

BULLETIN 934B

INSTALLATION & OPERATION

Rectangular Air Pad Bin Aerator

The Monitor Air Pad bin aerator is an aeration device used to promote the flow of dry bulk powders from a storage vessel.

Operating pressure is typically 3-5 psid with air consumption of 4-7 scfm per air pad. See Table 1 for air consumption rates.

PRINCIPLE OF OPERATION

The air pad operates by continuously introducing air into the body of the dry powder. When a powder is first conveyed into a storage vessel it is actually a highly aerated mixture of air and particulate. In this state the mixture flows quite readily. However, as the powder settles, the solid particulate and air separate resulting in a decrease in volume and an increase in bulk density. In this deaerated state powders can behave more like a single large solid structure rather than a fluid-like mixture. By replacing the naturally lost air the air to particulate mixture ratio is held thus maintaining the fluid like characteristic of the aerated powder.

PRE-INSTALLATION CONSIDERATIONS

Air Quality

Compressed or forced air (blower system) is needed to operate the air pad. The quality of air introduced into the stored powder will be that of the compressed air system. In the event it is imperative to maintain the integrity of the stored material the air must be conditioned accordingly. A supplier of air conditioning devices should be consulted to determine the correct combination of dryers and/or filters. At a minimum an oil and water trap should be installed on the air pad feed lines to prevent fouling of the air pad.

Air Volume

Depending on the number of air pads installed, a large volume of air may be required. Small quantities of air pads can be operated from a compressor. Large quantities are more economically operated from a positive displacement blower system.

Air Supply

The air pad is most effective when operated continuously, as noted in the operating principle section. It is critical that the air pad be operated whenever there is a rise in pressure within the storage vessel. Such conditions typically occur when a vessel is filled via a pneumatic conveying process. The operating pressure of the air pad must exceed the interior vessel pressure to prevent possible material back flow problems.

Air Pressure PSI	Cubic Feet Per Minute
1	4.2
2	5.7
3	6.5
4	7.1
5	7.6

Table 1 - Air Consumption

Vessel Configuration

The flat, low profile design of the air pad may not allow easy mounting on round vessels with diameters of less than 12 feet. Applications involving round vessels of less than 12 feet diameter should use the Monitor Evasser bin aerator.

MECHANICAL INSTALLATION

Location

The air pad is often located near the discharge opening, where most flow problems originate. Effective radius of each air pad is approximately 10 inches. Space the air pads so that the entire troublesome area is influenced by the pad's air.

For best results measure the sloping side of the hopper where the aerators are to be installed. Use the data in Table 2 to determine the recommended number of air pads per row. Generally, four rows of air pads on 12" or 15" centers is recommended.

Knowing the origins of a flow problem is very beneficial for an efficient application. Once the location of an obstruction is known a small number of air pads can be installed to fluidize and eliminate the footing of the flow obstruction. Our application engineers are available to assist in the selecting of the number and location of aeration equipment best suited to solve your particular material flow problem.



Monitor Technologies LLC

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12" Centers		15" Centers	
Length of Sloping Bin Wall	# of Air Pads/ Row	Length of Sloping Bin Wall	# of Air Pads/ Row
1' 8"	2	1' 11"	2
2' 8"	3	3' 2"	3
3' 8"	4	4' 5"	4
4' 8"	5	5' 8"	5
5' 8"	6	6' 11"	6
6' 8"	7	8' 2"	7
7' 8"	8	9' 5"	8
8' 8"	9	10' 8"	9
9' 8"	10	11' 11"	10

Table 2

Air Connections

A 1/8" NPT air inlet nipple is used to mount the air pad. Each air pad will need to be connected to a compressed air source via this fitting. Multiple air pads should be fed from a properly sized air manifold. See Table 3 for air manifold sizing information. The air manifold will insure that each individual air pad is fed a reasonably uniform air pressure and volume. If necessary a commercial plumber may be contracted to implement such a system.

Manifold Pipe Size	Number of Air Pads
3/4"	1-4
1 1/4"	5-10
1 1/2"	11-15

Table 3 - Air Manifold Sizing

Mounting the Air Pad From the Interior of a Vessel

A 7/16" diameter hole is required to mount the air pad. Cut the hole where the air pad location is desired. The air pad is supplied with a 1/8" NPT trade size air inlet nipple, two flat washers, a washer/gasket, and a jam nut. See Figure 1 for assembly order. The air nipple is not only used to plumb the air pad, but it also serves as a tie rod securing the air pad to the vessel wall. See Figure 2.

