

EASY LOAD SYSTEMS

O.M. 10748

DATE OF ISSUE: 08/85
REVISION: G, 07/17

WARNING

Do not use this equipment until you have READ this MANUAL and YOU UNDERSTAND its contents. *

These WARNINGS are included for the health and safety of the operator and those in the immediate vicinity.

***If you are using a Clemco Distributor Maintenance and Parts Guide, refer to the orange warnings insert preceding the Index before continuing with the enclosed instructions.**

Electronic files include a Preface containing the same important information as the orange cover.

© 2017 CLEMCO INDUSTRIES CORP.
One Cable Car Dr.
Washington, MO 63090
Phone (636) 239-4300
Fax (800) 726-7559
Email: info@clemcoindustries.com
www.clemcoindustries.com



WARNING

- Employers are responsible for identifying all job site hazards, educating and training all persons who will operate and maintain these products, and ensuring that all blast operators and their assistants understand the warnings and information contained in these instructions relating to safe and proper operation and maintenance of this equipment.
- Serious injury or death can result from failure to comply with all Occupational Safety and Health Administration (OSHA) regulations and all manufacturer's instructions.
- This equipment is not intended for use in any area considered hazardous per National Electric Code NFPA 70 2011, Article 500.
- Read this document and follow all instructions before using this equipment.

OSHA regulations relating to abrasive blasting are contained in the Code of Federal Regulations, Title 29 (29 CFR 1910 General Industry; 1915 Maritime; 1926 Construction). The most pertinent include: 1910.94 Ventilation, 1910.95 Occupational Noise Exposure, 1910.132 Personal Protective Equipment, 1910.133 Eye and Face Protection, 1910.134 Respiratory Protection, 1910.135 Head Protection, 1910.244 (b) Remote Controls. Consult www.osha.gov for complete information.

NOTICE TO PURCHASERS AND USERS OF OUR PRODUCTS AND THIS INFORMATIONAL MATERIAL

Clemco proudly provides products for the abrasive blast industry and is confident that industry professionals will use their knowledge and expertise for the safe and efficient use of these products.

The products described in this material, and the information relating to these products, are intended for knowledgeable, experienced users.

No representation is intended or made as to: the suitability of the products described here for any purpose or application, or to the efficiency, production rate, or useful life of these products. All estimates regarding production rates or finishes are the responsibility of the user and must be derived solely from the user's experience and expertise, not from information contained in this material.

It is possible that the products described in this material may be combined with other products by the user for purposes determined solely by the user. No representations are intended or made as to the suitability of or engineering balance of or compliance with regulations or standard practice of any such combination of products or components the user may employ.

Abrasive blast equipment is only one component of an abrasive blasting job. Other products, such as air compressors, air filters and receivers, abrasives, scaffolding, hydraulic work platforms or booms, equipment for lighting, painting, ventilating, dehumidifying, parts handling, or specialized respirators or other equipment, even if offered by Clemco, may have been manufactured or supplied by others. The information Clemco provides is intended to support the products Clemco manufactures. Users must contact each manufacturer and supplier of products used in the blast job for warnings, information, training, and instruction relating to the proper and safe use of their equipment.

GENERAL INSTRUCTIONS

This material describes some, but not all, of the major requirements for safe and productive use of blast machines, remote controls, respirator systems, and related accessories. All equipment and accessories must be installed, tested, operated and maintained only by trained, knowledgeable, experienced users.

The blast operator and all workers in the vicinity must be properly protected from all job site hazards including those hazards generated by blasting.

Work environments involving abrasive blasting present numerous hazards. Hazards relate to the blast process from many sources that include, but are not limited to, dust generated by blasting or from material present on the surface being blasted. The hazards from toxic materials may include, but are not limited to, silica, cyanide, arsenic, or other toxins in the abrasives or in the coatings, such as lead or heavy metals. Other hazards from toxins include, but are not limited to, fumes from coating application, carbon monoxide from engine exhaust, contaminated water, chemicals or asbestos. In addition, physical hazards that may be present include, but are not limited to, uneven work surfaces, poor visibility, excessive noise, and electricity. Employers must identify all job site hazards and protect workers in accordance with OSHA regulations.

Never modify Clemco equipment or components or substitute parts from other manufacturers for any Clemco components or parts. Any unauthorized modification or substitution of supplied-air respirator parts violates OSHA regulations and voids the NIOSH approval.

IMPORTANT

Contact Clemco for free booklets:

Blast Off 2 – Guide to Safe, Productive, and Efficient Abrasive Blasting, and Abrasive Blasting Safety Practices – Guide to Safe Abrasive Blasting.

Clemco Industries Corp. One Cable Car Drive Washington MO 63090

Tel: 636 239-4300 — Fax: 800 726-7559

Email: info@clemcoindustries.com

Website: www.clemcoindustries.com

OPERATIONAL INSTRUCTIONS

OPERATOR SAFETY EQUIPMENT

WARNING

- OSHA regulation 1910.134 requires appropriate respiratory protection for blast operators and workers in the vicinity of blasting. These workers must wear properly-fitted, properly-maintained, NIOSH-approved, respiratory protection that is suitable for the job site hazards. Blast respirators are to be worn only in atmospheres not immediately dangerous to life or health from which wearers can escape without use of the respirator.
- The employer must develop and implement a written respiratory protection program with required worksite- specific procedures and elements for required respirator use. The employer must provide effective training to employees who are required to use respirators. The training must be comprehensive, understandable, and recur annually, and more often if necessary.
- NEVER use abrasives containing more than one percent crystalline silica. Fatal diseases, such as silicosis, asbestosis, lead or other poisoning, can result from inhalation of toxic dusts, which include, but are not limited to, crystalline silica, asbestos, and lead paint. Refer to NIOSH Alert 92-102; and OSHA CPL 03-00-007: “National Emphasis Program – Crystalline Silica”, in which OSHA describes policies and procedures for implementing a national emphasis program to identify and reduce or eliminate health hazards from exposure to crystalline silica. Numerous topics associated with the hazards of crystalline silica in silica blasting sand can be found on [http:// osha.gov/](http://osha.gov/). Clemco urges users of silica blasting sand to visit this website, and read and heed the information it contains.
- Always make sure the breathing air supply (respirator hose) is not connected to plant lines that supply gases that include, but are not limited to, oxygen, nitrogen, acetylene, or other non-breathable gas. Never modify or change respirator air line connections without first testing the content of the line for safe breathing air. Failure to test the line may result in death to the respirator user.

- Breathing air quality must be at least Grade D, as defined by the Compressed Gas Association specification G-7.1, per OSHA Regulation 29 CFR 1910.134. When compressed air is the breathing air source, a Clemco CPF (suitable sorbent bed filter) should be used. Respirator hose connecting the respirator to the filter must be NIOSH approved. Non- approved hose can cause illness from chemicals employed to manufacture the hose.

- All workers must always wear NIOSH-approved respirators when any dust is present. Exposure to dust can occur when handling or loading abrasive, blasting, cleaning up abrasive, or working in the vicinity of blasting. Before removing the respirator, test the air with a monitoring device to ensure it is safe to breathe.

- Clemco respirators DO NOT remove or protect against carbon monoxide or any other toxic gas. Monitoring devices must be used in conjunction with the respirator to ensure safe breathing air. Always locate compressors and ambient air pumps where contaminated air will not enter the air intake.

- Always use Clemco lenses with Clemco respirators; installing non-approved lenses voids the NIOSH approval. Respirator lenses are designed to protect the wearer from rebounding abrasive; they do not protect against flying objects, heavy high-speed materials, glare, liquids, or radiation.

INDUSTRY ORGANIZATIONS

For additional information, consult:

Occupational Safety and Health Administration (OSHA) - www.osha.gov

Compressed Gas Association (CGA) - www.cganet.com

The Society for Protective Coatings (SSPC) - www.sspc.org

National Association of Corrosion Engineers (NACE) - www.nace.org

American Society for Testing and Materials (ASTM) - www.astm.org

National Institute of Occupational Safety and Health (NIOSH) - www.niosh.gov

American National Standards Institute (ANSI) - www.ansi.org

PREFACE

BLAST MACHINES AND REMOTE CONTROLS

WARNING

OSHA regulation 1910.169 describes the necessity of pressure relief valves on compressed air equipment. Do not operate blast machines with air compressors that are not equipped with properly functioning pressure relief valves.

OSHA regulation 1910.244(b) requires the use of remote controls on blast machines.

Serious injury or death can result from many sources, among them:

- Involuntary activation of the remote controls. Never modify or substitute remote control parts; parts are not compatible among different manufacturers. Welding hose is not suitable for remote control hose. Its ID and material composition make it unsafe for remote control use.
- Exceeding the maximum working pressure. Clemco blast machines are built to ASME-code and carry a 'U' or 'UM' stamp, and National Board/serial number. Every machine is marked with its maximum working pressure. Never exceed the maximum working pressure limits of the blast machine.
- Uncontrolled blast stream. High-velocity abrasive particles will inflict serious injury. Always point the blast nozzle in the direction of the blast surface only. Keep unprotected workers out of the blast area.
- Welding on the blast machine. Never weld on the blast machine; welding voids the National Board approval and may affect the dimensional integrity of the vessel.
- Moving the blast machine. Never manually move a blast machine containing abrasive, any machine containing abrasive must be moved with appropriate mechanical lifting equipment.

HOSES, COUPLINGS, AND NOZZLE HOLDERS

- The inside diameter (ID) of air hoses, fittings, and connections should be at least four times larger than the nozzle orifice size. Blast hose ID should be three to four times the size of the nozzle orifice. Example: a #6 nozzle (3/8" diameter orifice) calls for 1-1/2" ID blast hose and 1-1/2" ID or larger compressor hose. All hose runs should be kept as short as possible and run in as straight a line as possible to reduce pressure loss.
- To install, squarely cut the end of the hose so that it fits snugly against the coupling or hose end shoulder. Always use the screws recommended by the manufacturer ensuring that they do not penetrate the inner wall. Make sure the couplings tightly fit the hose. Install cotter pins at every connection or use couplings with built-in lock-springs to prevent disengagement. Install safety cables at all connections to prevent whipping if hoses disengage or blow out.

