

COMET SUCTION BLAST and VACUUM RECOVERY SYSTEM O. M. 14413

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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 important information.

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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.

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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

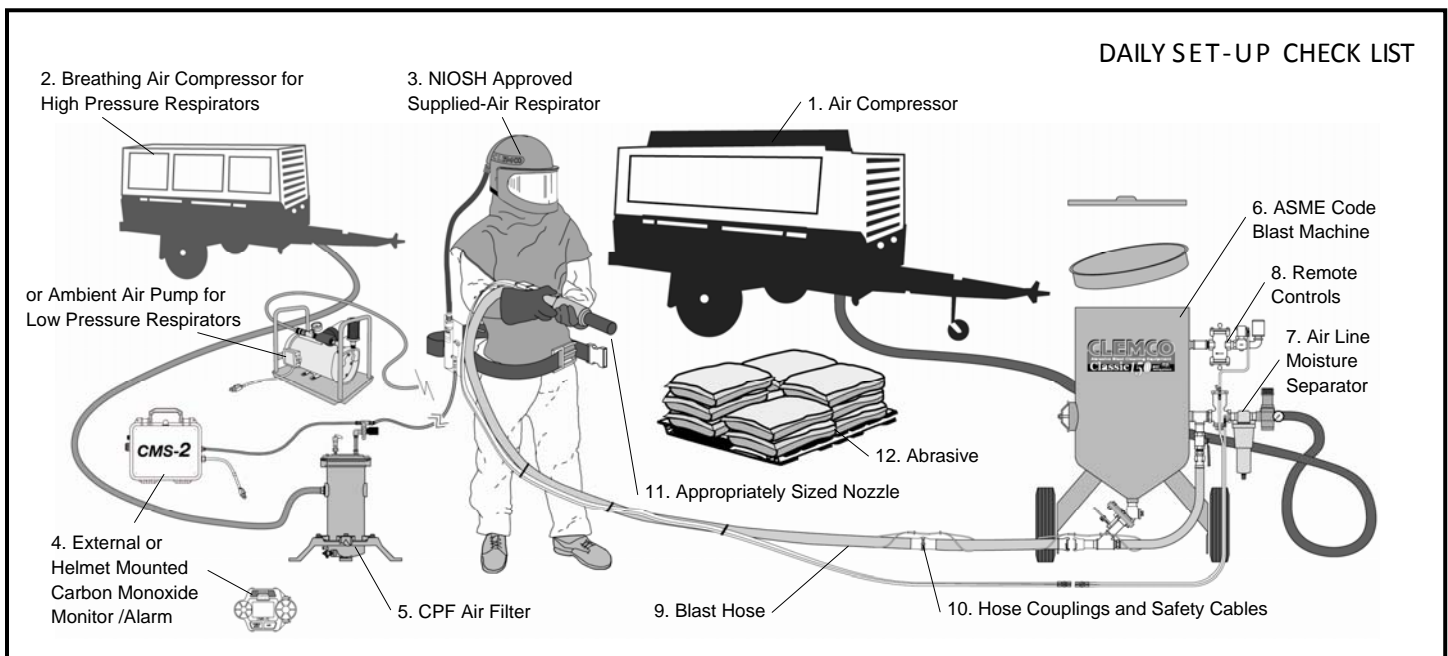
- Completely read and follow all service instructions and recommended maintenance intervals. Always shut off compressor and depressurize blast machine before performing any maintenance. At every service interval, clean all filters, screens, and alarm systems. If spring-loaded abrasive valves are used,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

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1.0 INTRODUCTION

1.1 Scope of manual

1.1.1 These instructions cover the set-up, operation, maintenance, troubleshooting, and replacement parts for the Comet blast and recovery machine.

1.1.2 These instructions contain important safety information. All operators and personnel involved with the abrasive blast process must read and understand the contents of these instructions, including the orange cover. It is equally important that the operator is trained and qualified to safely operate the blast machine and all other equipment used with the machine.

1.1.3 All personnel involved with the abrasive blasting process must be made aware of the hazards associated with abrasive blasting. The Clemco booklet "Abrasive Blasting Safety Practices" is included with every blast machine, and contains important safety information about abrasive blasting that may not be included in equipment operation manuals. To order additional copies, visit www.clemcoindustries.com or email info@clemcoindustries.com.

1.2 Safety Alerts

1.2.1 Clemco uses safety alert signal words, based on ANSI Z535.4-2011, 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:



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

NOTICE

Notice indicates information that is considered important, but not hazard-related, if not avoided, could result in property damage.

CAUTION

Caution indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

WARNING

Warning indicates a hazardous situation that, if not avoided, could result in death or serious injury.

DANGER

Danger indicates a hazardous situation that, if not avoided, will result in death or serious injury.

1.3 Components, Figure 1

1.3.1 The primary components of the Comet are:

1. Blast gun and vacuum head assembly with brushes for inside corner, outside corner and flat surfaces.
2. Reclaimer and recovery hose.
3. Dust collector and exhauster.

1.4 Theory of Operation

1.4.1 The Comet utilizes the suction blast principle; air moving through the blast gun and head assembly creates a partial vacuum. This vacuum draws abrasive from the reclaimer hopper through the media hose; the abrasive mixes with the compressed air stream in the blast gun, and is propelled out the nozzle.

