EMPIRE
ABRASIVE EQUIPMENT

Operating Instructions for 350, 650 & 1050 SuperBlast® Pressure Systems

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Operating Instructions

for the

SuperBlast Pressure Systems

Equipped with:

- ❒ Manual Control System (non-OSHA)
- ❒ 680 (bleed down) System with Saf-Stop II remote controls (pneumatic and electric)
- ❒ 780 (pressurized) System with Saf-Stop II remote controls (pneumatic and electric)
- ❒ Blast Room Pressure Vessel System

(Models manufactured after June 1, 1995)

EMPIRE ABRASIVE EQUIPMENT COMPANY

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Langhorne, PA 19047-1893

IMPORTANT

SILICA SAND IS NOT TO BE USED IN ANY EMPIRE BLAST EQUIPMENT.

Safety Precautions

■ ■ ■ WARNING ■ ■ ■

Failure to follow all the manufacturer's instructions for operator safety equipment and blast equipment could result in serious injury or death.

Read this manual completely before installing and operating the SuperBlast equipment.

For maximum operator safety, use protective equipment. NIOSH/OSHA require the use of a respirator (air-fed hood) with proper air supply, remote controls, canvas jacket, pants, and leather gloves.

OSHA requires that the air-fed hood be equipped with a personal air filter, grade "D" compressed air, and CO monitor or an ambient air pump.

Always use safety wires when joining blast hose and air hose couplings.

Always check filters *before* blasting.

Ensure that there is an adequate air supply to both the operator's helmet and the pressure vessel.

■ SAFETY NOTE ■

Operating instructions for operator safety equipment, such as respirators (air-fed hoods), personal air filters, and ambient air pumps, are provided separately.

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Introduction 1

1.1 Contents of this Manual

This manual covers the operation and maintenance of the following Empire SuperBlast and Blast Room pressure vessel blast systems.

- SuperBlast 350 equipped with either manual controls or *Saf Stop II* (model 680 or 780) remote controls (pneumatic and electric)
- SuperBlast 650 equipped with either manual controls or *Saf Stop II* (model 680 or 780) remote controls (pneumatic and electric)
- SuperBlast 1050 equipped with either manual controls or *Saf Stop II* (model 680 or 780) remote controls (pneumatic and electric)
- Blast Room pressure vessesl with *Saf Stop II* 680 remote controls

Read this manual carefully and keep it handy for future reference.

1.2 Additional Information

If you have any questions regarding the operation or maintenance of your Empire equipment, please contact your local Empire distributor or Empire, at **(215)-752-8800**. Ask for the Technical Services Department. Every Empire distributor is qualified to assist you with service and offers a complete stock of replacement parts.

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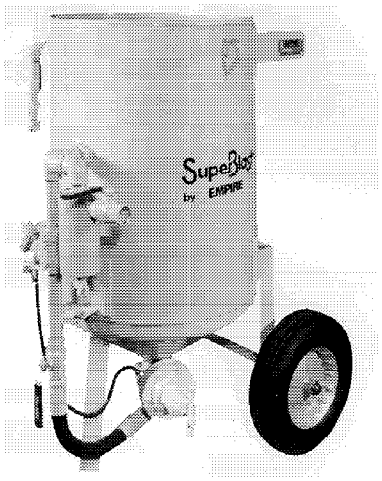

SuperBlast Portable System

NOTES:

SuperBlast System with Manual Controls

2

2.1 Description

The ***SuperBlast*** system with manual controls is illustrated in *Figure 2-1* and the parts list is provided in *Table 2-1*. Reference numbers in *Figure 2-1* correspond to the numbered items in *Table 2-1*.

■ NOTE ■

The SuperBlast system with manual controls is not an OSHA approved system.

2.2 Principles of Operation

The manual control system requires two operators.

To start blasting:

Operator 1 holds the blast nozzle and prepares for blasting, while Operator 2 (the Pot Tender) closes the exhaust valve and turns on the air supply to the vessel. The vessel pressurizes and immediately starts blasting.

To stop blasting:

The Pot Tender turns off the air supply and opens the exhaust valve.

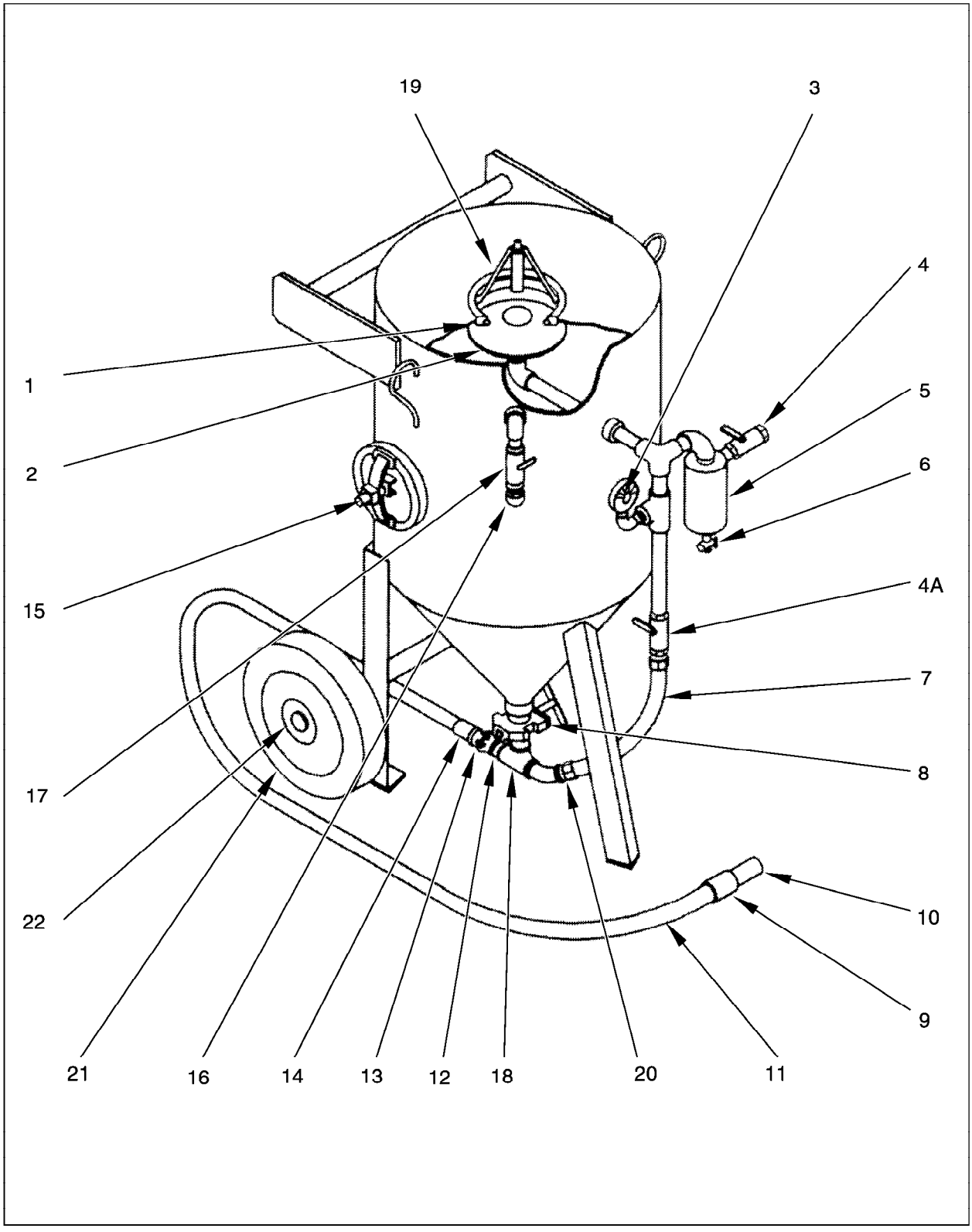

Figure 2-1 ***SuperBlast*** **System Equipped with Manual Controls**

Table 2-1 Parts List or the *SuperBlast* System with Manual Controls

Ref.	Part Number	Description	Ship Weight
1	523872	“O” Ring, 6” rubber	1 lb.
2	525072	Sealing Plunger (PVC coated), 6”	4 lbs.
3	550242	Air Gauge, 1/4” NPT	1 lb.
4A	518412	Manual Air Valve, 1” NPT (350)	5 lbs.
4	518502	Manual Air Valve, 1 1/4” NPT (650 & 1050) (350)	6 lbs.
	504352	Replacement Air Valve Handle, 1” (w/right angle stop tab)	1 lb.
	505272	Replacement Air Valve Handle, 1 1/4” (w/right angle stop tab)	1 lb.
	507132	Replacement Air Valve Handle, 1” (w/straight stop tab)	1 lb.
	507142	Replacement Air Valve Handle, 1 1/4” (w/straight stop tab)	1 lb.
5	290192	DF-2 Manual Drain Separator, 1 1/4” NPT (w/built-in check valve)	22 lbs.
	504562	ADS-1 Automatic Air Filter, 1” NPT (Optional 350)	11 lbs.
	504662	ADS-2 Automatic Air Filter, 1 1/4” NPT (Optional 650 & 1050)	15 lbs.
6	518252	Drain Valve, 1/4” NPT	1 lb.
7	520922	Flexible Hose w/fittings for 350 (Prior to 5/1/84)	4 lbs.
	290318	Flexible Hose w/fittings for 350 (After to 5/1/84)	3 lbs.
	521022	Flexible Hose w/fittings for 650 (Prior to 5/1/84)	5 lbs.
	290319	Flexible Hose w/fittings for 650 (After to 5/1/84)	4 lbs.
	521062	Flexible Hose w/fittings for 1050 (Prior to 5/1/84)	6 lbs.
	520982	Flexible Hose w/fittings for 1050 (After to 5/1/84)	5 lbs.
8	290383	Manual ***Sure-Flo*** Valve Assembly (Refer to Chapter 7)	–
9	–	Nozzle Coupling (Refer to Chapter 7)	–
9A	–	Nozzle Washer (Not shown) (Refer to Chapter 7)	–
10	–	Nozzle (Refer to Chapter 7)	–
11	–	Blast Hose (Refer to Chapter 7)	–
12	753262	Aluminum Tank Coupling	1 lb.
13	510511	Safety Pin	–
14	–	Quick Snap Coupling (Refer to Chapter 7)	–
15	506152	Clevis Inspection Door	7 lbs.
	524152	Door Gasket	1 lb.
16	753322	Silencer, 1” NPT	1 lb.
17	518492	Manual Air Valve, 1” NPT	4 lbs.
	504352	Replacement Air Valve Handle, 1”	1 lb.
18	545752	Tee, 2” x 1 1/4” x 1 1/4” NPT	1 lb.
19	290367	***E/Z*** Fill Bag Breaker/Screener (Refer to Chapter 7)	1 lb.
20	522112	Adaptor, 1” (350)	2 lbs.
	520262	Adaptor, 1 1/4” (650 & 1050)	2 lbs.
21	505062	Wheel, 12” Semi-Pneumatic, 5/8” Hub (350)	10 lbs.
	505072	Wheel, 16” Semi-Pneumatic, 1” Hub (650 & 1050)	22 lbs.
22	504692	Axle, 5/8” diameter x 26” L (350)	5 lbs.
	504702	Axle, 1” diameter x 32 1/2” L (650)	8 lbs.
	504712	Axle, 1” diameter x 36 1/4” L (1050)	12 lbs.

2.3 Set-Up

Refer to Figure 2-1. Use the following procedure to set up the ***SuperBlast*** system with manual controls:

Step	Procedure
1	Remove the inspection door (15) and remove any debris that may have fallen into the pressure vessel cone. This will eliminate potential media blockage at initial start-up.
2	Locate the air pressure gauge (3) in a box taped to the pipe string support bracket. Install the ¼" gauge in the connection elbow, as illustrated in Figure 2-1.
3	Locate the manual ***Sure-Flo*** media valve (8) with tank coupling (12) at the bottom of the vessel. Connect the blast hose with coupling (14) to the tank coupling (12). Ensure that each coupling has a rubber washer and a safety pin (13) or wire installed for safe operation.
4	Install nozzle washer (9A) inside nozzle coupling (9) between nozzle (10) and the blast hose end. Screw the nozzle into the threaded nozzle coupling until it seats and seals on the washer. Hand tight is sufficient.
5	Open exhaust air valve (17) and choke air valve (4A). In the open position, the handle is parallel to the pipe.
6	Close main air valve (4) (the handle is perpendicular to the valve). Close ***Sure-Flo*** media valve (8) by rotating the "T" handle fully clockwise.
7	Install the air hose coupling (not supplied) to the main air valve (4). Use couplings or fittings that do not restrict the air flow.
8	Connect the air line from the compressor to the air hose coupling installed in the previous step. Keep the hose length as short as possible. Use an air line at least 3 times the inside diameter (I.D.) of the nozzle orifice. A 1¼" I.D. or larger air hose is recommended.
9	Fill the pressure vessel with dry media through the 6" opening at the top of the vessel. Each ***SuperBlast*** system is supplied with the ***E-Z Fill*** bag breaker/screen, which is used to split open and filter bags of media. To prevent accidental dislodging of this device, make sure the screw located in the base of each leg is securely fastened. When full, the media level should not exceed the bottom of sealing plunger (2). ■ **CAUTION** ■ ***Over-filling the vessel may prevent the sealing plunger from closing properly and cause needless wear.***

Step	Procedure
	■ ■ WARNINGS ■ ■ ***1. The Operator must be equipped with recommended protective clothing. NIOSH/OSHA require the use of a respirator (air-fed hood), remote controls, canvas jacket, pants, and leather gloves.*** ***2. It is an OSHA requirement that the respirator is supplied with Grade "D" compressed air and equipped with a personal air filter and C.O. monitor or ambient air pump.***
10	Before blasting a) Check the personal air filter and C.O. monitor or ambient air pump for proper operation. b) Use safety pins or wires when joining the blast hose or air hose couplings. c) Make sure there is adequate air supply for both the operator's respirator and the blast system.

2.4 Operation

■ NOTE ■

For proper operation of your SuperBlast system, maintain it regularly according to the maintenance schedules in Chapter 6.

Use the following procedure to operate the ***SuperBlast*** system with manual controls:

Step	Procedure
1	Close main air valve (4). (In the closed position, the handle is perpendicular to the pipe, as illustrated in Figure 2-1.) Pressurize the air line from the compressor to the pressure vessel.
2	Close exhaust valve (17).
3	***Before Blasting - Important*** After the respirator is installed and the Operator is dressed in protective clothing and ready to start blasting, the Pot Tender opens the main air valve (4), pressurizes the vessel, and starts the blast, as explained in Step 4, following.

Step	Procedure
4	While the Operator holds the nozzle, the Pot Tender gradually opens the ***Sure-Flo*** media valve (8) by rotating the "T" handle counterclockwise until the proper air/media mixture is achieved. Generally, the best air/media mixture is when the media exiting the nozzle is just barely visible. **■ NOTES ■** ***1. For best results, hold the nozzle 18" from the work piece and at a 90 degree angle to its surface.*** ***2. Overlapping strokes are recommended.*** ***3. The optimum "dwell time" depends on the final finish required. For example, move the nozzle faster for a "brush-off" finish than for a "white metal" finish.***
5	To stop blasting, the Pot Tender closes the main air valve (4) and opens the exhaust valve (17). **■ ■ WARNINGS ■ ■** ***1. Compressed air and some media from the pressure vessel will exit through the exhaust valve.*** ***2. Always release trapped compressed air from the vessel and pipe string before disconnecting any hoses.*** **■ CAUTION ■** ***Never turn-off the compressor before depressurizing the pressure vessel.***
6	To avoid overnight condensation, ***empty the vessel of media at the end of each day.*** The most efficient way to empty the vessel is through normal blasting. However, if you want to empty the vessel quickly, proceed as follows: a) Remove the nozzle and washer from the nozzle coupling. b) Close the choke valve (4A). c) Completely open the ***Sure-Flo*** media valve (8). d) Close the exhaust valve (17). e) (Operator) Position yourself to begin blasting. f) Gradually open the main air valve (18). The vessel will "pump" the media out very quickly. g) When the vessel has been emptied, close the main air valve (4) and open the exhaust valve (17).
7	Release trapped air between the main air valve and the compressor before disconnecting the hose(s).

2.5 Troubleshooting the Manual Control System

Use the following procedure to troubleshoot the ***SuperBlast*** system equipped with manual controls:

Problem	Probable Cause	Remedy
Vessel will not pressurize	Compressed air supply not on	Start the compressor and open the compressed air valves to the vessel.
No air or media from nozzle	Choke and media valves closed	Open the choke valve and adjust the media valve.
	Clogged nozzle	■ ■ **WARNING** ■ ■ ***Shut-off air supply and depressurize vessel.*** Remove the nozzle from the coupling and clear the obstruction from the nozzle orifice.
	Clogged blast hose	■ ■ **WARNING** ■ ■ ***Shut-off air supply and depressurize vessel.*** Remove the nozzle from the nozzle coupling and disconnect the blast hose from the tank coupling under the vessel. Dump media and debris from the hose. Check the media valve for proper setting.

Problem	Probable Cause	Remedy
Air but no media flow from nozzle	Vessel empty	Fill the vessel with media.
	Media valve closed or set incorrectly	Open the media valve and adjust for desired media flow.
	Air leak(s) at one or more of the following locations: sealing plunger/ "O" ring exhaust valve media valve fittings at bottom of vessel	■ ■ **WARNING** ■ ■ ***Shut-off air supply and depressurize vessel.*** Repair/replace leaking and worn parts. Tighten the fittings at the bottom of the vessel.
	Sure-Flo media valve plugged	1) Open the ***Sure-Flo*** media valve completely. Close the choke valve, remove the nozzle and washer from the nozzle coupling, and turn on the air to blast. All air pressure will be through the media valve. If there is still no media flow: 2) Back the stationary roller bolt out ¼" and repeat Step #1. If there is still no media flow, see "Vessel Outlet Plugged" (below).
	Vessel outlet plugged	■ ■ **WARNING** ■ ■ ***Shut-off air supply and depressurize vessel.*** Lay the vessel down on the handle and disassemble the ***Sure-Flo*** media valve. Remove the pinch tube and clear the obstruction. It may be necessary to empty the vessel to remove accumulated debris.
	Wet/damp media from compressed air supply	■ ■ **WARNING** ■ ■ ***Shut-off air supply and depressurize vessel.*** Remove the vessel inspection door. Remove media from the vessel or follow "***Sure-Flo*** media Valve Plugged" remedy.
Very heavy media flow with occasional spurts of air	Choke valve closed	Open the choke valve completely.
	Low blast pressure	Check the air supply pressure and verify that all air supply valves are open completely.
	Sure-Flo media valve adjustment	Reduce media flow by turning the "T" handle clockwise.
Uneven media flow at nozzle	Media flow too rich	Adjust the media valve clockwise to reduce media flow.