MAINTENANCE AND REPAIR

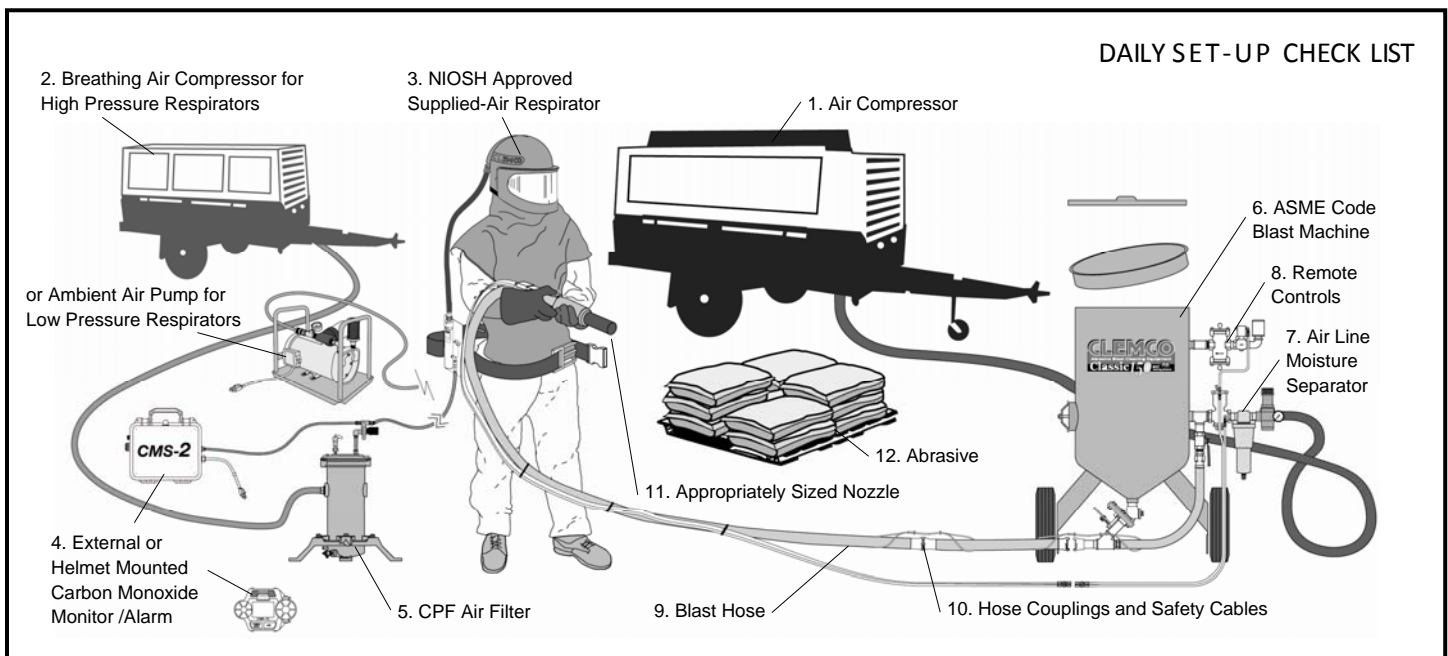
- Completely read and follow all service instructions and recommended maintenance intervals. Always shut off compressor and depressurize blast machine before performing any maintenance. At every service interval, clean all filters, screens, and alarm systems. If spring-loaded abrasive valves are used, always cage spring before disassembly.

WARRANTY

The following is in lieu of all warranties, express, implied or statutory, and in no event shall seller or its agents, successors, nominees or assignees, or either, be liable for special or consequential damage arising out of a breach of warranty. This warranty does not apply to any damage or defect resulting from negligent or improper assembly or use of any item by the buyer or its agent or from alteration or attempted repair by any person other than an authorized agent of seller. All used, repaired, modified, or altered items are purchased "as is" and with all faults. In no event shall seller be liable for consequential or incidental damages. The sole and exclusive remedy of buyer for breach of warranty by seller shall be repair or replacement of defective parts or, at seller's option, refund of purchase price, as set forth below

1. Seller makes no warranty with respect to products used other than in accordance hereunder.
 2. On products seller manufactures, seller warrants that all products are to be free from defects in workmanship and materials for a period of one year from date of shipment to buyer, but no warranty is made that the products are fit for a particular purpose.
 3. On products which seller buys and resells pursuant to this order, seller warrants that the products shall carry the then standard warranties of the manufacturers thereof, a copy of which shall be made available to the customer upon request.
 4. The use of any sample or model in connection with this order is for illustrative purposes only and is not to be construed as a warranty that the product will conform to the sample or model.
 5. Seller makes no warranty that the products are delivered free of the rightful claim of any third party by way of patent infringement or the like.
 6. This warranty is conditioned upon seller's receipt within ten (10) days after buyer's discovery of a defect, of a written notice stating in what specific material respects the product failed to meet this warranty. If such notice is timely given, seller will, at its option, either modify the product or part to correct the defect, replace the product or part with complying products or parts, or refund the amount paid for the defective product, any one of which will constitute the sole liability of the seller and a full settlement of all claims. No allowance will be made for alterations or repairs made by other than those authorized by seller without prior written consent of seller. Buyer shall afford seller prompt and reasonable opportunity to inspect the products for which any claim is made as above stated.
- Except as expressly set forth above, all warranties, express, implied or statutory, including implied warranty of merchantability, are hereby disclaimed.

PREFACE



DAILY SET-UP CHECK LIST

Make sure all blast operators are properly trained and suitably attired with a blast suit, safety boots, leather gloves, respiratory and hearing protection. Every day before start up, check all equipment components, including piping, fittings, and hoses, and valves, for leaks, tightness, and wear. Repair or replace as needed. Use the following checklist.

- 1. PROPERLY-MAINTAINED AIR COMPRESSOR** sized to provide sufficient volume (cfm) at given pressure for nozzle and other tools. ADD 50% volume (cfm) reserve to allow for nozzle wear. Use large compressor outlet and air hose (at least 4 times the nozzle orifice diameter). For oil-lubricated compressors, the employer shall use a high- temperature or carbon monoxide alarm, or both, to monitor carbon monoxide levels. If only high-temperature alarms are used, the air supply shall be monitored at intervals sufficient to prevent carbon monoxide in the breathing air from exceeding 10 ppm. Follow the manufacturer's checklist and maintenance instructions.
- 2. BREATHING-AIR COMPRESSOR** (or oil-less ambient air pump) capable of providing Grade D quality air, located in a dust free area. Read # 1 above.
- 3. CLEAN, PROPERLY-MAINTAINED NIOSH-APPROVED SUPPLIED-AIR RESPIRATOR** worn by blast operators, and other workers exposed to blast dust. Make sure all respirator components are in place — all lenses, inner collar, and cape. Thoroughly inspect all components for wear. The NIOSH approval (approval number is listed in the owner's manual) is for a complete assembly from point of attachment on the CPF (sorbet bed) filter to the complete respirator. Substitution of any part voids the NIOSH approval.
- 4. CARBON MONOXIDE MONITOR/ALARM** installed at the CPF filter or inside the supplied-air respirator for monitoring for the presence of deadly CO gas and warning the operator(s) when the CO level reaches an unacceptable level. When an ambient air pump is used for breathing air, a CO monitor provides a measure of safety. Read # 1 above.
- 5. BREATHING-AIR FILTER (OSHA-REQUIRED sorbet bed filter)** for removal of moisture and particulate matter in the compressed air breathing-air supply. Monitor the condition of the cartridge and replace when odor is detected or at 3 month intervals, whichever comes sooner. The breathing air filter does NOT detect or remove carbon monoxide (CO). Always install a CO monitor/alarm.
- 6. BLAST MACHINE** (bearing U or UM stamp, National Board Number, and Maximum Working Pressure) sized to hold a 30-minute abrasive supply. Examine pop-up valve for alignment. Check piping, fittings, screens, valves for tightness, leaks, and wear. Always ground the machine to eliminate hazard of static shock. Install a blast machine screen to keep out foreign objects. Use a blast machine cover if left outdoors overnight. Never exceed the maximum working pressure of the vessel.
- 7. AIR LINE FILTER** (moisture separator) installed as close as possible to the blast machine inlet and sized to match the size of the inlet piping or larger air supply line. Clean filter and drain often. Damp abrasive causes operational problems.
- 8. REMOTE CONTROLS** are required by OSHA and must be in perfect operating condition. Test and check all components to ensure all parts are present and fully functional. Use genuine replacement parts. NEVER mix parts from different manufacturers. Never use welding hose for remote control hose.
- 9. BLAST HOSE** should have an inside diameter sized to suit the blast nozzle. The ID should be three to four times the size of the nozzle orifice diameter. Blast hose should be arranged in as straight a line as possible from the blast machine to the work area, avoiding sharp bends.
- 10. COUPLINGS AND NOZZLE HOLDERS** should fit snugly on the hose and be installed with manufacturer recommended screws. Coupling lugs must snap firmly into locking position. Gasket must always be used to form a positive seal, and cotter pins must be installed. Replace gasket when wear, softness or distortion is detected. Check nozzle holder for thread wear; replace at any sign of wear. Install safety cables at all connections.
- 11. NOZZLE** orifice size should be checked and nozzle replaced when worn 1/16" from original size. (No. 5 nozzle has 5/16" orifice diameter; replace when it measures 3/8"). Threads should be inspected daily for wear and nozzle should be replaced when wear is detected. Always use a nozzle washer.
- 12. ABRASIVE** must be a material specifically manufactured for blasting. It should be properly sized for the job. Check material safety data sheet for free-silica, cyanide, arsenic, lead and other toxins and avoid use when these toxic, harmful substances are present.
- SURFACE TO BE BLASTED** should be examined for hazardous substances. Take appropriate protective measures as required by OSHA to ensure the blast operator, other workers in the vicinity, and any bystanders are properly protected.

©Clemco Industries Corp., Stock No. 20954P, 0692 Rev. F, 06/12

1.0 INTRODUCTION

1.1 Scope: This manual covers the installation, operation, maintenance, troubleshooting and replacement parts for the Clemco Easy Load Vacuum Systems. It is to be used in conjunction with manuals referring to the operation of the specific blast machine, remote control system and operator safety equipment being used.

1.2 Hazard Alerts

1.2.1 Clemco uses signal words, based on ANSI Z535.2-1991, to alert the user of a potentially hazardous situation that may be encountered while operating this equipment. ANSI's definitions of the signal words are as follows:

! NOTICE

"Notice" is used to indicate a statement of company policy as the message relates directly or indirectly to the safety of personnel or protection of property.

