

MODEL MK3 FLATBACK ELBOWS

MODEL RPB ROUND PIPE BENDS

Maintenance Service

MK3 Flat Back Elbows & Pipeline

MK3 Elbows

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2A.1 Preface

This manual is provided as a guide to personnel involved with the installation, operation, and maintenance of the conveying system. Operators, Inspectors, and Maintenance personnel of Baum supplied equipment should read and become familiar with the general procedures and Information contained within this manual. In addition we recommend that this manual be kept readily available for reference before beginning any operation or work associated with this equipment.

Safety precautions and instructions for awareness and information on potential hazards are found throughout this manual. Due to the complexities of the systems in which this equipment is used and the environments in which it operates, situations may arise which are not directly discussed in detail in this manual. When such a situation arises, past experience, availability of equipment, and common sense play a large part in what steps are to be taken. In addition, a Baum service representative is available to answer your questions, perform inspections and safety reviews, provide operator training, and supervise maintenance crews upon request.

Please feel free to contact a Baum Pneumatics representative at the following office:

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2A.2. General Safety

All parts of the equipment and the system into which it's installed must be used in keeping with sound safety practices. This manual contains safety information designed to be used in two ways: first as a primary reference for operators and plant maintenance personnel, providing them with details and explanations of operational and maintenance safety procedures; and second as a training tool within your plant's safety program.

Safety begins with properly designed and manufactured equipment. To that end, Baum has designed this equipment with safety in mind. However, the use of the equipment is subject to certain hazards that cannot be met by mechanical means alone, but only by the exercise of intelligence, care and common sense. Once the equipment enters service, Baum has no direct control over its inspection, maintenance, or operation. For this reason, safety in the field is the responsibility of the user.

CUSTOMERS ARE CAUTIONED to provide adequate Protection, Warning and Safety Equipment necessary to protect personnel against hazards involved in installation and operation of this equipment in the system or facility.

Any maintenance other than inspection, cleaning or obvious repair due to damage should be discussed with your Baum representative. Certain design parameters are utilized in the construction of this equipment. Wear for example, can render the equipment hazardous to operate and should be discussed with your Baum representative.

The following notes provide basic safety guidelines that should be incorporated into a comprehensive safety program at your plant.

- Do not remove warning signs from the equipment. If warning signs become damaged, contact Baum Pneumatics Inc. for replacements.
- Make certain that all barriers, covers, and guards are in place before starting the equipment.
- Keep aisles around equipment clear of unnecessary or hazardous articles.
- Wipe up spilled oil, grease, or water to minimize the risk of slips and falls.
- Keep clothing and all parts of the body away from moving machinery parts.
- Keep hands away from belt and chain drives.
- Wear appropriate safety equipment as required by the job and environment including hard hats, safety shoes, hearing, eye, and breathing protection.
- Read and understand all safety information in this manual.

2A.3 Warning Signs and Colors

Signs of various types are posted throughout this manual and on the equipment to warn the end user of potential hazards associated with the operation of this machinery. These signs aid in the safe and efficient operation of this equipment, and it is recommended that periodic inspection of all signs be included in the machine's inspection program. If signs are missing, damaged or illegible, they must be cleaned or replaced to maintain the safe operation of the equipment. Replacement warning signs are available for a nominal charge by contacting the Baum Pneumatics Inc. representative at the address listed in

Section A.1. Refer to Section B.5. for a complete list of warning signs.

Signs used in this manual and on the ESR Feeder use the following signal words to emphasize important and critical instructions.

DANGER

Danger is used to indicate an imminently hazardous situation which, if Not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

WARNING

Warning is used to indicate a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Caution is used to indicate a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage.

NOTICE

Notice is used for special instructions, which are important, but not hazard related.

2A.3. (cont.)

Paint Colors used to warn of potential hazards:

- | | |
|---|--|
| Safety Yellow
(Hi Visibility Yellow) | -Physical hazards that could cause stumbling, falling, tripping, striking against and being caught between. i.e. Handrail, Ladders, Guards |
| Safety Orange | -Moving parts that may cut, crush, or strike i.e. levers, rotors |

2A.4. Lockout/Tag out Procedures

When performing inspection or maintenance on Baum equipment, always follow Lockout/Tag out procedures as required by OSHA 29 CFR part 1910.147 and outlined in ANSI Z244.1. Refer to the maintenance section of your owner's manual prior to performing any maintenance. If the specific topic is not covered; contact Baum for advice before proceeding.