Problem	Probable Cause	Remedy
Media flow cannot be adjusted; either too lean or too rich	Pinch tube matrix. (Review pinch tube size and use chart.)	If adjusting the media valve with ¼ and 1/8 turns of the "T" handle does not correct problem, use an optional pinch tube in the media valve. A ¾" pinch tube is standard. A 5/8" pinch tube is recommended.
Hole in mixing tee under media valve	Choke valve partly closed when blasting	Operate the system with the choke valve fully open.
Premature blast hose failure	Nozzle/hose size incorrect	The blast hose I.D. should be 3 times larger than the nozzle orifice. Example: ¼" nozzle -- ¾" blast hose.
	Media flow too rich	Reduce media flow by turning the media valve "Tee" handle clockwise.
Poor production	Part condition	The part must be dry and free of oil and grease.
	Media flow	Adjust media flow. Media should be just visible as it exits the nozzle.
	Nozzle type	The Venturi nozzle concentrates media as it exits the nozzle.
	Distance of nozzle to part.	Closer up - smaller, more intense blast pattern. Farther back - larger, less intense blast pattern.
	Low blast pressure	Try each of the following: 1. Change worn nozzle 2. Use a smaller nozzle 3. Use a larger compressor and/or air supply line.
	Media size	Use coarser/larger media for thick material.

NOTES:

SuperBlast 680 System with *Saf-Stop II* Remote Controls

3

3.1 Description

The ***SuperBlast 680*** system with ***Saf-Stop II*** remote controls is illustrated in *Figure 3-1* and the parts list is provided in *Table 3-1*. Reference numbers in *Figure 3-1* correspond to the numbered items in *Table 3-1*.

3.2 Principles of Operation

The ***SuperBlast 680*** Remote Control System pressurizes the vessel and starts blasting when the ***Saf-Stop II*** control is depressed and de-pressurizes the vessel and stops blasting when the control handle is released.

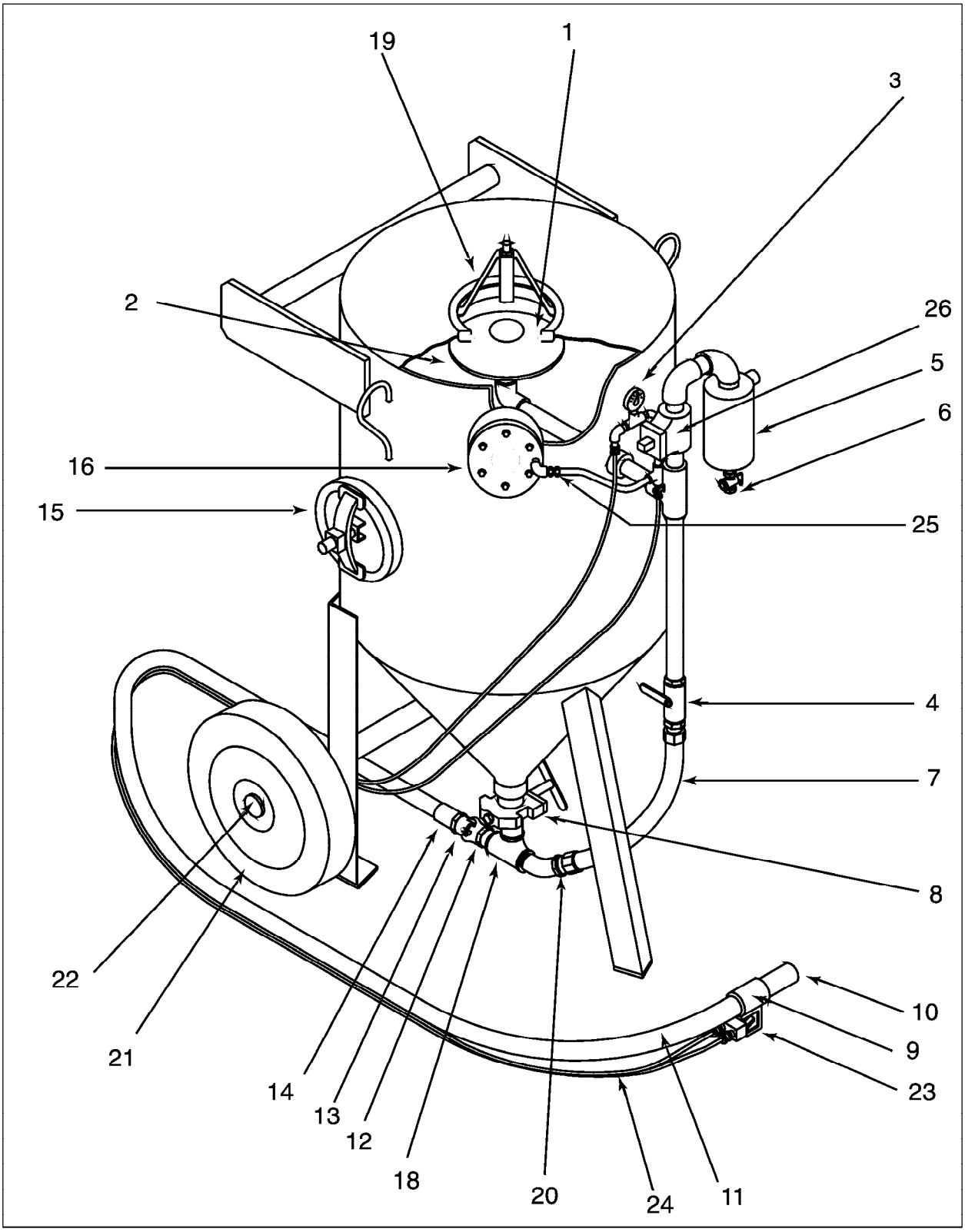

Figure 3-1 ***SuperBlast 680*** **System With Saf-Stop** ***II*** **Remote Controls**

Table 3-1 Part List for the *SuperBlast 680* System With *Saf-Stop II* Remote Controls

Ref.	Part Number	Description	Ship Weight
1	523872	"O" Ring, 6" rubber	1 lb.
2	525072	Sealing Plunger (PVC coated), 6"	4 lbs.
3	550242	Air Gauge, 1/4" NPT	1 lb.
4	518492	Manual Air Valve, 1" NPT (350)	5 lbs.
	518502	Manual Air Valve, 1 1/4" NPT (650 & 1050)	6 bs.
	504352	Replacement Air Valve Handle, 1" (w/right angle stop tab)	1 lb.
	505272	Replacement Air Valve Handle, 1 1/4" (w/right angle stop tab)	1 lb.
	507132	Replacement Air Valve Handle, 1" (w/straight stop tab)	1 lb.
	507142	Replacement Air Valve Handle, 1 1/4" (w/straight stop tab)	1 lb.
5	290191	DF-1 Manual Drain Separator, 1" NPT (w/built-in check valve) (350)	22 lbs.
	290192	DF-2 Manual Drain Separator, 1" NPT (w/built-in check valve) (650 & 1050)	22 lbs.
	504562	ADS-1 Automatic Air Filter, 1" NPT **Optional** (350)	11 lbs.
	504662	ADS-2 Automatic Air Filter, 1 1/4" NPT **Optional** (650 & 1050)	15 lbs
6	518252	Drain Valve, 1/4" NPT	1 lb.
7	520922	Flexible Hose w/fittings for 350 (Prior to 5/1/84)	4 lbs.
	290318	Flexible Hose w/fittings for 350 (After 5/1/84)	3 lbs.
	521022	Flexible Hose w/fittings for 650 (Prior to 5/1/84)	5 lbs.
	290319	Flexible Hose w/fittings for 650 (After 5/1/84)	4 lbs.
	521062	Flexible Hose w/fittings for 1050 (Prior to 5/1/84)	6 lbs.
	520982	Flexible Hose w/fittings for 1050 (After 5/1/84)	5 lbs.
8	290383	Manual ***Sure-Flo*** Valve Assembly (Refer to Chapter 7)	–
9	–	Nozzle Coupling (Refer to Chapter 7)	–
9A	–	Nozzle Washer (Not Shown) (Refer to Chapter 7)	–
10	–	Nozzle (Refer to Chapter 7)	–
11	–	Blast Hose (Refer to Chapter 7)	–
12	753262	Aluminum Tank Coupling	1 lb.
13	510511	Safety Pin	–
14	–	Quick Snap Coupling (Refer to Chapter 7)	–
15	506152	Clevis Inspection Door	7 lbs.
	524152	Door Gasket	1 lb.
16	290181	MG72 Exhaust Valve (Refer to Chapter 7)	17 bs.
17	N/A	Not required to 680 Control System (Not shown on drawing)	
	504352	Replacement Air Valve Handle, 1"	1 lb.
18	545752	Tee, 2" x 1 1/4" x 1 1/4" NPT	1 lb.
19	290367	***E-Z Fill*** Bag Breaker/Screener (Refer to Chapter 7)	1 lb.
20	522112	Adaptor, 1" (350)	2 lbs.
	520262	Adaptor, 1 1/4" (650 & 1050)	2 lbs.
21	505062	Wheel, 12" Semi-Pneumatic, 5/8" Hub (350)	10 lbs.
	505072	Wheel, 16" Semi-Pneumatic, 1" Hub (650 & 1050)	22 lbs.
22	504692	Axle, 5/8" diameter x 26" L (350)	5 lbs.
	504702	Axle, 1" diameter x 32 1/2" L (650)	8 lbs.

Table 3-1 Part List for the *SuperBlast 680* System With *Saf-Stop II* Remote Controls

Ref.	Part Number	Description	Ship Weight
	504712	Axle, 1" diameter x 36¼" L (1050)	12 lbs.
23	290164	Pneumatic ***Saf-Stop II*** Remote Control Handle (Refer to Chapter 7 for Electric)	2 lbs.
24	521962	Dual Line Hose w/fittings (30')	5 lbs.
	521882	Dual Line Hose w/fittings (50')	8 lbs.
	521892	Dual Line Hose w/fittings (55')	9 lbs.
	520872	Dual Line Hose per foot	1 lb.
25	290370	Control Hose, ¼" ID w/fittings, 14" L (350)	1 lb.
	290372	Control Hose, ¼" ID w/fittings, 14" L (650)	1 lb.
	290374	Control Hose, ¼" ID w/fittings, 16" L (1050)	1 lb.
26	518052	Automatic Air Valve, 1" NPT w/bleed (350) (Refer to Chapter 7)	1 lb.
	518062	Automatic Air Valve, 1¼" NPT w/bleed (650 & 1050) (Refer to Chapter 7)	1 lb.

3.3 Set-Up

Refer to Figure 3-1. Use the following procedure to set up the ***SuperBlast 680*** system with ***Saf-Stop II*** remote controls:

Step	Procedure
1	Remove the inspection door (15) and remove any debris that may have fallen into the pressure vessel cone. This will eliminate potential media blockage at initial start-up.
2	Locate the pressure gauge (3) in a box taped to the pipe string support bracket. Install the ¼" gauge in the connection tee, as illustrated in Figure 3-1.
3	Locate the Manual ***Sure-Flo*** media valve (8) with tank coupling (12) at the bottom of the vessel. Connect the blast hose with coupling (14) to the tank coupling (22). Ensure that each coupling has a rubber washer and a safety pin or wire installed for safe operation.
4	Install nozzle washer (9A) inside nozzle coupling (9) between nozzle (10) and the blast hose end. Screw the nozzle into the threaded nozzle coupling until it seats and seals on the washer. Hand tight is sufficient.

Step	Procedure
5	Prepare the ***Saf-Stop II*** remote control system for installation using either a) or b), below: a) If your ***SuperBlast*** system is equipped with **pneumatic** ***Saf-Stop II*** remote controls (refer to Page 7-6), it is supplied with dual-line hose (24). Connect the dual-line hose to the ***Saf-Stop II*** remote control handle (23) and the appropriate fittings on the vessel pipe string. b) If your ***SuperBlast*** system is equipped with **electrical** ***Saf-Stop II*** remote controls (refer to Pages 7-6 and 7-7), it is supplied with two lengths of electric cord. Connect the 20-foot line cord with clips (Page 7-7, Item 4) to a 12-volt D.C. electric power source. Plug the 55-foot length of cord (Page 7-6, Item 1) into the operator's ***Saf-Stop II*** remote control handle (Page 7-6, Item 7) and the electric box receptacle (Page 7-7, Item 1) attached to the vessel handle or leg.
6	Attach ***Saf-Stop II*** handle (23) to the blast hose just behind the nozzle coupling (9). The ***Saf-Stop II*** brass fittings or electrical plug must be facing away from nozzle (10).
7	Starting 18" to 24" from the ***Saf-Stop II*** handle, tape the dual-line hose or line cord to the blast hose approximately every four feet. Friction tape, duct tape, ty-wraps or similar material can be used. Leave slack in the control line between the ***Saf-Stop II*** handle and the first point of attachment.
8	The exhaust valve (16) is normally open. Open choke air valve (4A). The valve handle should be parallel to the pipe.
9	Close main air valve (4) and ***Sure-Flo*** media valve (8). To close the media valve, rotate the "T" handle full clockwise.
10	Install an air hose coupling (not supplied) to main air valve (4) or drain separator (5). Do not use a coupling or fitting that restricts air flow.
11	Connect an air line from the compressor to the air hose coupling you installed in the previous step. Keep hose length as short as possible. Use an air line at least three (3) times the I.D. of the nozzle orifice. A 1¼" I.D. or larger air hose is generally used.
12	Fill the pressure vessel with ***dry*** media through the 6" opening at the top of the vessel. Each ***SuperBlast*** system is supplied with the ***E-Z Fill*** bag breaker/screen, which is used to split open and filter bags of media. To prevent accidental dislodging of this device, make sure the screw located in the base of each leg is securely fastened. When full, the media level should not exceed the bottom of sealing plunger (2). ■ **CAUTION** ■ ***Over-filling may prevent the sealing plunger from closing properly and cause needless wear.***

Step	Procedure
13	**■ ■ WARNING ■ ■** ***1. The Operator must be equipped with recommended protective clothing. NIOSH/OSHA require the use of a respirator (air-fed hood), remote controls, canvas jacket, pants, and leather gloves.*** ***2. OSHA requires that the respirator be supplied with Grade "D" compressed air and equipped with a personal air filter and C.O. monitor or ambient air pump.*** Before blasting: a) Check the personal air filter and C.O. monitor or ambient air pump for proper operation. b) Use safety pins or wires when joining the blast hose or air hose couplings. c) Make sure there is adequate air supply for both the operator's respirator and the blast system.

3.4 Operation

■ NOTE ■

For proper operation of your SuperBlast system, maintain it regularly according to the maintenance schedules in Chapter 6.

Use the following procedure to operate the ***SuperBlast 680*** system with ***Saf-Stop II*** remote controls:

Step	Procedure
1	Close main air valve (4). (In the closed position, the handle is perpendicular to the pipe, as illustrated in Figure 3-1.) Pressurize the air line that connects the compressor to the pressure vessel.
2	After the operator is dressed in protective clothing and the respirator is installed, the operator opens the main air valve (4). The vessel will not pressurize. The vessel will pressurize and blasting will start when the operator depresses the ***Saf-Stop II*** remote control handle.
3	The operator depresses the ***Saf-Stop II*** remote control handle (23). The vessel will pressurize and only blast air (no media) will exit the nozzle.

Step	Procedure
4	While the operator holds the nozzle, depressing the ***Saf-Stop II*** remote control handle, the Pot Tender gradually opens the manual ***Sure-Flo*** media valve (8) by rotating the "T" handle counterclockwise until the proper air/media mixture is achieved. Generally, the best air/media mixture results when the blast stream exiting the nozzle is just visible. **■ NOTES ■** ***1. For best results, hold the nozzle 18" from the work piece and at a 90 degree angle to its surface.*** ***2. Overlapping strokes are recommended.*** ***3. The optimum "dwell time" depends on the final finish required. For example, move the nozzle faster for a "brush-off" finish than for a "white metal" finish.***
5	To stop blasting, the operator releases the ***Saf-Stop II*** remote control handle. The vessel will depressurize. **■ ■ WARNING ■ ■** ***Compressed air and some media from the pressure vessel will exit through the MG-72 exhaust valve.*** **■ CAUTION ■** ***Never turn-off the compressor before depressurizing the pressure vessel.*** **■ ■ WARNING ■ ■** ***Always release trapped compressed air from vessel and pipe string before disconnecting any hoses.***

Step	Procedure
6	To avoid overnight condensation, **empty the vessel of media at the end of each day**. The most efficient way to empty the vessel is through normal blasting. However, if you want to empty the vessel quickly, proceed as follows: a) Remove the nozzle and washer from the nozzle coupling. b) Close the choke valve (4A). c) Completely open the ***Sure-Flo*** media valve (8). d) (Operator) Position yourself to begin blasting. e) (Operator) Depress the ***Saf-Stop II*** remote control. The vessel will "pump" the media out very quickly. f) (Operator) When the vessel has been emptied, release the remote control and close the main air valve (4).
7	Release trapped air between the main air valve and the compressor before disconnecting the hose(s).

3.5 Troubleshooting

Use the following procedure to troubleshoot the ***SuperBlast 680*** system with ***Saf-Stop II*** remote controls:

Problem	Probable Cause	Remedy
Vessel will not pressurize	Compressed air supply not on	Start the compressor and open the compressed air valves to the vessel.
	Safety petcock valve closed	Open petcock valve.
	Saf-Stop II remote control	Refer to table for ***Saf-Stop II*** Remote Control Handle.
	Automatic blast air valve defective	Repair/replace valve internal components.
Vessel continuously alternates between pressurizing and depressurizing	Low volume of compressed air	Verify that supply air valve(s) are fully open.
	Supply hose too long or diameter too small for required air volume (causing excessive friction loss)	Use minimum 1¼" I.D. air hose
	Compressor too small or using too much air	Replace worn nozzle. Use smaller nozzle or use larger compressor.

Problem	Probable Cause	Remedy
Vessel pressurizes but no air or media emerges from nozzle	Choke and media valves closed	Open choke valve and adjust media valve
	Clogged nozzle	■ ■ **WARNING** ■ ■ ***Shut-off air supply and depressurize vessel.*** Remove the nozzle from the coupling and clear the obstruction from the nozzle orifice.
	Clogged blast hose	■ ■ **WARNING** ■ ■ ***Shut-off air supply and depressurize vessel.*** Remove the nozzle from the nozzle coupling and disconnect the blast hose from the tank coupling under the vessel. Remove media and debris from the hose. Check the media valve for proper setting.