1.4.2 The recovery vacuum begins when the operator starts the exhauster by flipping the toggle switch located on the exhauster motor.

1.4.3 When the air supply and electrical power are ON, the machine is ready for actuation by the palm valve mounted on blast gun assembly. Pressing the valve opens the air supply, and begins the blasting process. When the operator releases pressure on the valve, air shuts off, and blasting stops.

1.4.4 During operation, the abrasive metering valve installed at the bottom of the reclaimer meters a controlled quantity of abrasive through the media hose and into the blast gun. Blasting is contained entirely within the vacuum head assembly. A brush, at the end of the assembly, confines the abrasive and draws in atmospheric air, sweeping the blast area clean.

1.4.5 Spent abrasive and by-products are conveyed from the blast surface to the reclaimer. In the reclaimer, reusable abrasive drops out of suspension, passes through a screen, and collects in the abrasive hopper.

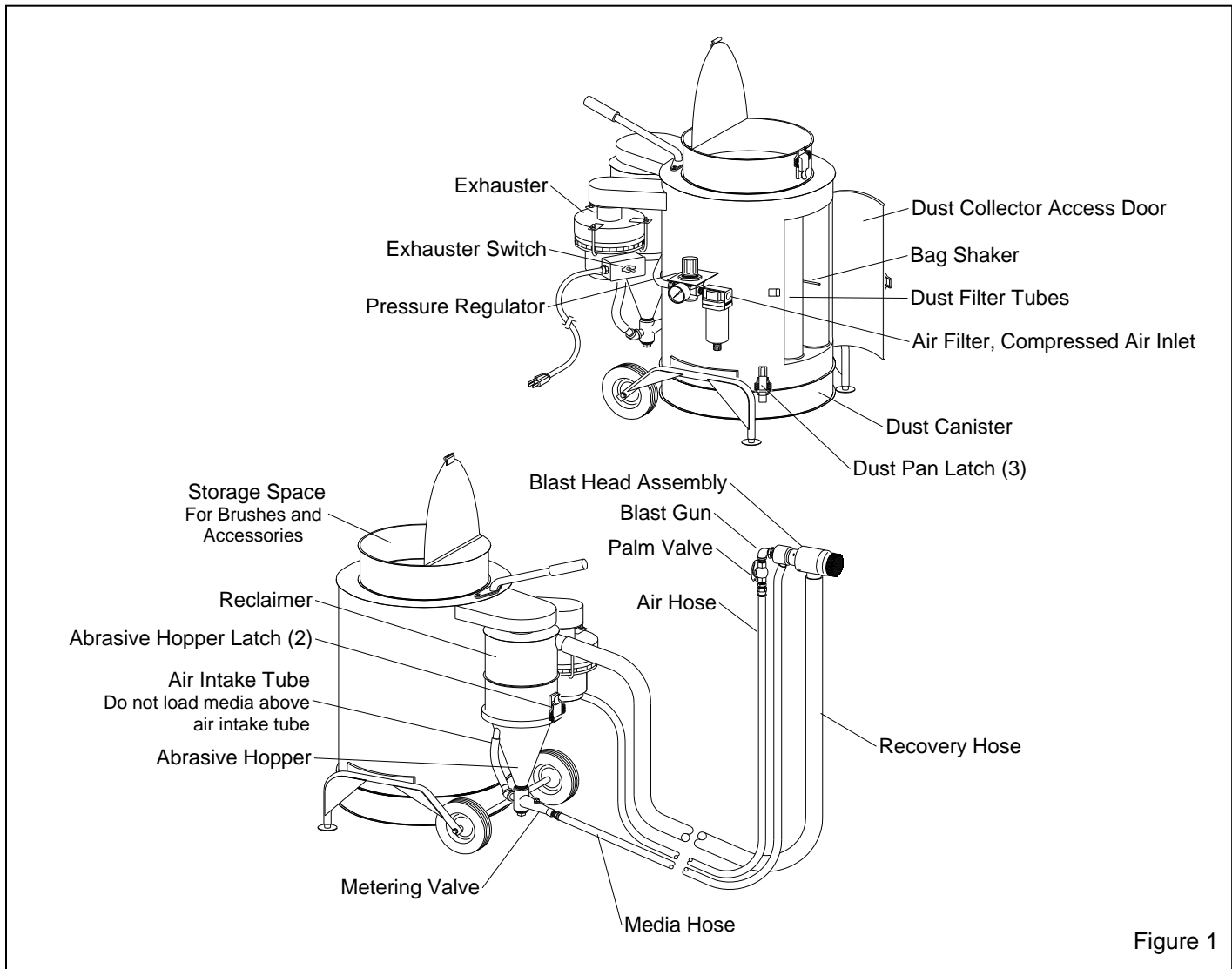


Figure 1

1.4.6 Air, dust and fine by-products leave the reclaimer and are drawn through the dust collector. Dust collects in the cloth filter, and the cleaned air passes through the exhaust fan and is discharged into the atmosphere. Dust particles trapped by the filter bags are removed by a mechanical bag shaking mechanism; dust released from the bags collects in a removable canister for disposal.

1.5 Nozzle Options

1.5.1 The Comet is shipped with a 3/16" orifice plate and 3/8" ceramic nozzle. Use an optional boron carbide nozzle and boron tube insert when blasting with aggressive abrasive as noted in Section 1.6.3. Refer to Section 8.2, items 2 and 4.

