



experience,
trust, service

3 and 6 Cubic Foot Blast Machines

Manual # 1090028
Revision C, 7/21/03



Before using this equipment, read, understand and follow all instructions in this manual.

Serious injury or death can result if you fail to comply with all instructions in this manual.

If the user or assistants cannot read or understand the warnings and instructions in this manual, the employer of the user and assistants must provide adequate and necessary training to ensure proper operation and compliance with all safety procedures pertaining to this equipment.

NOTA: Si no le es posible leer o comprender el Manual del operador (Operator's Manual), se debe solicitar la ayuda de otra persona que le instruya en los métodos seguros y apropiados de manejo y uso del equipo de limpieza con chorro de arena.

REMARQUE: Si vous ne pouvez pas lire ou si vous ne pouvez pas comprendre le texte du manuel d'utilisation (Operator's Manual), veuillez demander ci une autre personne de vous expliquer les méthodes de manipulation et d'utilisation correctes et sécuritaires du matériel de sablage.

NOTICE TO PURCHASER

Read and understand all instructions in this manual before using this equipment. If the employee or workers do not understand all of this information, the employer is responsible for training all workers operating this equipment in safe operating procedures. Give special attention to the HAZARD ALERT SIGNAL WORDS given on page 2. Not following instructions can result in serious injury or death.

The product described in this manual is only a component in the complete abrasive blasting system. Do not modify or substitute original manufacturer parts with non-approved sub-assemblies. Operating information regarding other products is the responsibility of the manufacturers of those products.



IMMEDIATE REPLACEMENT OF WORN COMPONENTS IS REQUIRED. FAILURE TO REPLACE WORN COMPONENTS COULD RESULT IN EXPOSING THE OPERATOR OR BYSTANDERS TO HIGH SPEED MEDIA AND COMPRESSED AIR WHICH COULD CAUSE DEATH OR SERIOUS INJURY.

FAILURE TO USE ORIGINAL MANUFACTURER REPAIR PARTS WILL VOID WARRANTIES, CAUSE MALFUNCTIONS AND COULD RESULT IN DEATH OR SERIOUS INJURY.

GENERAL INSTRUCTIONS

The very nature of the abrasive blasting operation can create hazards for the user. Read all operating and safety instructions BEFORE using equipment.

Protective equipment for the user and others exposed to the blasting process is the responsibility of the user and/or employer. User must consult with employer regarding potential hazards in the work environment and how to protect against those hazards. Potential hazards include but are not limited to:

- ◆ Dust containing toxic material from abrasive or material being blasted (free-silica sand, asbestos, lead paint, heavy metal paint and other toxins).
- ◆ Harmful dust can remain suspended in the air for long periods of time after blasting has ceased. Anyone in the blast area must use NIOSH-approved supplied-air respirators.
- ◆ Toxic fumes from adjacent coating operations, engine exhaust, chemicals, asbestos and contaminated water.
- ◆ Physical hazards such as poor visibility, excess noise, an uneven work surface and electrical hazards.

All components in a blasting operation must be installed, tested, operated and maintained by trained, qualified users.



BREATHING DUST FROM SILICA SAND MAY CAUSE SILICOSIS, A FATAL LUNG DISEASE. BREATHING DUST DURING BLASTING OPERATIONS MAY ALSO CAUSE ASBESTOSIS AND/OR OTHER SERIOUS OR FATAL DISEASES. A NIOSH-APPROVED, WELL-MAINTAINED AIR-SUPPLIED ABRASIVE BLASTING RESPIRATOR MUST BE USED BY ANYONE BLASTING, ANYONE HANDLING OR USING THE SAND AND ANYONE IN THE AREA OF THE DUST. HARMFUL DUST CAN REMAIN SUSPENDED IN THE AIR FOR LONG PERIODS OF TIME AFTER BLASTING HAS CEASED, CAUSING SERIOUS INJURY OR DEATH. FOLLOW ALL APPLICABLE OSHA STANDARDS, OSHA REGULATION 1910.134 (d).

1044 S. Dittmer Street
Davenport, IA 52802
800.BLAST.IT
www.marcousa.com

3 and 6 Cubic Foot Blast Machines

Manual # 1090028
Revision C, 7/21/03

! DANGER

IMPORTANT: KEEP THIS MANUAL IN A CONVENIENT LOCATION FOR FUTURE REFERENCE.

SUPPLIED-AIR RESPIRATOR

BREATHING DUST FROM SILICA SAND MAY CAUSE SILICOSIS, A FATAL LUNG DISEASE. BREATHING DUST DURING BLASTING OPERATIONS MAY ALSO CAUSE ASBESTOSIS AND/OR OTHER SERIOUS OR FATAL DISEASES. A NIOSH-APPROVED, WELL-MAINTAINED AIR-SUPPLIED ABRASIVE BLASTING RESPIRATOR MUST BE USED BY ANYONE BLASTING, ANYONE HANDLING OR USING THE SAND AND ANYONE IN THE AREA OF THE DUST. HARMFUL DUST CAN REMAIN SUSPENDED IN THE AIR FOR LONG PERIODS OF TIME AFTER BLASTING HAS CEASED, CAUSING SERIOUS INJURY OR DEATH.

BEFORE REMOVING RESPIRATOR, USE AN AIR MONITORING INSTRUMENT TO DETERMINE IF ATMOSPHERE IS SAFE TO BREATHE. CONTACT LOCAL OSHA OR NIOSH OFFICE TO DETERMINE THE PROPER RESPIRATOR FOR YOUR PARTICULAR APPLICATION. WEAR NIOSH APPROVED SUPPLIED-AIR RESPIRATORS ONLY IN ATMOSPHERES NOT IMMEDIATELY DANGEROUS TO LIFE OR HEALTH, WITH AT LEAST 19.5% OXYGEN, FROM WHICH A USER CAN ESCAPE WITHOUT USING THE RESPIRATOR. THE AIR SUPPLIED TO THE RESPIRATOR MUST BE AT LEAST GRADE D QUALITY AS DESCRIBED IN COMPRESSED GAS ASSOCIATION COMMODITY SPECIFICATION G-7.1 AND AS SPECIFIED BY OSHA REGULATION 1910.134 (d).

These requirements are as follows:

Oxygen	19.5-23.5%
Hydrocarbons (condensed)	
in mg/m ³ of gas	5 mg/m ³ max.
Carbon monoxide	10 ppm max.
Carbon dioxide	1,000 ppm max.
Odor	No detectable odor

No toxic contaminants at levels that make air unsafe to breathe. **SUPPLIED-AIR RESPIRATORS DO NOT REMOVE OR PROTECT AGAINST CARBON MONOXIDE (CO) OR ANY OTHER TOXIC GAS.** Use a carbon monoxide removal device and monitoring device with the respirator to ensure Grade D quality air.