! CAUTION

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

! WARNING

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

! DANGER

"Danger" is used to indicate an imminently hazardous situation which, if not avoided will result in death or serious injury.

1.3 General Description: The layout and components of the Easy Load systems are shown in Figures 1 and 2. The only difference between the two systems shown in the figures, is that one uses a 6 cubic foot storage hopper mounted on the blast machine, while the other uses the larger free-standing 17 cubic foot hopper. Figure 1 shows them set-up for loading, Figure 2 shows them set-up for recovery of spent abrasive.

The illustrations are shown with the reverse pulse dust collector. See Figure 4 for an illustration of the wet-filter. All connections, regardless of the dust containment options are the same as shown in Figures 1 and 2.

The first component, the Vacuum Producer ie., VPR, is designed in such a way that incoming compressed air creates a suction, giving the system its vacuum source. The vacuum is directed, through a sealed circuit, to the pick-up tool, where it will be used in one of two modes; loading, and recovery.

In either mode the sealed vacuum circuit flows through one of two dust containment options, a wet-filter drum, or the more efficient, dry, reverse pulse dust collector. Both dust containment options remove dust and fines, allowing only filtered air to enter the vacuum producer where it is exhausted through a silencer into the atmosphere.

1.4 Application

1.4.1 Dual Purpose: All systems can be used for loading or recovery.

1.4.2 Loading Mode: (See Figure 1) The Easy Load is a pneumatic abrasive loader which can move new or reusable abrasive from the loading hopper to the blast machine storage hopper, or the pick-up tool can be removed from the loading hopper to load piled abrasive. The system can be truck or trailer mounted for portable use or used in a permanent facility.

1.4.3 Recovery Mode: (See Figure 2) The pick-up tool is removed from the loading hopper and used as a portable pick-up tool. In this mode, spent abrasive is vacuumed from the blasting area, to a collection container for easy dumping.

Blast Nozzle CFM Chart								
PSI	30	40	50	60	70	80	90	100
Nozzle Size	CFM							
1/4"	33	40	47	54	61	68	74	81
5/16"	53	65	77	89	101	113	126	137
3/8"	72	90	108	126	143	161	173	196
7/16"	101	124	147	170	194	217	240	254
1/2"	137	166	195	224	252	280	309	338

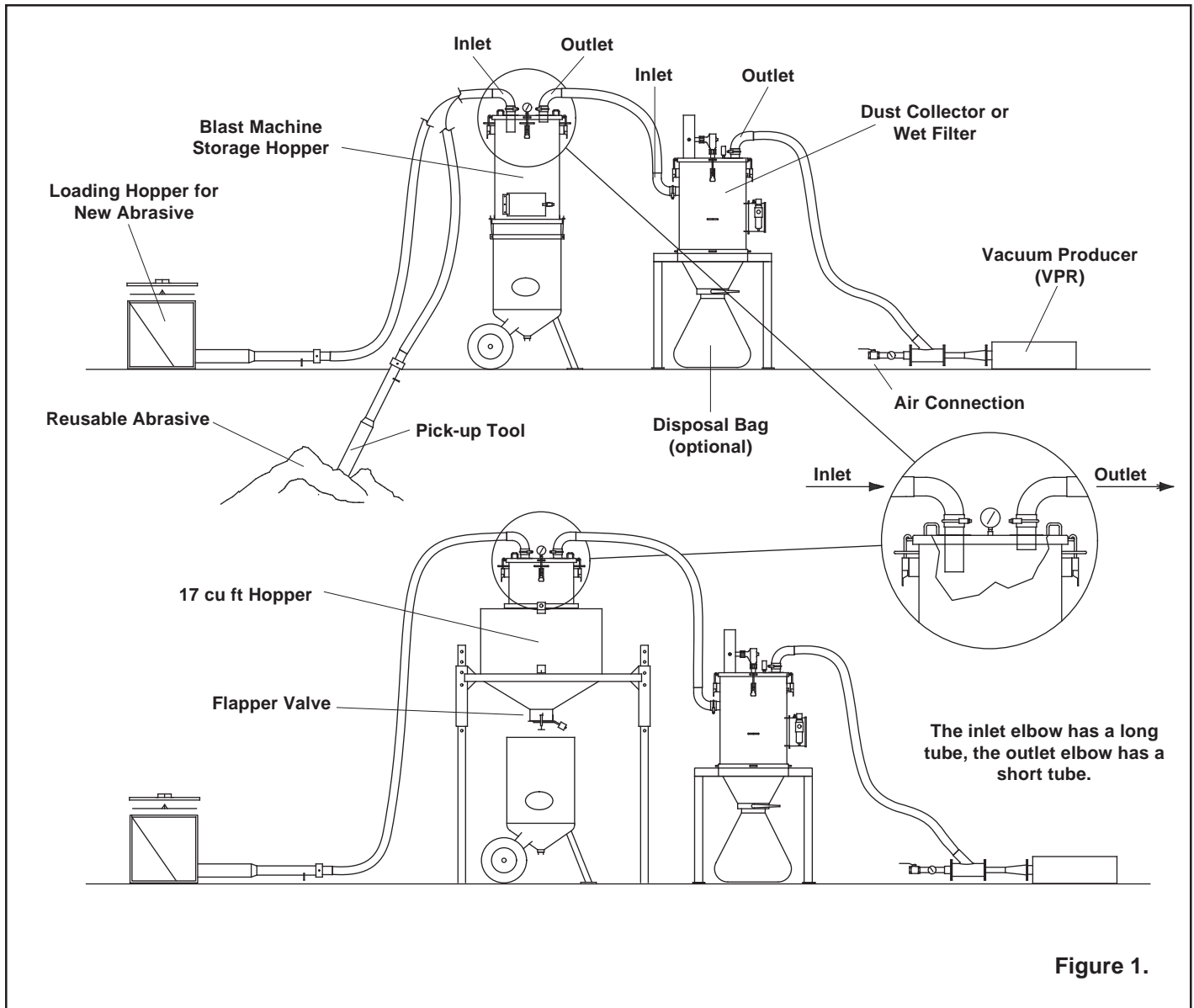


Figure 1.

2.0 AIR REQUIREMENTS

2.1 Vacuum Producer

2.1.1 The vacuum producer (VPR) requires 290 cfm at 100 psi. The optional reverse pulse dust collector requires 10 cfm at 90 psi. The compressor must be large enough to maintain 90-100 psi at the VPR, or maintain the required pressure at the nozzle, as specified in the Blast Nozzle CFM Chart. If the VPR, blast machine, and dust collector are to be used at the same time, the compressor must be large enough to maintain all pieces of equipment, plus the additional cfm required by other tools.

2.2 Air Supply Hose

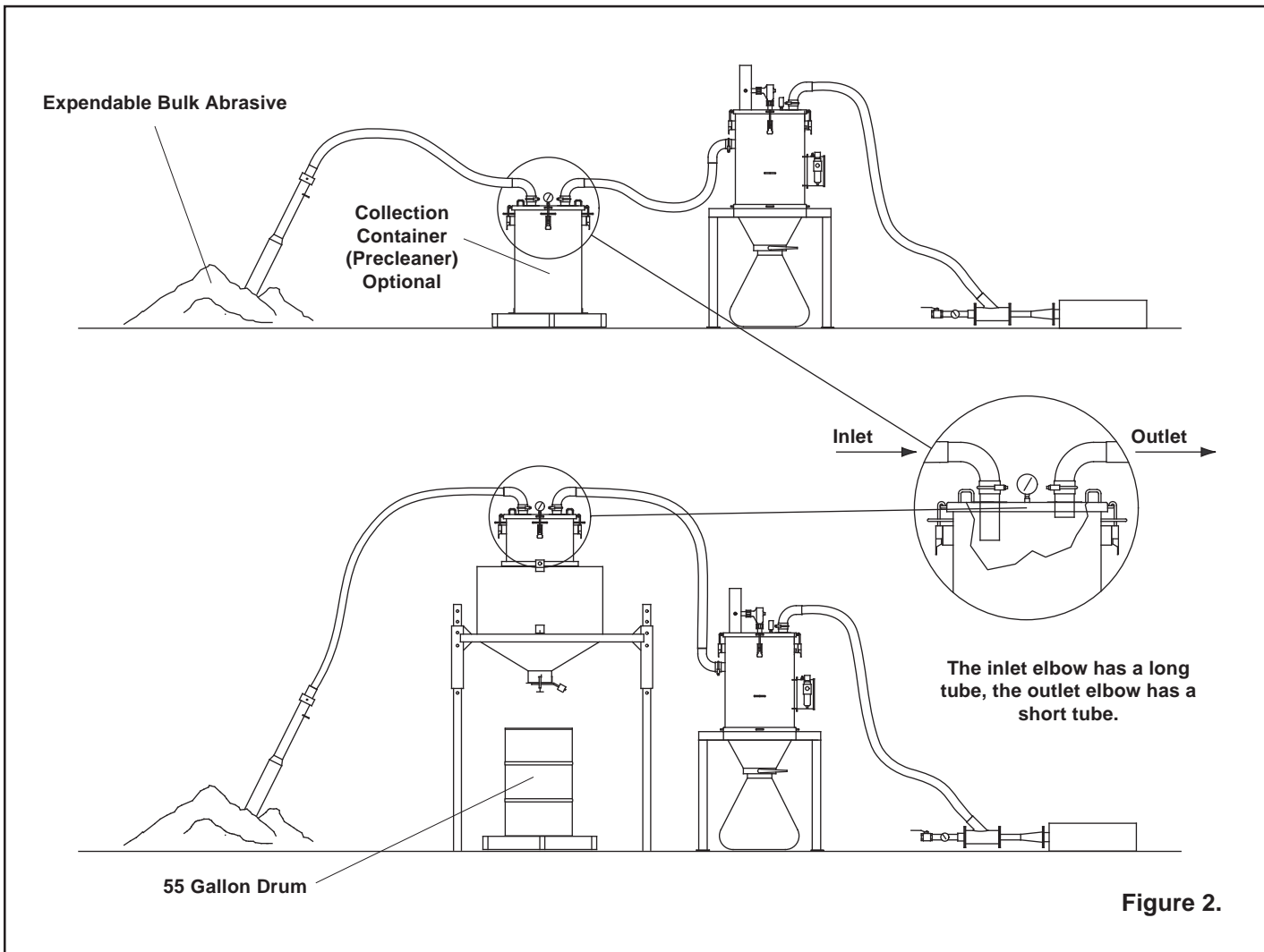
2.2.1 Recommended air supply hose is 1-1/2" I.D. or larger. The vacuum producer connection is 1-1/2" npt.