1.6 Abrasive

1.6.1 The Comet is designed to utilize most common recyclable abrasives, sized between 60 and 280 mesh that are specifically manufactured for blasting. Suitable abrasive mesh sizes are based on typical abrasive flow.

1.6.2 Glass Bead: Glass bead No. 6 to No. 13 may be used. Most beads are treated to ensure free-flow operation even with moderately high humidity. Glass beads subjected to moisture may be reused after thorough drying and breaking up of any clumps.

1.6.3 Aluminum Oxide, Silicon Carbide, and Garnet: Aggressive abrasives such as these may be used, but consideration must be given to the rapid wear on all parts of the system (reclaimer, nozzle, or hoses etc.) which come in contact with the abrasive. Optional boron nozzles and tube inserts are required when any of these abrasives is used. Refer to Section 8.2.

1.6.4 Steel: Steel grit or shot is too heavy for the system to recover. Do not use metallic abrasive.

1.6.5 Sand and Slag: Sand should never be used because of the respiratory hazards associated with abrasives containing free silica. Slags are not recommended because they rapidly break down and are not recyclable, making them unsuitable for closed-circuit blasting applications..

2.0 SET-UP

2.1 Compressed Air Requirements and Air Hose Connection

2.1.1 Refer to the table in Figure 2 to determine the minimum cfm requirements at various pressures.

Air Consumption in CFM (cubic feet per minute)					
		PSI			
JET	NOZZLE	50	60	70	80
3/16"	3/8"	32.8	37.5	43.0	47.5

Figure 2

2.1.2 The air supply line from the compressor to the Comet should have a minimum ID of 3/4".

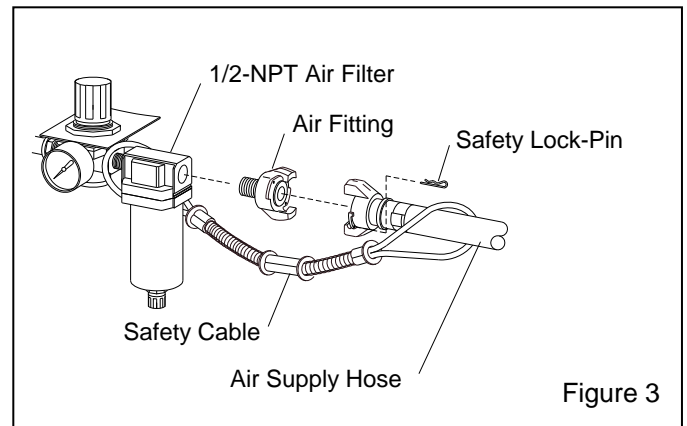
⚠ WARNING

Failure to observe the following before connecting the equipment to the compressed air source could cause serious injury or death from the sudden release of compressed air.

- **Lockout and tagout the compressed air supply.**
- **Bleed the compressed air supply line.**

2.1.3 Install an isolation valve at the air source to enable depressurization for service, and connect an air line from the air source to the air filter inlet.

2.1.4 Apply thread sealant to the male threads of an air fitting that is compatible with the air supply hose fitting, as noted in Paragraph 2.1.2, and install it onto the 1/2-NPT air filter as shown in Figure 3. Note that the style of connection shown is for reference only.



⚠ WARNING

If twist-on (claw type) air hose couplings are used, they must be secured by safety lock-pins or wires to prevent accidental disconnection while under pressure. Use safety cables to prevent hose whipping should a separation occur. Hose disconnection while under pressure could cause serious injury.

2.1.5 The air filter at the air inlet connection reduces condensed water from the compressed air. Its use is especially important in areas of high humidity, or when using fine-mesh media. Moisture causes media to clump and inhibits free flow through the feed assembly. If the filter does not remove enough moisture to keep media dry and flowing, it may be necessary to install an air dryer or aftercooler in the air supply line.

2.2 Electrical Requirements

2.2.1 The system requires 115-VAC, 1-Ph, 60-Hz, with 15 Amps service.

2.2.2 A power cord is supplied. No additional wiring is required. **Refer to the following important warning.**

⚠ WARNING

Do not use electrical adaptors that eliminate the ground prong on 115 volt plugs. Doing so can cause electric shock and equipment damage.

3.0 OPERATION

3.1 Inspection

3.1.1 Make sure that all compressed-air supply hose connections are secured. Use safety lock-pins or safety wire to lock the couplings together.

⚠ WARNING

If twist-on (claw type) air hose couplings are used, they must be secured by safety pins or wires to prevent accidental disconnection while under pressure. Use safety cables to prevent hose whipping should a separation occur. Hose disconnection while under pressure could cause serious injury.

3.1.2 Make sure that all air fittings are tight.

3.2 Loading the Machine with Abrasive

3.2.1 With the exhauster off, unlatch the abrasive hopper from the bottom of the reclaimer, and remove the screen. Pour clean, dry abrasive into the container. Do not fill past the lower level of the abrasive hopper's air intake tube; the tube must remain unobstructed.

3.2.2 Place the screen in the container, and latch the container to the reclaimer.

3.3 Select Brush and Attach to Head, Figure 4

3.3.1 Three containment brushes are provided: One for flat surfaces, one for inside corners, and one for outside corners.