! DANGER

ONLY PERSONS HAVING A NATIONAL BOARD "R" STAMP (ISSUED BY THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS) SHOULD BE ALLOWED TO WELD, DRILL, GRIND, OR ALTER THE BLAST MACHINE IN ANY WAY. IF ANYONE WITHOUT A BOARD "R" STAMP WELDS, GRINDS, DRILLS OR ALTERS THE BLAST MACHINE, THE ASME CERTIFICATION CODES AS WELL AS THE MANUFACTURER'S WARRANTY WILL BE VOIDED AND THE VESSEL CAN BE WEAKENED, CAUSING IT TO BURST, RESULTING IN DEATH OR SERIOUS INJURY (ASME PRESSURE VESSEL CODE, 2001, W / 2001 ADDENDUM).

Locate compressors to prevent potentially dangerous air (such as CO from engine exhaust) from entering the air intake. Install an in-line air purifying absorbent bed, filter and CO monitor to assure air quality.

Use only NIOSH approved breathing air hose to connect an appropriate air filter to the respirator. Non-approved hose can release chemical agents harmful to the user.

Ensure air filter and respirator system hoses are NOT connected to non-air, in-plant lines that may contain nitrogen, acetylene or other non-breathable gases. Always test the content of the air line before using. Failure to ensure Grade D quality air is being supplied to the user may result in serious injury or death. The respirator lenses are designed to protect only against rebounding abrasive. They will not protect against flying objects, glare, liquids, radiation, or high speed heavy materials. Using lenses from sources other than the original manufacturer will void NIOSH approval of the respirator.

Wear approved safety glasses or goggles at all times.

! DANGER

OSHA REQUIRES THE USE OF REMOTE CONTROLS ON ALL BLAST MACHINES. OSHA FURTHER REQUIRES THAT THE REMOTE CONTROL HANDLE MUST BE HELD OPEN (IN BLAST POSITION) MANUALLY. DO NOT TIE THE CONTROL HANDLE LEVER DOWN NOR ATTEMPT TO BYPASS ANY PART OF THE REMOTE CONTROL SYSTEM. DOING SO WILL DEFEAT THE PURPOSE OF THE FAIL-TO-SAFE FEATURE OF THE SYSTEM, RESULTING IN UNCONTROLLED BLASTING AND CAUSING DEATH OR SERIOUS INJURY.. 29 CFR 1910.244(B)

! DANGER

NEVER USE A PRESSURIZED OXYGEN CYLINDER TO PROVIDE OXYGEN TO THE AIRLINE RESPIRATOR. FAILURE TO TEST THE AIR LINE MAY RESULT IN THE SUFFOCATION AND DEATH OF THE RESPIRATOR USER, OR SERIOUS INJURY DUE TO THE LACK OF BREATHABLE AIR.

BLAST MACHINES AND REMOTE CONTROLS

Check air control orifice DAILY for cleanliness. Use only twin-line control hose. Do not use welding hose as the internal diameter and rubber composition are NOT SUITABLE for remote control use.

UNLESS OTHERWISE SPECIFIED, the maximum working pressure of blast machines and their related components MUST NOT EXCEED 125 psig (8.5 BAR) as approved by the (ASME) National Board.

! DANGER

ALWAYS USE AT LEAST TWO PEOPLE TO MANUALLY MOVE AN EMPTY BLAST MACHINE. NEVER ATTEMPT TO MANUALLY MOVE A BLAST MACHINE CONTAINING ABRASIVE. ALWAYS USE MECHANICAL LIFTING EQUIPMENT TO TRANSPORT ANY BLAST MACHINE CONTAINING ABRASIVE. FAILURE TO DO SO WILL RESULT IN DEATH OR SERIOUS INJURY.

3 and 6 Cubic Foot Blast Machines

Manual # 1090028

Revision C, 7/21/03



BREATHING DUST FROM SILICA SAND MAY CAUSE SILICOSIS, A FATAL LUNG DISEASE. BREATHING DUST DURING BLASTING OPERATIONS MAY ALSO CAUSE ASBESTOSIS AND/OR OTHER SERIOUS OR FATAL DISEASES.

A NIOSH-APPROVED, WELL-MAINTAINED AIR-SUPPLIED ABRASIVE BLASTING RESPIRATOR MUST BE USED BY ANYONE BLASTING, ANYONE HANDLING OR USING THE ABRASIVE AND ANYONE IN THE AREA OF THE DUST. HARMFUL DUST CAN REMAIN SUSPENDED IN THE AIR FOR LONG PERIODS OF TIME AFTER BLASTING HAS CEASED, CAUSING DEATH OR SERIOUS INJURY.

**FOLLOW ALL APPLICABLE OSHA STANDARDS,
OSHA REGULATION 1910.134 (d).**

PAY SPECIAL ATTENTION TO INDICATIONS OF DANGER, WARNINGS, CAUTIONS AND NOTICES!

THIS DOCUMENT CONTAINS SAFETY INDICATORS FOR YOUR SAFETY AND THE SAFETY OF PEOPLE AND PROPERTY AROUND THIS PRODUCT. DO NOT OPERATE OR SERVICE THIS EQUIPMENT UNTIL YOU HAVE THOROUGHLY READ AND UNDERSTAND THIS DOCUMENT.



THIS IS AN EXAMPLE OF DANGER. THIS INDICATES AN IMMINENTLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY.



THIS IS AN EXAMPLE OF A CAUTION. THIS INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, MAY RESULT IN MINOR OR MODERATE INJURY. IT CAN ALSO BE USED TO ALERT AGAINST UNSAFE PRACTICES.



THIS IS AN EXAMPLE OF A WARNING. THIS INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY.



THIS IS AN EXAMPLE OF A NOTICE. THIS INDICATES POLICY OR PRACTICE DIRECTLY RELATED TO SAFETY OF PERSONNEL OR PROTECTION OF PROPERTY.

THIS DOCUMENT CONTAINS INSTRUCTIONS AND WARNINGS FOR THE USE AND MAINTENANCE OF THE 3 AND 6 CUBIC FOOT BLAST MACHINES ONLY. IT DOES NOT ADDRESS HAZARDS ASSOCIATED WITH MEDIA BLASTING OR OTHER MEDIA BLASTING EQUIPMENT.

FOR INFORMATION ON USE, OPERATION AND SAFETY OF OTHER BLASTING EQUIPMENT, SEE APPROPRIATE EQUIPMENT MANUALS.

Description: Blast Machine

The Blast Machine is the main component in all abrasive blasting jobs. The Blast Machine is an American Society of Mechanical Engineers (ASME) certified pressure vessel used to pressurize media (abrasive), to be transferred at a high rate of speed, to a surface to be cleaned or prepared for painting. When operated and maintained properly, the Blast Machine will provide years of reliable service.