3.0 SET-UP

3.1 Set-up Notes

3.1.1 The following text explains the set-up for using the Easy Load in the loading mode. Set-up for recovery is the same except a recovery container is used in place of the blast machine storage hopper. If the 17 cubic foot hopper is used the only difference is the blast machine is removed from under the hopper and replaced with a disposal drum. See Figure 1 for loading set-up, Figure 2 for recovery set-up.

3.1.2 The illustrations in Figures 1 and 2 shows the optional reverse pulse dust collector. Set-up for the wet-filter is the same as the dust collector with the exceptions noted in section 3.6.1. See Figure 3 for wet-filter illustration.



3.2 Set-Up (Refer to Fig. 1 and 2).

3.2.1 Position all components in a convenient location.

!WARNING

The blast machine and storage hopper must be assembled and used on a flat, level surface. The blast machine and hopper must be adequately supported to ensure stability when the hopper is loaded with abrasive.

3.3 Six Cubic Foot Storage Hopper Assembly

NOTE: An umbrella must be installed over the blast machine pop-up opening for this application. If an umbrella is not installed, the weight of the abrasive will prevent the pop-up valve from closing.

3.3.1 Attach the mounting clamps to the blast machine as shown in Figure 3. The top of the clamps should be approximately 2" to 3" from the top of the machine. Consideration must be given to where the access door should be located, before securing the mounting clamps.

3.3.2 Place the rubber U-channel extrusion over the rim of the blast machine. To obtain an air tight seal, the ends of the extrusion must be square cut and tightly compressed. Rubber adhesive will help hold the extrusion in place during assembly.

3.3.3 Lower the 6 cubic foot storage hopper onto the blast machine. Align it by guiding the mounting clamp eyebolts into the holes on the hopper tabs. Secure all nuts and bolts.

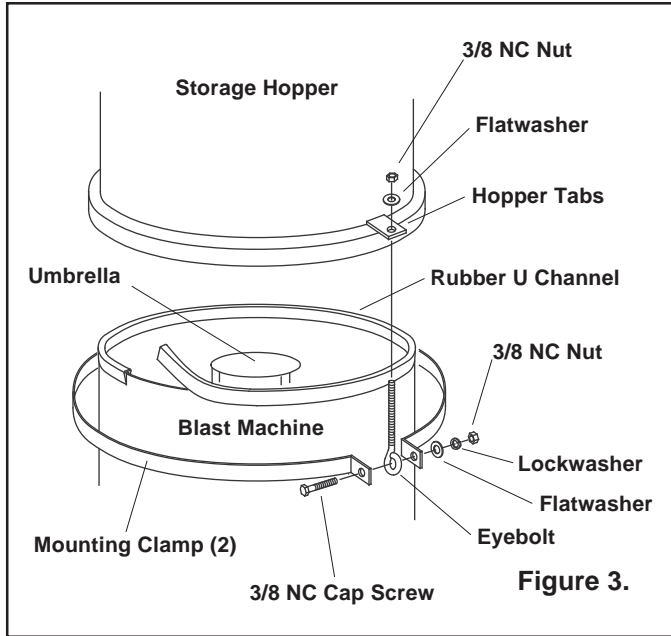


Figure 3.

! WARNING

Do not work under the hopper while it is hanging from a lifting devise. Severe injury can occur if the hopper is released from the lifting device before it is secured to the blast machine.

3.3.4 Place the lid assembly on the storage hopper. (When using the system in the recovery mode, use the lid over a collection container, see Figure 2). The elbow with the long dip tube is the inlet. Verify that the "IN" label is at the elbow with the long tube.

3.4 Seventeen Cubic Foot Hopper Assembly

! WARNING

Do not lift the storage unit, or adjust the hopper height if the hopper contains abrasive. Lifting lugs are NOT designed to lift the weight of the hopper with abrasive. Do not work under the hopper while it is hanging from a lifting devise. Severe injury can occur if the hopper is released from the lifting device before it is secured to all supporting legs.

3.4.1 Mount the legs onto the triangular frame by aligning the holes in the legs with those in the frame, inserting quick release pins to secure. Adjust to approximate height.

3.4.2 Mount the empty 17 cu. ft. storage hopper onto the frame, and adjust frame to required height.

3.4.3 Place the lid assembly on the 17 cu. ft. hopper. The elbow with the long dip tube is the inlet. Verify the "IN" label is at the elbow with the long tube.

3.4.4 Place the blast machine or collection container under the flapper valve assembly. The blast machine or container must be filled manually by opening the flapper valve.

3.5 Position Loading Hopper

3.5.1 The hopper may be mounted in the cube frame at ground level or recessed to be level with the floor. The recessed mounting requires a 22-1/4" square hole cut into the floor. The hopper is set into the hole, and is supported by the hopper flange.

NOTE: Recessed mounting requires 22" free space below the floor, and be accessible to install and adjust the bulk pick-up tool.

3.6 Assemble Dust Containers

3.6.1 Wet-filter, Figure 4: for assembly of the reverse pulse dust collector see section 3.6.2.

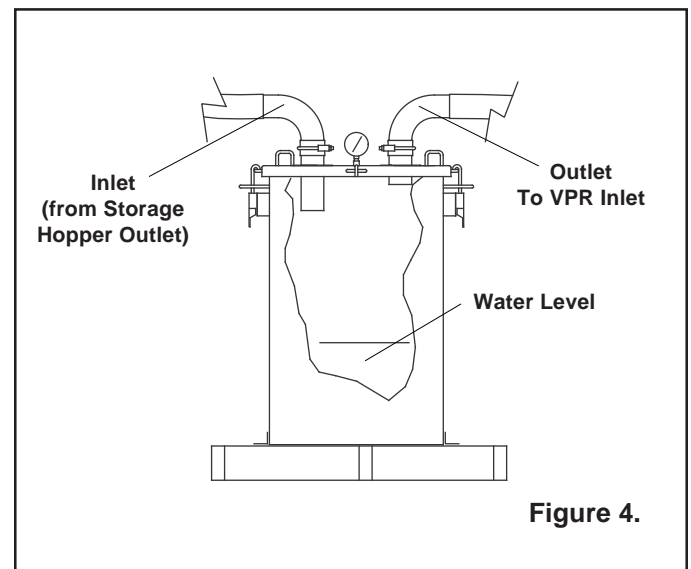


Figure 4.

3.6.1.1 Fill the wet-filter drum with water until approximately 1/3 full. The wet-filter drum must have enough water in it to contain dust. During operation, if excessive water comes from the VPR silencer, reduce the water level. If excessive dust is emitted, increase the water level. Small amounts of dust and water are normal. If conditions will not allow discharge from the VPR, the system can be up-graded to a reverse pulse collector.

3.6.1.2 Attach the lid to the filter. The elbow with the long dip tube is the inlet. Verify the "IN" label is at the elbow with the long tube. Skip to section 3.7

3.6.2 Reverse Pulse Dust Collector

Figure 5

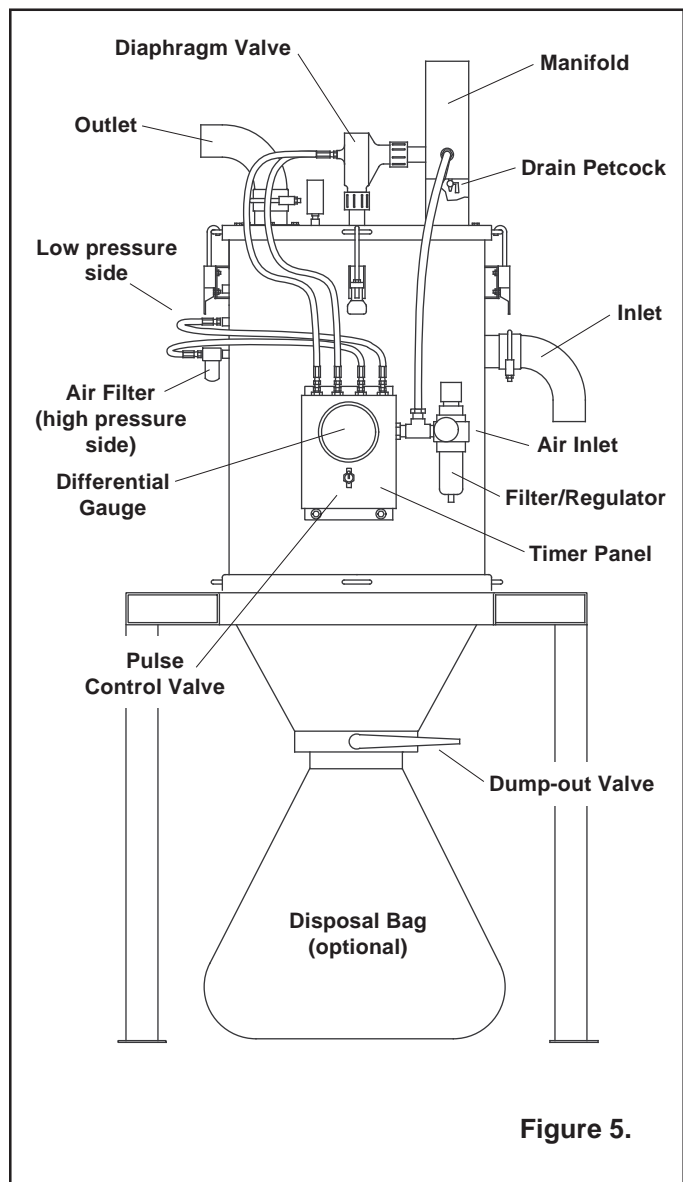


Figure 5.

3.6.2.1 Attach the dust collector lid assembly to the collector housing. To ensure the pulse jets are positioned correctly, the lid has two locator bolts that must be aligned with holes on the body before clamping the latches.

3.6.2.2 Install an air fitting on the timer panel filter/regulator, and attach a 1/2" or larger air hose.

3.6.2.3 Connect air lines between the quick release diaphragm valves and panel fittings as shown in Figure 6.

3.6.2.4 Open the panel to verify the following connections: Connect an air line between the "Low pressure" side of the differential pressure gauge to the upper fitting on the collector wall. Connect another line from the "High pressure" side of the gauge to the 1/4" air filter on the collector wall. See Figure 6 for air schematic.