Problem	Probable Cause	Remedy
Air but no media flow from nozzle	Vessel empty	Fill the vessel with media.
	Media valve closed or set incorrectly	Open the media valve and adjust for desired media flow.
	Air leak(s) at one or more of the following locations: sealing plunger/"O" ring exhaust valve media valve fittings at bottom of vessel	■ ■ **WARNING** ■ ■ ***Shut-off air supply and depressurize vessel.*** Repair/replace leaking and worn parts. Tighten the fittings at the bottom of the vessel.
	Sure-Flo media valve plugged	1) Open the ***Sure-Flo*** media valve completely. Close the choke valve, remove the nozzle and washer from the nozzle coupling, turn on air, and depress the ***Saf-Stop II*** to start the blast. All air pressure will be through the media valve. If there is still no media flow: 2) Back the stationary roller bolt out ¼" and repeat Step #1. If there is still no media flow, see "Vessel Outlet Plugged," below.
	Vessel outlet plugged	■ ■ **WARNING** ■ ■ ***Shut-off air supply and depressurize vessel.*** Lay the vessel down on the handle and disassemble the ***Sure-Flo*** media valve. Remove the pinch tube and clear the obstruction. It may be necessary to empty the vessel to remove accumulated debris.
	Wet/damp media (due to moisture from compressed air supply)	■ ■ **WARNING** ■ ■ ***Shut-off air supply and depressurize vessel.*** Remove the vessel inspection door. Remove media from the vessel, or follow "***Sure-Flo*** media Valve Plugged" remedy (above).
Very heavy media flow with occasional spurts of air	Choke valve closed	Open the choke valve completely.
	Low blast pressure	Check the air supply pressure and verify that all air supply valves are open completely.
	Sure-Flo media valve adjustment	Reduce media flow by turning the "T" handle clockwise.
Uneven media flow at nozzle	Media flow too rich	Adjust the media valve clockwise to reduce media flow.

Problem	Probable Cause	Remedy
Media flow cannot be adjusted—either too lean or too rich	Pinch tube matrix. (Review pinch tube size and use chart.)	If adjusting the media valve using ¼ and 1/8 turns of the "T" handle does not correct problem, use an optional pinch tube in the media valve. A ¾" pinch tube is standard. A 5/8" pinch tube is recommended.
Hole in mixing tee under media valve	Choke valve partly closed when blasting	The system must be operated with the choke valve fully open.
Premature blast hose failure	Nozzle/hose size incorrect	The blast hose I.D. should be 3 times larger than the nozzle orifice. Example: ¼" nozzle -- ¾" blast hose.
	Media flow too rich	Reduce media flow by turning the media valve T handle clockwise.
Poor production	Part condition	The part must be dry and free of oil and grease.
	Media flow	Adjust media flow. Media should be just visible as it exits the nozzle.
	Nozzle type	The Venturi nozzle concentrates media as it exits the nozzle.
	Distance between nozzle and part.	Closer up - smaller, more intense blast pattern. Farther back - larger, less intense blast pattern.
	Low blast pressure	Try each of the following: 1. Change worn nozzle 2. Use a smaller nozzle 3. Use a larger compressor and/or air supply line.
	Media size	Use coarser/larger media for thick material.

NOTES:

SuperBlast 780 System with *Saf-Stop II* Remote Controls

4

4.1 Description

The ***SuperBlast 780*** system with ***Saf-Stop II*** remote controls is illustrated in *Figure 4-1* and the parts list is provided in *Table 4-1*. Reference numbers in *Figure 4-1* correspond to the numbered items in *Table 4-1*.

4.2 Principles of Operation

The ***SuperBlast 780*** Remote Control System starts blasting when the ***Saf-Stop II*** control is depressed and stops blasting when the control handle is released. The vessel is manually pressurized and de-pressurized.

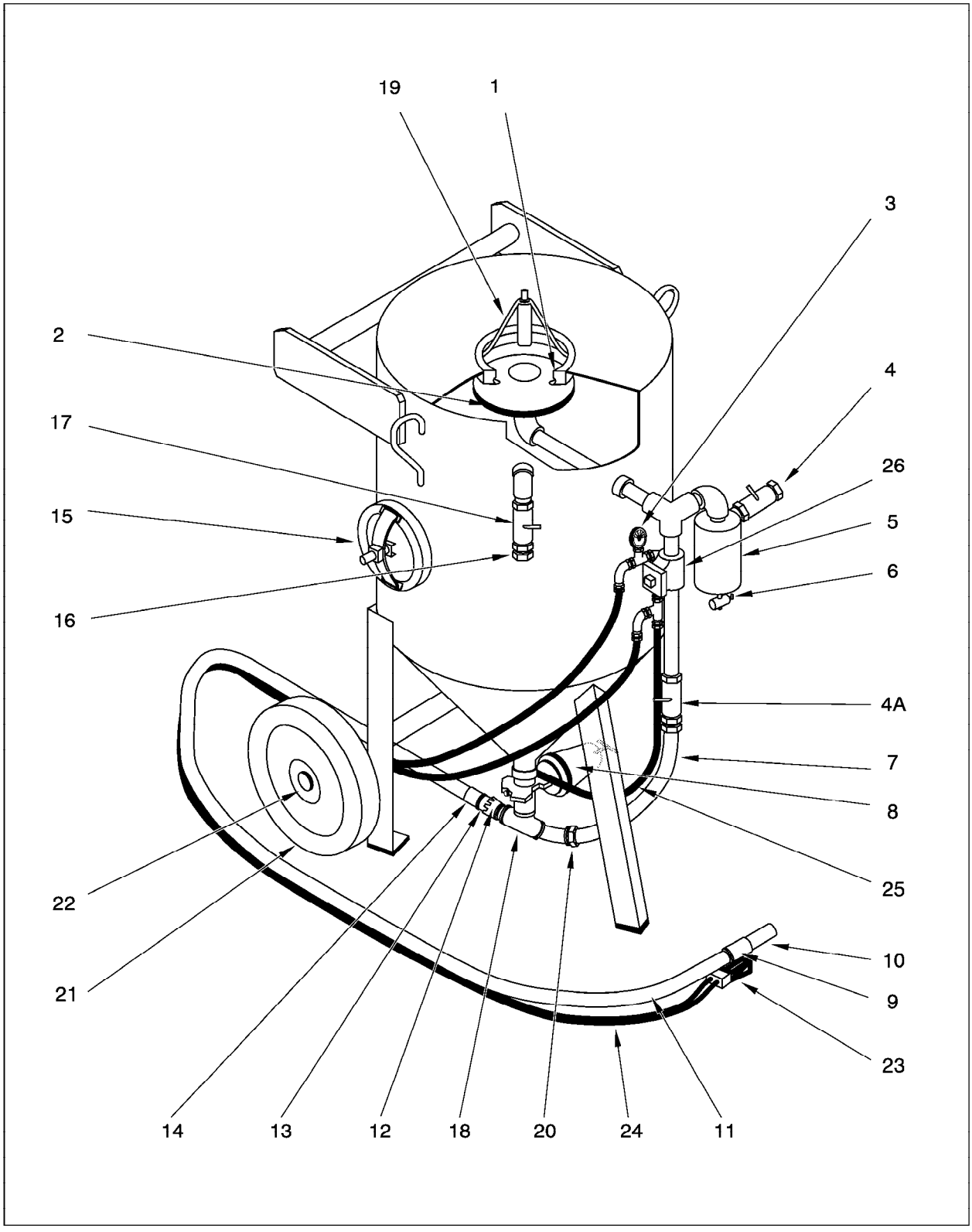

Figure 4-1 ***SuperBlast 780*** **System With** ***Saf-Stop II*** **Remote Controls**

Table 4-1 Parts List for the *SuperBlast 780* System with *Saf-Stop II* Remote Controls

Ref.	Part Number	Description	Ship Weight
1	523872	"O" Ring, 6" rubber	1 lb.
2	525072	Sealing Plunger (PVC coated), 6"	4 lbs.
3	550242	Air Gauge, 1/4" NPT	1 lb.
4A	518412	Manual Air Valve, 1" NPT (350)	5 lbs.
4	518502	Manual Air Valve, 1 1/4" NPT (650 & 1050)	6 lbs.
	504352	Replacement Air Valve Handle, 1" (w/right angle stop tab)	1 lb.
	505272	Replacement Air Valve Handle, 1 1/4" (w/right angle stop tab)	1 lb.
	507132	Replacement Air Valve Handle, 1" (w/straight stop tab)	1 lb.
	507142	Replacement Air Valve Handle, 1 1/4" (w/straight stop tab)	1 lb.
5	290192	DF-2 Manual Drain Separator, 1 1/4" NPT (w/built-in check valve) (650 & 1050)	22 lbs.
	504562	ADS-1 Automatic Air Filter, 1" NPT (Optional 350)	11 lbs.
	504632	ADS-2 Automatic Air Filter, 1 1/4" NPT (Optional 650 & 1050)	15 lbs.
6	518252	Drain Valve, 1/4" NPT	1 lb.
7	520922	Flexible Hose w/fittings for 350 (Prior to 5/1/84)	4 lbs.
	290318	Flexible Hose w/fittings for 350 (After to 5/1/84)	3 lbs.
	521022	Flexible Hose w/fittings for 650 (Prior to 5/1/84)	5 lbs.
	290319	Flexible Hose w/fittings for 650 (After to 5/1/84)	4 lbs.
	521062	Flexible Hose w/fittings for 1050 (Prior to 5/1/84)	6 lbs.
	520982	Flexible Hose w/fittings for 1050 (After to 5/1/84)	5 lbs.
8	290215	Automatic ***Sure-Flo*** Valve Assembly (Refer to Chapter 7)	–
9	–	Nozzle Coupling (Refer to Chapter 7)	–
9A	–	Nozzle Washer (Refer to Chapter 7)	–
10	–	Nozzle (Refer to Chapter 7)	–
11	–	Blast Hose (Refer to Chapter 7)	–
12	753262	Aluminum Tank Coupling	1 lb.
13	510511	Safety Pin	–
14	–	Quick Snap Coupling (Refer to Chapter 7)	–
15	506152	Clevis Inspection Door	7 lbs.
	524152	Door Gasket	1 lb.
16	753322	Silencer, 1" NPT	1 lb.
17	518492	Manual Air Valve, 1" NPT	4 lbs.
18	545752	Tee, 2" x 1 1/4" x 1 1/4" NPT	1 lb.
19	290367	***E/Z*** Fill Bag Breaker/Screener (Refer to Chapter 7)	1 lb.
20	522112	Adaptor, 1" (350)	2 lbs.
	520262	Adaptor, 1 1/4" (650 & 1050)	2 lbs.
21	505062	Wheel, 12" Semi-Pneumatic, 5/8" Hub (350)	10 lbs.
	505072	Wheel, 16" Semi-Pneumatic, 1" Hub (650 & 1050)	22 lbs.
22	504692	Axle, 5/8" diameter x 26" L (350)	5 lbs.
	504702	Axle, 1" diameter x 32 1/2" L (650)	8 lbs.
	504712	Axle, 1" diameter x 36 1/4" L (1050)	12 lbs.

Table 4-1 Parts List for the SuperBlast *780* System With *Saf-Stop II* Remote Controls

Ref.	Part Number	Description	Ship Weight
23		***Saf-Stop II*** Remote Control Handle (Refer to Chapter 7)	2 lbs.
24	521962	Dual Line Hose w/fittings (30')	5 lbs.
	521882	Dual Line Hose w/fittings (50')	8 lbs.
	521892	Dual Line Hose w/fittings (55')	9 lbs.
	520872	Dual Line Hose per foot	1 lb.
25	290371	Control Hose, ¼" ID w/fittings, 23" L (350)	1 lb.
	290373	Control Hose, ¼" ID w/fittings, 27" L (650)	1 lb.
	290375	Control Hose, ¼" ID w/fittings, 39" L (1050)	1 lb.
26	518052	Automatic Air Valve, 1" NPT w/bleed (350) (Refer to Chapter 7)	1 lb.
	518062	Automatic Air Valve, 1¼" NPT w/bleed (650 & 1050) (Refer to Chapter 7)	1 lb.

4.3 Set-Up

Refer to Figure 4-1. Use the following procedure to set up the ***SuperBlast 780*** system with ***Saf-Stop II*** remote controls:

Step	Procedure
1	Remove the inspection door (15) and remove any debris that may have fallen into the pressure vessel cone. This will eliminate potential media blockage at initial start-up.
2	Locate the air pressure gauge (3) in a box taped to the pipe string support bracket. Install the ¼" gauge in the connection tee, as illustrated in Figure 4-1.
3	Locate the Automatic ***Sure-Flo*** media valve (8) with tank coupling (12) at the bottom of the vessel. Connect the blast hose with coupling (14) to the tank coupling (12). Ensure that each coupling has a rubber washer and a safety pin or wire installed for safe operation.
4	Install nozzle washer (9A) inside nozzle coupling (9) between nozzle (16) and the blast hose end. Screw the nozzle into the threaded nozzle coupling until it seats and seals on the washer. Hand tight is sufficient.
5	Prepare the ***Saf-Stop II*** remote control system for installation using either a) or b): a) If your ***SuperBlast*** system is equipped with **pneumatic** ***Saf-Stop II*** remote controls (refer to Page 7-6), it is supplied with dual-line hose (24). Connect the dual-line hose to the ***Saf-Stop II*** remote control handle (23) and to the appropriate fittings on the vessel pipe string. b) If your ***SuperBlast*** system is equipped with **electrical** ***Saf-Stop II*** remote controls (refer to Pages 7-6 and 7-7), it is supplied with two lengths of electric cord. Connect the 20-foot line cord with clips (Page 7-7, Item 4) to a 12-volt D.C. electric power source. Plug the 55-foot length of cord (Page 7-6, Item 1) into the operator's ***Saf-Stop II*** remote control handle (Page 7-6, Item 7) and the electric box receptacle (Page 7-7, Item 1) attached to the vessel handle or leg.
6	Attach ***Saf-Stop II*** handle (23) to the blast hose just behind the nozzle coupling (9). The ***Saf-Stop II*** brass fittings or electrical plug must be facing away from nozzle (16).

Step	Procedure
7	Starting 18" to 24" from the ***Saf-Stop II*** handle, tape the dual-line hose or line cord to the blast hose approximately every four feet. Friction tape, duct tape, ty-wraps or similar material can be used. Leave slack in the control line between the ***Saf-Stop II*** handle and the first point of attachment.
8	Open the exhaust valve (17) and choke valve (4A). Both handles should be parallel to the pipe.
9	Close the main air valve (4) and the ***Sure-Flo*** media valve (8). To close the media valve, rotate the "T" handle full clockwise.
10	Install an air hose coupling (not supplied) to main air valve (4). Do not use a coupling or fitting that restricts air flow.
11	Connect an air line from the compressor to the air hose coupling you installed in the previous step. Keep hose length as short as possible. Use an air line at least three (3) times the I.D. of the nozzle orifice. A 1¼" I.D. or larger air hose is generally used.
12	Fill the pressure vessel with **dry** media through the 6" opening at the top of the vessel. Each ***SuperBlast*** system is supplied with the ***E-Z Fill*** bag breaker/screen, which is used to split open and filter bags of media. To prevent accidental dislodging of this device, make sure the screen located in the base of each leg is securely fastened. When full, the media level should not exceed the bottom of sealing plunger (2). **■ CAUTION ■** ***Over-filling may prevent the sealing plunger from closing properly and cause needless wear.***

■ ■ WARNINGS ■ ■

1. ***The Operator must be equipped with recommended protective clothing. NIOSH/OSHA require the use of a respirator (air-fed hood), remote controls, canvas jacket, pants, and leather gloves.***
2. ***OSHA requires that the respirator be supplied with Grade "D" compressed air and equipped with a personal air filter and C.O. monitor or ambient air pump.***

13 Before blasting:

a) Check the personal air filter and C.O. monitor or ambient air pump for proper operation.

b) Use safety pins or wires when joining the blast hose or air hose couplings.

c) Make sure there is adequate air supply for both the Operator's respirator and the blast system.

■ NOTE ■

When using an air regulator to control blast pressure, the air supply for the control air must be relocated to the line pressure side of the regulator.

4.4 Operation

■ NOTE ■

For proper operation of your SuperBlast system, maintain it regularly according to the maintenance schedules in Chapter 6.

Use the following procedure to operate the ***SuperBlast 780*** system with ***Saf-Stop II*** remote controls:

Step	Procedure
1	Close main air valve (4). (In the closed position, the handle is perpendicular to the pipe, as illustrated in Figure 4-1.) Pressurize the air line that connects the compressor to the pressure vessel.
2	***Before Blasting - Important*** After the Operator is dressed in protective clothing and the respirator is installed, close the exhaust valve (17) and open the main air valve (4).The vessel will pressurize. Blasting will not start until the Operator depresses the ***Saf-Stop II*** remote control handle.
3	The Operator depresses the ***Saf-Stop II*** handle. Only air (no media) will exit the nozzle.
4	While the Operator holds the nozzle, depressing the Saf-Stop II control, the Pot Tender gradually opens the ***Sure-Flo*** media valve (8) by rotating the "T" handle counterclockwise until the proper air/media mixture is achieved. Generally, the best air/media mixture is when the media exiting the nozzle is just barely visible. **■ NOTES ■** ***a. For best results, hold the nozzle 18" from the work piece and at a 90 degree angle to its surface.*** ***b. Overlapping strokes are recommended.*** ***c. The optimum "dwell time" depends on the final finish required. For example, move the nozzle faster for a "brush-off" finish than for a "white metal" finish.***
5	To stop blasting, the Operator releases hand pressure from the ***Saf-Stop II*** control. Blasting will stop and the vessel will stay pressurized. **■ CAUTION ■** ***Never turn-off the compressor before depressurizing the pressure vessel.*** **■ ■ WARNING ■ ■** ***Always release trapped compressed air from vessel and pipe string before disconnecting any hoses.***
6	To shut down the system, close the main air valve (4) and open the exhaust valve (17).
7	Release trapped air between the main air valve (4) and the compressor before disconnecting hose(s).

Step	Procedure
8	To avoid overnight condensation, **empty the vessel of media at the end of each day.** The most efficient way to empty the vessel is through normal blasting. However, if you want to empty the vessel quickly, proceed as follows: a) Remove the nozzle and washer from the nozzle coupling. b) Close the choke valve (4A). c) Completely open the *Sure-Flo* media valve (8). d) Close exhaust valve (17) and open the main air valve (4). e) (Operator) Position yourself to begin blasting and depress the *Saf-Stop II* remote control. The vessel will "pump" the media out very quickly. f) When the vessel has been emptied, release the remote control, close the main air valve (4), and open the exhaust valve (17).
9	Release trapped air between the main air valve (4) and the compressor before disconnecting the hoses(s).