Operational Requirements

Extensive design and field testing have proven the Blast Machine to be effective and durable under intended use conditions. The following are common mistakes which cause safety hazards or reduced performance:

- ◆ Welding, drilling or modifying the blast machine in any way
- ◆ Replacing ANY components with non-original manufacturer components
- ◆ Insufficient or excessive air pressure (50 psi minimum, 125 psi maximum)
- ◆ Failure to place the blast machine on a stable, flat surface
- ◆ Incorrect lifting or transporting of blast machine or incorrect or worn lifting devices being used

Operating Instructions

To operate, pressurize Blast Machine by closing outlet valve and opening inlet valve. Next, open choke valve on side of blast machine. With metering valve closed, only air will exit nozzle. Gradually open metering valve to introduce abrasive into the airstream (See metering valve operator's manual as well as "Blue Flame" section on page 7 of this manual for proper use and how to achieve the optimum air/abrasive mixture). To begin the deactivation process and to depressurize blast machine, close inlet valve and open outlet valve. NOTE: OSHA requires the use of remote controls on all blast machines. These systems, such as the KwikFire™ Remote Control Systems, will allow the user to pressurize and depressurize the blast machine from the nozzle end of the blast hose (see appropriate remote control system operator's manual for further information).

Before using:

- ◆ Inspect daily, all control lines, verifying they are not cracked, abraded or damaged.
- ◆ Inspect daily, blast machine and components; ensure there are no cracks or leaks.
- ◆ Ensure blast machine is placed on a stable, flat surface.
- ◆ Inspect daily, Pop-Up o-ring. Ensure o-ring is not worn or abraded and will produce an airtight seal.
- ◆ Immediately replace any worn or damaged components.

During use:

- ◆ Monitor remote control air lines to verify the flow of air cannot be disrupted. Route all control lines in a location free of traffic and severing hazards (see remote control operator's manual for further information).

After use:

- ◆ Always use lock out and tagout devices when machine is not in use.
- ◆ Empty abrasive from blast machine at the end of each day. Emptying blast machine will reduce the possibility of damp abrasive due to moisture accumulation. There are two methods for removing remaining abrasive from blast machine.
Option 1: (Protective clothing should be worn when performing this procedure):
Remove nozzle and place the exit end of hose into a container suitable for storing abrasive. Close choke valve and fully open the metering valve (see metering valve manual). Be prepared for strong recoil of the blast hose. Pressurize blast machine per remote control system instructions. As the blast machine pressurizes, abrasive will exit the hose in a "chugging" manner. After abrasive has been removed, depressurize blast machine per remote control system instructions.
Option 2: Remove inspection door assembly (see Maintenance section of this manual), and remove abrasive through the inspection door opening. Replace inspection door (see Maintenance section of this manual).



ALWAYS DEPRESSURIZE AND LOCKOUT THE BLAST SYSTEM BEFORE ANY MAINTENANCE OR TROUBLESHOOTING IS ATTEMPTED. FAILURE TO DEPRESSURIZE WILL RESULT IN RELEASE OF HIGH SPEED MEDIA AND COMPRESSED AIR, CAUSING DEATH OR SERIOUS INJURY.

HARMFUL DUST CAN REMAIN SUSPENDED IN THE AIR FOR LONG PERIODS OF TIME AFTER BLASTING HAS CEASED. ANYONE IN THE BLAST AREA MUST USE A NIOSH-APPROVED, AIR-SUPPLIED RESPIRATOR. FAILURE TO USE A NIOSH-APPROVED, AIR SUPPLIED RESPIRATOR IN THE WORK AREA MAY CAUSE SERIOUS INJURY OR DEATH.

Troubleshooting

If your Blast Machine fails to function properly, check the following:

Symptom \ Cause	Action
Neither air nor abrasive exit the nozzle Blockage/Obstruction (In Hose or Nozzle)	Fully depressurize blast machine. Remove nozzle from blast hose and check for obstruction. Always treat nozzle as if system is pressurized! NEVER look directly into a connected nozzle. Clear any obstruction from blast hose and/or the metering valve using "Damp Abrasive" procedure below.
Metering valve not functioning properly	Ensure metering valve is open and functioning properly (see troubleshooting section of metering valve operator's manual).
Remote control system not functioning properly	See remote control system operator's manual.
Damp Abrasive	See Damp Abrasive section below.
Air exits the nozzle but abrasive does not Damp Abrasive/Blockage in Metering Valve/Metering Valve Closed	Pressurize blast machine, open and close choke valve rapidly. Open metering valve (see metering valve operator's manual). See also Damp Abrasive section below.
Abrasive surge (Some surging is normal at startup) Blockage/Damp Abrasive/Metering Valve	Experiment with different choke settings to equalize pressure between blast machine and pusher line. If problem persists, open metering valve to full open position and open and close choke valve to clear any obstruction.
Insufficient air pressure (PSI) or air volume (CFM) being supplied by the compressor	Increase pressure (psi) to blast machine (minimum 50 psi, maximum 125 psi), and/or volume (cubic feet per minute/CFM).
Incorrect Nozzle Size (Nozzle worn or too large for CFM)	Select correct nozzle orifice size based on CFM and PSI being used (see Figure 3, Page 7).
Damp abrasive	Increase size of air supply hose from compressor to an inside diameter of at least 1 1/4" and install properly sized moisture separator. If problem persists, see "After Use" section (Page 3), of this manual.
Blast machine will not pressurize Worn Components	Inspect Pop-up Valve and O-ring for wear. Replace as necessary
Insufficient air pressure (PSI) or air volume (CFM) being supplied by the compressor	Increase pressure (psi) to blast machine (minimum 50 psi, maximum 125 psi), and/or volume (cubic feet per minute/CFM).
Remote control system not functioning properly	See remote control system operator's manual.
Machine does not depressurize or depressurizes slowly	See remote control system operator's manual.

Installation - Blast Machine (See Figure 1)

1. Verify all personal protective equipment is in place.
2. Locate compressor up wind from the blasting operation. Lockout the compressor from inadvertent power application while blast machine is being setup.
3. Locate Blast Machine on an even, flat surface that can withstand the weight of a full blast machine. Be aware of the possibility of load shifting and possible erosion of work surface.
4. Connect air supply hose from compressor to inlet valve (1). To ensure best blasting performance, use an air hose with an inside diameter of 1 1/4" or larger. The air hose must have a minimum rating of 125 working pressure.
5. Attach blast hose to metering valve quick coupling (2). Verify gaskets are in place and in good condition.
6. Verify safety pins are inserted completely through couplings and safety cables are in place.
7. Before loading abrasive into blast machine, ensure it is well screened and dry. Load abrasive by pouring into top of blast machine. The abrasive will flow into opening located at top of blast machine and will begin to fill vessel.

NOTE: Do not overfill the blast machine as this may prevent the pop-up valve from sealing properly.

NOTE: Use only abrasive specified for use in abrasive blasting.

