

**SUPER COMET  
PRESSURE BLAST and  
VACUUM RECOVERY SYSTEM  
O. M. 23437**

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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 the same important information as the orange cover.**

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**1.0 INTRODUCTION**

**1.1 Scope of manual**

**1.1.1** This manual covers installation, operation, maintenance, troubleshooting, and replacement parts for the Super Comet blast and recovery system.

**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 remote controls, and all other equipment used with the blast 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](http://www.clemcoindustries.com) or email [info@clemcoindustries.com](mailto: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 and Operating Principles**

**1.3.1 Components, Figure 1**

- 1.3.1.1** The primary components of the Super Comet are:
1. Blast machine with controls and blast hose
  2. Blast head assembly with brushes for inside corner, outside corner and flat surfaces
  3. Reclaimer and vacuum recovery hose
  4. Dust collector and exhauster
  5. Cart

Refer to Figure 2 for blast machine components.

**1.3.2 Blast Machine**

**1.3.2.1** Clemco blast machines (pressure vessels) are certified to conform to the ASME (American Society of Mechanical Engineers) Boiler and Pressure Vessel Code, Section VIII, Division 1. It is the owner's responsibility to maintain the integrity of the vessel in accordance with the requirements of state regulations. Regulations may include regular inspection and hydrostatic testing as described in National Board inspection code and jurisdictional regulations and/or laws.

**WARNING**

**Welding, grinding, or drilling on the blast machine could weaken the vessel. Compressed air pressure could cause a weakened blast machine to rupture, resulting in death or serious injury. Welding, grinding, or drilling on the vessel, without a National Board R stamp, voids the Clemco ASME certification.**

**1.3.2.2** All welding repairs to the vessel must be performed by certified welders at shops holding a National Board R Stamp. Welding performed by any welder not properly qualified per the ASME code, voids the Clemco ASME certification.

**1.3.2.3** Do not exceed the maximum working pressure rating (PSI) of the blast machine. The maximum pressure rating is stamped into the ASME nameplate which is welded to the side of the vessel.

**⚠ WARNING**

**Excessive compressed air pressure could cause a blast machine to rupture. To prevent serious injury or death, do not exceed the rated pressure of the blast machine.**

**1.3.2.4** OSHA does not require pressure relief valves on blast machines when air compressors supplying air to the blast machines are built to ASME<sup>(1)</sup> code and comply with OSHA<sup>(2)</sup> regulations. OSHA regulation 1910.169 refers to the ASME code when describing 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.

<sup>(1)</sup> American Society of Mechanical Engineers, Boiler and Pressure Vessel Code, Section VIII, Division 1,

<sup>(2)</sup> Occupational Safety and Health Administration, 29 CFR 1910, 169.

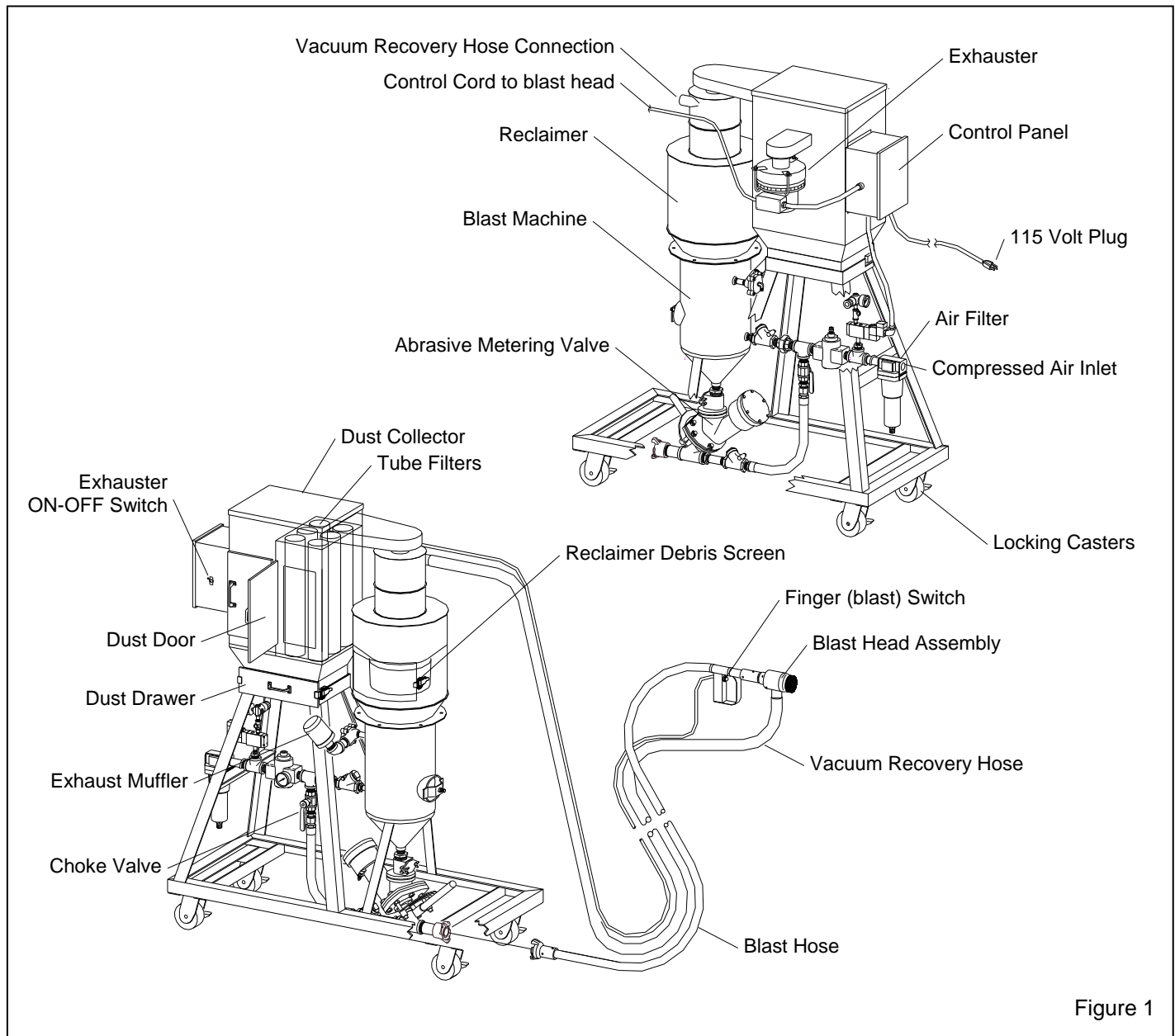


Figure 1

**1.3.3 Theory of Operation**

**1.3.3.1** When the air supply is ON, and electrical power is connected, the blast machine is ready for actuation by pressing the switch mounted on the blast hose hand grip assembly. Pressing the (momentary-contact) finger switch activates the electrical blast-control solenoid, which pneumatically opens the normally-closed pilot-operated pressure regulator, and closes the normally open outlet valve. The incoming air pressurizes the blast machine, and blasting begins. When pressure on the switch is released, the blast machine depressurizes, and blasting stops.