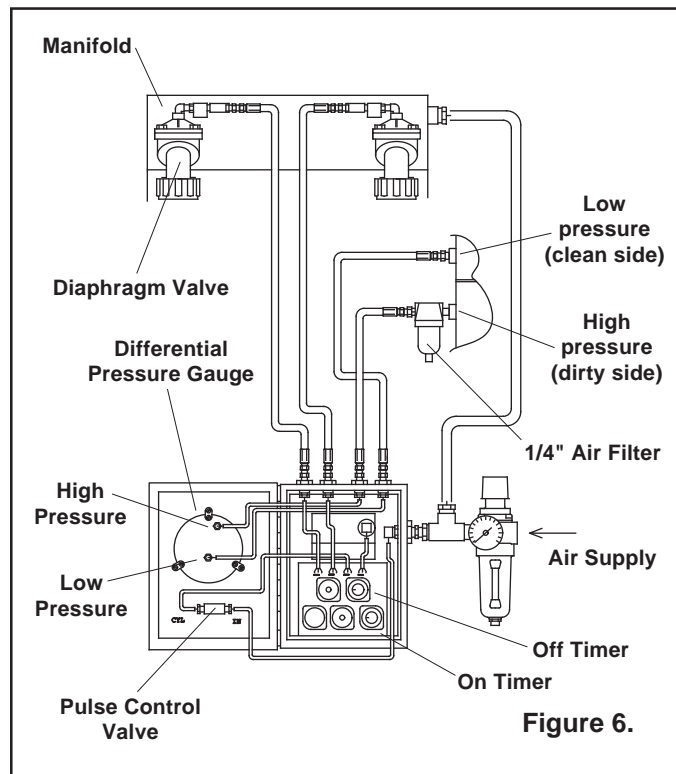


Figure 6.

3.6.2.5 Close the dump-out valve.

3.6.2.6 Place a dust disposal drum under the collector dump-out valve, or attach an optional disposal bag to the dump-out pipe.

3.7 Vacuum Hose Connections

3.7.1 Attach one 3" x 10 ft. connecting hose to the vacuum producer by twisting the hose clockwise over the casting stub. The other end is attached to the outlet of the wet-filter or dust collector. Secure both ends with worm clamps.

3.7.2 Attach the other 3" x 10 ft. connecting hose between the storage hopper outlet, and the wet-filter or dust collector inlet. Secure with worm clamps.

3.7.3 Attach the uncoupled end of the 25 ft. pick-up hose to the storage hopper inlet. Do not connect the other end to the pick-up tool at this time.

3.8 Vacuum Producer (VPR)

3.8.1 Attach a 1-1/2" I.D. or larger air hose from the compressor to the inlet valve of the vacuum producer. The vacuum producer inlet valve is 1-1/2" NPT.

4.0 OPERATION

NOTE: Operating vacuum is usually between 4" to 8" Mercury (Hg). Lower vacuum normally indicates a leak or the pick-up tool adjustment holes are open too far. Higher vacuum usually indicates not enough air enters the tool. Some applications may obtain better conveying rates with lower or higher than normal vacuum. Best conveying rates will be achieved by monitoring the vacuum gauge and air/abrasive mixture.

4.1 Common for loading and recovery

4.1.1 Close the vacuum producer inlet valve.

4.1.2 Check that all access doors are closed and secure including; lids, flapper valve (17 cu. ft. hopper only) or dump-out valve (dust collector only).

4.1.3 Start the compressor and bring it to operating conditions.

4.1.4 Slowly open the compressor's main air valve, to pressurize the air lines to the VPR, and dust collector (dust collector models only).

!NOTICE

New dust collectors and cartridges should not be pulsed until cartridges are seasoned, see section 6.2.6.

4.1.5 Switch the pulse control valve, located on the timer panel cover, to on.

4.1.6 Open the inlet valve on the vacuum producer, operation will begin immediately.

!WARNING

Ear protection is required when the vacuum producer is in operation.

4.1.7 Check the VPR pressure gauge. Optimum pressure is 90-100 psi.

4.1.8 Check the pulse pressure (dust collector models only). Pressure should be 90-100 psi.

4.1.9 Check the vacuum system for leaks by blocking approximately 90% of the pick-up end of the pick-up conveying hose with a board or other solid, flat object. Listen to, and feel each hose connection and seal between each segment for leaks. If leaks are found at hose connection, tighten the clamps. If there are leaks between segments, check the gaskets and clamp tension.

! CAUTION

Never completely block off the vacuum air inlet. Damage to drums, hoppers, or hoses may occur due to the high vacuum produced. Shut-down immediately if vacuum exceeds 20" Hg.

4.1.10 Turn off the vacuum producer by closing the air valve. Attach the pick-up tool to the coupled end of the pick-up conveying hose.

4.1.11 The tool may now be put into the loading hopper, for operation in the loading mode, or it can be hand held for abrasive recovery.

4.2 Loading Mode

4.2.1 Place the pick-up tool into the loading hopper.

4.2.2 Remove the cover from the loading hopper, drop bagged abrasive onto the screen and bag opener. Tear the punctured bag open, permitting abrasive to fall into the hopper.

4.2.3 Start the loading process by opening the air valve on the vacuum producer.

4.2.4 Adjust the air intake on the pick-up tool as described in section 5.1.

4.2.5 Continue to fill the loading hopper until the blast machine and/or storage hopper is full. **DO NOT OVER FILL.** Abrasive flow will slow down noticeably when hoppers are full.

4.2.6 As hoppers become full, stop filling the loading hopper and allow the pick-up hose to clear.

4.2.7 Shut-down the vacuum producer by closing the air inlet valve.

4.3 Recovery

4.3.1 Hold the handle of the pick-up tool in one hand. The other hand is used to help maneuver the tool to the most comfortable position for the operator. The pick-up hose is usually placed over the opposite shoulder or under the opposite arm, depending upon the angle at which the tool will be used.

4.3.2 The bulk pick-up tool is used for moving heavy concentrations of abrasive from the storage hopper, drums, or abrasive piles. Optional tools are available. They are listed under accessories and below for suggested use.

- Crevice Tool: used for vacuuming narrow recessed areas.
- * Flare Tool: used to vacuum thin layers or spread out layers of abrasive on flat areas such as floors.
- Wall Brush: used for vacuuming dust from walls and floors.

4.3.3 As the collection containers become full, the recovery rate will noticeably decrease. At that point, stop recovery and allow pick-up hose to clear.

4.3.4 Shut-down the system to empty or replace the collection container and dust collector. Continue with the recovery until the blast area is clean.

4.4 Shut-down

NOTE: Do not recover and load any-more abrasive than will be used. Condensation may develop in the hopper and blast machine, which will cause abrasive to get damp. Abrasive should be stored in air tight containers at the end of the work day.

4.4.1 Stop recovery and let abrasive clear from all recovery hoses.

4.4.2 Shut-down the vacuum producer by closing the air inlet valve.

4.4.3 Turn off the pulse control valve, and drain the manifold tank (dust collector models only).

4.4.4 Empty dust containers, precleaner, and hopper.

5.0 ADJUSTMENTS

5.1 Pick-up Tool

5.1.1 Adjust the air intake on the pick-up tool by sliding the bell shaped collar back from the outer pick-up tube. The further the collar is moved, the more air will be drawn in. Further adjustment may be made by moving the collar off of the air intake holes. Open only as far as needed to keep the abrasive flowing. Too much air will decrease recovery rates. Too little air will cause abrasive to pack, which will also decrease rates.

5.2 Latches

5.2.1 Loosen the lock nut, and turn the latch hook in or out as required to pull the segment tight when the hook is latched.

5.2.2 Tighten the lock nut.

5.3 Inlet/Outlet Elbows

5.3.1 Loosen the nuts on the U-clamp.

5.3.2 Rotate the elbows to the best position to facilitate vacuum hose connections.

5.3.3 Be certain the slits in the elbow slides below the end of stub.

5.3.4 Tighten the U clamps to secure.

5.4 Pulse Pressure (dust collector models only)

5.4.1 Pulse pressure is adjusted by the filter regulator combination located on the timer panel inlet. Adjust pressure between 90 psi and 100 psi.

5.5 Pulse Timer
(Refer to the air schematic in Figure 6, dust collector models only)

5.5.1 The timers are located in the timer panel. Open the panel door and adjust as follows:

5.5.2 Turn on the air supply, and switch the pulse control valve to on.

5.5.3 Turn both timer knobs fully clockwise to close.

5.5.4 "ON" time (lower timer) "On" time is the length of each pulse. The pulse should be kept as short as possible, because it is the initial burst of air that cleans the cartridge. Adjust the "On" time by turning the knob three full turns counterclockwise.

5.5.5 "OFF" time (upper timer) "Off" time is the time between each pulse. Adjust the off time by turning the knob approximately one half turn counterclockwise until the time between each pulse is around 15 seconds.

5.5.6 The differential pressure gauge is useful in determining the need to change the time between pulses ("off" time). When the gauge consistently reads 6" or above, (reading taken with the VPR on, and no recovery) turn the "OFF" time (upper timer) knob counterclockwise to increase the pulses, and lower the reading.

6.0 MAINTENANCE

6.1 Preventive Maintenance

6.1.1 Never operate without the pick-up tool. Using a hose without a pick-up tool to vacuum, will usually decrease recovery rates.

6.1.2 Do not leave abrasive in storage hopper, blast machine, or loading hopper overnight. Condensation may develop in the hopper, which will cause abrasive to get damp. At the end of the work day abrasive should be stored in air tight containers.

6.1.3 Do not over fill the system. Production decreases noticeably once the abrasive level reaches the bottom of the inlet tubes on the hopper cover. This will also cause carry over of useable abrasive into the dust container.

6.1.4 Do not operate without the dust collector, or wet-filter drum. Doing so will cause premature wear on the vacuum producer and silencer, and excessive dust.

6.1.5 Shut-down immediately if sand or dust is seen coming from the vacuum producer silencer. Check the filter cartridges or water level.

6.1.6 Keep all hose as straight as possible. Bends in the hose will accelerate wear and also decrease efficiency.

6.1.7 Do not pulse the dust collector with the dump-out valve open. Doing so will cause dust leaks every time the collector pulses.