! DANGER

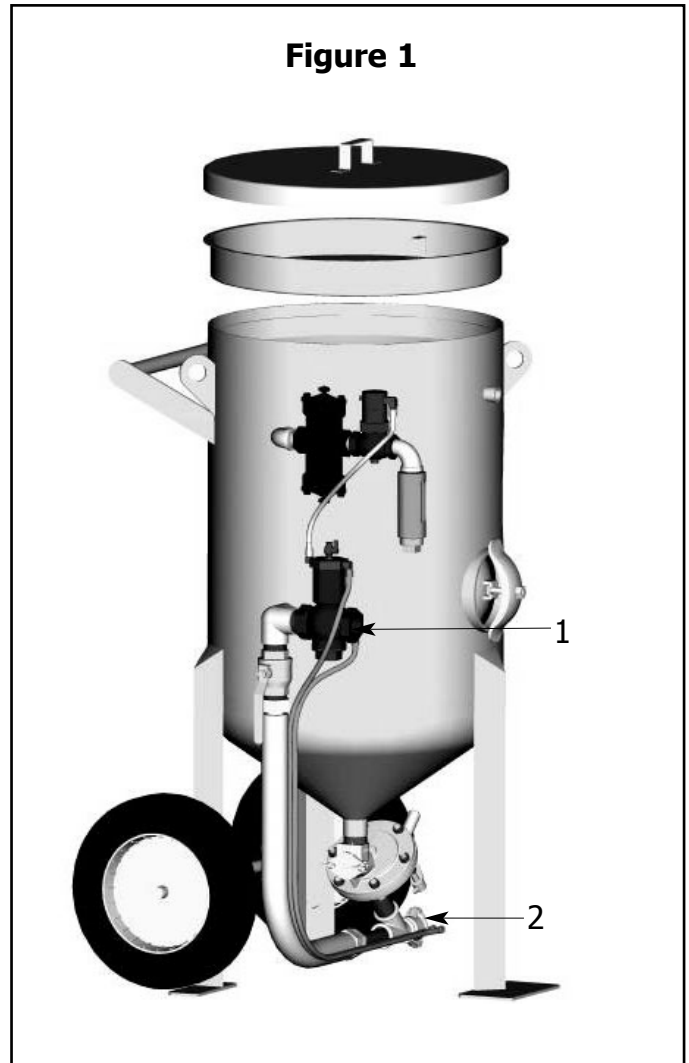
ALWAYS USE AT LEAST TWO PEOPLE TO MANUALLY MOVE AN EMPTY BLAST MACHINE. NEVER ATTEMPT TO MANUALLY MOVE A BLAST MACHINE CONTAINING ABRASIVE. ALWAYS USE MECHANICAL LIFTING EQUIPMENT TO TRANSPORT ANY BLAST MACHINE CONTAINING ABRASIVE. FAILURE TO DO SO WILL RESULT IN DEATH OR SERIOUS INJURY.

! DANGER

DO NOT EXCEED MAXIMUM WORKING PRESSURE OF 125 PSI. FAILURE TO KEEP MAXIMUM WORKING PRESSURE BELOW 125 PSI CAN CAUSE THE BLAST MACHINE TO BURST, CAUSING DEATH OR SERIOUS INJURY.

! WARNING

OSHA REQUIRES THE USE OF REMOTE CONTROLS ON ALL BLAST MACHINES. OSHA FURTHER REQUIRES THAT THE REMOTE CONTROL HANDLE MUST BE HELD OPEN (IN THE BLAST POSITION) MANUALLY. DO NOT TIE THE CONTROL HANDLE LEVER DOWN NOR ATTEMPT TO BYPASS ANY PART OF THE REMOTE CONTROL SYSTEM. DOING SO WILL DEFEAT THE PURPOSE OF THE FAIL-TO-SAFE FEATURE OF THE SYSTEM, RESULTING IN UNCONTROLLED BLASTING, CAUSING DEATH OR SERIOUS INJURY. 29 CFR 1910.244(B)



! DANGER

ONLY PERSONS HAVING A NATIONAL BOARD "R" STAMP (ISSUED BY THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS) SHOULD BE ALLOWED TO WELD, DRILL, GRIND, OR ALTER THE BLAST MACHINE IN ANY WAY. IF ANYONE WITHOUT A BOARD "R" STAMP WELDS, GRINDS, DRILLS OR ALTERS THE BLAST MACHINE, THE ASME CERTIFICATION CODES AS WELL AS THE MANUFACTURER'S WARRANTY WILL BE VOIDED AND THE VESSEL CAN BE WEAKENED, CAUSING IT TO BURST, RESULTING IN DEATH OR SERIOUS INJURY (ASME PRESSURE VESSEL CODE, 2001, W / 2001 ADDENDUM).

Maintenance - Blast Machine

Disassembly/Component Replacement (See Figure 2 and Figure 2a)

- ◆ Verify all personal protective equipment is in place.
- ◆ Locate compressor up wind from the blasting operation. Lockout the compressor from inadvertent power application while blast machine is being setup.

Pop-Up Valve O-Ring Replacement (See Figure 2) :

1. Pry O-Ring (1) from recess at the top of the blast machine and pull through opening.
2. Install new O-Ring (1) by inserting through opening in top of blast machine until fully seated in recess.

Inspection Door Assembly Removal and Replacement (See Figure 2a):

1. Loosen nut (2) at front of assembly.
2. Remove bracket (3).
3. With square head bolt (4) still in place in slot at front of inspection door, grasp bolt end and push inspection door (5) towards blast machine interior. A rubber mallet may be needed to loosen the inspection door.
4. Angle the inspection door (5) and remove along with gasket (6) out through opening (7).

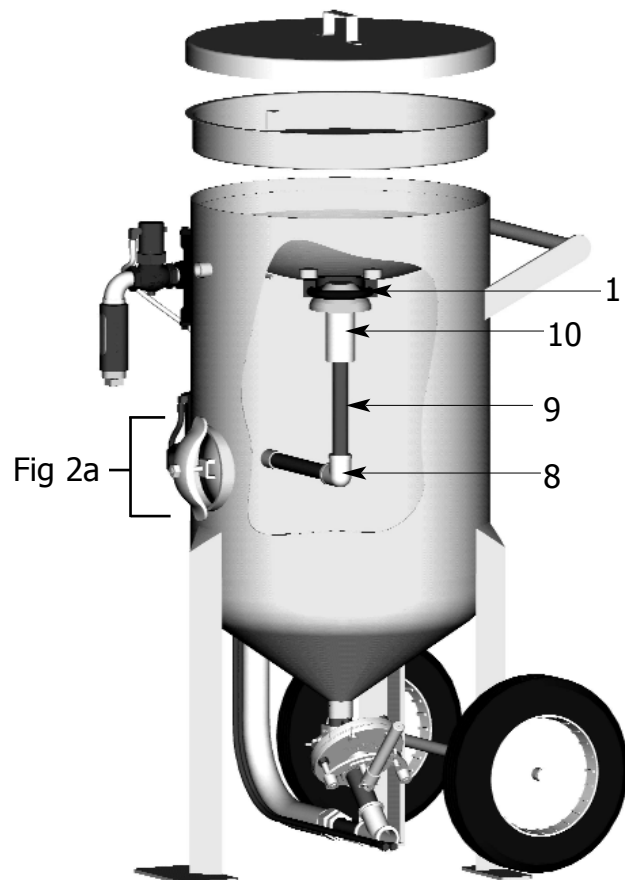
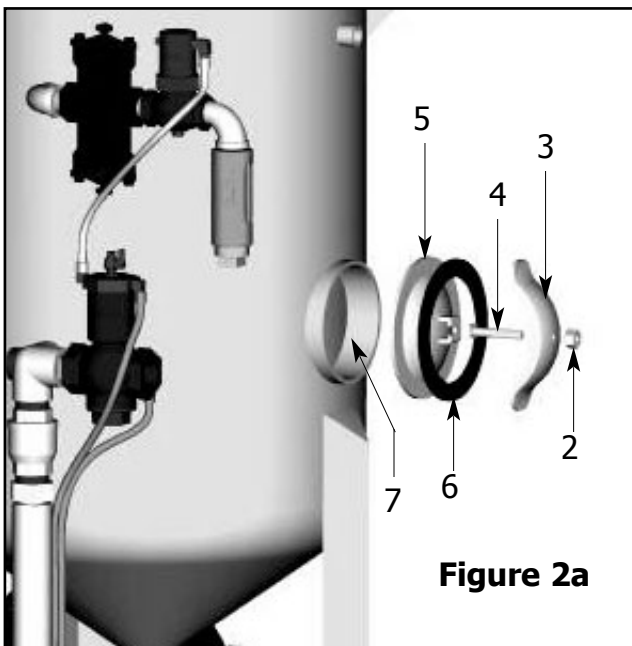
Removal & Replacement of pop-up Valve (See Figure 2):

