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

DATE OF ISSUE: 02/20/02
REVISION: E, 01/17

⚠ 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 important information.

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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.

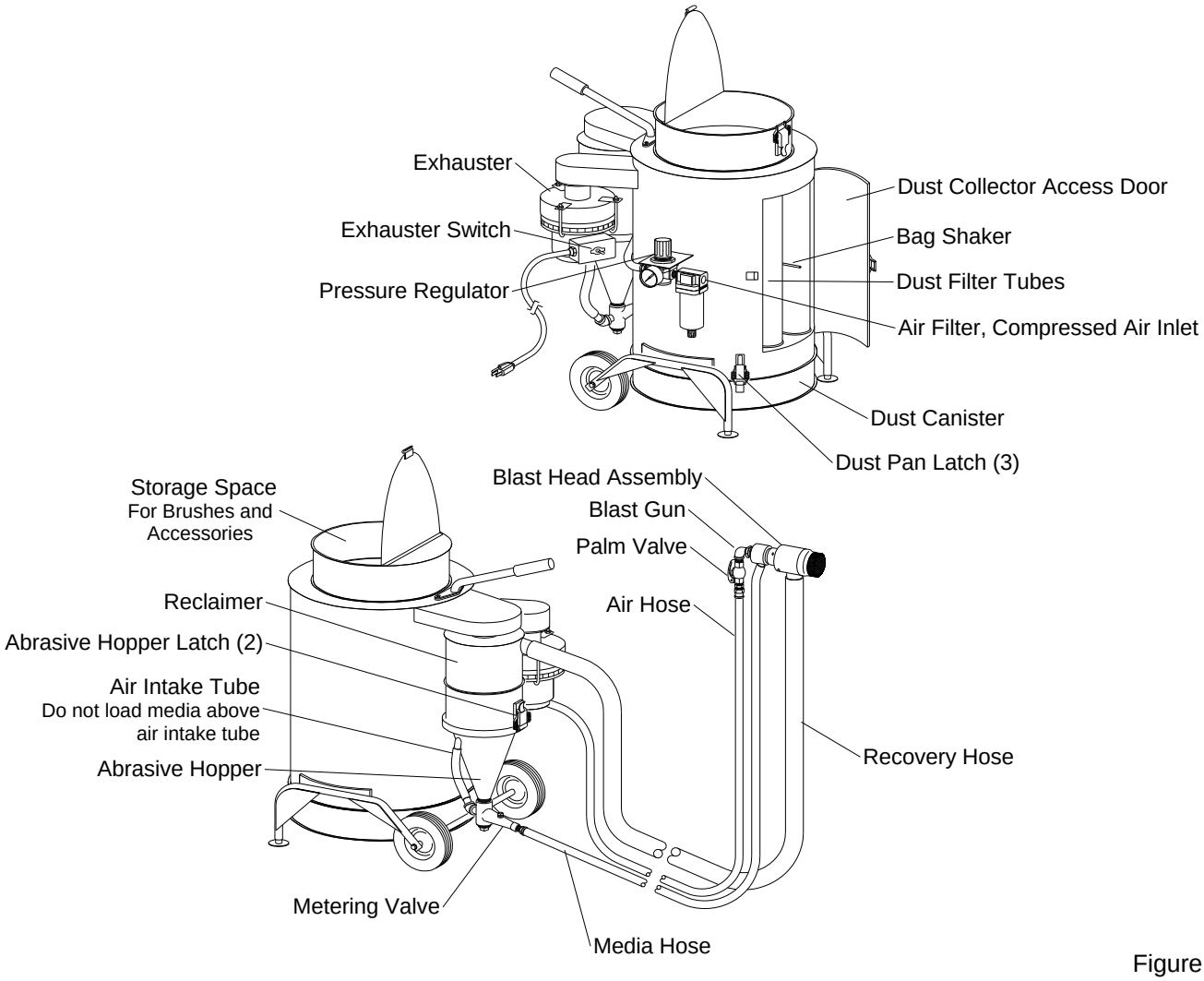

Figure 1

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 is 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.