**1.3.3.2** During operation, the abrasive metering valve installed at the bottom of the blast machine meters a controlled quantity of abrasive into the air stream. The air and abrasive travel through the blast hose to the blast gun. Blasting is contained entirely within the hand held gun assembly. A brush at the end of the assembly, confines the abrasive and draws in atmospheric air, sweeping the blast area clean.

**1.3.3.3** Spent abrasive and by-products are recovered from the blast surface into the reclaimer for separation. Lightweight dust and fines remain airborne and are drawn out of the reclaimer and into the dust collector. Heavier reusable abrasive falls through the screen into the

reclaimer hopper located above the blast machine and stored for reuse. When the foot pedal is released, blasting stops.

**1.3.3.4** Air, dust and fine by-products leave the reclaimer and collect in the cloth filters; cleaned air passes through the exhaust fan and is discharged into the atmosphere. Dust particles trapped by the filter bags are released by manually reversing the air flow; dust released from the bags collects in a pan for disposal.

**1.3.3.5** When the operator releases finger pressure from the control switch, the machine depressurizes and blasting stops. The pop-up valve drops when air is expelled from the machine and pressure equalizes. The blast machine automatically refills with abrasive stored in the hopper.

**1.4 Nozzle Options**

**1.4.1** The Super Comet is shipped with a 3/16" orifice tungsten carbide nozzle. A 1/8" orifice nozzle is available for use when the air supply is limited; a 1/4" orifice nozzle may be used for increased production at lower pressure, but will need to be replaced soon after the nozzle begins to wear, as leakage, due to the additional air volume, can occur at the blast head. Use an optional boron carbide nozzle and boron tube insert when blasting with aggressive abrasive. Refer to blast head and control assembly parts in Section 8.3.

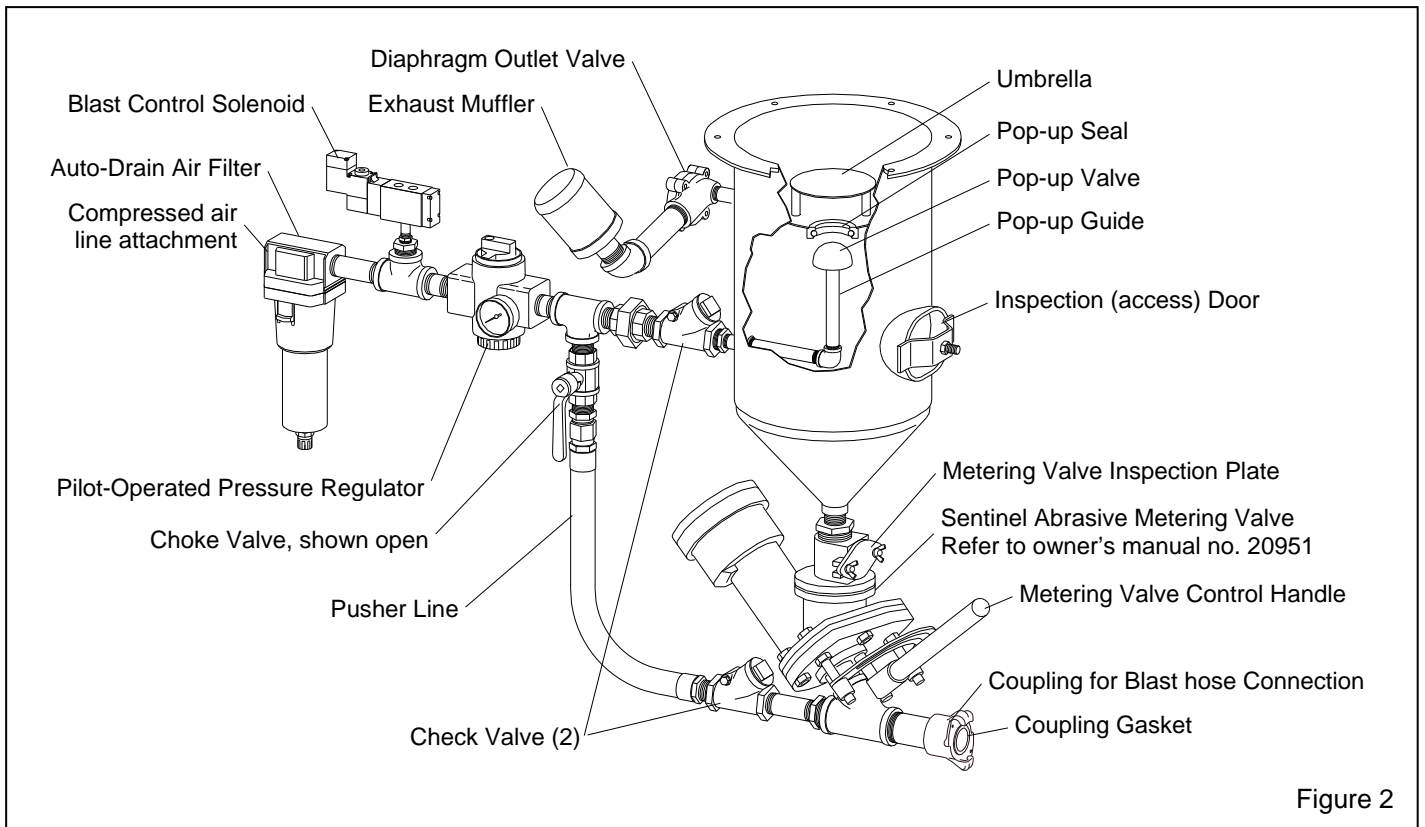


Figure 2

**1.5 Operation and Function of the Choke Valve**

**1.5.1** Temporarily closing the choke valve while blasting clears minor blockage caused from bridging and damp abrasive. Always blast with the choke valve fully open; the valve is open is when the handle is vertical and aligned with the piping as shown in Figure 2.

**1.5.2** Closing the valve while blasting lowers pressure in the pusher line from pressure in the vessel, forcing the minor blockage through the metering valve. Closing the valve is also used to rapidly empty the machine as noted in Section 3.3.

** CAUTION**

**Abrasive cannot be contained within the blast head when the choke valve is fully open; point the nozzle into a drum or suitable container, or in the direction the abrasive is to be disposed. Do not blast with choke valve closed or partially closed. Prolonged blasting with the choke valve partially closed will accelerate wear on the metering valve.**

**1.6 Abrasive**

**1.6.1** The Super Comet is designed to utilize most common recyclable abrasives, 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 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 only after thorough drying and breaking up of any lumps.

**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, hoses etc.) which come in contact with the abrasive. Optional boron nozzles and boron tube insert are required when any of these abrasives are used. Refer Section 8.3.