1. With inspection door removed, grasp elbow (8) and rotate counter-clockwise until valve guide (9) rests at a 45° angle.
2. Slide pop-up up valve (10) from internal valve guide (9) and remove through inspection door opening (7).
3. To install, slide pop-up valve (10) onto internal guide (9) and rotate elbow (8) and guide back to upright position.
4. Ensure pop-up valve (10) moves freely up and down on guide (9) and seats properly with pop-up valve o-ring (1).

Installation of Inspection Door Assembly (See Figure 2a):

1. Place new gasket (6) onto inspection door (5) and place inspection door and gasket through opening (7).
2. Place square head bolt (4) into slot on inspection door face.
3. Grasp square head bolt end and pull inspection door (5) and gasket (6) into place.
4. Place bracket (3) onto bolt (4) and tighten down with nut (2).
5. Ensure bracket is tight (3) and airtight seal is produced.

Figure 2



NOTICE

THE "BLUE FLAME" PRECISE METERING - ALL ABRASIVES

WHEN IT COMES TO ABRASIVE/AIR MIXTURES, MORE IS NOT NECESSARILY BETTER. OPTIMUM BLASTING EFFICIENCY TAKES PLACE WHEN A LEAN ABRASIVE/AIR MIXTURE IS USED. TO CORRECTLY SET THE METERING VALVE, BEGIN WITH THE VALVE FULLY CLOSED AND SLOWLY INCREASE THE AMOUNT OF ABRASIVE ENTERING THE AIRSTREAM. AS YOU INCREASE THE ABRASIVE FLOW, WATCH FOR A "BLUE FLAME" AT THE EXIT OF THE NOZZLE. FASTER CUTTING, REDUCED ABRASIVE CONSUMPTION AND LOWER CLEAN UP COSTS, ARE A FEW OF THE BENEFITS OF PRODUCING THE "BLUE FLAME".

NOTICE

SEE CHART (FIGURE 3) FOR ABRASIVE CONSUMPTION RATES AND REQUIRED AIR FLOW (IN CUBIC FEET PER MINUTE). YOUR SYSTEM MUST MEET THESE MINIMUM STANDARDS TO ENSURE PROPER FUNCTION AND PERFORMANCE.

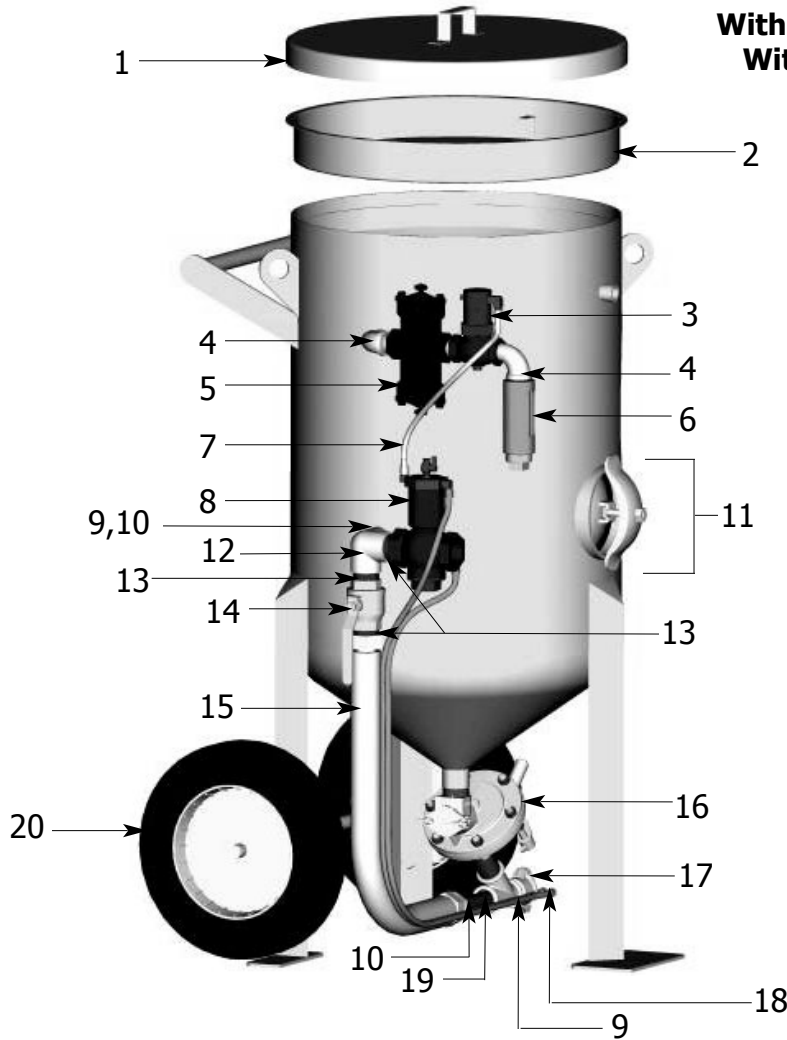
Figure 3: Required Air Flow and Abrasive Consumption Rates