3.3.2 Using the elastic brush retainer, attach the appropriate brush to the blast head as follows.

3.3.2.1 Some find it is easier to attach the brush if the elastic retainer is first placed on the head and then rolled inside-out, backward over the head.

3.3.2.2 Place the brush over the end of the head until it snaps into position into the mating groove. Note: inside and outside corner brushes may be rotated to align the angle to the corners to be blasted to minimize interference with the blast and vacuum recovery hoses.

3.3.2.3 Roll the elastic over the end of the brush to secure, as shown in Figure 4.

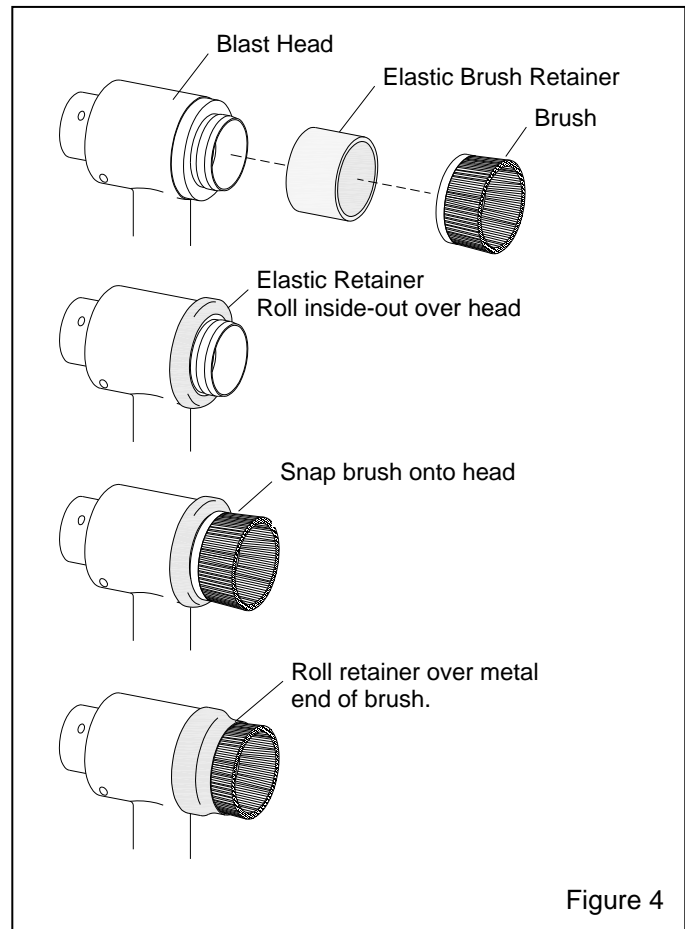


Figure 4

3.4 Blasting Operation

NOTICE

All parts to be blasted must be free of oil, water, and other contaminants. If not clean, the abrasive may contaminate the blast surface, and may clog abrasive, resulting in equipment malfunction.

3.4.1 Operators must wear operator safety equipment. A NIOSH-approved, supplied-air respirator protects against inhalation of dust. Heavy gloves and clothing will help prevent serious injury from the abrasive blast if the brushes are accidentally lifted off the surface.

3.4.2 The machine is ready for operation when compressed air and electrical power are supplied to the machine, and the machine contains abrasive.

3.4.3 Adjust the pressure regulator, located on the inlet plumbing, to the required blasting pressure, per Section 4.1.

3.4.4 Start the exhauster by flipping the toggle switch located on the electrical box on the exhauster motor.

3.4.5 Hold the vacuum head brush against the surface to be blasted and depress the palm valve. Blasting will begin immediately.

3.4.6 To stop blasting, release the pressure on the palm valve. Leave the brush against the surface for several seconds after blasting stops, to ensure that all abrasive is recovered from the surface.

3.5 Operating Technique

3.5.1 To achieve full abrasive and dust recovery, the brush must be in contact with the surface at all times.

3.5.2 Keep the brush flat against the surface. Keep the vacuum head perpendicular to the surface.

3.5.3 Do not apply excessive pressure that would cause the brush to bend into the blast stream.

3.5.4 Make straight, even passes over the blast surface. The blast pattern should barely overlap the pattern from the previous pass.

3.5.5 When reversing direction, move the gun and brush in a small radius, allowing the brush bristles to flex evenly.

3.6 Shut-down

3.6.1 After blasting is complete, run the exhauster for several seconds to clear abrasive from the hoses.

3.6.2 When working in environments subject to extreme temperature changes, or very humid conditions, empty the machine of all abrasive when shutting down for the day. Doing so will eliminate trouble from moist abrasive when starting blasting. Store the abrasive in an air-tight container.

3.6.3 Close the compressed-air supply valve.

3.6.4 Drain receiver tank, filters, and water collecting devices, and bleed the compressed-air supply hose, and shut down the compressor.

4.0 ADJUSTMENTS

4.1 Blast Pressure, Figure 5

4.1.1 The pressure regulator, located on the inlet plumbing, enables the user to adjust blasting pressure to suit the application. The suitable pressure for most purposes is 80 psi. Lower pressures may be used for delicate work. In all cases, highest production can be achieved only when pressure is carefully monitored.

4.1.2 To adjust, unlock the knob by pulling it up, and turn it clockwise to increase pressure or counterclockwise to decrease pressure. Pressure will usually drop from closed-line pressure when blasting is started. Once operating pressure is set, push the knob in to lock it and maintain the setting.