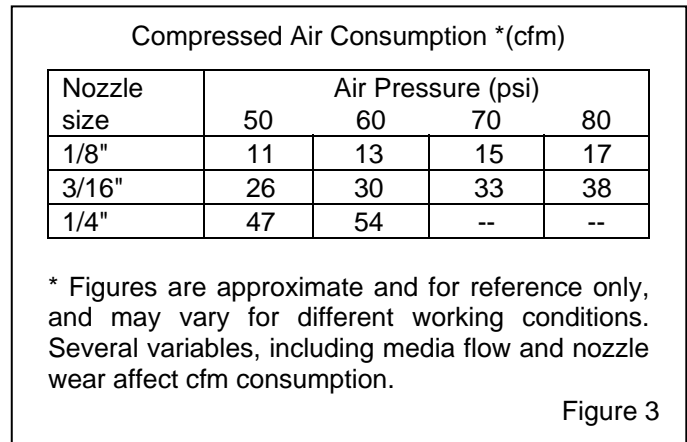
**1.6.4 Steel:** Steel grit and shot are too heavy for the system to recover. Do not use metallic abrasives.

**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** The size of the compressor required to operate the machine depends on the size of nozzle and blasting pressure. Unless otherwise specified, the machine is supplied with a 3/16" orifice nozzle. The table in Figure 3 shows air consumption of nozzles when new. A nozzle is considered worn when its diameter has increased by 1/16" (to the next orifice size) or when abrasive can no longer be contained within the blast head. A 1/4" orifice nozzle should be limited to lower blasting pressure. Consult with a compressor supplier for a suggested compressor size based on the air consumption.



**2.1.2** The air supply line from the compressor to the blast machine inlet should have a minimum ID of 3/4"; a smaller diameter hose may reduce blasting efficiency.

**2.1.3** 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-NPT air filter, as shown in Figure 4. Note that the style of connection shown is for reference only.

** WARNING**

**Hose disconnection while under pressure can cause serious injury or death. Use safety lock pins or safety wire to lock twist-on (claw-type) couplings together and prevent accidental separation while under pressure, and safety cables to prevent hose from whipping should separation occur.**

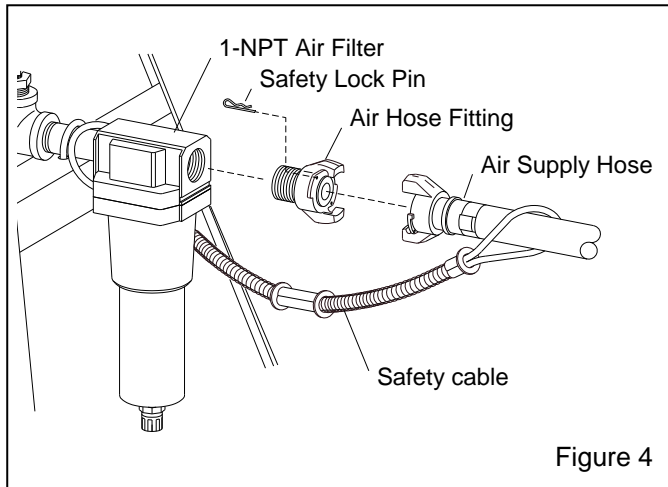


Figure 4

**⚠ 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.

2.1.4 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 located at the blast machine inlet.

**⚠ WARNING**

To avoid the risk of injury from compressed air, install an isolation valve and bleed-off valve where the air supply is tapped into the compressed air system. This enables depressurization of the compressed-air lines before performing maintenance.

**2.2 Compressed Air Filter**

2.2.1 The air filter at the blast machine inlet removes condensed water from the compressed air. The filter automatically drains when moisture fills the bowl to a certain level. Its use is especially important in areas of high humidity, or when fine-mesh media are used. Moisture causes media to clump and inhibits free flow through the metering valve. 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.

2.2.2 Insert a section of 3/8" O. D. tubing into the automatic drain at the bottom of the filter and place the other end into a pail. When the filter automatically drains, the water will drain into the pail.

**2.3 Electrical Requirements**

2.3.1 115-VAC, 1-Ph, 60-Hz.; A 115 volt power cord with u-ground plug is provided. No additional wiring is required. **SEE 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 Refer to Figure 5 and make sure coupling gaskets in both couplings are in place and in good condition before connecting the blast hose to the quick coupling on the blast machine. Use safety lock-pins or safety wire to lock the couplings together, to prevent accidental separation during blasting.

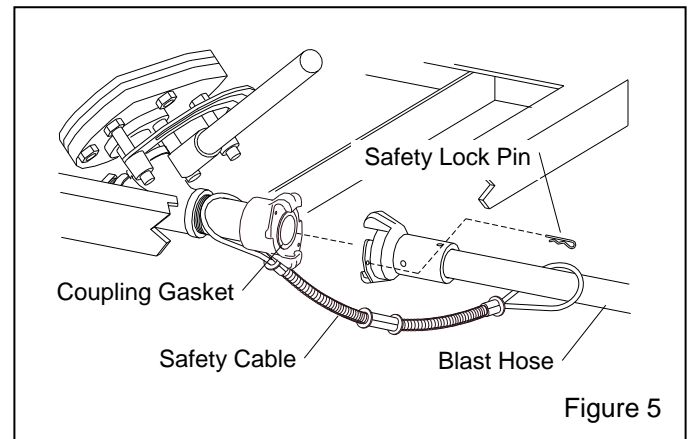


Figure 5

**⚠ WARNING**

Hose disconnection while under pressure could cause serious injury or death. Use safety lock-pins and safety cables on all hose coupling connections to help prevent couplings from accidental disconnection.

**3.1.2** Make sure that all compressed-air supply hose connections are secured with safety lock pins and safety cables to prevent accidental separation or disconnection. Lock pins and safety cables are listed in Section 8.1.

**3.1.3** Make sure that all air fittings are secure. Leaks will cause the system to malfunction.

**3.1.4** Make sure the choke valve is open (handle in-line with the piping).

**3.1.5** Close the abrasive metering valve. The closed position for the Sentinel valve is when the handle is fully to the right. It is not necessary to close the metering valve during routine start-ups once abrasive flow is set as noted in Section 4.2,.

**3.2 Loading the Machine with Abrasive**

**3.2.1 Capacity:** Abrasive capacity is approximately 0.5 cu. ft (1/2 cubic foot). The machine is full when abrasive reaches the level of the bottom of the pop-up valve. Overfilling will result in abrasive carryover to the dust collector and possible blockage in the conveying hose.

**3.2.2 Abrasive Loading:** With the exhauster off, pour clean, dry abrasive into the reclaiming hopper through the reclaiming door.

**3.3 Emptying the Machine of Abrasive**

**3.3.1** When working in environments subject to extreme temperature changes, or very humid conditions, condensation may develop inside the machine. Condensation wets abrasive and causes flow problems. To prevent this, empty the machine of all abrasive when shutting down for the day. This will eliminate trouble from moist abrasive when starting a new day's blasting.

**3.3.2** With the blast machine off, turn the blast pressure down to approximately 40 psi, close the choke valve and set the abrasive metering valve at full open.

**3.3.3** Point the nozzle into a drum or suitable container, or in the direction the abrasive is to be disposed.

**3.3.4** Hold the hose securely and pressurize the machine by activating the control switch. Be prepared for surging, or recoil of the hose, which can be severe.

**3.3.5** When the machine is empty, release the control switch, open the choke valve, and reset the abrasive metering valve.