NOZZLE ORIFICE		PRESSURE AT THE NOZZLE (psi)						
		50	60	70	80	90	100	125
3/16"	Air (cfm)	26.0	30.0	33.0	38.0	41.0	45.0	55.0
	Abrasive (lbs/hr)	150.0	171.0	196.0	216.0	238.0	264.0	319.0
	Horsepower	6.0	7.0	7.5	8.5	9.5	10.0	12.0
1/4"	Air (cfm)	47.0	54.0	61.0	68.0	74.0	81.0	98.0
	Abrasive (lbs/hr)	268.0	312.0	354.0	408.0	448.0	494.0	608.0
	Horsepower	10.5	12.0	13.5	15.0	16.5	18.0	22.0
5/16"	Air (cfm)	77.0	89.0	101.0	113.0	126.0	137.0	168.0
	Abrasive (lbs/hr)	468.0	532.0	604.0	672.0	740.0	812.0	982.0
	Horsepower	17.5	20.0	22.5	25.5	28.0	30.5	37.0
3/8"	Air (cfm)	108.0	126.0	143.0	161.0	173.0	196.0	237.0
	Abrasive (lbs/hr)	668.0	764.0	864.0	960.0	1052.0	1152.0	1393.0
	Horsepower	24.0	28.0	32.0	36.0	38.5	44.0	52.0
7/16"	Air (cfm)	147.0	170.0	194.0	217.0	240.0	254.0	314.0
	Abrasive (lbs/hr)	896.0	1032.0	1176.0	1312.0	1448.0	1584.0	1931.0
	Horsepower	33.0	38.0	43.5	48.5	53.5	56.5	69.0
1/2"	Air (cfm)	195.0	224.0	252.0	280.0	309.0	338.0	409.0
	Abrasive (lbs/hr)	1160.0	1336.0	1512.0	1680.0	1856.0	2024.0	2459.0
	Horsepower	43.5	50.0	56.0	62.5	69.0	75.0	90.0
5/8"	Air (cfm)	308.0	356.0	404.0	452.0	504.0	548.0	663.0
	Abrasive (lbs/hr)	1875.0	2140.0	2422.0	2690.0	2973.0	3250.0	3932.0
	Horsepower	68.5	79.5	90.0	100.5	112.0	122.0	146.0
3/4"	Air (cfm)	432.0	504.0	572.0	644.0	692.0	784.0	948.0
	Abrasive (lbs/hr)	2672.0	3056.0	3456.0	3840.0	4208.0	4608.0	5570.0
	Horsepower	96.0	112.0	127.0	143.0	154.0	174.5	209.0

NOTE: Figures based on abrasive with bulk density of 100 lbs. per cubic foot.

Figure 4

**6 Cubic Foot Blast Machine
With Regulator Valve and
With Remote Controls**



6 Cubic Foot Blast Machine (With Remotes)

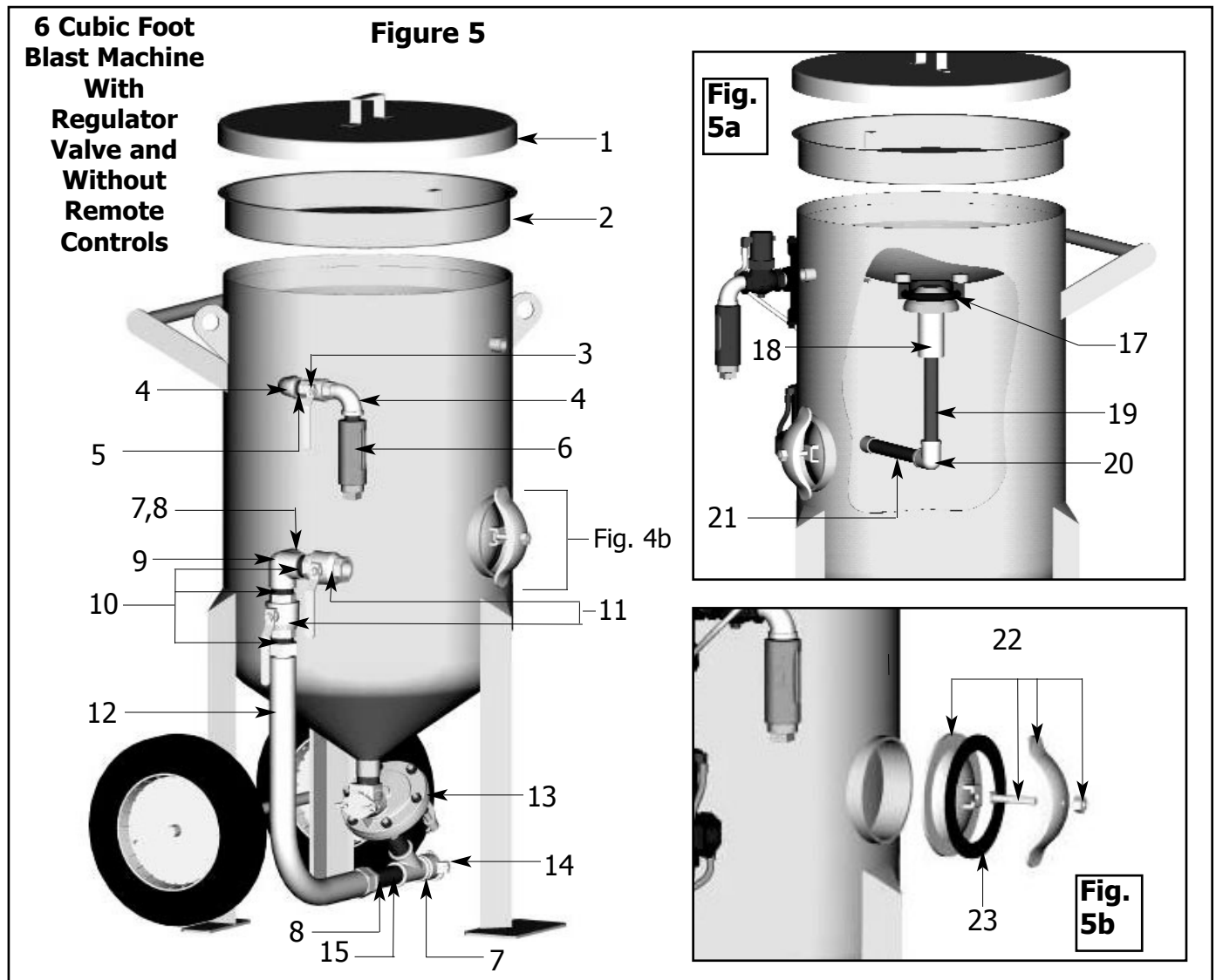
ID	Part#	Description	ID	Part#	Description
Fig. 4	1006008	6 Cu. Ft. Blast Machine With Regulator Valve and KwikFire™ 125 Pneumatic Remote Control System Installed	14	1011603	1 1/2" Ball Valve
1	1006101	24" Cover	15	1006304	1 1/2" Pusher Line (w/Swivel Fittings)
2	1006102	24" Screen	16	1014000	Regulator Valve, Complete (With 1 1/4" "Y", 5" Nipple & 1 1/2" Close Nipple)
3	1012050	1" Outlet Valve	17	10SB1	1 1/4" Tank Coupling
4	1011801	1" Street Elbow (2 Required)	18	10TL5	5' Twinline
5	1012000	Abrasive Trap	19	1011202	1 1/4" X 6" Pipe Nipple
6	1011100	Exhaust Muffler Assembly	20	1006064	Wheel
7	10CL18	18" Control Line	-	1006063	Retainer Clip for Wheel (Not visible)
8	1012200	1 1/2" Inlet Valve	-	1090024	4" Umbrella (Optional/Not Shown)
9	1011201	1 1/4" Close Nipple (2 Required)	-	1091019	Blast Machine Warning Label
10	1011501	1 1/2" x 1 1/4" Reducer (2 Required)	-	1091020	Blast Machine Warning Plate
11	1006200	Inspection Door Assembly (No Gasket)	-	1090028	Blast Machine Operator's Manual
12	1011804	1 1/2" 90° Elbow With Side-Out			
13	1014015	1 1/2" Close Nipple (3 Required)			

Note: For internal components, see Figure 5a (Page 9)



IMMEDIATE REPLACEMENT OF WORN COMPONENTS IS REQUIRED. FAILURE TO REPLACE WORN COMPONENTS COULD RESULT IN EXPOSING THE OPERATOR OR BYSTANDERS TO HIGH SPEED MEDIA AND COMPRESSED AIR, CAUSING DEATH OR SERIOUS INJURY.