4.5 Troubleshooting

Use the following procedure to troubleshoot the ***SuperBlast 780*** system with ***Saf-Stop II*** remote controls:

Problem	Probable Cause	Remedy
Vessel will not pressurize	Compressed air supply not on	Start the compressor and open the compressed air valves to the vessel.
	Exhaust valve open	Close exhaust valve.
No air or media emerges from nozzle	Vessel not pressurized	See remedies for "Vessel will not pressurize" above.
	Choke and media valves closed	Open choke valve and adjust media valve.
	Safety petcock valve closed	Open safety petcock valve.
	Saf-Stop II control	Refer to table for *Saf-Stop II* Remote Control Handle.
Air but no media flow from nozzle	Vessel empty	Fill the vessel with media.
	Media valve closed or set incorrectly	Open the media valve and adjust for desired media flow.
	Low control air pressure	To open fully, the *Sure-Flo* media valve requires line pressure of 80 PSI (min.) when blasting. Valve closes at 40 PSI.

Problem	Probable Cause	Remedy
Air but no media flow from nozzle	Leaking or defective diaphragm in air valve or media valve	■ ■ **WARNING** ■ ■ ***Shut-off air supply, open exhaust valve, and depressurize vessel.*** Repair/replace leaking and worn parts. Tighten the fittings at the bottom of the vessel.
	Low volume of compressed air	Verify that supply air valve(s) is (are) fully open.
	Supply hose too long or diameter too small for required air volume (causing excessive friction loss)	Use minimum 1¼" I.D. air hose.
	Compressor too small or using too much air	Replace worn nozzle, use smaller nozzle, or use larger compressor.
	Air leak(s) at one or more of the following locations: sealing plunger/"O" ring exhaust valve media valve fittings at bottom of vessel	■ ■ **WARNING** ■ ■ ***Shut-off air supply, open exhaust valve, and depressurize vessel.*** Repair/replace leaking and worn parts. Tighten the fittings at the bottom of the vessel.
	Sure-Flo media valve plugged	1) Open the ***Sure-Flo*** media valve completely. Close the choke valve, remove the nozzle and nozzle washer from the nozzle coupling, and depress the ***Saf-Stop II*** operator's handle. All air pressure will be through the media valve. If there is still no media flow: 2) Back the stationary roller bolt out ¼" and repeat Step #1. If there is still no media flow, see "Vessel Outlet Plugged," below.
	Vessel outlet plugged	■ ■ **WARNING** ■ ■ ***Shut-off air supply, open exhaust valve, and depressurize vessel.*** Lay the vessel down on the handle and disassemble the ***Sure-Flo*** media valve. Remove the pinch tube and clear the obstruction. It may be necessary to empty the vessel to remove accumulated debris.

Problem	Probable Cause	Remedy
Air but no media flow from nozzle	Wet/damp media from compressed air supply	■ ■ **WARNING** ■ ■ ***Shut-off air supply, open exhaust valve, and depressurize vessel.*** Remove the vessel inspection door. Remove media from the vessel, or follow "***Sure-Flo*** media Valve Plugged" remedy (above).
Very heavy media flow with occasional spurts of air	Choke valve closed	Open the choke valve completely.
	Low blast pressure	Check the air supply pressure and verify that all air supply valves are open completely.
	Sure-Flo media valve adjustment	Reduce media flow by turning the "T" handle clockwise.
Uneven media flow at nozzle	Media flow too rich	Adjust the media valve "T" handle clockwise to reduce media flow.
Media flow cannot be adjusted—either too lean or too rich	Pinch tube matrix. (Review pinch tube size and use chart.)	If adjusting the media valve using ¼ and ⅛ turns of the "T" handle does not correct problem, use an optional pinch tube in the media valve. A ¾" pinch tube is standard. A ⅝" pinch tube is recommended.
Hole in mixing tee under media valve	Choke valve partly closed when blasting	Operate the system with the choke valve fully open.
Premature blast hose failure	Nozzle/hose size incorrect	The blast hose I.D. should be 3 times larger than the nozzle orifice. Example: ¼" nozzle — ¾" blast hose.
	Media flow too rich	Reduce media flow by turning the media valve "T" handle clockwise.
Poor production	Part condition	The part must be dry and free of oil and grease.
	Media flow	Adjust media flow. Media should be just visible as it exits the nozzle.
	Nozzle type	The Venturi nozzle concentrates media as it exits the nozzle.
	Distance between nozzle and part.	Close up - smaller, more intense blast pattern. Farther back - larger, less intense blast pattern.
	Low blast pressure	Try each of the following: 1. Change worn nozzle 2. Use a smaller nozzle 3. Use a larger compressor and/or air supply line.
	Media size	Use coarser/larger media for thick material.

NOTES:

Blast Room Pressure Vessel with 680 *Saf-Stop II* Remote Controls

5

5.1 Description

The ***Blast Room Pressure Vessel with 680 Saf-Stop II*** remote controls is illustrated in *Figure 5-1* and the parts list is provided in *Table 5-1*. Reference numbers in *Figure 5-1* correspond to the numbered items in *Table 5-1*.

5.2 Special Considerations

Review the following recommendations before you install the ***Blast Room Pressure Vessel*:**

Blast Hose Assembly	Recommended size: 1 in. diameter x 50 ft. long If your blast hose length exceeds 50 ft., you will need additional dual line.
Nozzle (size and type)	Di-Carb venturi nozzle is recommended for most applications. Media type, available air supply, and production requirements should define the nozzle type and size.
Exhaust Blow-Down Hose	Exhaust blow-down hose must be attached to the MG-78 exhaust valve and connect to the reclaimer, airwash, etc. This is required to assure a clean environment when the vessel de-pressurizes.
Umbrella Assembly Part #290420	This may be required for installation over the 6 in. diameter inlet of the vessel for installations in which the storage hopper feeds media automatically.
MG-78 Exhaust Valve	For aggressive media (steel grit and alox), it is recommended that you upgrade to a boron carbide restrictor kit (Part #290184) in the MG-78 Exhaust Valve.
Airwash	You are required to add an air vibrator solenoid valve assembly (Part #321050) when you are adapting to an existing Empire ***Vibrating Airwash System***.
Air Supply Pressure	For the Automatic ***Sure-Flo*** media valve to operate properly, the ***Blast Room Pressure Vessel*** system will require an operating compressed air supply pressure of 80 psi., minimum.

5.3 Principles of Operation

The ***Blast Room Pressure Vessel with 680 Remote Controls*** pressurizes the vessel and starts the blast when the operator depresses the ***Saf-Stop II*** operator control. When the operator releases the ***Saf-Stop II*** control handle, the blast stops and the vessel de-pressurizes.

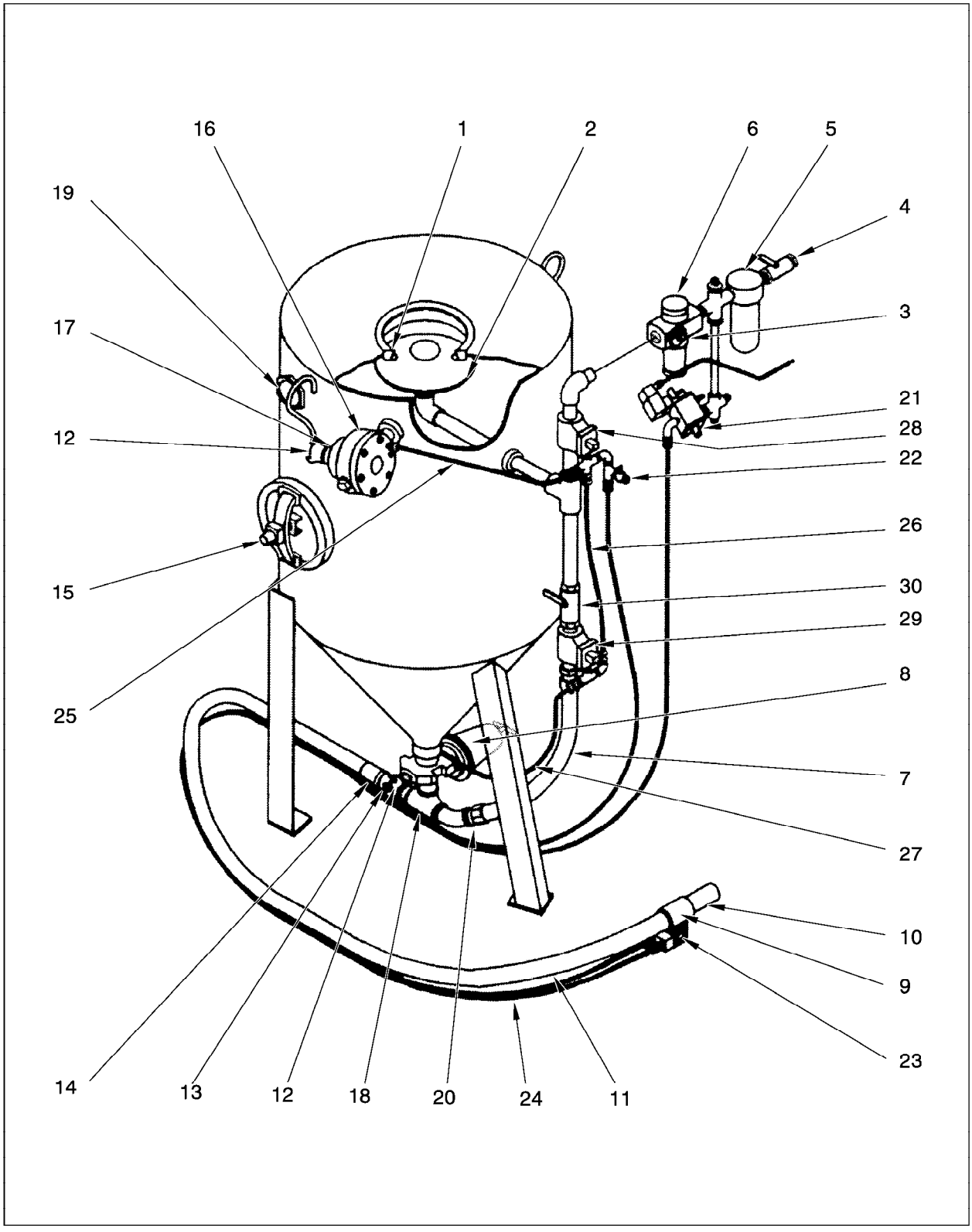

Figure 5-1 ***Blast Room Pressure Vessel with 680 Remote Controls***

Table 5-1 Parts List or the *Blast Room Pressure Vessel with 680* Remote Controls

Ref.	Part Number	Description	Ship Weight
1	523872	“O” Ring, 6” rubber	1 lb.
2	525072	Sealing Plunger (PVC coated), 6”	4 lbs.
3	550242	Air Gauge, 1/4” NPT	1 lb.
4	518941	Manual Air Valve, 1 1/4” NPT locking	6 lbs.
5	504632	Automatic Air Filter, 1 1/4” NPT	5 lbs.
6	517291	Regulator, 1 1/4” relieving	5 lbs.
7	290319	Flexible Hose w/fittings for 650 (After 5/1/84)	4 lbs.
	520982	Flexible Hose w/fittings for 1050 (After 5/1/84)	5 lbs.
8	290215	Automatic ***Sure-Flo*** Valve Assembly (Refer to Chapter 7)	–
9	–	Nozzle Coupling (Refer to Chapter 7)	–
9A	–	Nozzle Washer (Refer to Chapter 7)	–
10	–	Nozzle (Refer to Chapter 7)	–
11	–	Blast Hose (Refer to Chapter 7)	–
12	753262	Aluminum Tank Coupling	1 lb.
13	510511	Safety Pin	–
14	–	Quick Snap Coupling (Refer to Chapter 7)	–
15	506152	Clevis Inspection Door	7 lbs.
	524152	Door Gasket	1 lb.
16	290582	MG78 Exhaust Valve (Refer to Chapter 7)	18 lbs.
17	546192	Close Nipple, 1 1/4” Schedule 80	1 lb.
18	545752	Tee, 2” x 1 1/4” x 1 1/4” NPT	2 lbs.
19	545493	Sight glass, 2” NPT	1 lb.
20	520262	Adaptor, 1 1/4”	2 lbs.
21	519042	Safety Interlock Solenoid Valve, 120 VAC	3 lbs.
	517086	Replacement Coil, 120 VAC	1 lb.
22	520642	Petcock 1/4”	1 lb.
23	290164	Pneumatic ***Saf-Stop II*** Remote Control Handle (Refer to Chapter 7)	2 lbs.
24	521962	Dual Line Hose w/fittings (30’)	5 lbs.
	521882	Dual Line Hose w/fittings (50’)	8 lbs.
	521892	Dual Line Hose w/fittings (55’)	9 lbs.
	520872	Dual Line Hose per foot	1 lb.
25	290372	Control Hose, 1/4” ID w/fittings 14”L (650)	1 lb.
	290371	Control Hose, 1/4” ID w/fittings 23”L (1050)	1 lb.
26	290371	Control Hose, 1/4” ID w/fittings 23”L (650)	1 lb.
	290376	Control Hose, 1/4” ID w/fittings 23”L (1050)	1 lb.
27	290373	Control Hose, 1/4” ID w/fittings 27”L (650)	1 lb.
	290376	Control Hose, 1/4” ID w/fittings 36”L (1050)	1 lb.
28	518062	Automatic Air Valve, 1 1/4” NPT w/bleed (Refer to Chapter 7)	6 lbs.
29	517052	Automatic Air Valve, 1 1/4” NPT no bleed (Refer to Chapter 7)	6 lbs.
30	518502	Manual Air Valve, 1 1/4” NPT (Choke valve)	6 lbs.

5.4 Set-Up

Refer to Figure 5-1. Use the following procedure to set up the **Blast Room Pressure Vessel with 680 Remote Controls**:

Step	Procedure
1	Unwrap and remove the pressure vessel from the shipping pallet. Inspect for shipping damage. If damage is found, ***you must*** *file a claim with the shipping company.*
2	Place the vessel in its final operating location. Orient the vessel so that: a) any previous or new media recovery system will adapt to and mate with the new vessel b) the blast hose (11) will run as straight as possible to the point of use c) there is adequate maintenance space around the vessel inspection door (15), ***Sure-Flo*** media regulator (8), and plumbing d) there is adequate space for the installation of the main compressed air supply to the vessel
3	Connect the compressed supply air to the pressure vessel manual air valve (4). Install a union, drip leg, and air shut-off valve ahead of the vessel connection. Install the pressure gauge (3) in the pressure regulator (6).
4	A qualified electrician can make the necessary electrical connections in accordance with applicable electrical codes. The safety interlock solenoid (21) must be connected to a door(s) closed relay, door limit switch(s), and system electrical controls. The safety interlock solenoid must disable the blast system when the enclosure doors are opened during blasting and when the main electrical controls of the blast room are disabled.
5	Install the blast hose, connecting the blast hose quick coupling (14) to the tank coupling (12) at the bottom of the vessel. Ensure that each coupling has a rubber washer installed to seal the coupling joint. Insert the safety pin (13) to prevent accidental uncoupling. **■ ■ WARNING ■ ■** ***Accidental uncoupling of Quick Couplings can cause property damage and injury to personnel.***
6	Install the ***Saf-Stop II*** operator control handle (23) to the blast hose (11) just behind the nozzle coupling, with the brass hose fittings oriented away from the blast nozzle (10). Use the supplied gear clamps to clamp the handle to the blast hose. Attach the black dual line hose (24) to the IN port fitting and the yellow dual line hose to the OUT port fitting of the ***Saf-Stop II*** handle (23).
7	Unroll the dual line hose (24) from the ***Saf-Stop II*** handle (23) back along the blast hose (11) to the pressure vessel. Leaving slack at the ***Saf-Stop II*** handle end of the dual line hose (to allow the blast hose to flex), wrap duct tape, electrical tape, or tie-wraps around the dual line hose and blast hose at 3' to 4' intervals.
8	Attach the remaining ends of the dual line hose to the pressure vessel controls. Connect the black dual line hose to the hose fitting of the safety interlock solenoid (21). Connect the yellow dual line hose to the hose fitting on the automatic air valve (28) under petcock valve (22).

Step	Procedure
9	Install the exhaust blow-down hose (refer to 5.2 Special Considerations) to the aluminum tank coupling (12) located on the MG-78 exhaust valve (16). Ensure that each coupling has a rubber washer installed to seal the coupling joint. Insert the safety pin (13) to prevent accidental uncoupling. **■ ■ WARNING ■ ■** ***Accidental uncoupling of Quick Couplings can cause property damage and personal injury.***
10	Connect the discharge end of the exhaust blow-down hose to the media separator, air wash, or other component that will contain the exhaust air (plus media and dust). Direct the hose to a location away from personnel and into a ventilated dust collection area.
11	Remove the vessel inspection door (15) and inspect the interior of the vessel. Remove any debris that may have accumulated in the vessel.
12	Install the vessel inspection door and door gasket (15), ensuring an air tight seal.
13	Perform a dry run using the ***Blast Room Pressure Vessel System*** to verify that it functions correctly. Turn on the compressed air supply, set the blast pressure regulator to 50 psig, and adjust the ***Sure-Flo*** media valve to full open. After putting on safety equipment, enter the blast room and test the newly installed equipment. During the dry run, check the door safety interlock solenoid and any other electrical interlocks that have been wired into the ***Blast Room Pressure Vessel System.***
14	When you have completed a successful dry run, shut the system down by opening the main electric disconnect switch and closing the main air supply valve (4). **■ NOTE ■** ***The main air supply valve is a 3-way valve. When it is in the OFF position, trapped air in the Blast Room Pressure Vessel System will bleed off to the atmosphere. The main air supply valve may be locked out in the CLOSED position.***

5.5 Operation

■ ■ WARNINGS ■ ■

1. ***The Blast Room Pressure Vessel System operator must be equipped with the recommended protective clothing. NIOSH and OSHA require the use of a respirator (air-fed hood), remote controls, canvas jacket and pants, and leather gloves.***

2. ***OSHA requires that the operator's respirator be supplied with Grade D compressed air and equipped with a personal air filter and carbon monoxide (CO) monitor or ambient air pump.***

Use the following procedure to operate the ***Blast Room Pressure Vessel with 680 Saf-Stop II Remote Controls***:

Step	Procedure
	Preparation
1	Inspect the operator's safety equipment (OSHA requirement). Clean, repair, and/or replace damaged or unserviceable components.
2	Perform an equipment safety check, as outlined in *5.6 Daily Equipment Safety Check*.
	Setup
1	Move the parts to be blasted into the blast area.
2	Check the blast media level in the pressure vessel. Shine a flashlight through one sight glass and look into the vessel through the second sight glass (19) to observe the media level. The vessel may be filled to a level up to, but not above, the sealing plunger (2).
3	Fill the vessel. **■ CAUTION ■** ***Over-filling the vessel may prevent the sealing plunger from closing properly and cause needless wear.***
4	Turn on the compressed air supply using the main air valve (4). Set the blast pressure regulator (6) to the required setting.
5	Turn on the electrical controls, which include the safety interlock solenoid (21).
	Start-Up
1	Before starting the blast, the operator should: ■ Be dressed in the operator's safety equipment. ■ Enter the blast area and check it for hazards and other personnel.
2	Blasting can start when the blast area is clear of hazards and other personnel.