**3.4 Select Brush and Attach to Head, Figure 6**

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

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

**3.4.2.1** 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.

**3.4.2.2** 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.

**3.4.2.3** Roll the elastic over the end of the brush to secure, as shown in Figure 6.

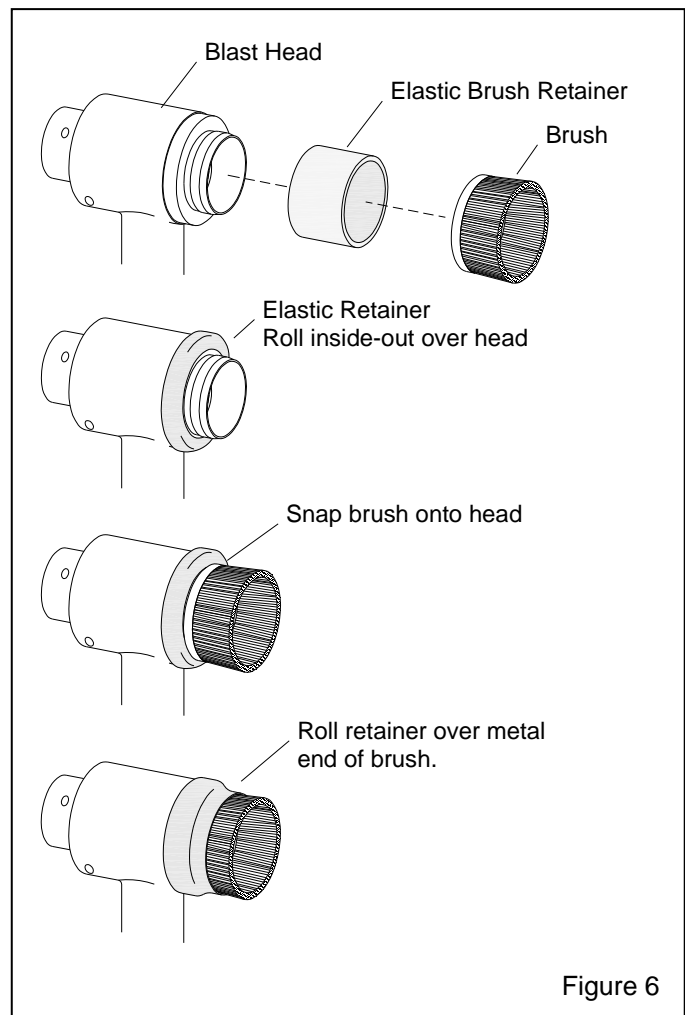


Figure 6

**3.5 Blasting Operation**

**⚠ CAUTION**

**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 and dust filters, resulting in equipment malfunction.**

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

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

**3.5.3** Adjust the pressure regulator, located on the blast machine piping, to the required blasting pressure per Section 4.1.

**3.5.4** Start the exhauster by flipping ON the toggle switch located on the electrical panel.

**3.5.5** Hold the brush against the surface to be blasted; do not apply excessive pressure that would cause the bristles to bend into the blast stream. Depress the finger switch, blasting (air only at the initial start-up until abrasive flow is adjusted) will begin within a couple of seconds. Adjust abrasive flow per Section 4.2

**3.5.6** To stop blasting, release pressure on the finger switch. Leave the brush against the surface for several seconds after blasting stops, to ensure that all abrasive is recovered from the surface.

**3.6 Operating Technique**

**3.6.1** To achieve full abrasive containment and recovery, the brush must be in contact with the surface at all times.

**3.6.2** Keep the brush flat against the surface. Keep the blasting head perpendicular to the surface.

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

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

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

**3.7 Shut-down**

**3.7.1** After blasting is complete, run the exhauster for several seconds to clear the hoses before shutting it OFF.

**3.7.2** When shutting down for the day, empty the machine of abrasive per section 3.3.

**3.7.3** Close the compressed-air supply valve.

**3.7.4** Drain receiver tank, filters, and water collecting devices, and bleed the compressed-air supply hose.

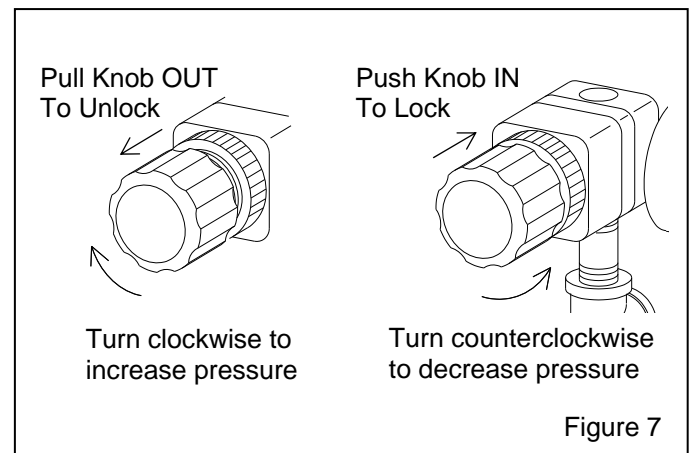
**3.7.5** Shut down the compressor.

**4.0 ADJUSTMENTS**

**4.1 Blast Pressure, Figure 7**

**4.1.1** The blast pressure pilot regulator, located on the blast machine piping, enables the user to adjust blasting pressure to suit the application. The suitable pressure for most purposes is 80 psi. Lower pressure may be used for delicate work, minimum pressure is about 40 psi. In all cases, highest production can be achieved only when pressure is carefully monitored.

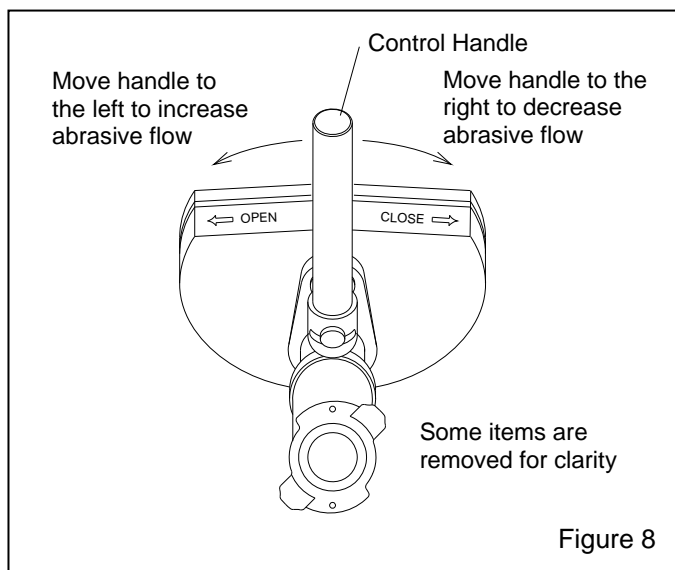
**4.1.2** To adjust pressure, unlock the knob by pulling it straight out as shown in Figure 7, and turn it clockwise to increase pressure or counterclockwise to decrease pressure. Pressure will usually drop from closed-line pressure when blasting is started. Once operating pressure is set, push the knob in to lock it and maintain the setting.