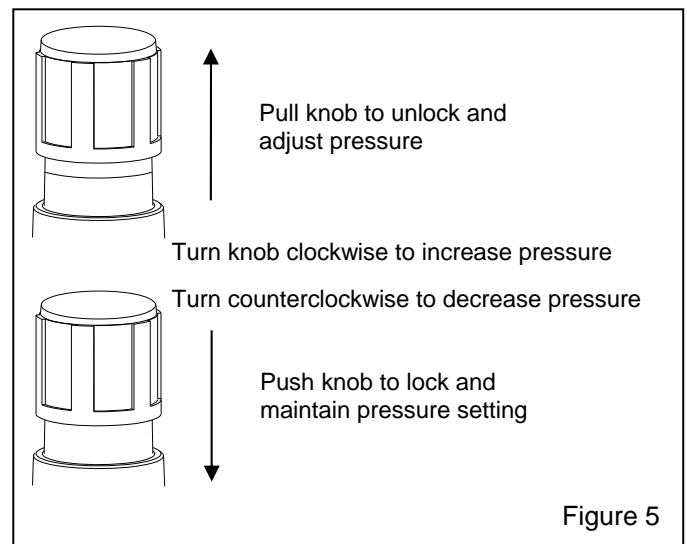


Figure 5

5.0 PREVENTIVE MAINTENANCE

WARNING

Failure to wear approved respirators and eye protection when servicing dust-laden areas of the dust collector, and when emptying the dust canister, could result in serious eye irritation and lung disease or death. Toxicity and health risk vary with type of abrasive and dust generated by blasting. The respirator must be approved for the type of dust generated. Identify all material being removed by blasting, and obtain a safety data sheet (SDS) for the blast abrasive.

5.1 Inspection

5.1.1 To avoid unscheduled downtime, establish a weekly inspection schedule. Inspect all parts subjected to abrasive contact.

5.1.2 Inspect the blast gun, nozzle, vacuum head assembly, and brushes for wear.

5.1.3 Inspect the media hose and recovery hose for thin spots, by squeezing them every and 6 to 12 inches.

5.1.4 Inspect dust collector bag compartment for dust. Replace the dust bags for at first sign of wear. NOTE: Small amount of dust is normal when dust bags are new.

5.2 Dust Collector

5.2.1 The dust collector uses tubular filters which collect dust on their inner surfaces. Every half hour to one hour of blasting, shut off the exhauster and clean the filter bags; open the dust collector access door, grasp the metal shaker ring and shake the bags vigorously eight to ten times. Shaking the bags loosens dust, dropping it into the dust canister. During the blasting operation, the dust collector door must be closed tightly.

5.2.2 Empty the dust canister. Begin by checking the canister after every bag cleaning, and adjust frequency based on usage and breakdown rate of abrasive. Dump the contents into a suitable disposal container.

CAUTION

Blast media is usually non-toxic, however, some materials removed by the process may be toxic. Check with proper authorities for disposal regulations.

5.3 Debris Screen

5.3.1 The screen is accessible by removing the abrasive hopper. With the exhauster OFF, remove the screen and empty it daily or when loading abrasive. Empty the screen more often if part blasted causes excessive debris. Do not operate the machine without the screen in place.

5.4 Air Filter

5.4.1 The machine is equipped with a manual drain air filter. Drain the filter at least once a day, and more often if water is present. Drain the air line and receiver tank regularly. If the filter does not remove enough moisture to keep media dry and flowing, it may be necessary to install an air dryer or aftercooler in the compressed-air supply line.

5.5 Changing Abrasive Type

5.5.1 When changing from one type of abrasive to another, make sure the abrasive hopper, blast hose, recovery hose, and reclaimers are carefully cleaned to remove any remaining abrasive. If not carefully done, the new abrasive will become contaminated.

5.6 Replenishing Abrasive

5.6.1 Renew the abrasive when it becomes worn or contaminated with by-products. Abrasive is considered worn when it is too small for the cleaning applications.

6.0 SERVICE MAINTENANCE

WARNING

Failure to wear approved respirators and eye protection when servicing dust-laden areas of the dust collector and when emptying the dust collector could result in serious eye irritation and lung disease or death. Toxicity and health risk vary with type of media and dust generated by blasting. Identify all material being removed by blasting, and obtain a material safety data sheet for the blast media.

6.1 Nozzle

6.1.1 Replace the nozzle when the diameter of its orifice has increased by 1/16", or sooner if abrasive flow diminishes noticeably.