Step	Procedure
	Blasting
1	Hold the blast nozzle (10) 18" from the work piece and perpendicular (90° angle) to the part surface.
2	The most efficient blast occurs when the media exiting the nozzle is just visible. Adjust the media flow by turning the "T" handle of the automatic media valve (8). Make coarse adjustments first, followed by 1/8 turns of the media valve "T" handle for final adjustment. Turn the handle: ■ clockwise to decrease the media flow ■ counterclockwise to increase the flow
3	Move the blast across the work piece in steady, even strokes.
4	The optimum dwell time and speed of the stroke across the work piece depends on the final finish required. For a "brush-off" finish, move the nozzle rapidly across the work piece. For a "white metal" finish, move the nozzle more slowly.
	Shut Down
1	When you are finished blasting, if the ***Blast Room Pressure Vessel*** system will not be operated for the next: ■ Hour: Turn OFF the electrical blast interlock controls and compressed air supply. ■ 24 Hours: Empty the blast media from the vessel into a storage container. Turn OFF the electrical blast interlock and compressed air supply.
2	Clean and place the operator safety equipment in a clean, protected storage area.

5.6 Daily Equipment Safety Check

Use the following procedure to inspect the **Blast Room Pressure Vessel with 680 Remote Controls** and all components of the blast system.

Step	Procedure
1	Turn OFF the electrical controls and main air valve (4). Air trapped within the pipe string and controls will bleed off.
2	Disconnect all quick couplings (14) and tank couplings (12). Verify that all washers are installed properly and in good condition. Inspect quick couplings for signs of air leaks and wear. Ensure that hoses are installed properly in the couplings, and that all coupling screws are in place and screwed in completely.
3	Inspect the inside of the blast hose (11) at each coupling for normal wear of the inside wear tube. The blast hose must be replaced when only 1/8" of inner tube remains (measured from the ID of the hose to the hose braid).

Step	Procedure
4	Inspect the entire length of blast hose (11) for interior wear and external damage. Check the internal wear by grasping the hose and pinching it with your thumb to detect soft spots. The outside radius of bends in the hose will wear first. If you find soft spots, replace the blast hose before operating the system.
5	Remove the blast nozzle (10) from the nozzle coupling (9). Inspect the nozzle washer and nozzle. The nozzle washer must be in good condition and the I. D. of the washer and nozzle entrance must be the same size. Inspect the nozzle I.D. for obstructions, uneven and/or unusual interior wear, and damage to the outside nozzle jacket. ***Replace all parts that display obvious wear or damage.***
6	Inspect the nozzle coupling the same way you inspected the quick couplings and tank couplings in Step 2, above.
7	Inspect the 680 Saf-Stop II Remote Control Operator Handle (23) for proper operation of the trigger and plunger. Verify that the urethane disc is glued in place. ***Repair*** or ***replace*** (if necessary) before using.
8	Inspect the dual air line (24) for damage and leaks. ***Repair*** (if necessary) before using.
9	Install the nozzle washer in the nozzle coupling and screw the nozzle into the nozzle coupling, hand tight. Be sure that the end of the blast hose, nozzle washer, and nozzle are sealed.
10	Connect all quick couplings and tank couplings and ***install safety pins*** (13) to prevent accidental uncoupling that could cause property damage or injury to personnel.
11	Inspect all manual valves, the manual air valve (4), automatic ***Sure-Flo*** media valve (8), petcock valve (22), and manual air valve (choke valve) (30) for wear and ease of operation. Before using the equipment, replace any valves that are worn or difficult to operate.
12	Inspect pressure vessel control hoses (25) (26) (27). They must be securely installed and free of leaks.
13	Inspect the MG-78 exhaust valve (16) and the exhaust blow-down hose with fittings, as described in Steps 2 and 10, above.
14	Verify that all electrical safety interlocks are in good condition and functioning correctly.

5.7 Troubleshooting

Refer to 3.5 Troubleshooting (***SuperBlast 680*** System with ***Saf-Stop II*** Remote Controls) on Page 3-8, or 4.5 Troubleshooting (***SuperBlast 780*** System with ***Saf-Stop II*** Remote Controls) on Page 4-7.

6

SuperBlast System Maintenance

6.1 Regular Maintenance

All ***SuperBlast*** systems should be maintained at regular intervals to ensure operator safety, optimize system performance, and extend equipment life. This section describes the daily, weekly, and monthly maintenance routines that should be performed on your ***SuperBlast*** system.

■ ■ WARNING ■ ■

Before servicing any vessel or component, always depressurize the system, release trapped compressed air, and disconnect the air supply from the vessel. These steps are critical to avoiding personal injury and/or property damage.

6.1.1 Daily Maintenance (All models)

Step	Daily Maintenance Procedures
1	Check the operator's protective equipment, including respirator, lens, gloves, and protective clothing.
2	Verify that all rubber washers for the nozzle, blast hose, tank, and air line couplings are properly installed and in good condition.
3	Verify that all couplings are equipped with a safety pin or wire.
4	Verify that the nozzle is tightly secured in the nozzle coupling with a nozzle washer. **■ CAUTION ■** ***Do not use the nozzle without a washer. This will cause premature wear to the nozzle and coupling. Also, the nozzle entrance I.D. and the washer I.D. must be the same size.***
5	Open the drain valve on the optional ***Dry-Flo*** Moisture and Oil Separator to remove any accumulated liquids.
6	Verify that the dual line hose or electrical cord is in good operating condition and tightly secured to *both* the operator's ***Saf-Stop*** control handle and the pressure vessel.
7	**(Model 780)** Verify that the main air valve and exhaust valve are in good operating condition and that they open and close easily.

6.1.2 Weekly Maintenance (All models)

Step	Weekly Maintenance Procedures
1	Perform all the steps in the Daily Maintenance Procedures (Section 6.1.1).
2	Check the nozzle for wear. A nozzle is considered worn out when its opening wears to approximately 1 1/2 times its original size. For example 3/16" nozzle increases to 1/4" 1/4" nozzle increases to 3/8" 5/16" nozzle increases to 7/16" Use a drill bit to measure the nozzle orifice. Blasting with a worn nozzle can cause reduced blasting pressure and/or a poor blast pattern that will reduce blasting speed.
3	Check the specially constructed blast hose for signs of wear. Replace the blast hose if you find soft spots when you pinch it. Check bends (especially) for soft spots.
4	Inspect the O-ring and sealing plunger for signs of wear. Replace the O-ring or sealing plunger if worn or damaged. **To replace the O-ring:** a. Remove the ***E-Z Fill*** bag breaker/screen and pry the old ring out with a screw-driver from the top of the vessel. b. Install a new O-ring by pressing it into the ring holder. Verify that the O-ring is seated properly before operating the system. If the O-ring is difficult to install, apply a lubricant such as petroleum jelly directly to the O-ring. **To replace the sealing plunger:** a. Remove the inspection door. b. Turn the plunger guide counter-clockwise using vice-grip pliers or a small pipe wrench. c. Remove the plunger and guide. d. Slide the new plunger over the guide and install the guide back onto the tee. Hand-tighten the guide. Use pipe tape to ensure easy removal of the guide in the future. e. Replace the inspection door. Verify that the door gasket is centered to prevent leakage. Insure door is air tight.
5	Check the main air valve, the choke valve, and the exhaust for ease of operation. Replace any damaged or leaking valves or handles.
6	**680 Control System** Verify that the MG-72 exhaust valve (Figure 3-1, Item 16) operates properly. Check the rubber diaphragm, valve ball, inlet cover, and exhaust ring for wear. Use an adjustable wrench to remove the exhaust cover to inspect the valve interior. The MG-72 valve is illustrated on page 7-4.
7	**680 and 780 Control Systems** Verify that the rubber diaphragm in the automatic air valve (Figure 3-1, Item 26, and Figure 4-1, Item 26) is in good condition.

6.1.3 Monthly Maintenance (All models)

■ NOTE ■

This procedure should be performed monthly, or after every 200 hours of operation, whichever comes first.

Step	Monthly Maintenance Procedures
1	Perform all the steps in the Daily and Weekly Maintenance Procedures (Sections 6.1.1 and 6.1.2).
2	Check the metering tube in the ***Sure-Flo*** (manual or automatic) media valve for wear or rupture. An indication of tube wear in an automatic ***Sure-Flo*** valve with 780 controls is the failure of the nozzle to shut off when the ***Saf-Stop II*** control handle is released. Replace the tube if it is defective. (See 6.2.1 or 6.2.2.)
3	**780 Control System** Verify that the rubber diaphragm in the automatic ***Sure-Flo*** media valve (Figure 4-1, Item 8) is in good condition. Air leaking through or around a diaphragm will escape through the vent hole in the diaphragm cover. Replace the diaphragm if it is defective. (See 6.2.3.)

6.2 *Sure-Flo* Media Regulator Maintenance

■ ■ WARNINGS ■ ■

1. ***Before servicing any vessel or component, always depressurize the system, release trapped compressed air, and disconnect the air supply from the vessel. These steps are critical to avoiding personal injury and/or property damage.***

2. ***Before disconnecting any hoses from your SuperBlast system, always release trapped compressed air from the vessel and pipe string.***

3. ***The Sure-Flo media valve should never be disassembled while the system is under pressure. The vessel should be disconnected from the air supply and empty of media.***

4. ***The metering tube is made of a specific abrasive resistant material. Use only Empire supplied replacement tubes to ensure optimum blasting performance and to avoid voiding your equipment warranty.***

6.2.1 Metering Tube - Manual *Sure-Flo*

For the following procedure, refer to the illustration on page 7-2.

Step	Procedure
1	Disconnect the compressor air line and blast hose from the tank coupling.
2	Disconnect the flexible hose assembly from the tee (pipe fitting) mounted under the *Sure-Flo* media valve.
3	Back off the T-handle (14) and bolt (3) to relieve pressure on the metering tube. It is not necessary to remove the T-handle and bolt completely.
4	Remove the 4 carriage bolts (8) that hold the top and bottom of the *Sure-Flo* assembly together.
5	Remove the flange (7) and metering tube (1).
6	Install the replacement metering tube into the *Sure-Flo* body. Insure pinch rollers (6) are in their proper location, one on each side of metering tube.
7	Reassemble the flange to the valve body, using the four carriage bolts to compress the metering tube. Ensure that the lock washers (9) are in place before tightening the nuts (10).
8	When the *Sure-Flo* is reassembled, turn the bolt (3) and then the T-handle (14) fully clockwise until the *Sure-Flo* closes.

Follow the procedure for adjusting media flow in Section 5.5.

6.2.2 Metering Tube - Automatic *Sure-Flo*

For the following procedure, refer to the illustration on page 7-3.

Step	Procedure
1	Disconnect the compressor air line and blast hose from the tank coupling.
2	Disconnect the flexible hose assembly from the tee (pipe fitting) mounted under the *Sure-Flo* media valve.
3	Loosen the jam nut (11) and unscrew the spring tensioner (21) and T-handle (17) out from the spring enclosure (22) approximately 1 1/2". It is not necessary to remove the spring tensioner and T-handle from the Sure-Flo media valve.
4	Remove the 4 carriage bolts (8) that hold the top (2) and bottom (7) of the *Sure-Flo* valve assembly together.
5	Remove the flange (7).
6	Back off the bolt (3) to relieve pressure on the metering tube and remove the old metering tube (1).
7	Install the replacement metering tube into the *Sure-Flo* body. Insure pinch rollers (6) are in their proper location, one on each side of metering tube.
8	Reassemble the flange to the valve body, using the four carriage bolts to compress the metering tube. Ensure that the lock washers (9) are in place before tightening the nuts (10).
9	Thread the jam nut, spring tensioner, and T-handle assembly back into the *Sure-Flo* spring enclosure. Tighten the bolt (3), completely.

Follow the procedure for adjusting media flow in Section 5.5.

6.2.3 Automatic *Sure-Flo* Diaphragm

For the following procedure, refer to the illustration and to Detail B on page 7-3.

■ ■ WARNING ■ ■

Never disassemble the spring assembly!

The spring assembly is under compression. Removing components of the spring assembly is likely to cause injury. Replace the entire assembly (P/N 290296).

Step	Procedure
1	Loosen the jam nut (11) and unscrew the spring tensioner (21) and T-handle (17) out from the spring enclosure (22) approximately 1 1/2". It is not necessary to remove the spring tensioner and T-handle from the Sure-Flo media valve.
2	Remove two bolts (15), separate and remove spring housing assembly (22) (23) from the valve body.
3	Remove the six bolts holding the spring enclosure (22) to the *Sure-Flo* diaphragm cover (23).
4	Unscrew the plunder (27), remove the steel washer (28), rubber washer (29), and the spring and diaphragm assembly (31).
5	After replacing the old diaphragm, install a new rubber washer, steel washer, and plunger. Be sure the washers are centered on the spring retaining nut before tightening. Replace the worn plunder O-ring.
6	Reassemble the spring enclosure in reverse order.

6.2.4 Directions for Changing Plunger and O Ring

1.	Disconnect electric power and close the main air supply valve to the system and lock out.
2.	Loosen the vessel inspection door and permit media to drain from system.
3.	Catch media and place in containers for re-use.
4.	Remove all blast media from the storage hopper above the vessel.
5.	Remove blast media from vessel until below the vessel inspection door.
6.	Remove the vessel inspection door.
7.	Locate the 1 1/4" pipe inside the vessel.
8.	By hand, raise the sealing plunger and hold up exposing the **vertical** 1-1/4" nipple (plunger guide).
9.	Use a 10" or 12" pipe wrench to remove the **vertical** 1-1/4" nipple (plunger guide) and sealing plunger.
10.	With plunger guide and sealing plunger removed, reach to the inside top of the vessel and locate the O ring.
11.	Grab the edge of the O ring and remove it from the O ring holder in the top of the vessel.
12.	Inspect the O ring holder for damage.
13.	Install new O ring.
14.	Install new sealing plunger and plunger guide.
15.	Install vessel inspection door with gasket.
16.	Turn on air and electric, pressurize the vessel and check the inspection door for air leaks.
17.	Look down through the storage hopper and inspect sealing plunger and O ring for air leaks.
18.	Correct all air leaks before filling system with media.

NOTES:

Individual Component Parts

7

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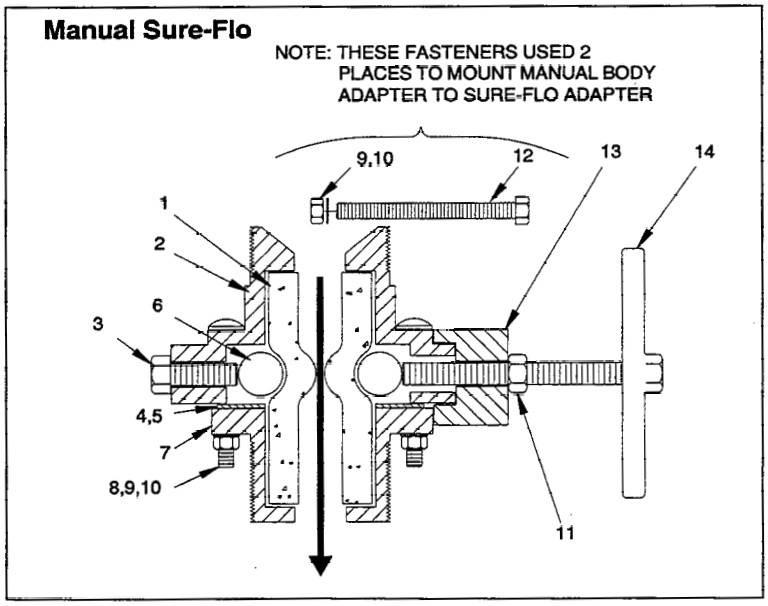
MANUAL SURE-FLO REGULATOR PARTS P/N #290383

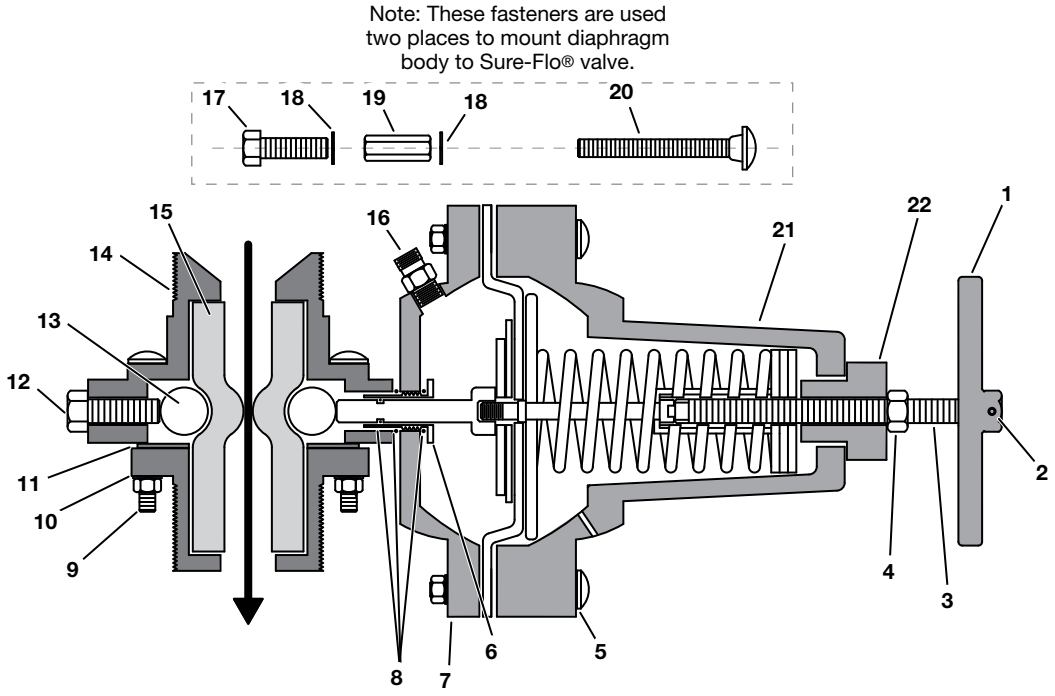
Item	Part Number	Description	Nozzle	Grit	Comments
1	525451	Metering tube, 3/8" ID	Small	Fine	Back out roller bolt ½"
	525782	Metering tube, ½" ID	Small-Med	Fine-Med	Back out roller bolt ½"
	523592	**Metering tube, ¾" ID**	**Medium**	**Medium**	**Supplied as standard**
	523512	Metering tube, ¾" ID	Medium	Medium	Use below 32°F (red)
	525792	Metering tube, 5/8" ID	Medium-large	Med-coarse	—
	525802	Metering tube, 7/8" ID	Large	Coarse	High production use
2	753692	Valve body, 2" MPT			
3	552222	Bolt 7/16" - 14 x 1¼"			
4	753092	Roller stop/holder			
5	551352	Screw, 8-32 x ½" (2 per assembly)			
6	753632	Pinch roller (2 per assembly)			
7	753292	Flange, 2" MPT			
8	552052	Bolt, carriage, 3/8" - 16 x 2½" (4)			
9	552762	Lock washer, 3/8" ID (6)			
10	552542	Nut, hex 3/8" - 16 (6)			
11	552672	½" Jam nut (after 5/1/84)			
	552382	7/16" Jam nut (prior to 5/1/84)			
12	551902	Bolt, hex 3/8" - 16 x 3" (2)			
13	753372	Adapter, manual body, Sure-Flo			
14	290384	Handle assembly, ½" - 13 x 4"			

