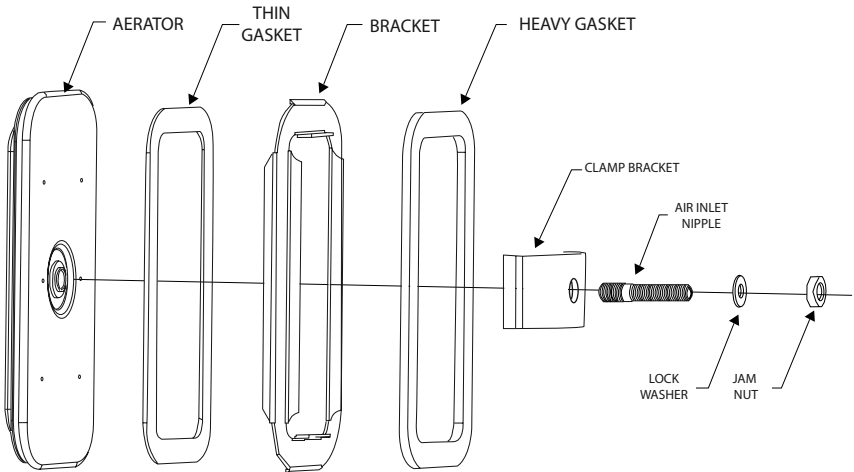


Figure 4: Aerator and External Mounting Assembly Kit Sequence

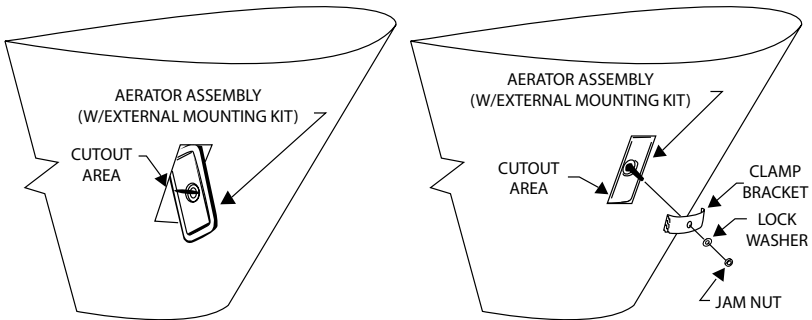


Figure 5: Aerator assembly mounting with external mounting kit accessory

The external mounting kit accessory includes the following components; aerator mounting bracket, clamp, thin gasket, heavy gasket and lockwasher. To install the aerator using the external mounting kit:

1. Cut a rectangular opening 2- $\frac{5}{8}$ " wide x 6- $\frac{3}{8}$ " high in the bin wall for each aerator. Cut the opening where each aerator location is desired.
2. Peel off the protective tape on one side of the thin gasket and attach it to the front side of the external mounting bracket. Refer to Figure 4.
3. Peel off the protective tape on the other side of the thin gasket and place the aerator on the gasket. The upturned edges of the mounting bracket will keep the aerator from turning within the bin.
4. Peel off the protective tape on the thick gasket and attach it to the back side of the external mounting bracket. The longer legs on this side of the mounting bracket will keep the bracket itself from turning when placed in the bin wall cutout. Do NOT insert this assembly into the bin wall cutout.
5. Insert the air inlet nipple into the back side of the Model RA aerator and tighten. The end with the fewer number of threads goes into the aerator. If the air inlet nipple is not tightened securely in the aerator, it may unthread when the aerator is removed from the bin. However, do not over-tighten or damage may be caused to the aerator.
6. Slip the clamp over the air inlet nipple with the clamp legs toward the aerator. Place the lockwasher onto the air inlet nipple and thread the jam nut in place.
7. Holding the aerator/mounting kit assembly by the air inlet nipple, slip the entire assembly through the cutout in the bin wall and into position. Rotate the clamp to bridge the opening and tighten the jam nut. The aerator assembly will be securely held in place and the cutout in the bin wall will be sealed. Refer to Figure 5.