Lockout/Tag out procedures is to protect personnel working on or around the equipment by preventing accidental start up and exposure to hazardous energy release such as electrical shocks and stored energy. An individuals locks and tags be placed on controls, shutoff switches, valves, or other devices to prevent usage until the person who installed the lock removes it. Never attempt to operate any control device when it is locked and tagged out.

2A.5 OSHA Lockout/Tag out Procedure includes:

1. A documented and established site policy on the steps to follow for lockout and tag out
Such as:
 - a. Notify all affected people including supervisors before lockout or tag out is used.
 - b. Shut off the affected machine, equipment, system or function in a manner consistent with proper shut down procedures.
 - c. Disengage, isolate or release energy supply or source.
 - d. Apply individual locks and tags on controls, or other devices to prevent usage.
 - e. Try or test the equipment to check that the energy has been removed before service or maintenance.
2. Employee training about the facilities Lockout/Tag out Procedures at the facility.
3. Identification and location of shutoff switches and controls that isolate hazardous energy are predetermined at the site facility.
4. After maintenance is complete and each Lockout/Tag out is removed by the appropriate individual, all affected people are notified, and the energy or power is restored.

2A.6. Confined Spaces Procedures

Certain areas of this equipment may be considered a Confined Space, or a Permit Required Confined Space, per OSHA 29 CFR Part 1910.146 and outlined in ANSI Z117.1. If the Equipment is so designated, a warning sign will be posted, and a documented and established site policy must be referred to detailing the steps to follow before any entry is allowed. These procedures, along with Lockout/Tag out, must be followed before any entry is attempted into a confined space or permit required confined space.

CANADA OCCUPATIONAL HEALTH AND SAFETY REGULATIONS PART 11 - CONFINED SPACES

Interpretation

11.1 In this Part, class of confined spaces means a group of at least two confined spaces that are likely, by reason of their similarity, to present the same hazards to persons entering, exiting or occupying them; (catégorie d'espaces clos)

"confined space" means an enclosed or partially enclosed space that

(a) is not designed or intended for human occupancy except for the purpose of performing work,

(b) has restricted means of access and egress, and

(c) may become hazardous to any person entering it owing to

- (i) its design, construction, location or atmosphere,
- (ii) the materials or substances in it, or
- (iii) any other conditions relating to it; (espace clos)

"hot work" means any work where flame is used or a source of ignition may be produced. (travail à chaud)

2A.7 Material Safety Data Sheets (MSDS)

In order to transfer MSDS information from our suppliers to our customers, Baum Pneumatics Inc. will provide this service on customer request. All customer requests need to be specific because of the volume and complexity of the MSDS system. To correctly identify the appropriate MSDS, the Baum Pneumatics job number must be known. Inquiries concerning the MSDS information can be addressed to the Baum Pneumatics Inc.

B Installation

2B.1 Receiving

Before uncrating check the packing slip carefully to be sure all components have been received.

Visually inspect components for shipping damage, if any damage is found, notify the carrier at once. Shipping damage is NOT covered by warranty. The carrier is responsible for all repair, or replacement costs, resulting from damage in shipment.

2B.2 Description

Pneumatic conveying is designed for use with standard commercial quality pipe, great versatility can be achieved routing around, between, or over obstacles. Lengths of pipe are field trimmed to suit, which simplifies the installation process. A well maintained pneumatic conveying system keeps everything inside the pipe reducing clean up to a minimum.

During the installation phase of a pneumatic conveying pipeline there are some Important points that should be noted:

2B.3 Pipeline Alignment

The inside surface of the pipeline must be properly aligned during the original Installation. If misaligned the resulting shoulder will soon be worn by the material and a hole will develop. These shoulders should be re welded and the pipe properly aligned as shown below. Further installation hints can be found on drawings A-9760, A-9765, A-9770.