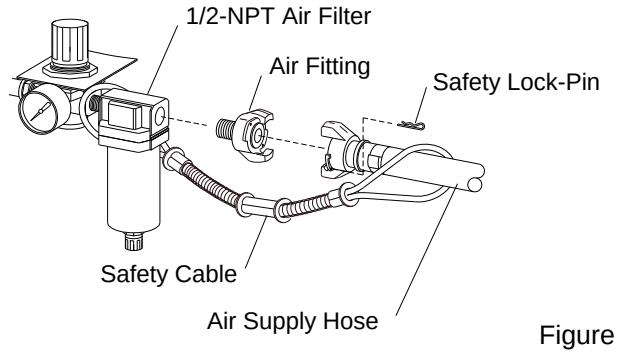

Figure 3

⚠ 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.

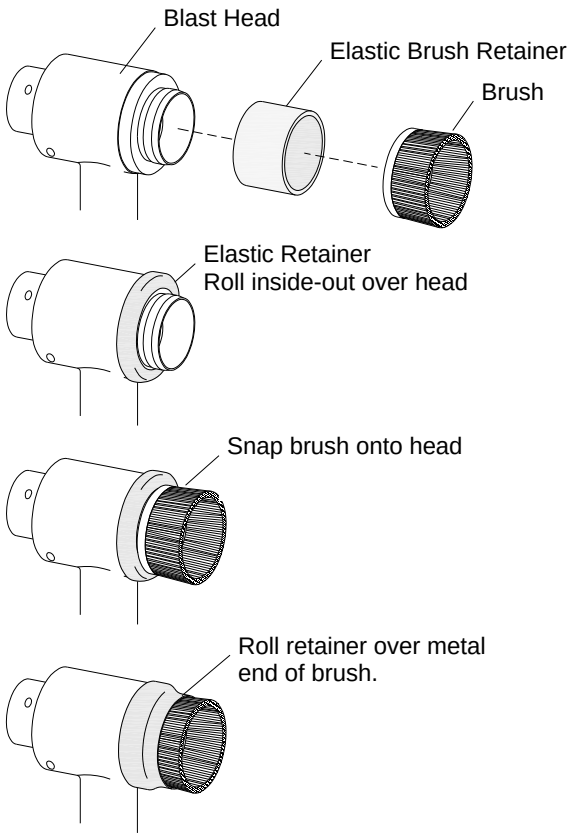

Figure 4

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 counter-clockwise 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.

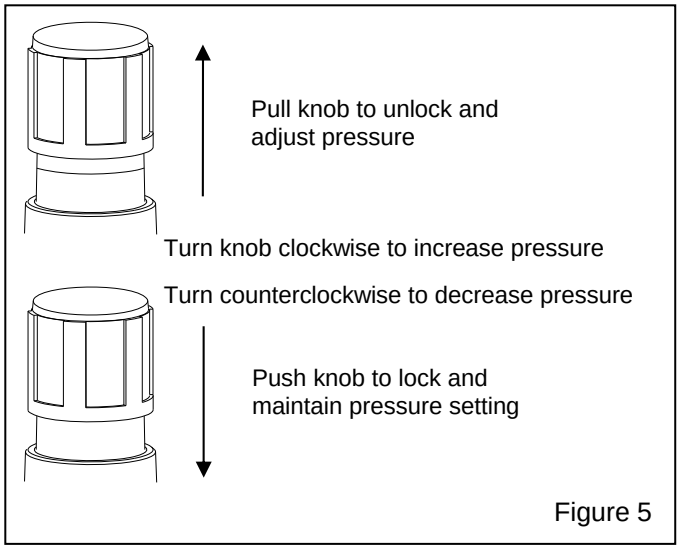

Figure 5

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 reclaimer 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.