6.1.8 Do not operate with the dust collector dump-out valve open. Doing so will loose vacuum and cause pneumatic wear of dump-out valve and other parts.

6.1.9 Drain the dust collector pulse manifold at the end of daily operations. Drain more frequently if water is present in the air line. A drain petcock is located on the bottom of the manifold.

6.2 General Maintenance

! WARNING

NIOSH approved air-supplied respirators and protective clothing must be worn when servicing any area of the system and collector that exposes the user to dust.

- 6.2.1** Check and clean storage hopper screens daily.
- 6.2.2** Empty dust filters and precleaner at least daily. Loading dusty abrasive, or recovering spent abrasive will require more frequent emptying.
- 6.2.3** Immediately check filter cartridges for damage if dust is emitted from the vacuum producer silencer.
- 6.2.4** Emptying dust collector
- 6.2.4.1** Shut off the VPR, turn off the pulse control valve, and drain the manifold tank.
- 6.2.4.2** Check that the dust disposal container or bag is in place and sealed around the dump-out opening.
- 6.2.4.3** Open the dump-out valve to let dust enter the disposal container.

! CAUTION

To avoid spilling harmful dust, close the dump-out valve before the dust container is full. The container must have the capacity to hold dust left in the tube after the valve is closed.

- 6.2.5** Changing filter cartridges.
- 6.2.5.1** Empty dust collector.
- 6.2.5.2** Remove the vacuum hose and manifold air hose from the dust collector lid.
- 6.2.5.3** Remove the lid from the dust collector body.
- 6.2.5.4** Remove the four hex nuts and hold-down plate on each cartridge.

6.2.5.5 Pry up on the cartridge flange to break the seal on the cartridge gasket. Pull the filter cartridges straight up out of the collector housing.

6.2.5.6 Clean the top side of the cartridge plate, particularly around the sealing area.

6.2.5.7 Set the new cartridges in place, and replace the hold-down plates. Secure with the hex nuts.

6.2.5.8 Replace the lid assembly. The lid has two locator bolts that must be aligned with holes on the housing before clamping the latches.

6.2.5.9 Replace the vacuum hose and manifold air hose.

6.2.5.10 Season the cartridges per section 6.2.6.

6.2.6 Seasoning Cartridges

6.2.6.1 New cartridges must be seasoned. Cartridges are seasoned by letting a dust cake develop on the filter media before starting the pulse cycle.

6.2.6.2 Let new cartridges run without pulsing (pulse control valve turned off) until the differential pressure gauge reads 1 inch above the initial reading. At that point the pulse control valve can be turned on to start the pulsing cycle. New dust collectors and cartridges should not be pulsed until cartridges are seasoned.

7.0 TROUBLESHOOTING

7.1 No vacuum or low vacuum at the pick-up tool.

7.1.1 Clogged filter cartridges. Decrease pulse time or replace cartridges.

7.1.2 Leak in hose connections, storage hopper or filter lids. See Section 4.7.

7.1.3 Access door in storage hopper is open or leaking. Close, repair or replace gasket.

7.1.4 Inadequate air supply. Check pressure gauge on vacuum producer. It should be between 90-100 psi.

7.1.5 Worn venturi tube insert in vacuum producer. Replace.

7.1.6 Venturi insert loose. Check and tighten.

7.1.7 Dirt accumulated on VPR jet. Clean.

7.1.8 Storage hopper or dust container is full. Check level.

7.1.9 Blockage in pick-up hose. Remove pick-up tool and clear.

7.1.10 Flapper valve is open (17 cubic foot hopper only). Close.

7.2 If the abrasive flow at the pick-up tool stops for a few seconds then re-starts, check the following:

7.2.1 Air intake on pick-up tool isn't open far enough. Refer to section 5.1 for adjustment.

7.3 If dust or abrasive is coming from the vacuum producer, check the following:

7.3.1 Damaged or loose filter, shut-down and check immediately.

7.3.2 Water level in wet-filter is not high enough.

7.4 If there is excessive water coming from the vacuum producer silencer (wet-filter only), check the following:

7.4.1 Water level in the wet filter is too high.

NOTE: A small amount of water coming from the silencer is normal. As dust is collected in the drum, the water level will rise and carry over to the vacuum producer.

7.5 Carry over of useable abrasive to dust container.

7.5.1 Blast machine or storage container full. Decrease loading time.

7.5.2 Inlet and outlet hose reversed on the storage hopper. The elbow with the long dip tube is the inlet, see Figure 1. Verify that the pick-up hose is connected to the elbow with the long tube.

8.0 ACCESSORIES

(Optional)

Description	Stock No.
Bulk pick-up tool, 2" O.D.	04327
Crevice tool, 2" O.D. with swivel adaptor and coupling.....	04270
Crevice tool, 3" O.D. with swivel adaptor and coupling.....	04271
Flare tool, 2" O.D. with swivel adaptor and coupling.....	04272
Flare tool, 3" O.D. with swivel adaptor and coupling.....	04273
Wall brush assembly, 2"	04300
Hose, 2" bulk vacuum, up to 100 ft. (specify length in feet).....	10332

Hose, 3" bulk vacuum, up to 100 ft.
 (specify length in feet) 10286
 3"-2" Vacuum hose transition,
 connects 2" vacuum hose to 3" hose 11221

NOTE: To connect two 3" hoses together, it is necessary to order:
 2 Hose end coupler 3" 04338
 2 Clamp, 3" hose 02816
 1 Clamp, 3" coupler 08777

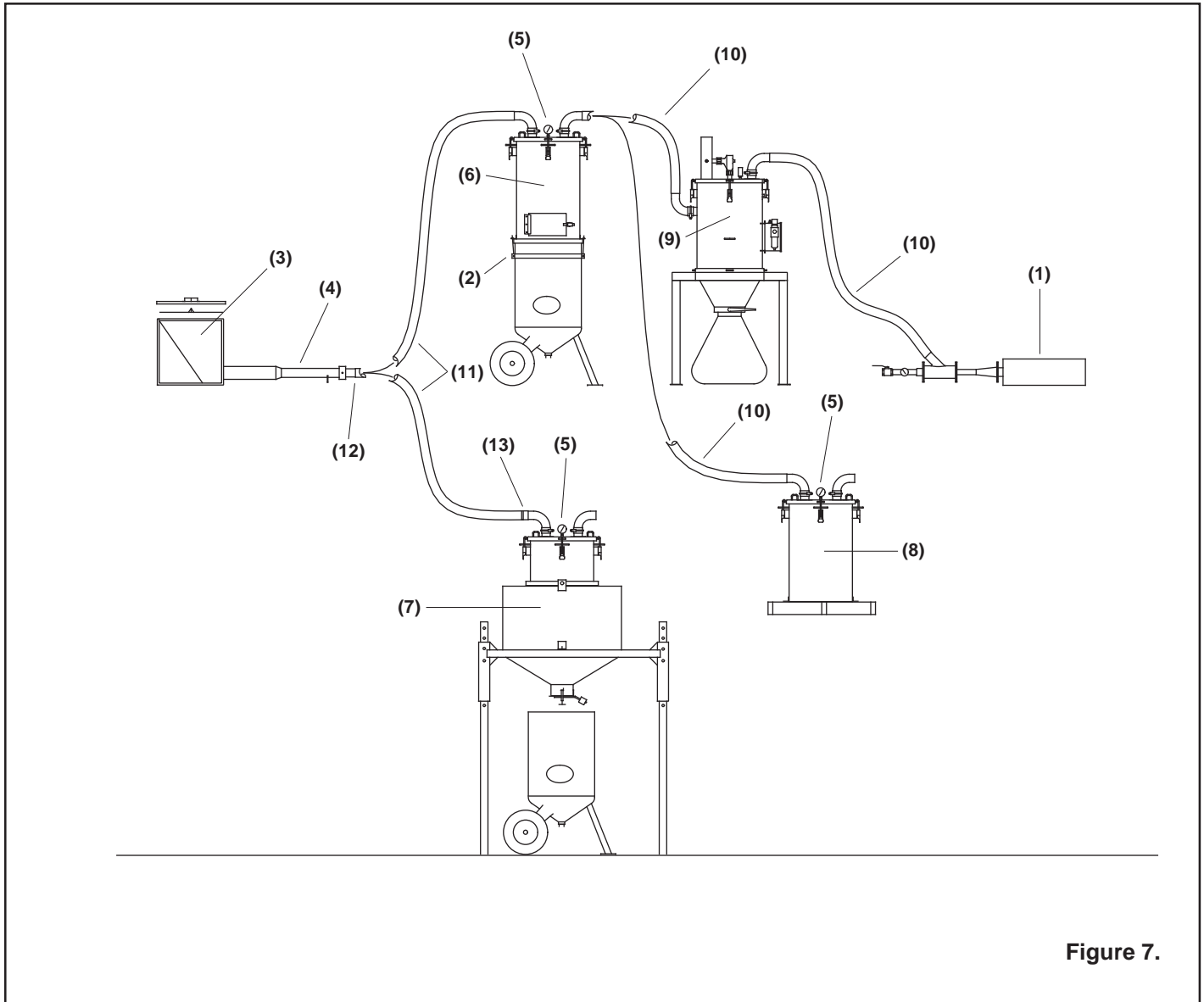


Figure 7.