P/N #290383

Manual Sure-Flo



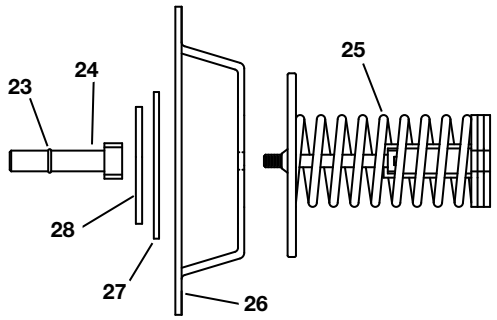
AUTOMATIC SURE-FLO REGULATOR PARTS P/N #290215



Item	Description	PART #
1	Handle assembly, ½" - 13, Sure-Flo (after 5/84)	290217
	Handle only, ½" - 13	753622
2	Set screw, ½" - 13 x ½", nyloc	551732
3	Shaft handle	505802
4	Jam nut, ½" - 13	552672
5	Carriage bolt, ⅜" - 16 x 2½"	552052
	Lock washer, ⅜" ID	552762
	Hex nut, ⅜" - 16	552542
6	Plunger guide	753462
7	Diaphragm cover	753112
8	O-ring kit (includes 2 for guide, 1 for plunger)	561422
9	Carriage bolt, ⅜" - 16 x 2½"	552052
	Lock washer, ⅜" ID	552762
	Hex nut, ⅜" - 16	552542
10	Flange, 2" MPT	753292
11	Roller stop holder	753092
	Screw, 8 - 32 x ½" (2 per assembly)	551352
12	Bolt, 7/16" - 14 x 1¼"	552222
13	Pinch roller (2 per assembly)	753632
14	Valve body, 2" MPT	753692
15	Metering tube, ⅜" ID	525451
	Metering tube, ½" ID	525782
	Meter tube, ¾"	**523592**
	Metering tube, ¾" ID	523512
	Metering tube, ⅝" ID	525792
	Metering tube, ⅞" ID	525802
16	Adapter, ¼" NPT x ¼" tube	521081
17	Bolt, ⅜" - 16 x 1¼" (2, Auto Sure-Flo)	551852
18	Lock washer, ⅜" ID	552762
19	Nut extension, ⅜" - 16 (2, Auto Sure-Flo)	552662
20	Carriage bolt, ⅜" - 16 x 2½"	552052

Spring & Diaphragm Detail (Part # 290296)

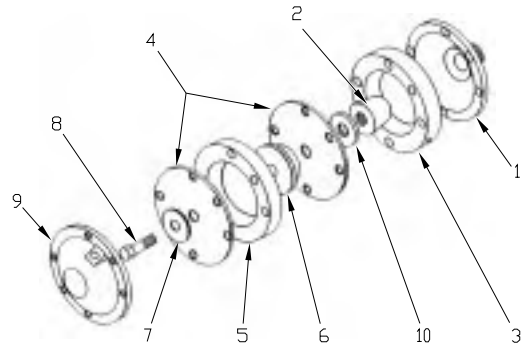
(Part # 290296 includes items 23 through 28.)



WARNING: Never attempt to disassemble the spring assembly in the automatic Sure-Flo. The spring is under tension and could cause injury to personnel.

Item	Description	PART #
21	Spring enclosure	753682
22	Spring tensioner	505822
23	O-ring kit (includes 2 for guide, 1 for plunger)	561422
24	Plunger with O-ring	505872
25	Spring assembly	290296
26	Diaphragm, raised (after 5/84)	525012
	Diaphragm, flat (before 5/84)	523662
27	Diaphragm gasket	525002
28	Washer, ½" ID	552842

MG-72 EXHAUST VALVE PARTS P/N #290181



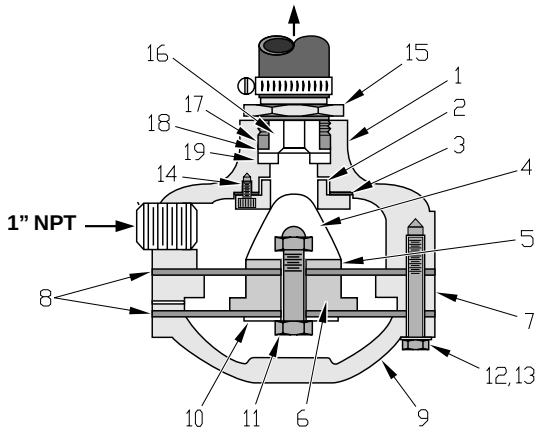
Item	Part Number	Description
1	753442	Inlet Cover
2	525322	Valve ball
3	753722	Exhaust ring
4	523672	Rubber diaphragms (each)
5	753402	Outer spacer ring
6	753392	Inner spacer ring
7	552902	Washer
8	551962	Hex bolt, 1/2” - 13 x 1 3/4”
9	753382	Valve cover
10	553412	Spacer washer

⚠ WARNING

STAY CLEAR OF EXHAUST VALVE WHEN POT BLOWS DOWN. EXHAUSTED PARTICLES CAN CAUSE EYE INJURY
NOTE: BLOW DOWN IS OPERATOR CONTROLLED AND CAN OCCUR WITHOUT WARNING. WEAR PROTECTIVE CLOTHING.

MG-78 EXHAUST VALVE PARTS P/N #290182 – 290582 (W/BORON RESTRICTOR)

Item	Part Number	Description
	290183	Rebuild Kit, MG-78 (Seat & gasket, ball, diaphragm, 3 screws, drawing).
		Note: MG-78 castings must be in good condition to use PN 290183 effectively.)
1	753332	Valve Body
2	753412	Seat, valve ball (steel)
3	524132	Gasket, seat
4	525322	Valve ball (also used on 411 & 412 valves)
5	553412	Spacer washer, steel (1/2” ID x 2” OD x 1/4” thick)
6	753392	Spacer ring, inner
7	753402	Spacer ring, outter
8	723672	Diaphragm
9	753382	Cover valve
10	772842	Washer (1/2” ID x 2” OD x 1/16” thick)
11	551962	Bolt, 1/2” - 13 x 1 3/4”
12	553982	Bolt, 3/8” - 16 x 2”
13	552762	Lock washer, 3/8”
14	551122	Screws, seat 1/4” - 20 x 1/2” (pack of 3)
15	544512	Reducer bushing, 1 3/4” MPT x 1” FPT

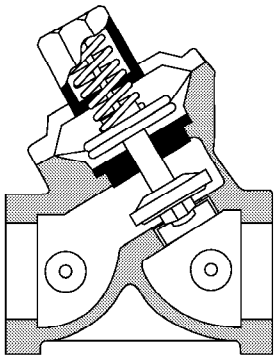


RESTRICTOR PARTS

	290218	Restrictor Kit
16	502431	Ceramic Nozzle (Standard)
	502081	Boron Carbide upgrade for Restrictor Kit, customer installed (extended wear)
	290184	Boron Carbide upgrade for Restrictor Kit, factory installed (extended wear) used in 290582
17	552952	Washer, steel
18	524062	Washer, nozzle, NW-1 (1” ID x 1 1/2” OD x 1/4” thick) (pack of 10)
19	524082	Washer, nozzle, NW-4 (3/4” ID x 1 1/2” OD x 1/4” thick) (pack of 10)

TIP: Worn restrictors may result in premature reclaimer failure. Check the restrictor for wear when replacing a reclaimer. Check for wear often when using aggressive media.

AUTOMATIC AIR VALVE PARTS



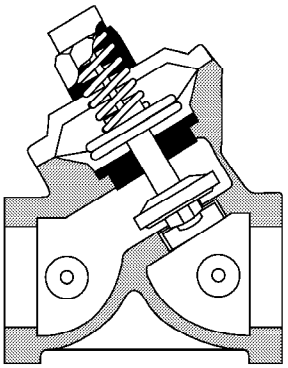
SERIES 421

P/N 518052 (1" NPT, ***with bleed***)

1" normally open spring assist closed

Series 421 **(Bleed type)**

P/N 518432	Spring (½" x 2" high)
P/N 517582	Diaphragm/seal repair kit
P/N 518352	Internal repair kit



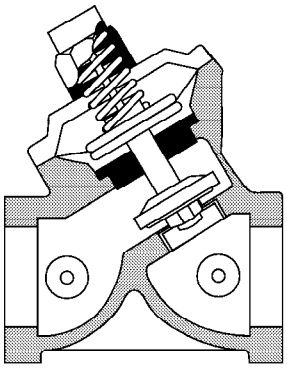
SERIES 424

P/N 518062 (1¼" NPT, ***with bleed***)

1¼" normally open spring assist closed

Series 424 (**Bleed type**)

P/N 518082	Spring (1¼" x 1¾" high)
P/N 517592	Diaphragm/seal repair kit
P/N 518362	Internal repair kit
P/N 519052	Lower seat



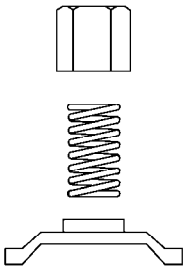
SERIES 424

P/N 517052 (1¼" NPT)

1¼" normally open spring assist closed

Series 424 (**Standard type**)

P/N 518082	Spring (1¼" x 1¾" high)
P/N 517592	Diaphragm/seal repair kit
P/N 518921	Internal repair kit
P/N 519052	Lower seat



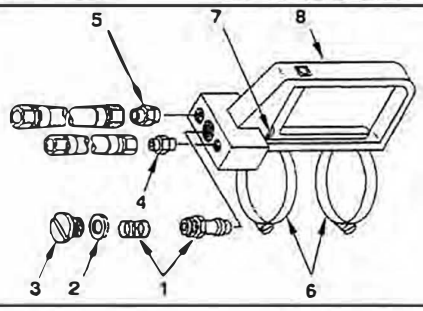
When ordering springs, have your spring dimensions ready before ordering.

NOTE

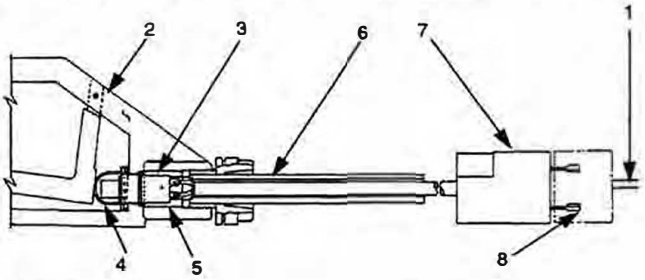
Some older versions of the **1¼" Standard and Bleed** valves may have this style cap and spring.

PNEUMATIC SAF-STOP II REMOTE CONTROL HANDLE PARTS P/N #290164

Item	Part Number	Description
1	290224	Saf-Stop II plunger assembly. Includes: push rod, nut, spring, washer, O-ring
2	290225	Saf-Stop II Parts Kit. Includes: washer, two O-rings, urethane disc
3	520122	Saf-Stop II brass plug
4	520212	Hose adapter, 1/8" x 1/8"
5	520222	Hose adapter, 1/4" x 1/4"
6	520521	Adjustable clamp, 3" (each)
7	525112	Urethane disc
8	752102	Handle w/trigger only



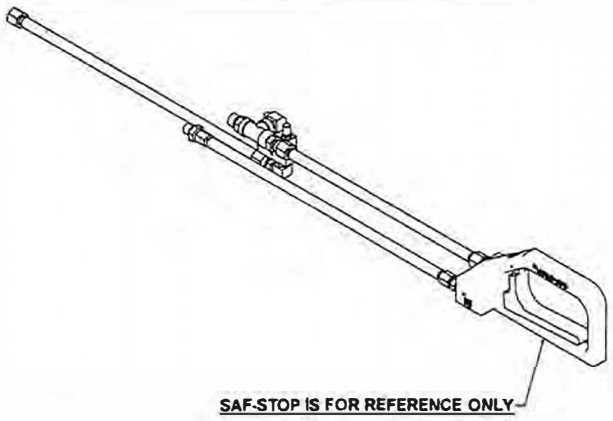
ELECTRIC SAF-STOP II REMOTE CONTROL HANDLE PARTS



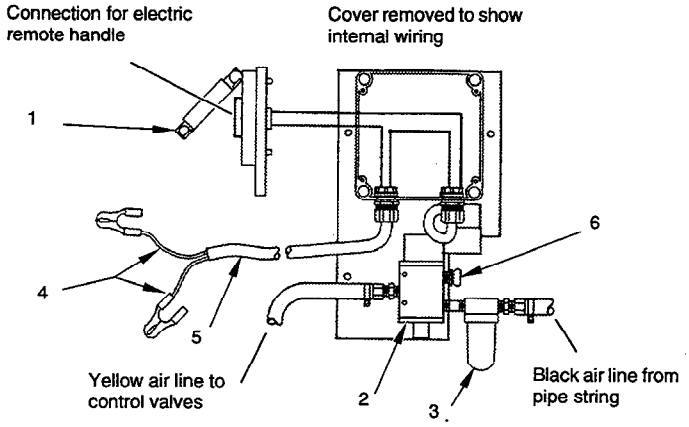
Item	Part Number	Description
1	530042	55-ft cable w/fitting (standard)
	530052	20-ft cable w/fitting
	530062	Cable per foot
2	753672	Handle w/trigger only
3	534531	Push button
4	534541	Push button boot
5	523972	O-ring
6	290353	Electric Saf-Stop cord w/fittings
7	534001	Connector
8	534011	Receptacle

GRIT CUT-OFF SWITCH - For use with 780 pneumatic remote control

Part Number	Description	Application
290413 CI 290424 FI	Grit Cut-off Switch	Enables Remote Cut-off of Grit Flow. Allows for operator to use air only for dust off of parts.

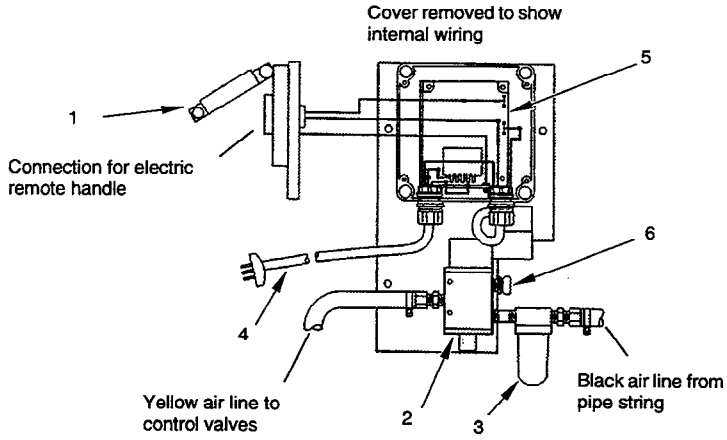


12 VOLT DC ELECTRIC REMOTE CONTROL PARTS P/N #290334



Item	Part Number	Description
1	534122	Receptacle w/flip lid
2	519032	Solenoid valve, 12 VDC
	517096	Replacement Coil - 12 VDC
3	504552	Air filter assembly, ¼" NPT
	506882	Air filter bowl
	506742	Air filter element
4	528651	Battery clip
5	529851	Electric cord (sold by the foot)
6	523261	Vent, ⅛" NPT

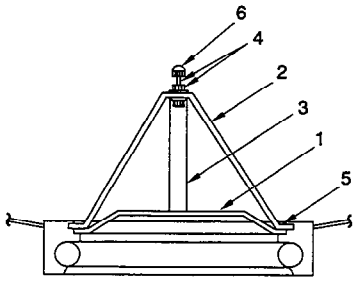
120 VOLT AC ELECTRIC REMOTE CONTROL PARTS P/N #290305



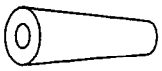
Item	Part Number	Description
1	534122	Receptacle w/flip lid
2	519042	Solenoid valve, 120 VAC
	517086	Replacement Coil - 120 VAC
3	504552	Air filter assembly, ¼" NPT
	506882	Air filter bowl
	506742	Air filter element
4	529601	Line cord
5	290484	Power supply
6	523261	Vent, ⅛" NPT

E-Z FILL BAG BREAKER/SCREENER PARTS

Item	Part Number	Description
1	762992	Screen
2	762972	Top legs
3	762982	Bottom legs
4	552112	Hex bolt assembly
5	551372	Screw, 10-32 x ¼"
6	564002	Acorn nut, ¼" - 20



CERAMIC NOZZLES

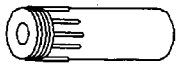


Use NW-5 washer
Use NA-2 & NA-3 adapters

Straight Bore with Tapered Body - 1 1/8" diameter at base

Part Number	Catalog Name	I.D.	Length	Description
502342	CN3-0	3/32"	3 3/4"	Qty: 1
503372	CN3-0	3/32"	3 3/4"	Qty: 10
503432	CN3-0	3/32"	3 3/4"	Qty: 50
502352	CN3-2	1/8"	3 3/4"	Qty: 1
503382	CN3-2	1/8"	3 3/4"	Qty: 10
503442	CN3-2	1/8"	3 3/4"	Qty: 50
502362	CN3-3	3/16"	3 3/4"	Qty: 1
503392	CN3-3	3/16"	3 3/4"	Qty: 10
503442	CN3-3	3/16"	3 3/4"	Qty: 50
502372	CN3-4	1/4"	3 3/4"	Qty: 1
503402	CN3-4	1/4"	3 3/4"	Qty: 10
503462	CN3-4	1/4"	3 3/4"	Qty: 50
502382	CN3-5	5/16"	3 3/4"	Qty: 1
503412	CN3-5	5/16"	3 3/4"	Qty: 10
503472	CN3-5	5/16"	3 3/4"	Qty: 50
502392	CN3-6	3/8"	3 3/4"	Qty: 1
503422	CN3-6	3/8"	3 3/4"	Qty: 10
503482	CN3-6	3/8"	3 3/4"	Qty: 50