**4.2 Abrasive Metering, Figure 8**

**4.2.1** Adjust abrasive flow using the metering valve located at the bottom of the blast machine. The valve is closed when the handle is fully to the right. To adjust, begin with the valve closed, begin blasting and have someone slowly move the handle to the left in about 1/4" increments to increase abrasive flow. Allow time for the flow to stabilize before further adjusting. The valve is fully open when the handle is at the full left position. Optimum flow rate depends on the type and size of media and blasting pressure, and size of the nozzle orifice, and can best be determined by experience. Use as little media as possible to do the job while maintaining the best cleaning rate.



**5.1 Inspection**

**5.1.1** To avoid unscheduled downtime, establish an inspection schedule. Inspect all parts subjected to abrasive contact. Observe the schedule shown below until the wear rate based on the application is established, and then modify the schedule accordingly.

**5.1.2 Daily**

**5.1.2.1** Brushes: Inspect brushes for wear. Replace brush as soon as it no longer contains abrasive at the blast surface.

**5.1.2.2** Compressed-air filter: The blast machine is equipped with an auto-drain air filter. By inserting a section of 3/8" O.D. tubing into the automatic drain at the bottom of the filter and placing the other end into a pail, the filter will automatically drain the water into the pail. Empty the pail before it is full and while it is a manageable weight. Moist air inhibits the flow of abrasive. If the filter does not remove enough moisture to keep abrasive dry and flowing, it may be necessary to install an air dryer or aftercooler in the compressed-air supply line.

**5.1.2.3** Inspect reclaimer debris screen: The screen is accessible through the reclaimer door. With the exhauster off, remove the screen and empty it daily or when loading abrasive. Empty more often if part blasted causes excessive debris. Do not operate the machine without the screen in place.

**5.1.2.4** Clean dust collector filters: The dust collector uses tubular filters which collect dust on their inner surfaces. Every two to three hours while the exhauster is ON, release dust from the filter bags by alternately opening and closing each dust collector door four to six times in. Hand pulls are provided on these two doors which are located on the dust collector directly above the dust drawer. Opening and closing the doors momentarily draws in through the clean side of the filter bag, loosens dust, causing it to drop it into the dust drawer. During the blasting operation, the collector doors must be closed tightly.

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

**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 drawer, 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 Safety Data Sheets (SDS) for the blast abrasive.**

**⚠ CAUTION**

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

**5.1.3 Weekly**

**5.1.3.1 Blast head assembly:** Inspect blast head, tube insert nozzle, and brushes for wear.

**5.1.3.2 Blast hose:** Inspect the blast hose for wear and thin spots by pinching it every 6 to 12 inches. Soft spots mean the hose is worn. The first sign of wear is usually along the outside radius where the hose bends just behind the nozzle holder. Replace the hose as soon as soft spots are noted.

**⚠ WARNING**

**Worn blast hose can suddenly burst. Couplings and nozzle holders may not adequately grip worn hose causing them to blow-off under pressure. Compressed air and abrasive escaping from a burst hose, or disconnected coupling or nozzle holder, can cause severe injury.**

**5.1.3.3 Dust collector:** Inspect the dust collector bag compartment for dust. Check the dust bags for wear.

**5.2 Changing Abrasive Type**

**5.2.1** When changing abrasive type, make sure the blast machine, blast hose, recovery hose, and reclaimer are cleaned, to fully remove any remaining abrasive. If not done, the new abrasive will become contaminated.

**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 Safety Data Sheets (SDS) 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 pressure diminishes noticeably, or if abrasive escapes from the brush. Make sure the nozzle gasket is in place before screwing the nozzle into the nozzle holder.

**6.2 Filter Tube Replacement, Figure 9**

**⚠ CAUTION**

- **Do not bend spring ends so tightly that the ends kink.**
- **Do not use a sharp instrument to force spring rings into the opening. This could damage the filter and seriously impair the efficiency of the dust collector.**
- **Install one filter at a time. Make sure top and bottom spring rings are fully seated, and the tube is not twisted, before proceeding to the next.**

**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 9.

**6.2.2** The tubular filter is held firmly by spring rings above and below the hole in the top and bottom tube plate. The filters fit tightly to prevent dust leakage; force may be required by the installer. Check for proper seating at both ends, and remove any twist in the tube before proceeding to the next filter.

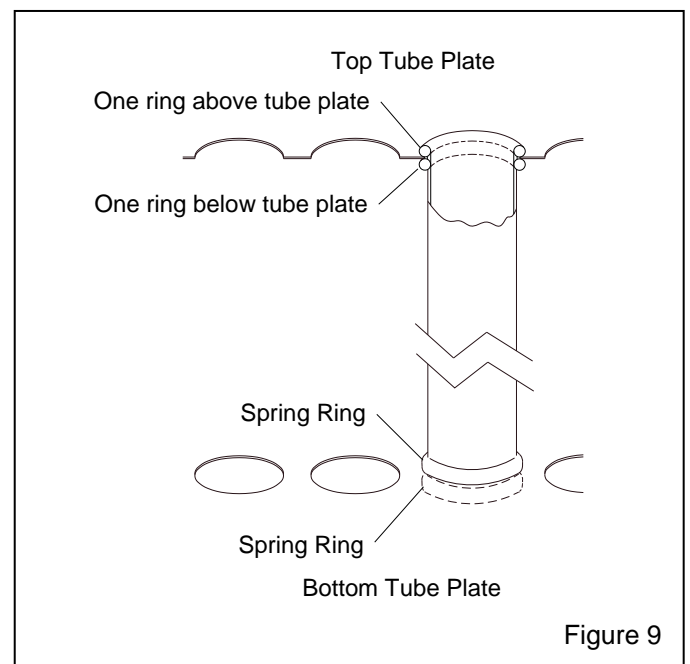


Figure 9

**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 leakage at the blast surface.

**6.4 Pop-up Valve Replacement, Figure 10**

**6.4.1** Empty the machine of abrasive as described in Section 3.3.

**6.4.2** Depressurize the blast machine, and lockout and tagout the compressed-air supply.

**⚠ WARNING**

**Failure to observe the following procedure before performing any maintenance could cause serious injury or death from the sudden release of compressed air.**

- **Depressurize the blast machine.**
- **Lockout and tagout the compressed-air supply.**
- **Bleed the air supply line to the blast machine.**

**6.4.3** To gain access to the pop-up valve, remove the inspection door assembly.

**6.4.4** Using a small pipe wrench, unscrew the pop-up valve guide, by turning it counterclockwise. Remove the pop-up valve and guide from the machine.