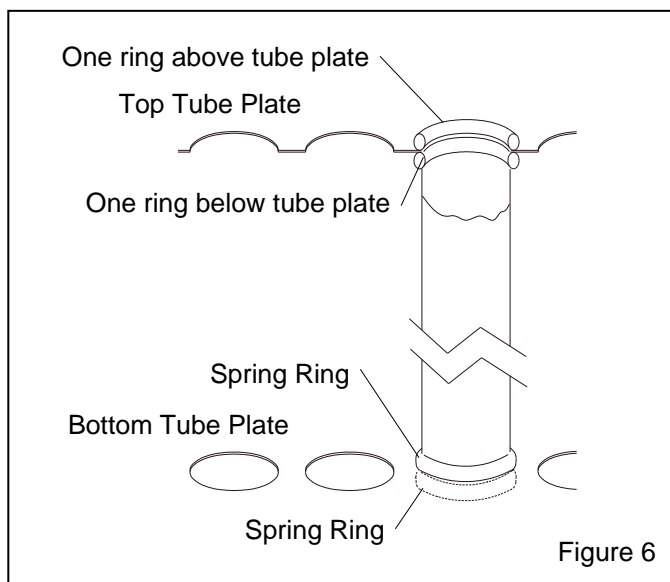
6.1.2 To change the nozzle: loosen the three set screws securing the vacuum head to the nozzle nut, and remove the head assembly. Unscrew the nozzle holding nut from the gun end, and pull the nozzle from the gun. Insert a new nozzle, placing the tapered end toward the jet. Screw the nozzle holding nut onto the gun, and reassemble the vacuum head assembly.

6.2 Filter Tube Replacement

⚠ CAUTION

- **Do not bend spring ends so tight that the ends kink.**
- **Do not use a sharp instrument to force spring rings into the opening. Doing so could damage the filter and seriously impair the efficiency of the dust collector.**
- **Install one filter at a time. Make sure the spring rings are seated with one ring above the tube plate and one below it, and that the tube is not twisted, before proceeding to the next filter.**

6.2.1 Replace damaged filters immediately. Remove the old filters by pulling the spring rings off the bottom and top tube plates. Working from the back to the front, install one filter at a time. To install new filters, form the end of the spring ringed tubular filter into a shallow "c" shape, push the filter far enough into the hole of the top plate to allow one spring ring to snap into place above the tube plate and the other to snap into place below it. Refer to the illustration in Figure 6.



6.2.2 The tubular filters are held firmly by a spring ring above and below the perimeter of the hole in the plate. The other end of the filter is similarly installed in the lower plate. The filters must fit tightly to prevent dust leakage. To ensure a tight seal, apply force as necessary. Check for proper seating at both ends, and remove any twist before proceeding to the next filter.

6.3 Brushes

6.3.1 To avoid unscheduled down-time, keep spare brushes on hand. Replace brushes at the first sign of deterioration. A worn brush will cause abrasive to escape at the blast surface.

7.0 TROUBLESHOOTING

⚠ WARNING

To avoid serious injury, observe the following when troubleshooting.

- **Turn off the air, and lock out and tag out the air supply.**
- **If checking the controls requires air, always enlist the aid of another person to:**
 - **Hold the nozzle securely.**
 - **Operate the palm valve.**
- **Never bypass the palm valve, or tie it in the operating position.**

7.1 Poor vacuum recovery (abrasive escaping at brushes)

7.1.1 Dirty tube filters. Clean the tube filters, and empty dust canister regularly.

7.1.2 Hole worn in recovery hose between vacuum head and reclaimer inlet. Inspect hose for wear.

7.1.3 Reclaimer or dust collector door open. All doors must be closed during operation.

7.1.4 Obstruction in vacuum recovery path. Check for blockage.

7.1.5 Brushes worn. Inspect brushes.

7.1.6 Exhauster not operating. Make sure the exhauster toggle switch is ON.

7.2 Abnormally high abrasive consumption

7.2.1 Abrasive hopper (cone) at bottom of reclaimer loose or gasket is worn. Air entering the reclaimer at this point will cause abrasive to be carried into the dust collector.

7.2.2 Abrasive may be too fine or worn-out.

7.2.3 Using friable abrasive that rapidly breaks down.

7.2.4 Nozzle pressure is too high for the abrasive, causing abrasive to break down.

7.2.5 Hole worn in reclaimer, or leak in reclaimer seams. Check reclaimer for negative-pressure leaks.

7.3 Reduction in blast cleaning rate

7.3.1 Low abrasive level reducing abrasive flow. Check abrasive level and refill as needed.

7.3.2 Reduced air pressure. Reduced pressure may be caused by a malfunctioning regulator, a dirty filter element in air filter, partially closed air valve, leaking air line, or other air tools in use.

7.3.3 Blockage in nozzle. Blockage may occur as a result of a missing debris screen.

7.3.4 Moist abrasive. Moisture may cause frequent bridging or blockage in the area of the metering valve. Refer to Section 7.5.

7.4 Plugged nozzle

7.4.1 A damaged or missing reclaimer screen will allow large particles to pass and block the nozzle. Replace or reinstall the screen as necessary.

7.5 Abrasive bridging

7.5.1 Frequent bridging or blockage in the metering valve can be caused by damp abrasive. Abrasive becomes damp by blasting parts that are slightly oily, from moisture in the compressed air line, or from absorption.

7.5.2 To avoid contaminating abrasive from the workpiece, all parts should be clean and dry. If parts are oily or greasy, degrease and dry them prior to blasting.

7.5.3 Moist compressed air may be due to: a faulty compressor that overheats or pumps oil or moisture into the air line, an air line that is too long permitting moisture to condense on the inside, and high humidity. Drain the

filter regularly. Ongoing problems with moist air may require the installation of an air dryer or aftercooler in the air supply line.

7.5.4 Absorption. Some abrasives tend to absorb moisture from the air, especially fine-mesh abrasives in high humidity areas. Keep unused abrasive in an airtight container.