The basic components of the Blast Machine are shown in Figure 5. Remote controls (Not shown in Figure 5), are an OSHA requirement on all blast machines. Remote Control operator's manuals are provided with the remote controls.

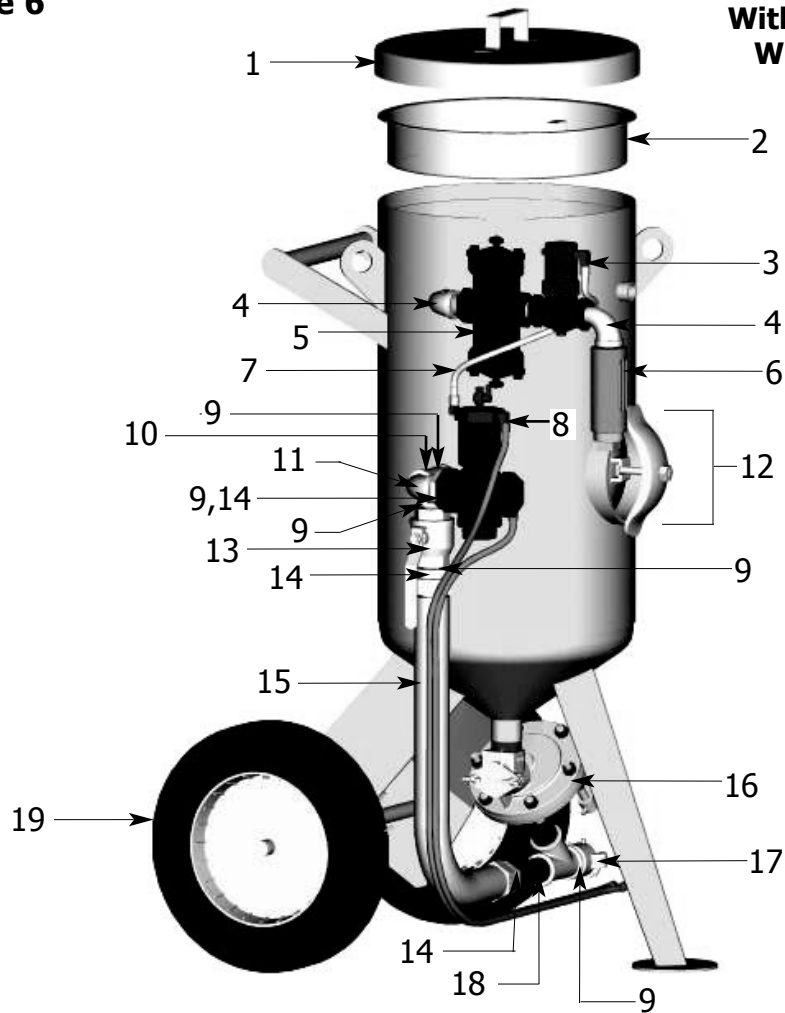


6 Cubic Foot Blast Machine

ID	Part#	Description	ID	Part#	Description
Fig. 5	1006003	6 Cubic Foot Blast Machine With Regulator Valve & Without Remotes	Fig. 5a		Internal Components
1	1006101	24" Cover	17	1016050	Pop-Up O-Ring
2	1006102	24" Screen	18	1016020	External Pop-Up Valve
3	1011601	1" Ball Valve	19	1016202	Internal Pop-Up Valve Guide
4	1011801	1" Street Elbow (2 Required)	20	1006204	1 1/2" x 1 1/4" Reducer Elbow
5	1012151	1" Close Nipple	21	1006203	1 1/4" x 10" Inlet Pipe
6	1011100	Exhaust Muffler Assembly	22	1006064	Wheel
7	1011201	1 1/4" Close Nipple (2 Required)	23	1006063	Retainer Clip for Wheel (Not visible)
8	1011501	1 1/2" x 1 1/4" Reducer (2 Required)	Fig. 5b		Inspection Door Assembly
9	1011804	1 1/2" 90° Elbow With Side-Out	22	1006200	Inspection Door Assembly (No Gasket)
10	1014015	1 1/2" Close Nipple (3 Required)	23	1006201	Inspection Door Gasket
11	1011603	1 1/2" Ball Valve (2 Required)	-	1090024	4" Umbrella (Optional/Not Shown)
12	1006304	1 1/2" Pusher Line (w/swivel fittings)	-	1091019	Blast Machine Warning Label
13	1014000	Regulator Valve, Complete (With 1 1/4" Y, 5" Nipple & 1 1/2" Close Nipple)	-	1091020	Blast Machine Warning Plate
14	10SB1	1 1/4" Tank Coupling	-	1090028	Blast Machine Operator's Manual
15	1011202	1 1/4" X 6" Pipe Nipple			