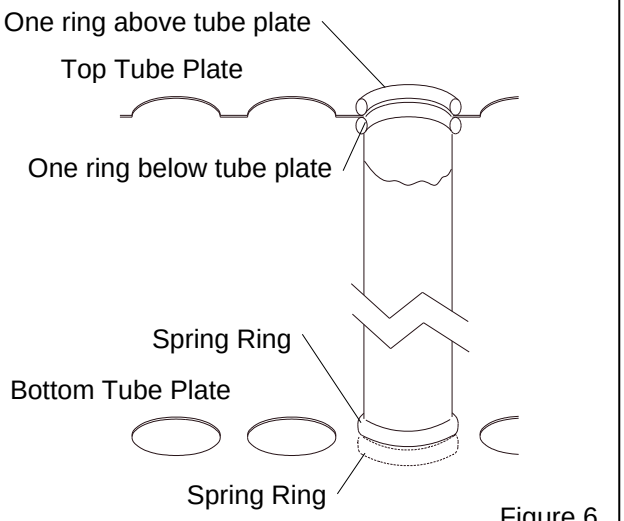

Figure 6

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

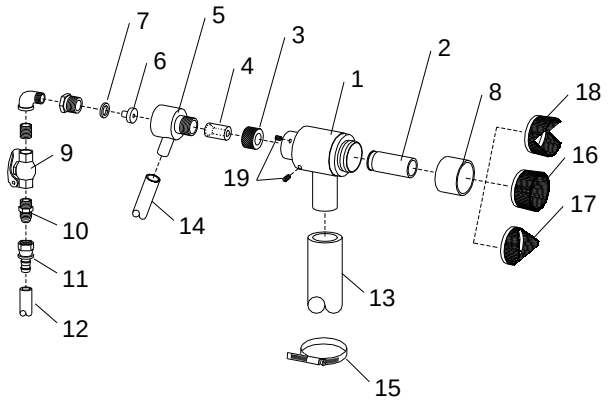

Figure 7

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

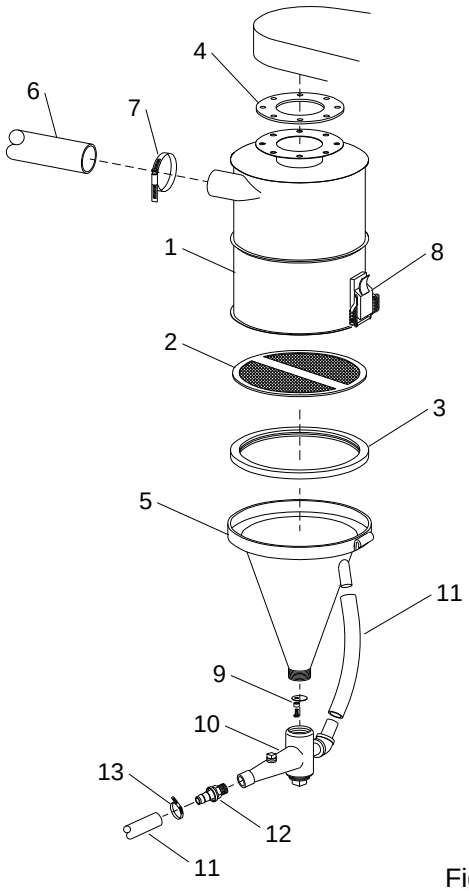

Figure 8

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

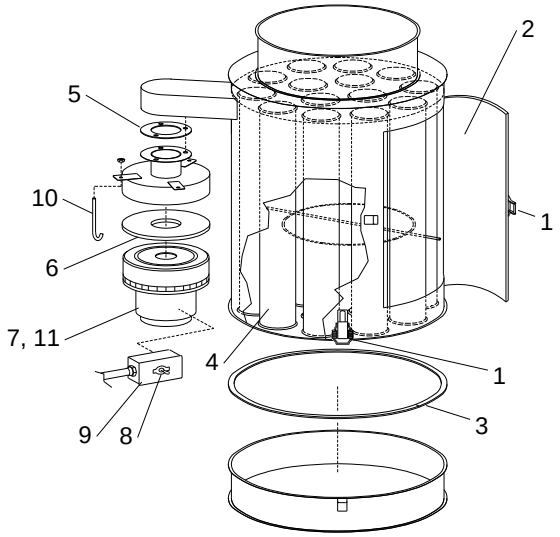

Figure 9

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

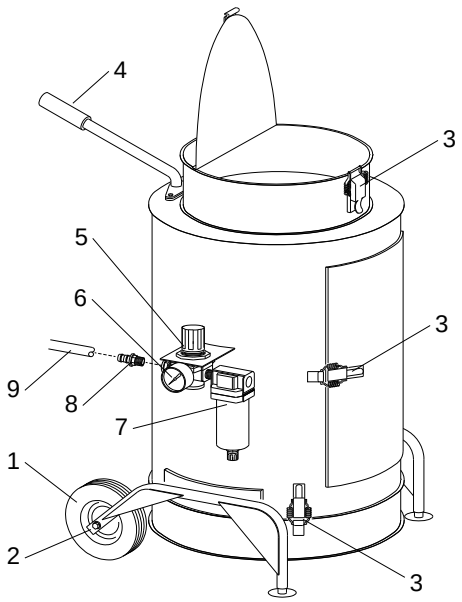

Figure 10