2B.4 Pipeline Bends

Round Pipe Bends (RPB's) are made of heavier wall sections than the pipeline. Be careful not to leave any shoulders on the inside surface of the pipeline which would interfere with the flow of air or material. Refer to drawings A-2000, A-2010 & A-2040

2B.5 Expansion Joints

Installation of an expansion joint is recommended for every 400 ft. of straight pipeline. Location of the expansion joint in a horizontal section is preferred. Refer to drawing A-9100

2B.6 Flange locations

Flanges should be strategically located to allow for the clearing of plugs and to rotate the pipe as wear develops. For pipeline sizes under 14" dia. it is recommended that flanges are located every 120 feet. For pipelines over 14" dia. flanges should be located every 80 ft.

2B.7 Pipeline Supports

Supports should be located using the maximum span chart shown on A-9760, this chart is only a guide, access to doorways, roads and service areas will help determine specific locations. The pipe supports should be located as close as possible to connected equipment such as valves, tee injectors elbows, cyclones, etc. in order to make support less complex.

2B.8 Corrosion Prevention

To prevent corrosion on the outside of the pipe, wire brush and paint periodically. If the pipe is buried in the ground, it should be painted with tar or pitch, or supplied properly coated and wrapped (jacketed)

C Operation

PIPELINE PLUGGING CAUSES

2C.1 Blower

If the intake filter screen is not kept clean or if the belt drive between the motor is allowed to slip, the air intake will be reduced and a plug may develop.

2C.2 Wear

If air leaks develop because of wear or faulty installation and cause air supply to be reduced, a plug may develop.

2C.3 Alignment

Large pieces of material will lodge at poorly aligned joints slowing down flow and cause plugging.

2C.4 Material

Oversize material or high density (rocks, metal etc.) in the system may cause a plug at the discharge end of the tee injector, or the first vertical elbow.

2C.5 Metering

If the material metering device to the pneumatic system is out of adjustment an excessive rate of flow to the system can result which will overload the system and possibly cause a plug.

2C.6 System Overload

The pneumatic system is designed to handle only the volume and tonnage detailed in the system specifications. Conveying more than the design allows could result in a pipeline plug.

2C.7 Take Away Equipment

If material is being fed through a cyclone and discharges into a conveyor or bin, and the conveyor stops or the bin becomes full and allows material to back up in the cyclone a plug can develop. A good interlock system will help prevent this type of plugging.

2C.8 Emergency Stop/ Power Outage

The use of the emergency stop button while the material is being fed into the system may cause line plugging when the blower is restarted. (building a “snowball” of material)

Normal stop and shutdown procedures should be followed unless an emergency does exist. See section 3c.5 to restart correctly

2C.9 CLEARING A PIPELINE PLUG

WARNING

Pneumatic systems can cause physical injury if proper safety practices are not followed in the course of normal inspection, maintenance, or clearing of a plug. When it is necessary to enter any piece of equipment along the pipeline, **it is important to lock out the entire system at the electrical disconnects.**

Baum does not recommend the use of access doors or tee injector inspection doors as an air bleed off where the blower is allowed to run continuously while the line is being purged. This is an extremely hazardous method of clearing a plug and can cause physical injury. Below are our recommended procedures:

Shut down the entire system

. Remove the cleanout door at the discharge end of the tee injector. If material has caused a plug at this point, try to determine what caused the plug blower and tee injector is operating properly. When the tee is clean, replace the door and restart the blower only. If the free running pressure (empty line) is not back to normal shut down and lock out entire system and proceed as follows:

1. Check the discharge end of the pipeline to make sure the material has not backed up into the pipeline or cyclone
 2. If equipped with clean-outs open all clean-outs and target box, run the blower, once the first section clears close that clean-out, and proceed to the next, eventually clearing the entire line. This is not only the simplest way, but often the fastest way to clear a plugged line.
 2. If a plug is found in the tee injector or pipeline check the settings of the (mercoid) pressure switch for the blower. It should be set to trip out at 1 to 2 PSIG over the rated system pressure.
 3. A plug in the line at an elbow, can be dug out by removing the back of the elbow (system requires lock out). Often a plug is not solid for any appreciable length of pipe, so a hole can be cut through the pipe allowing a passage which air can flow. Careful intermittent jogging of the blower only (no infeed) will gradually clear the line.
-