SILICON CARBIDE



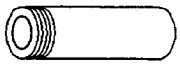
Use NW-1 washer

Production Venturi - Blue polymer jacket

Part Number	Catalog Name	I.D.	Length	Description
502712	SCV-3	5/16"	4 1/4"	Silicon carbide liner
502722	SCV-4	1/4"	5 1/4"	1 1/4" NPT brass thread
502732	SCV-5	5/16"	6"	1" entry diameter
502742	SCV-6	3/8"	6 3/4"	3/4 lb.
502752	SCV-7	7/16"	8"	
502762	SCV-8	1/2"	9 1/4"	

TUNGSTEN CARBIDE (Di-Carb)

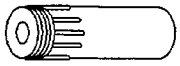
Production Venturi - Brass Jacket



Use NW-1 washer

Part Number	Catalog Name	I.D.	Length	Description
501662	DCV-3	3/16"	4 1/4"	
501672	DCV-4	1/4"	5 1/4"	
501682	DCV-5	5/16"	6"	
501692	DCV-6	3/8"	6 3/4"	Tungsten carbide liner
501702	DCV-7	7/16"	8"	1 1/4" NPT brass thread
501712	DCV-8	1/2"	9 1/4"	1" entry diameter

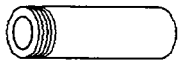
Production Venturi - Yellow Polymer Jacket



Use NW-1 washer

501742	DCYV-3	3/16"	4 1/4"	
501752	DCYV-4	1/4"	5 1/4"	
501762	DCYV-5	5/16"	6"	1 1/4 lb
501772	DCYV-6	3/8"	6 3/4"	Tungston carbide liner
501782	DCYV-7	7/16"	8"	1 1/4" NPT brass thread
501792	DCYV-8	1/2"	9 1/4"	1" entry diameter

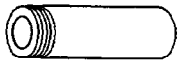
Venturi - Aluminum Jacket



Use NW-1 washer

501582	DCV3-3	3/16"	3"	
501592	DCV3-4	1/4"	3"	
501602	DCV3-5	5/16"	3"	
501612	DCV3-6	3/8"	3"	Tungsten carbide liner
501622	DCV3-7	7/16"	3"	1 1/4" NPT brass thread
501632	DCV3-8	1/2"	3"	1" entry diameter

Straight Bore - Aluminum Jacket



Use NW-1 washer

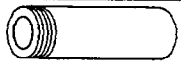
501382	DC3-2	1/8"	3"	
501392	DC3-3	3/16"	3"	
501402	DC3-4	1/4"	3"	
501412	DC3-5	5/16"	3"	
501422	DC3-6	3/8"	3"	
501432	DC3-7	7/16"	3"	Tungsten carbide liner
501442	DC3-8	1/2"	3"	1 1/4" NPT brass thread
501452	DC3-10	5/8"	3"	1" entry diameter

Straight Bore - Brass Jacket

Use NW-1 washer

501552	DC6-2	1/8"	6"	
501492	DC6-3	3/16"	6"	
501502	DC6-4	1/4"	6"	
501512	DC6-5	5/16"	6"	
501522	DC6-6	3/8"	6"	
501532	DC6-7	7/16"	3"	Tungsten carbide liner
501542	DC6-8	1/2"	3"	1 1/4" NPT brass thread
501462	DC6-10	5/8"	3"	1" entry diameter

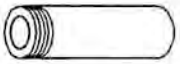
Double Venturi - Aluminum Jacket



Use NW-1 washer

503552	DC2V-4	1/4"	9 1/4"	
503542	DC2V-5	5/16"	9 1/4"	
503532	DC2V-6	3/8"	9 1/4"	Tungsten carbide liner
503522	DC2V-7	7/16"	9 1/4"	1 1/4" NPT brass thread
503512	DC2V-8	1/2"	9 1/4"	1" entry diameter

TUNGSTEN CARBIDE (Di-Carb), continued



Use NW-4 washer
Tungsten carbide liner
1 1/4" NPT brass thread

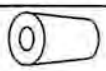
45 Degree Angle Nozzle - Aluminum Jacket

Part Number	Catalog Name	I.D.	Length	Description
501802	TNA-32	1/8"	3"	3 orifices
501812	TNA-13	3/16"	3"	1 orifice
501822	TNA-23	3/16"	3"	2 orifices
501832	TNA-33	3/16"	3"	3 orifices
501842	TNA-14	1/4"	3"	1 orifice
501852	TNA-24	1/4"	3"	2 orifices
501862	TNA-34	1/4"	3"	3 orifices
501872	TNA-15	5/16"	3"	1 orifice
501882	TNA-25	5/16"	3"	2 orifices
501792	TNA-35	5/16"	3"	3 orifices

SpinAbrator 1 - Aluminum Jacket

502622	SDC-4	1/4"	9/16"	Tungsten carbide liner
502632	SDC-5	5/16"	9/16"	3/4" NPT with 3/4" entry diameter;
502642	SDC-7	7/16"	9/16"	Includes O-ring for nozzle rotation

Straight Bore w/Tapered Body - Aluminum Jacket



Use NW-4 washer
Use NA-2 & NA-3 adapters

501272	DC2F-2	1/8"	1 3/4"
501282	DC2F-3	3/16"	1 3/4"
501292	DC2F-4	1/4"	1 3/4"
501302	DC2F-5	5/16"	1 3/4"

Tungsten carbide liner
1 1/8" diameter at base

BORON CARBIDE

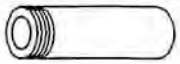
Venturi - Aluminum Jacket

Use NW-1 washer

502282	NNV-4	1/4"	4"
502292	NNV-5	5/16"	4"
502302	NNV-6	3/8"	4"
502312	NNV-7	7/16"	4"
502322	NNV-8	1/2"	4"

1lb.
Boron carbide liner
1 1/4" NPT thread
1" entry diameter

Straight Bore - Aluminum Jacket



Use NW-4 washer

502132	NN3-2	1/8"	3"
502142	NN3-3	3/16"	3"
502152	NN3-4	1/4"	3"
502162	NN3-5	5/16"	3"
502172	NN3-6	3/8"	3"
502182	NN3-7	7/16"	3"
502192	NN3-8	1/2"	3"

Boron carbide liner
1 1/4" NPT thread
1" entry diameter

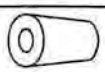
Straight Bore - Aluminum Jacket

Use NW-4 washer

502222	NN6-5	5/16"	6"
502232	NN6-6	3/8"	6"
502242	NN6-7	7/16"	6"
502252	NN6-8	1/2"	6"

Tungsten carbide liner
1 1/4" NPT brass thread

Straight Bore - w/Tapered Body - Aluminum Jacket



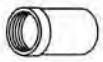
Use NW-4 washer
Use NA-2 & NA-3 adapters

502022	NN2F-2	1/8"	1 3/4"
502032	NN2F-3	3/16"	1 3/4"
502042	NN2F-4	1/4"	1 3/4"

Boron carbide liner
1 1/8" Diameter at base

NOZZLE COUPLINGS AND WASHERS

Nozzle Couplings (for connecting nozzle onto end of blast hose)



Part Number	Catalog Name	Description
505232	NC-1/2	Steel - fits 1 1/8" O.D. blast hose, 1" MPT
753212	NC-3/4	Steel - fits 1 1/2" O.D. blast hose, 1 1/4" MPT
753222	NC-1	Steel - fits 1 7/8" O.D. blast hose, 1 1/4" MPT
753232	NC-1 1/4	Steel - fits 2 5/32" O.D. blast hose, 1 1/4" MPT
753242	NC-1 1/2	Steel - fits 2 3/8" O.D. blast hose, 1 1/4" MPT
753252	NC-VB	Quick disconnect nozzle coupling with 1 1/4" straight thread
753102		Quick disconnect nozzle coupling for flanged high production nozzles

Flanged Nozzle Adapters

504912	NA-2	Aluminum - to secure CN3, DC2F & NN2F nozzles to NC-1/2 coupling 1" FPT
504942	NA-3	Brass - to secure CN3 nozzles to NC-3/4 coupling 1 1/4 FPT

Coupling Screws

554232	SCW-5/8	One (1) package of 4 - #8 x 5/8" Large sheet metal screws for cast aluminum and brass couplings only
554242	SCW-3/8	One (1) package of 4 - #8 x 3/8" Large sheet metal screws for steel couplings only

Nozzle Washers (installs inside nozzle coupling to seat nozzle)

524062	NW-1	1" I.D. X 1 1/2" O.D. - Use with SVC, DCV, NNV, DC3, & DC6 nozzles. Quantity: 10
524052	NW-2	1/2" I.D. X 1 1/8" O.D. - Use with DC2F & NN2F nozzles. Quantity: 10
524082	NW-4	5/8" I.D. X 1 1/2" O.D. - Use with NN3, NN6, & TNA nozzles. Quantity: 10
524041	NW-5	5/8" I.D. X 1 1/8" O.D. - Use with CN3 nozzles. Quantity: 10

⚠ WARNING

1. ***Inspect couplings and blast hose daily for splits, bubbles, soft spots, wear, etc. Make sure nozzle washers are in good condition and screw heads are snug against coupling surfaces. The safety pin must be in place to prevent quick coupling disconnection.***

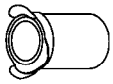
2. ***When assembling couplings to blast hose, only use #8 x 5/8" LG. self-tapping sheet metal screw (P/N 554232) for cast brass and aluminum couplings; use #8 x 3/8" LG. self-tapping sheet metal screw (P/N 554242) for all steel couplings.***

3. ***Use of other types of screws may create a safety hazard. Empire will not warrant equipment or assume responsibility for damage or injury resulting from neglect or use of improper parts.***

BLAST HOSE COUPLINGS (for connecting blast hose together or to tank coupling)

Quick Snap Couplings

Caution: All couplings require safety pins for safe operation



Part Number	Catalog Name	Description
505222	QC-1/2	Steel - fits 1 1/8" O.D. blast hose
751062	QC-3/4	Aluminum - fits 1 1/2" O.D. blast hose
751092	QC-1	Aluminum - fits 1 7/8" O.D. blast hose
751102	QC-1 1/4	Aluminum - fits 2 5/32" O.D. blast hose
751142	QC-1 1/2	Aluminum - fits 2 3/8" O.D. blast hose
751072	QCB-3/4	Brass - fits 1 1/2" O.D. blast hose
751082	QCB-1	Brass - fits 1 7/8" O.D. blast hose
751132	QCB-1 1/4	Brass - fits 2 5/32" O.D. blast hose
751152	QCB-1 1/2	Brass - fits 2 3/8" O.D. blast hose

Safety Pins (required for safe operation on all quick snap tank couplings)

510511	NA-3	Safety Pin for Quick Snap Couplings

Blast Hose Coupling Washers

524032	QCW	Qty: 10 - 1 1/4" I.D. x 1 7/8" O.D. to fit all blast hose couplings, except QC-1/2
525092	QCW	Qty: 25 - 1 1/4" I.D. x 1 7/8" O.D. to fit all blast hose couplings, except QC-1/2
524101	AHCW	Qty: 10 - 3/4" I.D. x 1 3/8" O.D. to fit QC-1/2
525102	AHCW	Qty: 25 - 3/4" I.D. x 1 3/8" O.D. to fit QC-1/2

Tank Couplings (to allow blast hose to attach to vessel)

Caution: All couplings require safety pins for safe operation

753262	TC	Aluminum - quick snap with 1 1/4" FPT
753272	TCB	Brass - quick snap with 1 1/4" FPT
506832	TC-37	Steel - quick snap with 3/8" FPT (P-105)
505212	TC-50	Steel - quick snap with 1/2" FPT (P-100, P150 & P-300)
505782	UF-100	Steel - quick snap with 1" FPT (P-105)

⚠ WARNING

1. ***Inspect couplings and blast hose daily for splits, bubbles, soft spots, wear, etc. Make sure nozzle washers are in good condition and screw heads are snug against coupling surfaces. The safety pin must be in place to prevent quick coupling disconnection.***
2. ***When assembling couplings to blast hose, only use #8 x 5/8" LG. self-tapping sheet metal screw (P/N 554232) for cast brass and aluminum couplings; use #8 x 3/8" LG. self-tapping sheet metal screw (P/N 554242) for all steel couplings.***
3. ***Use of other types of screws may create a safety hazard. Empire will not warrant equipment or assume responsibility for damage or injury resulting from neglect or use of improper parts.***

BLAST HOSES AND ASSEMBLIES

Blast Hose

All Premium blasting hose is 4 ply rated, static dissipating, nylon wrapped construction.
1/2" to 1" blast hose: 150 PSI maximum working pressure
1 1/4" & 1 1/2" blast hose: 125 PSI maximum working pressure

520792	PBH-1/2	1/2" I.D. X 1/16" O.D. blasting hose
520812	PBH-3/4	3/4" I.D. X 1 1/2" O.D. blasting hose
520822	PBH-1	1" I.D. X 1 7/8" O.D. blasting hose
520832	PBH-1 1/4	1 1/4" I.D. X 2 5/32" O.D. blasting hose
520842	PBH-1/2	1 1/2" I.D. X 2 5/32" O.D. blasting hose

Blast Hose with Coupling Installed

The blast hose assemblies below are supplied with aluminum couplings.

521672	PBH-1/2	(10') 1/2" blast hose w/quick snap & nozzle coupling
521682	PBH-1/2	(25') 1/2" blast hose w/quick snap & nozzle coupling
521692	PBH-1/2	(50') 1/2" blast hose w/quick snap & nozzle coupling
521702	PBH-1/2	(10') 1/2" blast hose w/two (2) quick snap couplings
521712	PBH-1/2	(25') 1/2" blast hose w/two (2) quick snap couplings
521722	PBH-1/2	(50') 1/2" blast hose w/two (2) quick snap couplings
521732	PBH-3/4	(10') 3/4" blast hose w/quick snap & nozzle coupling
521742	PBH-3/4	(25') 3/4" blast hose w/quick snap & nozzle coupling
521752	PBH-3/4	(50') 3/4" blast hose w/quick snap & nozzle coupling
521762	PBH-3/4	(25') 3/4" blast hose w/two (2) quick snap couplings
521772	PBH-3/4	(50') 3/4" blast hose w/two (2) quick snap couplings
521782	PBH-1	(10') 1" blast hose w/quick snap & nozzle coupling
521792	PBH-1	(25') 1" blast hose w/quick snap & nozzle coupling
521802	PBH-1	(50') 1" blast hose w/quick snap & nozzle coupling
521812	PBH-1	(25') 1" blast hose w/two (2) quick snap couplings
521822	PBH-1	(50') 1" blast hose w/two (2) quick snap couplings
521832	PBH-1 1/4	(25') 1 1/4" blast hose w/quick snap & nozzle coupling
521842	PBH-1 1/4	(50') 1 1/4" blast hose w/quick snap & nozzle coupling
521852	PBH-1 1/4	(50') 1 1/4" blast hose w/two (2) quick snap couplings
521862	PBH-1 1/2	(50') 1 1/2" blast hose w/quick snap & nozzle coupling
521872	PBH-1 1/2	(50') 1 1/2" blast hose w/two (2) quick snap couplings

Dual Line Hose Assemblies

521962	(30') dual line hose with fittings
521882	(50') dual line hose with fittings
521892	(55') dual line hose with fittings

Dual Line Hose Parts and Hardware

520872	Dual line hose (3/16") - per foot
520492	Worm Gear Clamp, 3/16" hose

Hardware from Vessel to Dead Man Handle - Black

520352	Adapter, 1/8" female swivel x 3/16" hose barb
520872	Ball connector, 1/8" male x 1/8" male
520012	Splice Coupling, 3/16"

Hardware from Dead Man Handle to Vessel - Yellow

520342	Adapter, 1/4" female swivel x 3/16" hose barb
520032	Ball connector, 1/4" male x 1/4" male
520012	Splice Coupling, 3/16"

NOTES:

Charts

8

MEDIA CONSUMPTION AND AIR REQUIREMENT CHART
(Air Mixed with Media)

Utilize the chart below to determine compressor size and estimate media consumption.

Please note:
1. Nozzles will wear over time, expanding the nozzle orifice, thus increasing the air requirement.
2. Safety equipment (air-fed hoods) require additional air.
3. It is recommended that the compressor operate at 70 - 80% of its rated output.

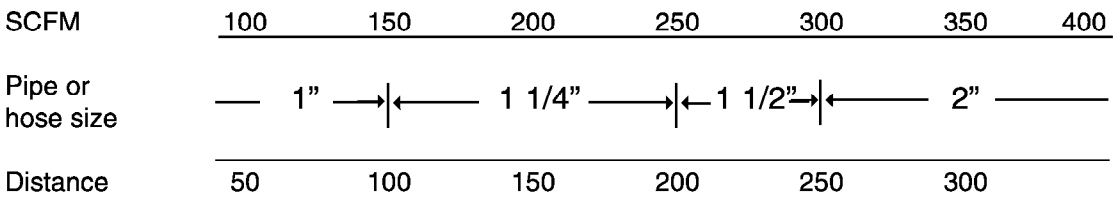
Nozzle Inside Orifice	PSI	60	70	80	90	100	120	140*
3/16"	Air (CFM)	30	33	38	41	45	–	–
	Horsepower	7.0	7.5	8.5	9.5	10.0	–	–
	Lbs. Media/Hour	171	196	216	238	264	–	–
1/4"	Air (CFM)	54	61	68	74	81	97	111
	Horsepower	12.0	13.5	15.0	16.5	18.0	21.5	24.6
	Lbs. Media/Hour	312	354	408	448	494	582	666
5/16"	Air (CFM)	89	101	113	126	137	152	173
	Horsepower	20.0	22.5	25.5	28.0	30.5	34.0	38.7
	Lbs. Media/Hour	534	604	672	740	812	912	1,038
3/8"	Air (CFM)	126	143	161	173	196	220	249
	Horsepower	28.0	32.0	36.0	38.5	44.0	49.0	55.5
	Lbs. Media/Hour	764	864	960	1,052	1,152	1,320	1,494
7/16"	Air (CFM)	170	194	217	240	254	300	340
	Horsepower	38.0	43.5	48.5	53.5	56.5	67.0	76.0
	Lbs. Media/Hour	1,032	1,176	1,312	1,448	1,584	1,800	2,040
1/2"	Air (CFM)	224	252	280	309	338	392	443
	Horsepower	50.0	56.0	62.5	69.0	75.0	87.5	98.9
	Lbs. Media/Hour	1,336	1,512	1,680	1,856	2,024	2,352	2,658
5/8"	Air (CFM)	356	404	452	504	548	611	692
	Horsepower	79.5	90.0	100.5	112.0	122.0	136.0	154.0
	Lbs. Media/Hour	2,136	2,424	2,712	3,024	3,288	3,668	4,152

*Consumption rate is based on media with a bulk density of 100 lbs./ft.^{3}

SUPPLY PIPING CHART

Utilize the chart below to determine the minimum pipe or hose size for the air supply to the pressure vessel. Determine the volume of air required (cfm) from the chart on the previous page. Draw a straight line from the cfm quantity to the number representing the distance from the air source. (e.g. If the air flow is 200 cfm and the air source is 100 feet away, 1 1/4" supply pipe is the minimum required)

Please note:
1. Undersized pipe or hose will starve the system, adversely affecting performance.
2. Always use clean, dry air. Moisture and oil are contaminates; they will cause media flow problems and possibly down time.
3. The moisture trap provided with the unit will remove condensed water, but will not clean grossly contaminated air.