7.6 Neither abrasive nor air comes out the nozzle when the palm valve is pressed

7.6.1 Pressure regulator may be turned down or OFF. Check pressure on pilot regulator.

7.6.2 Make sure the air compressor is ON and air supply valves are open.

7.6.3 Nozzle plugged. Refer to Section 7.4.

7.7 Air only (no abrasive) comes out the nozzle

7.7.1 Make sure the abrasive hopper contains abrasive.

7.7.2 Check the abrasive cone and debris screen for blockage.

7.7.3 Abrasive too coarse to pass through debris screen.

7.8 Dust leaking from dust collector

7.8.1 Check for damaged or loose filters.

7.8.2 Check for a faulty seal on the dust canister.

8.0 ACCESSORIES AND REPLACEMENT PARTS

8.1 Comet Suction Blast System

Description	Stock No.
Comet Suction System, 120-V, 1-Ph, 60-Hz	12542
Comet Suction System, 220-V, 1-Ph, 50 Hz	12547

8.2 Blast Head and Control Assembly, Figure 7

Item	Description	Stock No.
1.	Head, vacuum, includes set screws and item 2 in alum. .	12300
2.	Insert, tube aluminum, standard	12175
	boron carbide, optional	12409
3.	Nut, nozzle holding	11914
4.	Nozzle, ceramic No. 6, standard	11931
	boron carbide No. 6, optional	11936
5.	Body, gun	11533
6.	Orifice, (air jet) No. 6	11953
7.	Washer, rubber	04396
8.	Retainer, brush	12039
9.	Valve, palm	12188
10.	Adaptor, 3/8" NPT x 1/2" flare	11726
11.	Fitting, 1/2" barb x 1/2" female swivel	15002
12.	Hose, 1/2" ID air, 20 ft. required	12472
13.	Hose, vacuum, 1-1/2" ID x 20 ft.	12450
14.	Tubing, clear urethane media 20 ft. required	11847
15.	Clamp, 2-1/4" hose	12750
16.	Flat surface brush	11569
17.	Inside corner brush	11570
18.	Outside corner brush	11571
19.	Screw, 1/4" x 1/2" socket set	12067

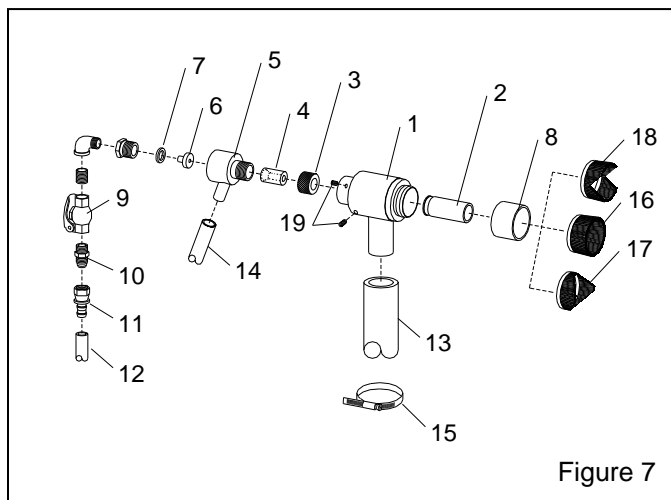


Figure 7

8.3 Reclaimer, Figure 8

Item	Description	Stock No.
1.	Reclaimer assembly includes items 4 and 8	12390
2.	Debris screen	12388
3.	Gasket, debris screen	11756
4.	Gasket, reclaimer mount	11755
5.	Cone, abrasive hopper	29196
6.	Hose, vacuum, 1-1/2" x 20 ft.	12450
7.	Clamp, 2-1/4" hose	12750
8.	Spring latch with strike and fasteners	12263
9.	Valve assembly, flapper	12418
10.	Metering valve assembly includes item 9	12419
11.	Tubing, clear urethane media 1 ft. required at abrasive hopper	11847
	20 ft. required for media conveyance	11847
12.	Fitting, hose, 3/8" NPT x 1/2" barb	06369
13.	Clamp, hose 3/4"	12756