4. Inspect the entire length of the pipeline and tap the pipe with a hammer to determine the area of the plug. It will normally be found in an elbow or round bend. When the plug location is found, check to be sure the total system is locked out, then open the plugged section of pipe at a position beyond and use a rod to punch a hole to allow air to flow.
5. If a hole can be made through the plug, reconnect the flange, checking the entire length of pipeline to be sure no one is near an open flange, door or line discharge. Careful intermittent jogging of the blower will gradually clear the line.
6. If the plug cannot be detected and the material cannot be damaged by water, remove all clean-out doors on the tee injector or break the pipeline beyond the feeder and ram a fire Hose or equivalent into the discharge end of the pipe. The water may soften the plug and break it free. Often a combination of rod, air, and/or water is required to free a plug. This method should be used to flush or wash material out of a pipeline. Be careful not to create a swelling condition. When wood chips absorb moisture they swell creating a much harder plug to remove.

CAUTION

If water is used to free a plugged line, remove all inspection doors at the tee injector, or break the line beyond the feeder. If water and/or material backs up into either the feeder or blower it will be forced into the clearance areas and cause damage to the equipment.

7. Depending on the wood species and atmospheric conditions (higher temperatures), some build up of free pitch (black in color) could occur on the inside surfaces of the pipeline. This condition could result in a reduction of conveying capacity, and could be avoided by adding a slight spray of water to the material. Baum Pneumatics should be contacted when problems of this nature are experienced. When the possibility of freezing exists the water should be discontinued.
8. During cold weather wet material being conveyed through a pipeline could cause a build-up of ice on the interior surfaces of the pipeline. To avoid this condition the material to be conveyed, should be kept dry as possible and the blower inlet filter should be installed in a dry location. Reclaiming from outside storage also may introduce snow or ice into the conveying system, which may melt from the heat of compression from the blower, and then freeze again several hundred feet further down the line. Several conditions; blower heat added, ambient air temperature brought into the blower, outside air temperature (with wind chill), length of exposed line to outside weather all factor into calculating the dew point at which temperature the moisture separates from the air inside the line and condenses on the interior walls of the pipe, and freezes.

When clearing a plug with the pipeline open to allow rods to be inserted, **THE BLOWER, FEEDER and DIVERTER VALVES MUST BE LOCKED OUT**. Until the entire system is safe again for operation.

Lubrication (Water Injection)

Used as a temporary measure to lubricate wood chips causing a reduction in horsepower required, only used at temperatures above 0 degrees Celsius See drawing A-9620

D Maintenance

2D.1 Bends

The pneumatic conveying pipeline will eventually wear because of the abrasive characteristics of high velocity bulk material. When this occurs the bends should be patched or replaced immediately as air loss may be serious enough to cause a plug in the pipeline.

2D.2 Straight Pipe

Wear may develop at the bottom of a horizontal pipeline due to material abrasion. If a hole appears, patch it immediately and rotate the pipe 90 degrees to even the wear. Flanges should be installed at specific locations to facilitate rotation of the pipe sections. After a horizontal elbow, pipeline wear will be on the side of the pipe (on the long side of the bend) for approx. ten diameters of pipe length.

2D.3 Recommended Spare Parts

The following items are recommended spare parts that should be kept on hand at all times. The complete callout for items can be found in the General Arrangement and Repair Parts Sheets for this job, and are included as part of this manual. This includes necessary ordering information, including Baum drawing numbers (part numbers) that are required to fill orders. When ordering spares, it is helpful to have the original Baum Job Number.

MODEL MK3 Elbow –

1	12 ¾" & 14" Wear Back straight and curved
1	12 ¾" & 14" Square to Round Transition
SAWDUST SYSTEM	Chromite Iron Cast Segments avail for extreme wear.

DRAWINGS HERE

Please feel free to contact a Baum Pneumatics representative at the following office:

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