Regulation Review

9

NIOSH
Recommended Standard for Control of Exposure to Crystalline Silica

WARNING

UNCONTAINED ABRASIVE BLASTING PRESENTS SERIOUS HEALTH HAZARDS

The National Institute for Occupational Safety and Health (NIOSH) recommends that employee exposure to crystalline silica in the workplace be controlled by adherence to the following sections. The standard is designed to protect the health and safety of workers for up to a 10-hour workday, 40-hour workweek, over a working lifetime. Compliance with the standard should prevent adverse effects of crystalline silica on the health and safety of workers. The standard is measurable by techniques that are valid, reproducible, and available to industry and government agencies and are attainable with existing technology. The criteria and the standard recommended in this document will be subject to review and revision as necessary.

Crystalline silica, hereafter referred to in this document as free silica, is defined as silicon dioxide (SiO_2). "Crystalline" refers to the orientation of SiO_2 molecules in a fixed pattern as opposed to a nonperiodic, random molecular arrangement defined as amorphous. The three most common crystalline forms of free silica encountered in industry are quartz, tridymite, and cristobalite. Micro- and crypto-crystalline varieties of free silica, also included in the recommended standard, are composed of minute grains of free silica cemented together with amorphous silica and include tripoli, flint, chalcedony, agate, onyx, and silica flour. Other forms of free silica which, upon analysis, are found to have a crystalline structure as part of their composition, are also subject to the recommended standard.

"Exposure to free silica" means exposure of the worker to an airborne concentration of free silica greater than half of the recommended environmental level in the workplace. Worker exposure at lower environmental concentrations will not require adherence to the following sections.

Section 1
Environmental
(Workplace Air)

a. Concentration

Occupational exposure shall be controlled so that no worker is exposed to a time-weighted average (TWA) concentration of free silica greater than 50 micrograms per cubic meter of air (50 μg/cu m; 0.050 mg/cu m) as determined by a full-shift sample for up to a 10-hour workday, 40-hour workweek.

b. Sampling, Calibration, and Analysis

Exposure to free silica shall be determined by a personal (breathing zone) sample.

Procedures for sampling, calibration of equipment, and analysis of environmental samples shall be as provided in Appendices I and II, or by methods shown to be equivalent in sensitivity, accuracy, and precision to the method specified.

Section 2
Medical

a. Medical examinations shall be made available to all workers subject to "exposure to free silica" prior to employee placement and at least once each three years thereafter. Examinations shall include as a minimum:

1. A medical and occupational history to elicit data on worker exposure to free silica and signs and symptoms of respiratory disease.

2. A chest roentgenogram (posteroanterior 14 in. by 17 in. or 14 in. by 14 in.) classified according to the 1971 ILO International Classification of Radiographs of Pneumoconioses. [ILO U/C International Classification of Radiographs of Pneumoconioses 1971, Occupational Safety and Health Series 22 (rev). Geneva, International Labor Office, 1972]

3. Pulmonary function tests including forced vital capacity (FVC) and forced expiratory volume at one second (FEV_2) to provide a baseline for evaluation of pulmonary function and to help determine the advisability of the workers using negative- or positive-pressure respirators. It should be noted that pulmonary function tests may vary significantly in various ethnic groups. For example, in black persons, the test values for the FVC should be divided by 0.85 before the percentage value is compared with normal figures.

4. Body weight.

5. Height.

6. Age.

7. Initial medical examinations for presently employed workers shall be offered within six months of the promulgation of a standard incorporating these recommendations.

b. Medical Management

An employee with or without roentgenographic evidence of silicosis who has respiratory distress and/or pulmonary functional impairment should be fully evaluated by a physician qualified to advise the employee whether he should continue working in a dusty trade.

c. These records shall be available to the medical representatives of the Secretary of Health, Education, and Welfare, the Secretary of Labor, or the employee or former employee, and of the employer.

d. Medical records shall be maintained for at least 30 years following the employee's termination of employment.

Section 3
Labeling (Posting)

a. The following warning shall be posted to be readily visible at or near entrances or access ways to work areas were there is potential exposure to free silica.

WARNING!
FREE SILICA WORK AREA
Unauthorized Persons Keep Out

b. The following warning shall be posted in readily visible locations in any work area where there is potential exposure to free silica.

WARNING!
FREE SILICA WORK AREA
Avoid Breathing Dust
May Cause Delayed Lung Injury
(Silicosis)

The posting required under sections 3a. and 3b. shall be printed both in English and in the predominant language of non-English speaking workers, unless they are otherwise trained and informed of the hazardous areas. Illiterate workers shall receive such training.

c. The following warning label, in addition to or in combination with labels required by other statutes, regulations, or ordinances, shall be affixed to all new materials, mixtures, and other products containing more than five percent free silica, or to their containers.

WARNING!
CONTAINS FREE SILICA
DO NOT BREATHE DUST
May Cause Delayed Lung Injury
(Silicosis)

Section 4
Personal Protective
Equipment and Work Clothing

Engineering controls shall be used to maintain free silica dust exposures below the prescribed limit. Subsection a. shall apply whenever a variance from the standard recommended in Section 1 is granted under provisions of the Occupational Safety and Health Act, or in the interim period during the application for a variance. When the limits of exposure to free silica prescribed in paragraph a. of Section 1 cannot be met by limiting the concentration of free silica in the work environment, an employer must utilize, as provided in subsection a. of this section, a program of respiratory protection to affect the required protection of every worker exposed.

a. Respiratory Protection

Appropriate respirators, as prescribed in Table I-1, shall be provided and used when a variance has been granted to allow respirators as a means of control of exposure to routine operations and while the application is pending. Administrative controls may also be used to reduce exposure. Respirators shall also be provided and used for nonroutine operations (occasional brief exposures above the environmental standard and for emergencies), however, for these instances a variance is not required but the requirements set forth below continue to apply. Appropriate respirators as described in Table I-1 shall only be used pursuant to the following requirements:

1. For the purpose of determining the type of respirator to be used, the employer shall measure the atmospheric concentration of free silica in the workplace when the initial application for variance is made and thereafter whenever processes, worksite, climate, or control changes occur which are likely to affect the free silica concentration. This requirement shall not apply when only atmosphere-supplying positive-pressure respirators are used. The employer shall ensure that no worker is exposed to free silica in excess of the standard because of improper respirator selection, fit, use, or maintenance.

2. Employees experiencing breathing difficulty while using respirators shall be evaluated by a physician to determine the ability of the worker to wear a respirator.

3. A respiratory protective program meeting the requirements of Section 1910.134 of the Occupational Safety and Health Standards shall be established and enforced by the employer. [29 CFR 1910.134 published in the Federal Register, vol 39, page 23671, dated June 27, 1974, as amended]

4. The employer shall provide respirators in accordance with Table I-1 and shall ensure that the employee uses the appropriate respirator.

5. Respiratory protective devices in Table I-1 shall be those approved either under 30 CFR 11, published March 25, 1972, or under the following regulations:

A. Filter-type dust, fume, and mist respirators – 30 CFR 14 (Bureau of Mines Schedule 21B).

B. Supplied air respirator – 30 CFR 12 (Bureau of Mines Schedule 19B).

6. A respirator specified for use

Table I-I
Requirements for Respirator Usage at Concentrations Above the Standard

Concentrations of Free Silica in Multiples of the Standard	Respirator Type[a]
Less than or equal to 5X	Single use (valveless type) dust respirator.
Less than or equal to 10X	Quarter or half mask respirator with replaceable dust filter or single use (with valve) dust respirator.
Less than or equal to 100X	Full facepiece respirator with replaceable dust filter. Type C, supplied air respirator, demand type (negative pressure), with full facepiece.
Less than or equal to 200X	Powered air-purifying (positive-pressure) respirator, with replaceable applicable filter.[b]
Greater than 200X	Type C, supplied air respirator, continuous flow type (positive pressure), with full facepiece, hood, or helmet.

[a] Where a variance has been obtained for abrasive blasting with silica sand, use only Type C continuous flow, supplied air respirator with hood or helmet.

[b] An alternative is to select the standard high efficiency filter which must be at least 99-97 percent efficient against 0.3 micrometer dioctyl phthalate (DOP).

in higher concentrations of free silica may be used in atmospheres of lower concentrations.

7. Employees shall be given instruction on the use of respirators assigned to them, on cleaning respirators, and on testing for leakage.

b. Work Clothing

Where exposure to free silica is above the recommended environmental limit, work clothing shall be vacuumed before removal. Clothes shall not be cleaned by blowing or shaking.

Section 5
Informing Employees of
Hazard from Free Silica

a. Each employee exposed to free silica shall be apprised at the beginning of his employment or assignment to a free silica exposure area of the hazards, relevant symptoms, appropriate emergency procedures, and proper conditions and precautions for safe use or exposure. The employee shall be instructed as to availability of such information including that prescribed in b. below. Such information shall be kept on file and shall be accessible to the worker at each place of employment where free silica is involved in unit processes and operations. Workers shall also be advised of the increased risk of impaired health due to the combination of smoking and free silica dust exposure.

b. Information, to the extent applicable to free silica, as specified in Appendix III shall be recorded on U.S. Department of Labor form OSHA 20, "Material Safety Data Sheet" (see Appendix III) or on a similar form approved by the Occupational Safety and Health Administration, U.S. Department of Labor.

Section 6
Work Practices and
Control Procedures

a. Substitution

1. Wherever a hazard of silicosis can be eliminated by a reasonable substitution of other less toxic materials for free silica, the substitution shall be made unless the silica sand has been so processed before use to make it nonrespirable such as by washing to remove fine particles. Examples of such substitution are the use of alumina instead of flint for china placing in potteries, and the substitution of a quartz-free grit in abrasive blasting.

2. Uncontrolled abrasive blasting with silica sand is such a severe silicosis hazard that special attention must be given to this problem. Silica sand, or other materials containing more than one percent free silica, should be prohibited as an abrasive substance in abrasive blasting cleaning operations.

b. Dust Suppression

Moisture shall be added where such addition can substantially reduce the exposure to airborne respirable free silica dust.

c. Ventilation

Where a local exhaust ventilation and collection system is used, it shall be designed and maintained to prevent the accumulation or recirculation of free silica dust into the workplace. The total system shall be inspected periodically for efficiency of operation. In addition, necessary measures shall be taken to ensure that discharge outdoors will not produce a health hazard to humans, animals, or plants.

d. General Housekeeping

1. Cleaning by blowing with compressed air or dry sweeping shall be avoided and dustless methods of cleaning such as vacuuming or washing down with water shall be substituted.

2. Emphasis shall be placed upon cleanup of spills, preventive maintenance and repair of equipment, proper storage of materials, and collection of dusts containing free silica. Sanitation shall meet the requirements of 29 CFR 1910.141 as amended.

Section 7
Monitoring and
Recordkeeping Requirements

Work environments where is has been determined, on the basis of a professional industrial hygiene survey or by the judgment of a compliance officer, that the workers' exposure does not exceed half of the standard shall not be considered to have exposure to free silica. Records of these surveys, including the basis for concluding that air levels are at or below half of the standard shall be maintained. Surveys shall be repeated when any process change indicates a need for reevaluation or at the discretion of the compliance officer. Requirements set forth below apply to areas in which there is "exposure to free silica."

Employers shall maintain records of the workers' exposure to free silica based upon the following sampling and recording schedules:

a. In all monitoring, samples representative of the exposure in the breathing zone of employees shall be collected. An adequate number of samples shall be collected to permit construction of a full-shift exposure for every operation or process. The minimum number of time-weighted average determinations for an operation or process shall be based on the number of workers exposed as provided in Table 1-2 or as otherwise indicated by a professional industrial survey.

b. The first work environment (breathing zone) sampling shall be completed within six months of the promulgation of a standard incorporating these recommendations.

c. Work environment (breathing zone) samples shall be taken within 30 days after installation of a new process or process changes.

d. Samples shall be collected and analyzed at least every six months in accordance with Appendices I and II for the evaluation of the workers' exposure with respect to the recommended standard.

Table I-2
Sampling Schedule

Number of Employees Exposed Number of Employees Exposed	Number of Number of TWA Determinations
1 to 20	50% of the total number of workers
21 to 100	10 plus 25% of the excess over 20 workers
Over 100	30 plus 5% of the excess over 100 workers

e. When monitoring of the workers' exposure indicates a free silica concentration in excess of the recommended standard, suitable controls shall be initiated to reduce the exposure level to or below the recommended standard. In such cases monitoring shall continue at 30-day intervals until two consecutive surveys indicate the recommended standard is no longer exceeded. Periodic review and evaluation of environmental and medical data shall be performed to determine the effectiveness of control measures.

f. Records shall be maintained of medical examinations and all sampling schedules to include the sampling and analytical methods, type of personal protection devices, if any, in use at the time of sampling and the determined free silica dust concentration. Records shall be maintained for at least 30 years following termination of workers' employment. Each employee shall be able to obtain information on his exposure.

NISOH "Recommendations for a Crystalline Silica Standard," HEW Publication No. (NIOSH) 75-120, published 1975.

Warranty

Empire Abrasive Equipment Company ("Empire") warrants all parts and equipment against defects in material workmanship to the original purchaser for 3 years after shipment. Upon prompt notification by buyer, components that are determined by Empire to be defective, within this period, will be supplied for replacement, modified or repaired at Empire, or additional parts will be supplied at NO CHARGE.

Limitations of Warranty

1. Warranty does not apply to normal wear items such as nozzles, blast hose, or other components exposed to and in direct contact with blast media.
2. Recommended maintenance schedules must be performed for the warranty to be valid. (Refer to Chapter 6.)
3. Warranty is void if unauthorized service, repair or alteration has been made.
4. Warranty does not apply to misapplication of products.
5. Empire neither assumes nor authorizes anyone else to assume additional liability in connection with sale of Empire Products.
6. Associated installation costs are excluded.
7. Freight costs for goods returned to Empire are to be assumed by buyer unless parts are determined defective by Empire.
8. Returned Material Authorization (RMA) form must be filled out completely and accompany returned goods. Returns are not recognized without prior authorization and RMA form.
9. **Warranty is voided if genuine Empire replacement parts are not used.** Fraudulent claims will be back charged for time and material.
10. Commercial parts not manufactured by Empire will be warranted under terms of the original manufacturer.

This warranty is in lieu of all other warranties whether expressed, implied, or statuary, including implied warranties of merchantability or fitness.

Please fax (215-752-9373) Warranty Registration Card on page 9-5 within 10 days.

RETAIN FOR YOUR RECORDS

EMPIRE MODEL NUMBER: _____

EMPIRE SERIAL NUMBER: _____

DATE OF PURCHASE: _____ DATE OF INSTALLATION: _____

PURCHASED FROM: _____

WARRANTY REGISTRATION

PLEASE FAX OR MAIL WARRANTY REGISTRATION CARD WITHIN 10 DAYS

IMPORTANT NOTICE:

We ask that you please complete this card and fax or mail it to us immediately upon installation. This will register your purchase and allow us to extend to you the full scope of our services. Machinery is warranted to the orginial purchaser (see limited warranty) for a period of 3 years after shipment. It is therefore in your best interest to register your machine immediately upon installation. Registration will also allow us to contact you for warranty updates, product recalls, safety notices, etc.

NOTE: MACHINES REGISTERED WITHIN 10 DAYS OF INSTALLATION ENTITLE THE UNDERSIGNED TO A **FREE** TEE SHIRT*. CARD MUST BE COMPLETE!

COMPANY NAME _____

ADDRESS _____

CITY _____ STATE_____ ZIP _____

PHONE (_____) _____

YOUR INDUSTRY: _____

IS MACHINE PRIMARILY USED FOR SHOP MAINTENANCE ❒ yes ❒ no

• NAME OF PRINCIPAL WORKPIECES (PARTS TO BE BLASTED):___

• WORKPIECES ARE: ❒ NEW ❒ SALVAGE - REWORK OF NEW PARTS ❒ BEING REMANUFACTURED

• PARTS BASE MATERIAL:_____ COATING MAT'L: _____

• PRINCIPAL MEDIA USED:

❒ GLASS BEAD ❒ ALUMINUM OXIDE ❒ STEEL GRIT
❒ STEEL SHOT ❒ PLASTIC ❒ OTHER

SECONDARY MEDIA USED: _____

• SIZE OF MEDIA:

❒ FINE ❒ MEDIUM ❒ COARSE

SPECIFY MESH SIZE (IF KNOWN): _____

MODEL NUMBER:_____ **SERIAL** NUMBER:_____

DATE OF PURCHASE:_____ DATE OF INSTALLATION: _____

DISTRIBUTOR PURCHASED FROM: _____

• PROCESS:

❒ FINAL FINISHING ❒ SURFACE CLEANING
❒ COATING REMOVAL ❒ SURFACE PREPARATION
❒ OTHER (SPECIFY):_____

• DESIRED RESULTS: _____

• PREVIOUS METHOD FOR THIS PROCESS: _____

• ANTICIPATED USAGE: _____HOURS PER WEEK

• HOW DID YOU FIRST HEAR OF EMPIRE?

❒ YELLOW PAGES ❒ REFERRAL
❒ THOMAS REGISTER ❒ PREVIOUS EXPERIENCE WITH EMPIRE
❒ DISTRIBUTOR ❒ OTHER (SPECIFY):
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*Tee Shirt is "One Size Fits All" Alternative gift(s) of equal or greater value may be substituted without notice.

I have been informed that abrasive blasting presents serious health hazards, which could lead to long-term illness or death if appropriate protective devices are not employed. I am aware that operators of abrasive blasting equipment, as well as other persons exposed to uncontained blasting, must adhere to NIOSH and OSHA guidelines. Operators and workers must be equipped with necessary safety gear, which at minimum, should always include a NIOSH approved hood respirator, CO monitor or high temperature alarm on your compressor, and an air purifier to remove oil and moisture from Grade "D" breathing air, and a proper "dead-man" remote control system that stops blasting at the operator's station.

Further, I have read the NIOSH "Recommendations for a Crystalline Silica Standard", HEW Publication No. (NIOSH) 75-120, dated 1975 and have reviewed the safety requirements set forth in this article on page 9-1 of this manual.

_____ _____

(Authorized Signature) (Print Name)

_____

(Date)

EMPIRE

ABRASIVE EQUIPMENT COMPANY

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