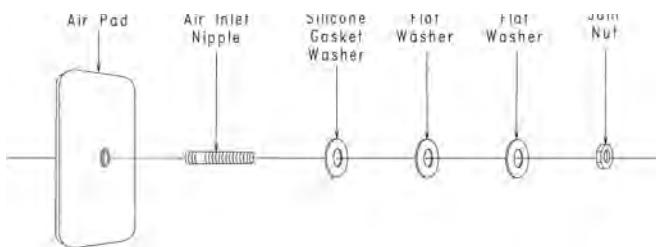


Figure 1 - Assembly Order

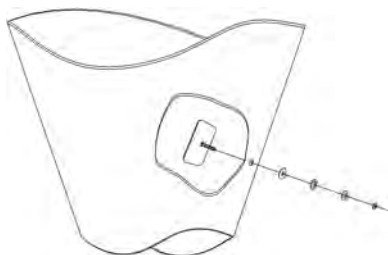


Figure 2 - Mounting Bin Air Pad from the Inside of Vessel

Mounting Air Pad from the Exterior of a Vessel

Mounting the air pad from the exterior of a vessel requires the optional external mounting kit as well as components from the original air pad assembly. Components required from the air pad assembly are the air pad, air inlet nipple, Silicon gasket washer, flat washer and jam nut. External mounting kit components include the rectangular mounting bracket, clamp bracket, lock washer, thin gasket, heavy gasket and jam nut. A rectangular opening 2-5/8" wide by 6-3/8" high is required. Cut the opening where the air pad location is desired. Partially assemble the air pad and external mounting kit, using Figure 3A as a guide. Use the thin gasket to adhere the air pad to the rectangular mounting bracket. The heavy gasket is used to seal around the cutout from inside the bin. Align the heavy gasket on the bin wall side of the rectangular mounting bracket making certain that it is evenly distributed around the circumference of the bracket for proper sealing.

While holding the air pad by the air inlet nipple insert the air pad into the vessel through the cutout opening. A combination of tipping and rotation of the subassembly will be necessary to clear the small opening. See Figure 3B. Secure the air pad subassembly to the vessel wall as shown in Figure 3B. Tighten the clamp bracket jam nut one full turn past hand-tight.

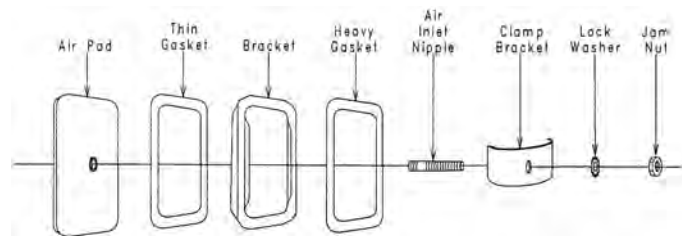


Figure 3A - Overall assembly scheme for air pad with external mounting kit

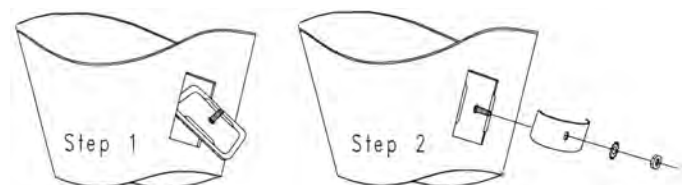


Figure 3B - Insert subassembly into vessel opening and secure subassembly to vessel with spring bracket. Secure bracket with hardware.

WARRANTY

Monitor Technologies LLC warrants each air pad bin aerator it manufactures to be free from defects in material and workmanship under normal use and service within two (2) years from the date of purchase within North America, and within one (1) year from date of purchase outside of North America. The purchaser must give notice of any defect to Monitor within the warranty period, return the product intact and prepay transportation charges. The obligation of Monitor Technologies LLC under this warranty is limited to repair or replacement at its factory. This warranty shall not apply to any product which is repaired or altered outside of the Monitor Technologies LLC factory, or which has been subject to misuse, negligence, accident, incorrect wiring by others or improper installation.