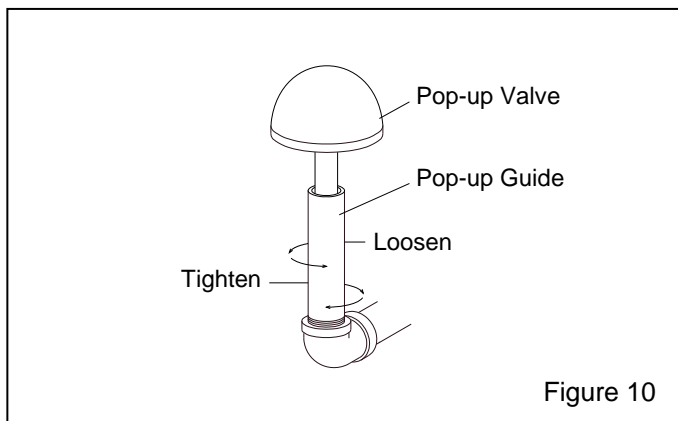


Figure 10

**6.4.5** Place the new pop-up valve in the guide, and then screw the valve guide (with the pop-up valve in it) into position inside the machine. Tighten the guide, it should be wrench-snug, but not wrench-tight. Over-tightening the guide will make it difficult to remove the next time the pop-up valve needs replacement.

**6.4.6** Put a new gasket on the inspection door before bolting the door onto the machine.

**6.5 Pop-up Valve Seat Replacement**

**6.5.1** The easiest method to replace the rubber pop-up seat is through the reclaimer access door. If for some reason replacement cannot be made through the reclaimer, observe the warning in Section 6.4, empty the machine and bleed the air supply line. Remove the inspection door and work through the opening.

**6.5.2** Remove the old seat by using a finger, screwdriver, or similar object, to work the seat out of the retainer groove.

**6.5.3** Push the new seat all the way through the port and then fit it into the groove. Pull up on the seat and allow it to "pop" into position.

**7.0 TROUBLESHOOTING**

**⚠ WARNING**

**To avoid serious injury, observe the following when troubleshooting.**

- **Turn off the air, and lockout and tagout the air supply.**
- **If checking the controls requires air, always enlist the aid of another person to:**
  - **Hold the nozzle securely.**
  - **Operate the finger switch.**

**Never bypass the finger switch, 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 drawer regularly.

**7.1.2** Using friable abrasive that rapidly breaks down, or using abrasive that is too fine or worn out.

**7.1.3** Hole worn in recovery hose between blast head and reclaimer inlet. Inspect hose for wear.

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

**7.1.5** Obstruction in recovery circuit. Check for blockage.

**7.1.6** Brushes worn. Inspect brushes.

**7.1.7** Nozzle worn. Check nozzle orifice, and replace the nozzle if worn by 1/16".

**7.2 Abnormally high abrasive consumption**

**7.2.1** Door on reclaimer open, or improper fit or worn door gasket. Air entering the reclaimer at this point will cause abrasive to be carried into the dust collector. DO NOT operate unless all doors are closed.

**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 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** Incorrect metering valve adjustment. Adjust per Section 4.2.

**7.3.3** Reduced air pressure. This 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.

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

**7.3.5** Moist abrasive. Frequent bridging or blockage in the area of the metering valve can be caused by moisture. Refer to Section 7.7.

**7.4 Neither abrasive nor air comes out the nozzle when the finger control switch is pressed**

**7.4.1** Depressurize the blast machine, and check the nozzle for blockage. Refer to Section 7.6.

**7.4.2** Make sure the blast machine pressurizes when the finger switch is pressed. If it does not, refer to Section 7.8.

**7.4.3** Make sure the abrasive metering valve and the choke valve are open.

**7.5 Air only (no abrasive) comes out the nozzle**

**7.5.1** Make sure the machine contains abrasive.

**7.5.2** Make sure the media metering valve is not closed. Adjust abrasive flow per Section 4.2.

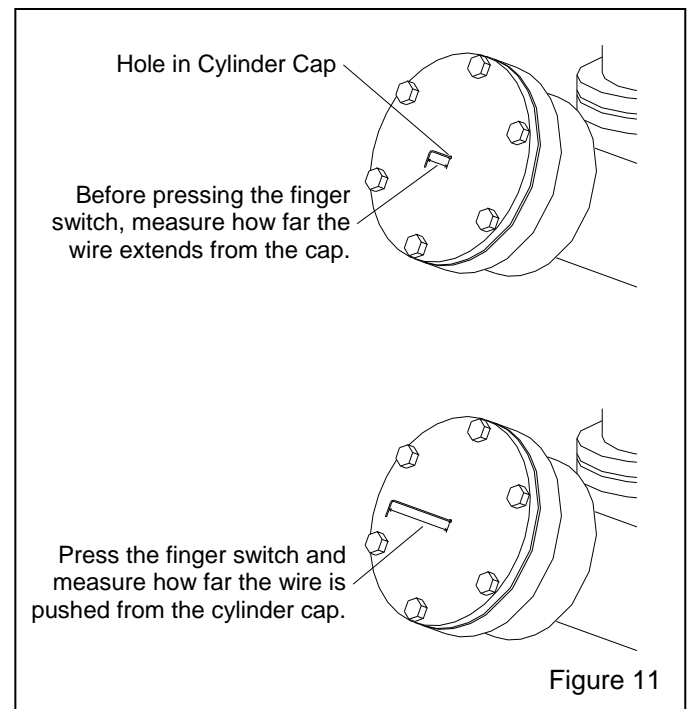
**7.5.3** Check for minor blockage in the abrasive metering valve by fully opening the metering valve, and closing the choke valve. Activate the finger control switch, to blow out obstructions. If this procedure fails, depressurize the machine, open the metering valve inspection plate, and check for foreign objects.

**7.5.4** Check the muffler on the solenoid valve. Air should exhaust from the muffler when the finger switch is released. If air does not exhaust, remove the muffler and try again. If air exhausts now, the muffler is blocked. If air does not exhaust, the solenoid valve may be faulty. Have it checked by a qualified electrician.

**7.5.5** Make sure the abrasive metering valve opens when the finger switch is pressed. Refer to Figure 11 and use the following method to make sure the valve opens.

**7.5.5.1** Insert a straightened paperclip or wire as far as it will go into the relief hole located in center of the cylinder cap, as shown in the upper illustration in Figure 11, it will bottom against the piston inside the body.

**7.5.5.2** Before activating the finger switch, mark the wire at the cylinder cap or measure the distance between the top of the cap and end of the wire.



**Figure 11**

**7.5.5.3** Press the finger switch and measure how far the wire is pushed out the hole as the piston moves up within the body. The wire should be pushed out approximately 1-3/16" if the valve is fully opening, a shorter distance indicates the valve may not be fully opening. Check control-line pressure to the Sentinel valve. If pressure is equal to supply line pressure, the valve requires service. Refer to the Sentinel metering valve manual, stock number 20951.

**7.6 Plugged nozzle**

**7.6.1** Depressurize the blast machine before checking the nozzle for blockage.

**7.6.2** A damaged or missing reclaimer screen will allow large particles to pass and block the nozzle. Replace or re-install the screen as necessary.

**7.7 Abrasive bridging**

**7.7.1** 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.

**7.7.2** 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.

**7.7.3** Moist compressed air may be due to: a faulty compressor that overheats, or pumps oil or moisture into the air line; too long an air line permitting moisture to condense on the inside; or high humidity. If the problem persists, change abrasive more often, or install an aftercooler or air dryer.

**7.7.4** Absorption. Some abrasive tends to absorb moisture from the air, especially fine-mesh abrasive in high humidity areas. Empty the blast machine after use.