TECHNICAL DATA

Air Supply:	Clean, dry air, 3-5 psi
Air Consumption:	4.2scfm @ 1psi (1.2m ³ /min @ 0.07bar)
	5.7scfm @ 2psi (1.6m ³ /min @ 0.14bar)
	6.5scfm @ 3psi (1.8m ³ /min @ 0.21bar)
	7.1scfm @ 4psi (2.0m ³ /min @ 0.28bar)
	7.6scfm @ 5psi (2.2m ³ /min @ 0.35bar)

Materials of Construction:

Body	Zinc-plated steel
Diffuser	Cotton (Up to 180°F/82°C) or Fiberglass (Up to 650°F/343°C)
Diffuser Screens	Zinc-plated steel
Air Inlet Nipple/Nut	Brass
Spacer Washers	Zinc-plated steel
Washer/Gasket	Buna-N (Up to 180°F/82°C)
External Mount Kit:	
Brackets/Lockwashers	Zinc-plated steel
Gaskets	Neoprene (Up to 180°F/82°C)

DIMENSIONS

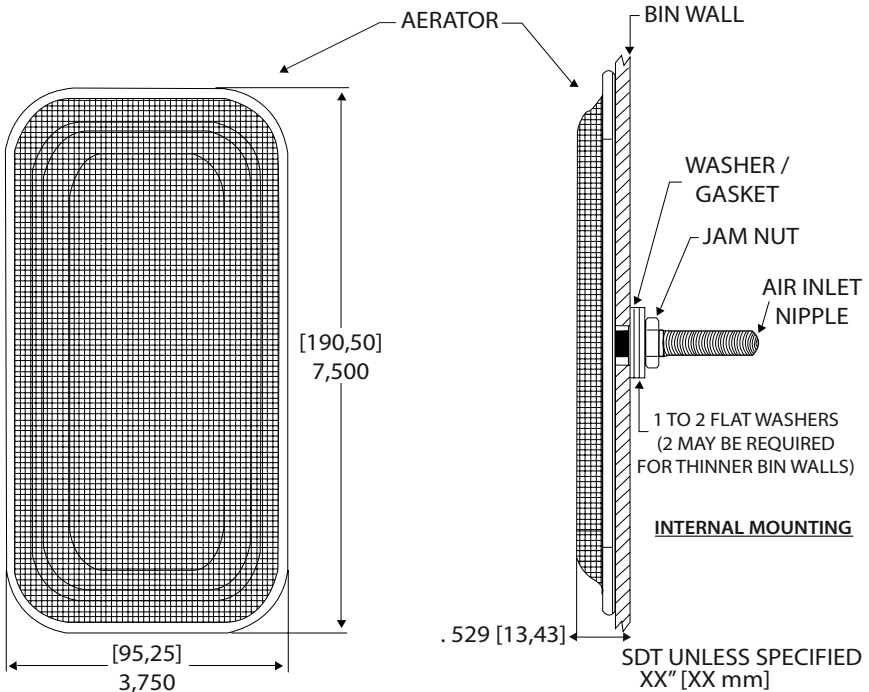


Figure 6: Aerator Dimensions (internal mounting)

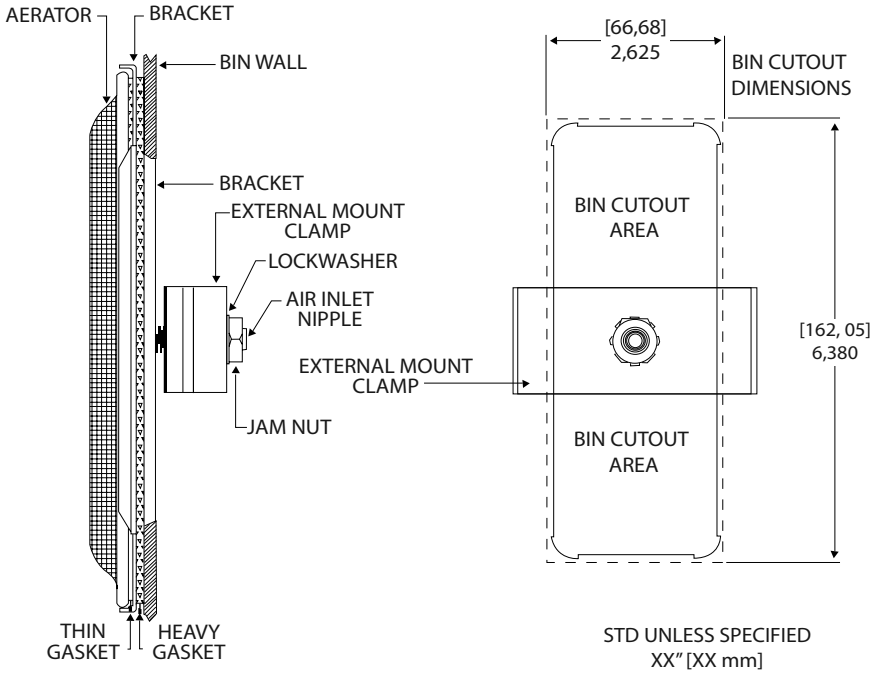


Figure 7: Aerator Dimensions w/ External Mounting Kit



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