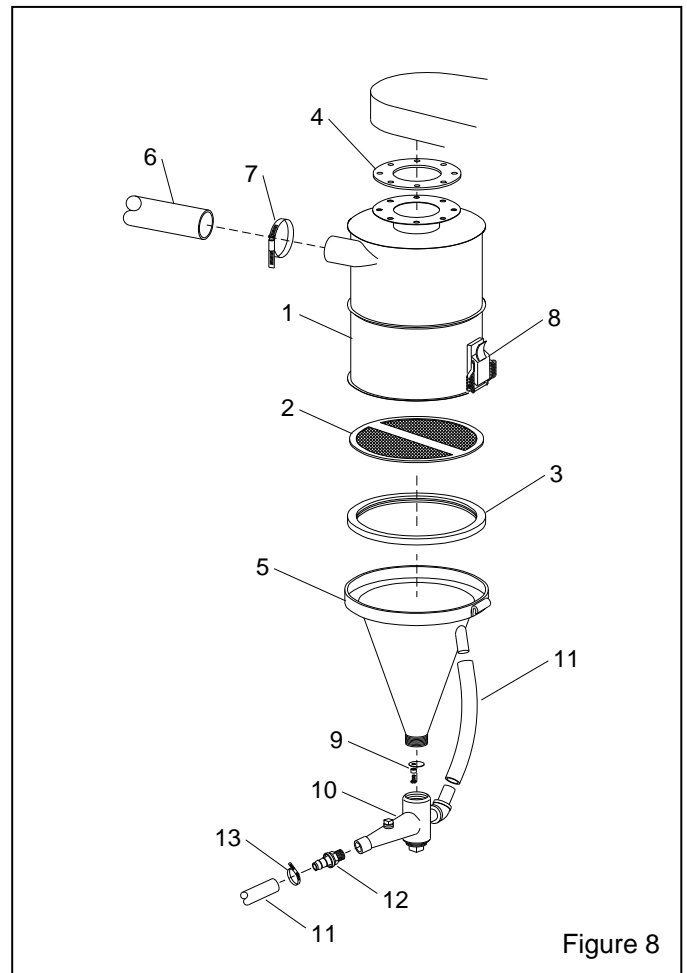


Figure 8

8.4 Dust Collector, Figure 9

Item	Description	Stock No.
1.	Spring latch with strike and fasteners.....	12263
2.	Gasket, door	11760
3.	Gasket, 5/16" x 1" adhesive backed, (5 ft. required)	00187
4.	Dust bag, 20" Long, 14 required	11506
5.	Gasket, air injector	11754
6.	Gasket, motor adaptor	11781
7.	Motor, comet 120-V, 1-Ph, 60-Hz	12315
	220-V, 1-Ph, 50 Hz	11906
8.	Switch, toggle (switch only)	12127
9.	Switch assembly w/ box, cord and plug ..	12384
10.	J-bolt	13576
11.	Brushes, blower motor, ea., not shown	28157

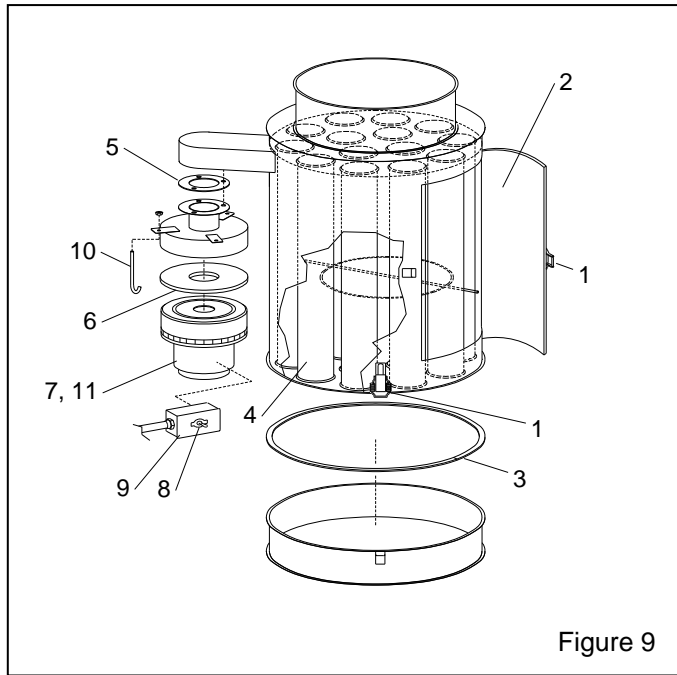


Figure 9

8.5 Miscellaneous, Figure 10

Item	Description	Stock No.
1.	Wheel, 6 inch, each	12214
2.	Axle	13824
3.	Spring latch with strike and fasteners	12263
4.	Hand grip, molded	00812
5.	Regulator, 3/8" pressure	12053
6.	Gauge, 1/8" CBM	01908
7.	Filter, 1/2" manual drain air	01308
8.	Fitting, hose, 1/2" barb x 3/8" male NPT ..	06369
9.	Hose, 1/2" ID air, 20 ft. required	12472

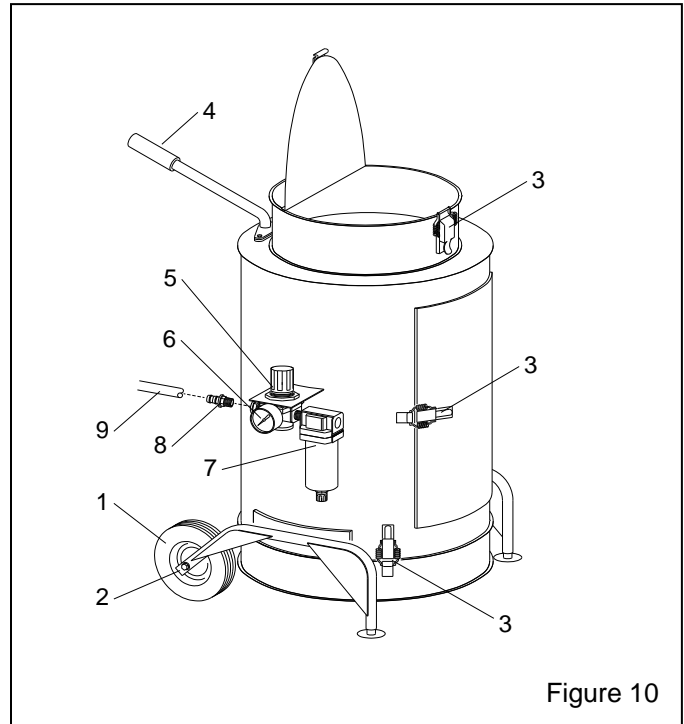


Figure 10