9.0 REPLACEMENT PARTS

**9.1 System Replacement Parts,
 Figure 7**

Item	Description	Stock No.
1.	290 Vacuum producer with silencer	07585
2.	Attachment kit, 24" blast machine	10289
3.	Loading hopper	07556
4.	Pick-up tool, 3" bulk	04275
5.	Lid assembly, with 3" inlet	20417
	with 2" inlet (for CCB)	20419
6.	Hopper assembly, 6 cu.ft.	07568
7.	Hopper assembly, 17 cu.ft	10793
8.	Pre-cleaner/wet-filter drum	20418
9.	Dust collector, complete	20416
10.	Hose, 3" x 10 ft vacuum	10900
11.	Hose, 3" x 25 ft vacuum	10902
12.	Hose end coupler, 3"	04338
13.	Clamp, 3" hose	02816

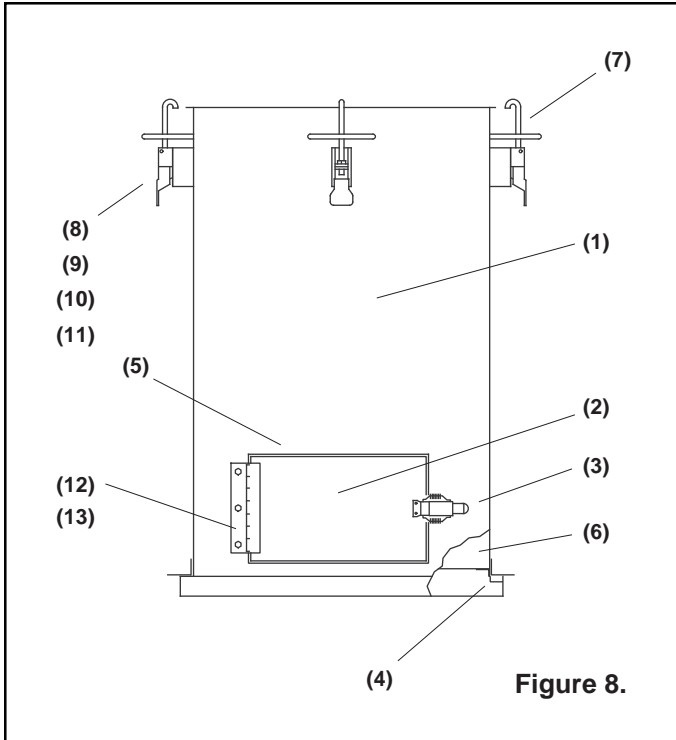


Figure 8.

9.2 Storage Hopper, 6 Cubic Foot
Figure 8

Item	Description	Stock No.
(-)	Storage hopper, complete	07568
1.	Storage hopper weldment	07548
2.	Door	07560
3.	Latch assy, spring, door	12263
4.	Gasket, 7/16" x 1" adhesive backed, 7 ft. required	00190
5.	Gasket, door	11745
6.	Screen	15091
7.	Latch assy, hook	20445
8.	Screw, 1/4-nc x 1 hex head.	03053
9.	Nut, 1/4-nc hex	03111
10.	Washer, 1/4" lock	03117
11.	Washer, 1/4" flat	03116
12.	Screw, 10-32 x 1/2" truss	12062
13.	Nut, 10-32 lock	12731

9.3 Hopper Assembly, 17 Cubic Foot
Figure 9

Item	Description	Stock No.
(-)	Hopper assembly, complete	10793
1.	Hopper only, 17 cu. ft.	07579
2.	Volume segment	07547
3.	Stand assembly	07559
4.	Release pin and chain	10276
5.	Hinge (rubber), flapper valve	04062
6.	Gasket, flapper valve	04061
7.	Clamp, flapper valve	10186
8.	Tee bolt, flapper valve	10187
9.	Counter weight, flapper valve	04065
10.	Clamp, flapper valve hinge	04057
11.	Latch assy., hook	20445

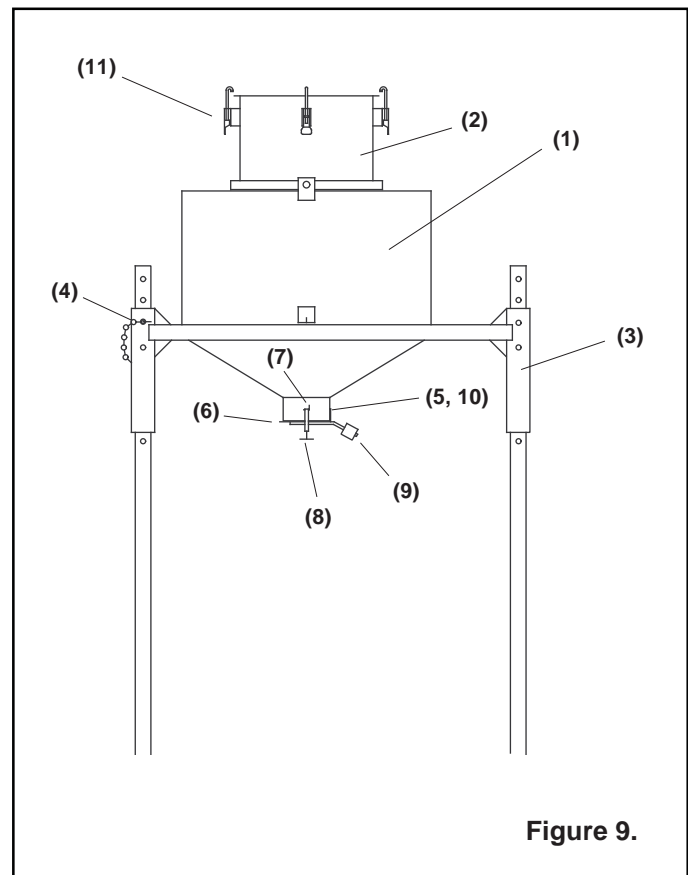


Figure 9.

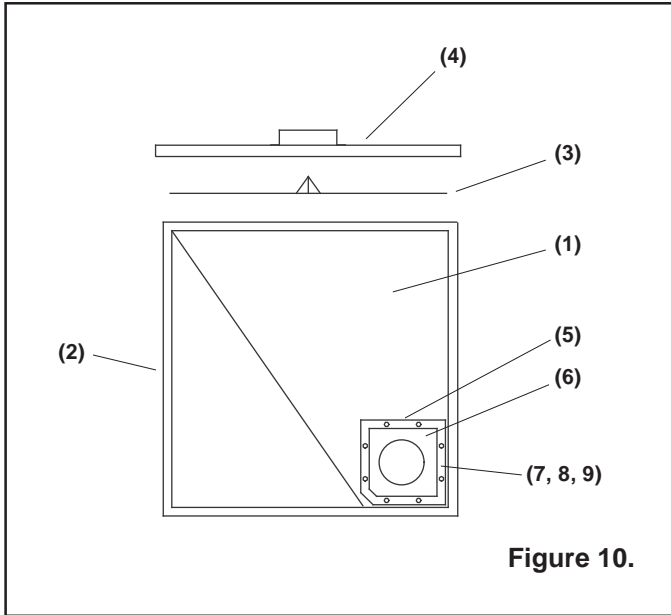


Figure 10.

9.4 Loading Hopper Assembly

Figure 10

Item	Description	Stock No.
(-)	Loading hopper, complete	07556
1.	Hopper	07567
2.	Frame	07532
3.	Screen	10293
4.	Cover	10294
5.	Retainer, gasket	07533
6.	Gasket	07534
7.	Screw, 1/4-nc x 1/2" hex head	03051
8.	Nut, 1/4-nc	03111
9.	Washer, 1/4" flat	03116

9.5 Lid, Cover Assembly

Figure 11

Item	Description	Stock No.
(-)	Lid assembly, complete, with 3" inlet	20417
(-)	Lid assembly, complete, with 2" inlet	20419
1.	Lid weldment	20414
2.	Retainer quadrant, each	20395
3.	Elbow, 2"	10792
4.	Elbow, 3"	10179
5.	Gauge, 30" Hg vacuum	10169
6.	Gasket, dip tube	10232
7.	Gasket, extruded	20443
8.	3" Outlet tube, 3.5" long	10451
9.	3" Inlet tube, 8.5" long	10452
10.	2" Inlet tube, 8.5" long	10790
11.	2" U-clamp	10789
12.	3" U-clamp	10486

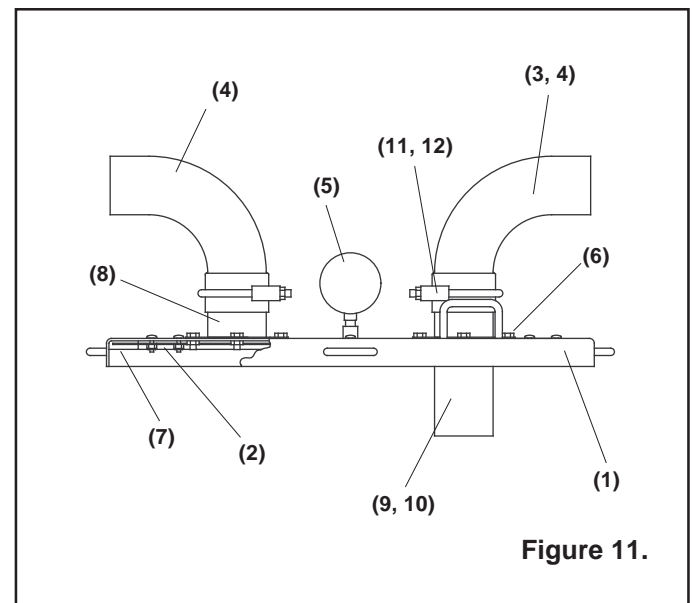


Figure 11.

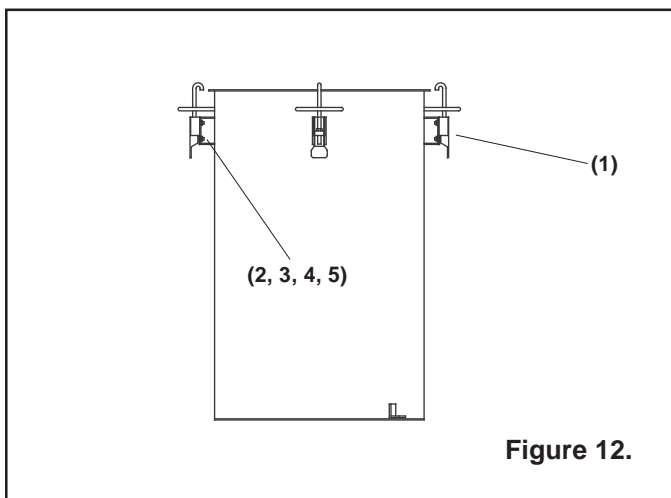


Figure 12.