**7.8 Blast machine does not pressurize**

**7.8.1** Make sure that the air compressor is on and air supply valves are open.

**7.8.2** Make sure the pressure regulator is not turned too low. Minimum pressure is 40 psi. Refer to Section 4.1.

**7.8.3** Inadequate air supply. Refer to Section 2.1.

**7.8.4** Inspect the diaphragm outlet valve for wear.

**7.8.5** Inspect pop-up valve and seat for alignment and wear.

**7.8.6** Blocked or leaking control line. Check all fittings for blockage or leaks.

**7.8.7** Finger switch or solenoid valve malfunction. Check by qualified electrician.

**7.8.8** Inspect the check valve (Section 8.2, Item 5) for obstruction or broken flap.

**7.9 Blast machine will not depressurize or depressurizes too slowly**

**7.9.1** Faulty finger switch or solenoid valve. Check voltage and continuity, by a qualified electrician.

**7.9.2** Check the outlet muffler for blockage.

**7.10 Heavy abrasive flow**

**7.10.1** Make sure the choke valve is open.

**7.10.2** Abrasive metering valve open too far. Adjust per Section 4.2. If adjusting the valve does not regulate abrasive flow, empty the machine, depressurize the machine, and inspect internal parts of the valve for wear. Refer to the Sentinel metering valve manual, stock number 20951.

**7.11 Abrasive surge** (A small amount of surge is normal at start-up.)

**7.11.1** Heavy abrasive flow. Adjust per Section 4.2

**7.11.2** Empty, and depressurize the blast machine, and inspect the internal parts of the metering valve for wear.

**7.12 Dust leaking from dust collector**

**7.12.1** Check for damaged or loose filters.

**8.0 ACCESSORIES AND REPLACEMENT PARTS**

**8.1 Electrical and Miscellaneous**

Refer to the wiring schematic packed in the electrical panel for electrical items not listed

<b>Description</b>	<b>Stock No.</b>
Transformer .....	12172
Relay, 24 volts .....	12047
Switch, control panel toggle .....	12127
Caster, 4 inch, each .....	13142
Lock pins (pkg of 25) for twist-on couplings .....	11203
Safety cable, 1/2" to 1-1/4" OD hose .....	15012

**8.2 Blast Machine, Figure 12**

Item	Description	Stock No.
1.	Ball valve with handle, 1" .....	02396
2.	Handle, 1" ball valve .....	22531
3.	Pop-up valve .....	01242
4.	Seat, pop-up .....	01245
5.	Check valve, 1" swing .....	12187
6.	Metering valve, Sentinel fine mesh .....	21439
7.	Inspection door assembly, 3" x 4" .....	01267
8.	Gasket, 3" x 4" inspection door .....	01249
9.	Regulator, 1/4" pilot, with gauge .....	12050
10.	Gauge, pressure, 1/8" cbm .....	01908
11.	Solenoid, 4-way .....	12197
12.	Muffler, 1/4" bronze .....	03988
13.	Valve, 1/2" diaphragm outlet .....	02512
14.	Adaptor, 1" male NPT x 1" male flare .....	11720
15.	Pusher line assembly, 1" x 21" .....	22508
16.	Muffler, exhaust .....	05068
17.	Regulator, 1" pilot operated with gauge ...	12052
18.	Gauge, pressure, 1/4" cbm .....	11830
19.	Air filter, auto-drain .....	22425
20.	Gasket, 5/16" x 1" adhesive backed, (4 ft. required) .....	00187
21.	Fitting, elbow 1/4" NPT x 3/8" tube .....	11685
22.	Fitting, straight 1/4" NPT x 3/8" tube .....	11736
23.	Tubing, 3/8" OD poly, specify ft. req'd .....	12478
24.	Tee, 1/4", one MPT x two 1/4" FPT .....	20847
25.	CF Coupling w/1-1/4-NPT x 3" nipple .....	10806
26.	Coupling, 1/2" ID hose, CQA-1/2 .....	00599
27.	Gasket, CQG, pkg of 10 .....	00850
28.	Nozzle holder, CHE-1/2 .....	00577
29.	Blast hose, 1/2" ID x 25 ft. coupled, includes items 26 & 28 .....	01268
30.	Diaphragm, 1/2" outlet valve .....	02511
31.	Cap, 1/2" outlet valve .....	02299
32.	Body, 1/2" outlet valve .....	02298
33.	Lock pins, pack of 25 .....	11203
34.	Safety cable, 1/2" to 1-1/4" OD hose .....	15012