9.6 Precleaner Drum

Figure 12

Item	Description	Stock No.
(-)	Precleaner drum, complete	20418
1.	Latch assembly, hook	20445
2.	Screw, 1/4-nc x 1 hex head	03053
3.	Nut, 1/4-nc hex head	03111
4.	Washer, 1/4" lock	03117
5.	Washer, 1/4" flat	03116

9.7 VPR Vacuum Producer
Figure 13

Item	Description	Stock No.
(-)	VPR assembly with silencer	07585
(-)	VPR assembly without silencer	07599
1.	Silencer	07594
2.	Venturi tube w/290 venturi insert and set screws.....	07518

3.	Screw, 1/4-nc x 1/4" set	03075
4.	Jet, 290 air	07516
5.	Body	07524
6.	Adaptor, air jet, 290	07598
7.	Gasket	07514
8.	Nipple, 1-1/2" x 10"	07531
9.	Gauge, pressure	07520
10.	Valve, 1-1/2-NPT ball	07596
11.	Wear insert, 290 venturi tube.....	10912

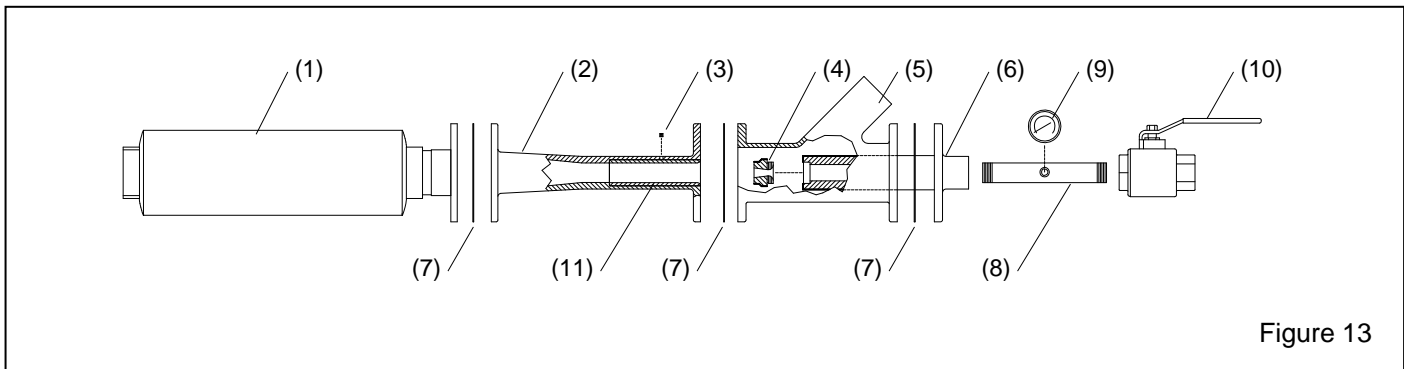


Figure 13

9.8 Dust Collector
Figure 14

Item	Description	Stock No.
(-)	Dust collector, complete	20416
1.	Valve, 1" diaphragm pulse	10392
2.	Filter cartridge, 9" x 24", 2 required	20444
3.	Gauge, 30" Hg vacuum	10169
4.	Elbow, 3"	10179
5.	3" U-clamp	10486
6.	Latch assembly	20445
7.	Petcock, drain	01993
8.	U-channel, rubber, 7 feet required.....	04076
9.	Tube, 3" OD x 3.5" long dip	10451
10.	Gasket, dip tube	10232
11.	Filter regulator 1/2"	05530
12.	Lid weldment	20422
13.	Valve, 6" dump	21082
14.	Pipe, 6" outlet	20459
15.	Bag, 4 cu ft dust	21083
16.	Clamp, 8"	11576
17.	Gasket, dump valve, 2 required	20204

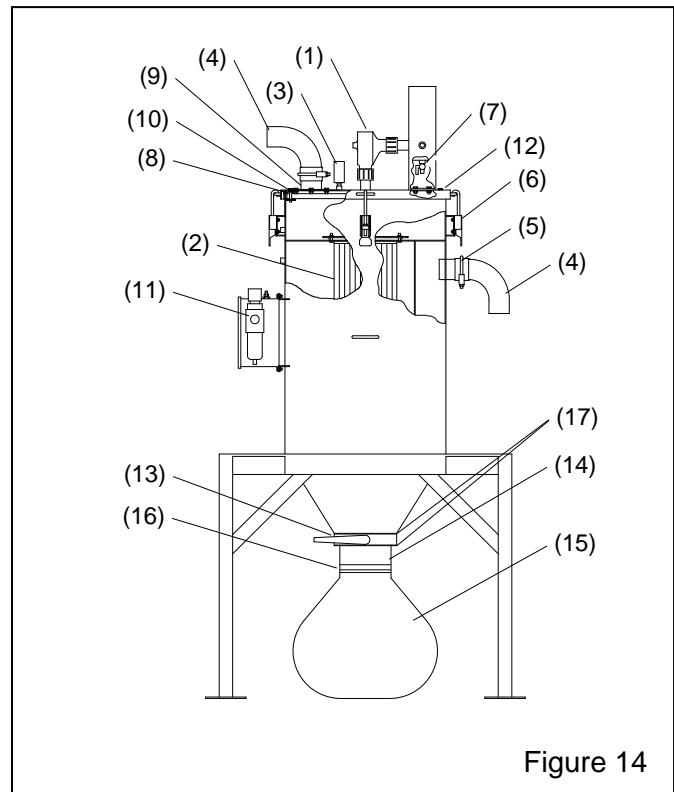


Figure 14

9.8 Dust Collector Air Schematic, Figure 15

Item	Description	Stock No.
1.	Fitting, 1/4" bulkhead	05605
2.	Differential pressure gauge	10188
3.	Valve, 3 way toggle	07658
4.	Fitting, 1/8" bulkhead	20114
5.	Tee, 1/2" npt	01787
6.	Nipple, 1/2" npt x close	01733
7.	Bushing, 1/2" x 1/4"	01801
8.	Bushing, 1/4" x 1/8"	02010
9.	Nipple, 1/4" npt x close	01829
10.	Hose, 1/2" air, 4' req.	12472
11.	Hose end, 1/2" swivel	15002
12.	Adaptor, 1/2" npt x 1/2" flare	11351
13.	Valve, 1" diaphragm	10392
14.	Adaptor, 1/8" npt x 1/8" barb	11732
15.	Adaptor, elbow, 1/8" npt x 1/8" barb	11733
16.	Tubing, 1/8" urethane	12475
17.	Actuator, air pilot	19123
18.	Valve, 3 way	12202
19.	Elbow, 1/8" npt st	03993
20.	Nipple, 1/8" npt hex	01962
21.	Adaptor, 1/8" npt	01940
22.	Adaptor, 1/4" npt	02494
23.	Hose, 3/16" x 18"	02454
24.	Hose, 3/16" x 12"	20440
25.	Hose, 3/16" x 36"	02498
26.	Subplate, pulse timer	20446
27.	Control, air timer	20447
28.	Valve, air timer	20448
29.	Valve, air timer	20449
30.	Valve, air timer	20450
31.	Timing chamber	20424
32.	Filter, 1/4"	20438
33.	Filter regulator	20442

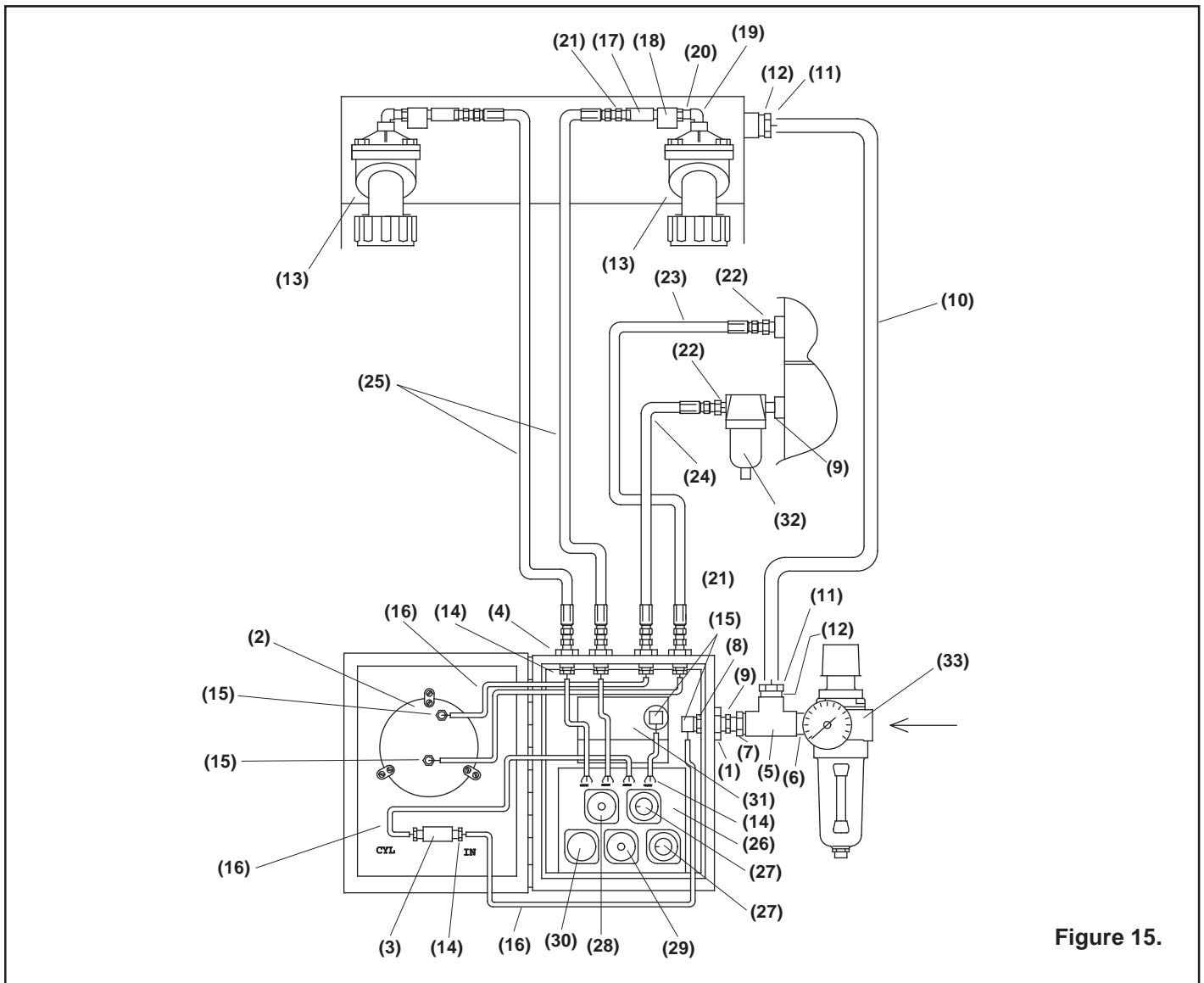


Figure 15.