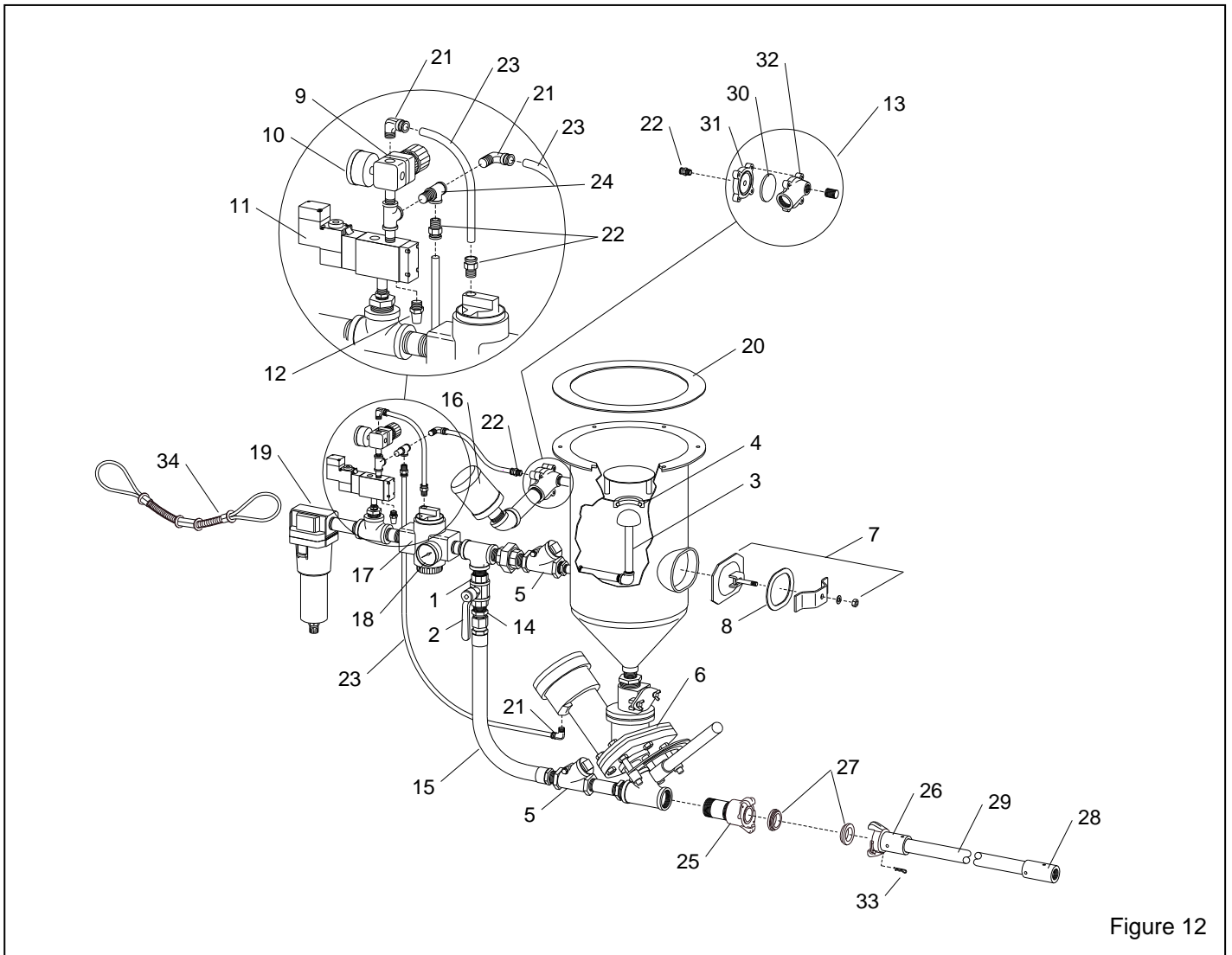


Figure 12

**8.3 Blast Head and Control Assembly, Figure 13**

Item	Description	Stock No.
1.	Control assembly, includes items within dashed box .....	12383
2.	Head, vacuum, includes 5 item 19 and item 3 in alum. . .	12300
3.	Insert, tube aluminum, standard .....	12175
	boron carbide, optional .....	12409
4.	Collar .....	13890
5.	Nozzle, Tungsten carbide	
	CT-2, 1/8" orifice .....	01351
	CT-3, 3/16" orifice, standard .....	01352
	CT-4, 1/4" orifice .....	01353
	Boron carbide, CTB-3 .....	21091
6.	Nozzle washer, NW-1, pack of 10 .....	21580
7.	Retainer, brush .....	12039
8.	Cover, switch .....	11587
9.	Switch .....	12119
10.	Gasket, 1/8" x 2" foam, per foot 1 foot min., trim to fit .....	13089
11.	Hose, blast 1/2" ID x 25 ft., coupled includes item 12 and coupling .....	01268
12.	Nozzle holder, CHE-1/2" .....	00577
13.	Hose, vacuum, 1-1/2" x 20 ft. ....	12450
14.	Clamp .....	12750
15.	Brush, flat surface .....	11569
16.	Brush inside corner .....	11570
17.	Brush outside corner .....	11571
18.	Screw, 1/4-NC x 3/8 socket set .....	13873
19.	Screw, 1/4-NC x 1/2 socket set .....	12067

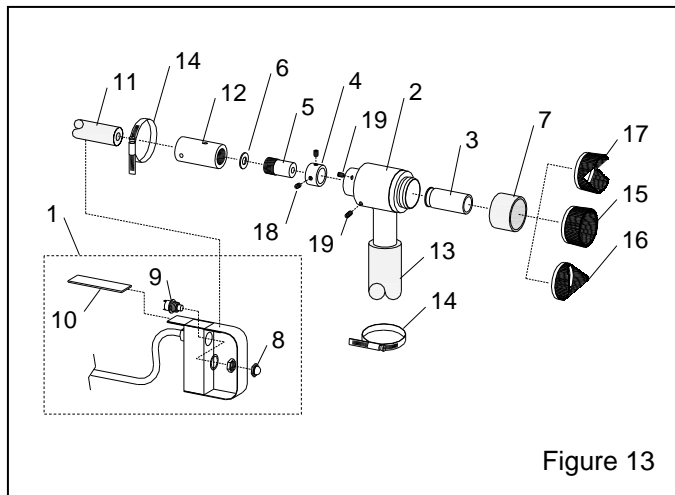


Figure 13

**8.4 Dust Collector, Figure 14**

Item	Description	Stock No.
1.	Spring Latch w/strike .....	11876
2.	Gasket, door, 2 required .....	13872
3.	Gasket, 5/16" x 1" adhesive backed, (3 ft. required) .....	00187
4.	Dust Bag, 3" x 20", 12 required .....	11506
5.	Gasket, air injector .....	11754
6.	Gasket, motor adaptor .....	11781
7.	Bolt, 1/4-20 J .....	13576
8.	Motor, exhauster .....	12315
9.	Brushes, blower motor, ea., not sown .....	28157

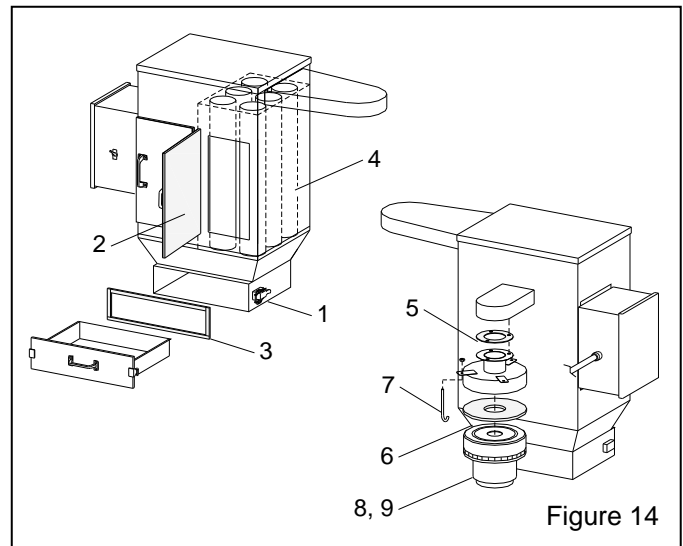


Figure 14

**8.5 Reclaimer, Figure 15**

Item	Description	Stock No.
1.	Debris screen, 8-mesh .....	21265
2.	Gasket, door .....	11745
3.	Gasket, reclaimer mount .....	11755
4.	Hose, vacuum, 1-1/2" x 20 ft. ....	12450
5.	Clamp .....	12750
6.	Gasket, 5/16" x 1" adhesive backed, (4 ft. required) .....	00187
7.	Spring latch assembly .....	12263

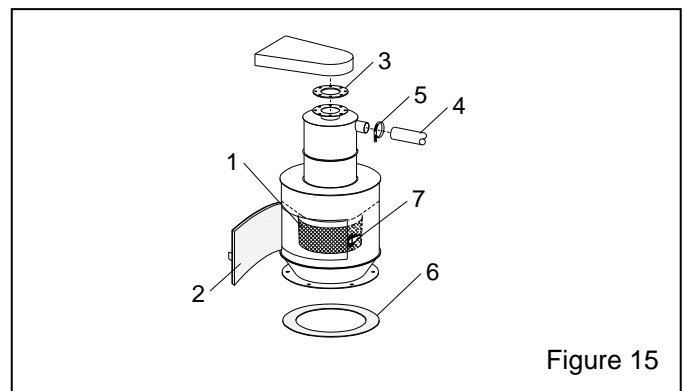


Figure 15