Figure 6

**3 Cubic Foot Blast Machine
With Regulator Valve and
With Remote Controls**

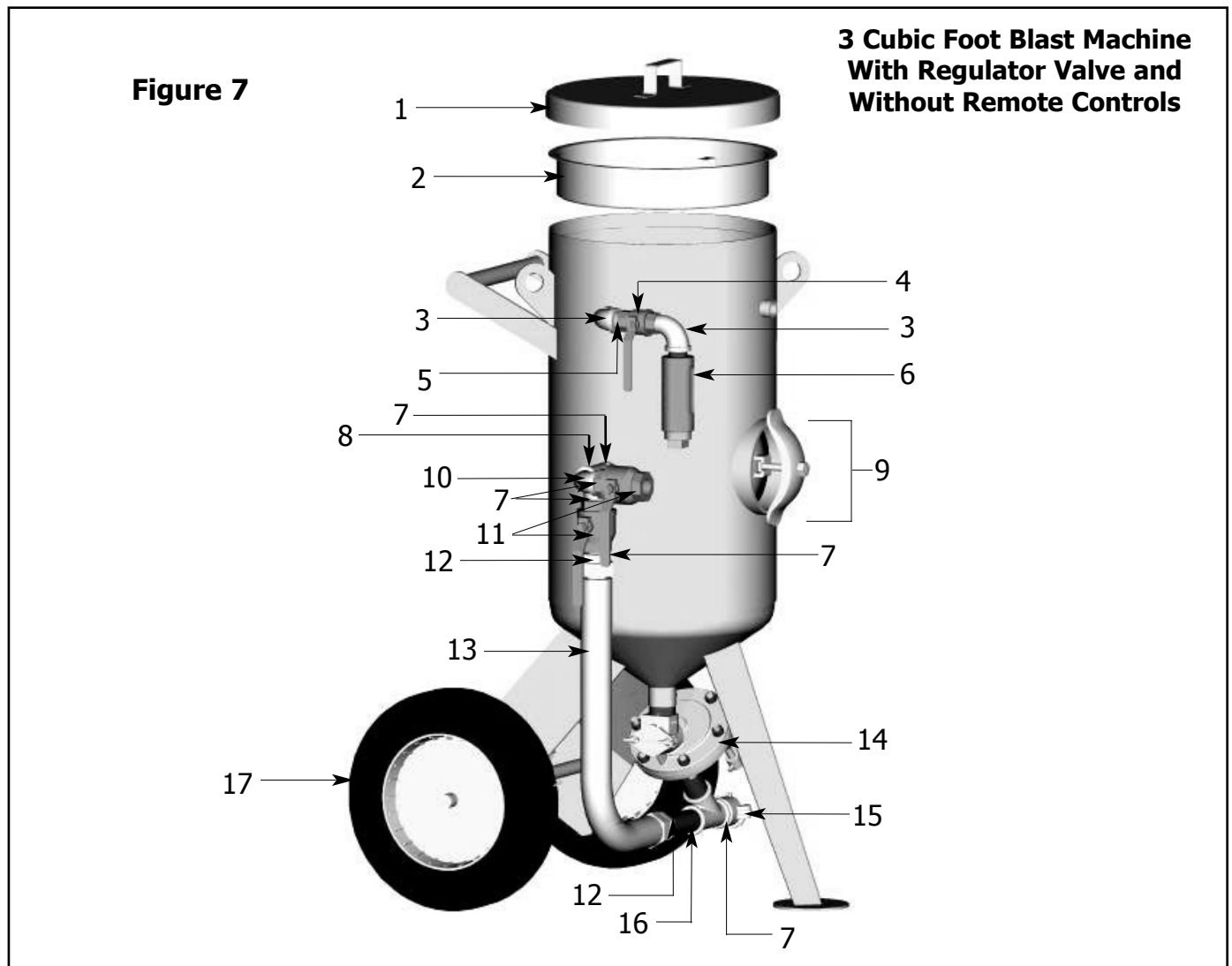


3 Cubic Foot Blast Machine (With Remotes)

ID	Part#	Description	ID	Part#	Description
Fig. 6	1003008	3 Cu. Ft. Blast Machine With Regulator Valve and KwikFire™ 125 Pneumatic Remote Control System Installed	14	1011501	1 1/2" x 1 1/4" Reducer (3 Required)
1	1003101	16" Cover	15	1006304	1 1/2" Pusher Line (w/swivel fittings)
2	1003102	16" Screen	16	1014000	Regulator Valve, Complete (With 1 1/4" 'Y', 5" Nipple & 1 1/2" Close Nipple)
3	1012050	1" Outlet Valve	17	10SB1	1 1/4" Tank Coupling
4	1011801	1" Street Elbow (2 Required)	18	1011202	1 1/4" X 6" Pipe Nipple
5	1012000	Abrasive Trap	19	1006064	Wheel
6	1011100	Exhaust Muffler Assembly	-	1006063	Retainer Clip for Wheel (Not visible)
7	10CL18	18" Control Line	-	1090024	4" Umbrella (Optional/Not Shown)
8	1012200	1 1/2" Inlet Valve	-	1091019	Blast Machine Warning Label
9	1011201	1 1/4" Close Nipple (5 Required)	-	1091020	Blast Machine Warning Plate
10	1011803	1 1/4" Tee	-	1090028	Blast Machine Operator's Manual
11	1011802	1 1/4" Street Elbow			
12	1006200	Inspection Door Assembly (No Gasket)			
13	1011602	1 1/4" Ball Valve			

Note: For internal components, see Figure 5a (Page 9)

The basic components of the Blast Machine are shown in Figure 7. Remote controls (Not shown in Fig. 7), are an OSHA requirement on all blast machines. Remote Control operator's manuals are provided with the remote controls.



3 Cubic Foot Blast Machine

ID	Part#	Description	ID	Part#	Description
Fig. 7	1003003	3 Cu. Ft. Blast Machine With Regulator Valve & Remote Controls	13	1006304	1 1/2" Pusher Line (w/swivel fittings)
1	1003101	16" Cover	14	1014000	Regulator Valve, Complete (With 1 1/4" Y, 5" Nipple & 1 1/2" Close Nipple)
2	1003102	16" Screen	15	10SB1	1 1/4" Tank Coupling
3	1011801	1" Street Elbow (2 Required)	16	1011202	1 1/4" X 6" Pipe Nipple
4	1011601	1" Ball Valve	17	1006064	Wheel
5	1012151	1" Close Nipple	-	1006063	Retainer Clip for Wheel (No visible)
6	1011100	Exhaust Muffler Assembly	-	1090024	4" Umbrella (Optional/Not Shown)
7	1011201	1 1/4" Close Nipple (5 Required)	-	1091019	Blast Machine Warning Label
8	1011803	1 1/4" Tee	-	1091020	Blast Machine Warning Plate
9	1006200	Inspection Door Assembly (No Gasket)	-	1090028	Blast Machine Operator's Manual
10	1011802	1 1/4" Street Elbow			
11	1011602	1 1/4" Ball Valve (2 Required)			
12	1011501	1 1/2" x 1 1/4" Reducer (2 Required)			

Note: For internal components, see Figure 5a (Page 9)

NOTES



DO NOT EXCEED MAXIMUM WORKING PRESSURE OF 125 PSI. FAILURE TO KEEP MAXIMUM WORKING PRESSURE BELOW 125 PSI CAN CAUSE THE BLAST MACHINE TO BURST, CAUSING DEATH OR SERIOUS INJURY.



POINT THE NOZZLE ONLY AT THE OBJECT BEING BLASTED. NEVER POINT THE ABRASIVE BLAST STREAM AT YOURSELF OR OTHERS. THE HIGH VELOCITY ABRASIVE PARTICLES MAY INFLICT SERIOUS INJURY OR DEATH. KEEP UNPROTECTED WORKERS OUT OF THE BLASTING AREA. ALWAYS BE CERTAIN TO HAVE SECURE FOOTING WHEN BLASTING. THERE IS A RECOIL HAZARD WHEN BLASTING STARTS THAT MAY CAUSE USER TO FALL AND MISDIRECT THE ABRASIVE STREAM AT OPERATOR OR BYSTANDER.

AIR HOSE, BLAST HOSE, COUPLINGS, AND NOZZLE HOLDERS

Keep air hose length as short as possible and in a straight line. Inspect daily and immediately repair leakage. It is recommended the blast hose have an inside diameter 3 to 4 times the size of nozzle orifice diameter. Keep hose lengths as short as possible to reduce pressure loss. Inspect blast hose daily for soft spots and repair or replace immediately. Cut loose hose ends square when installing hose couplings and nozzle holders to provide uniform fit of hose to coupling shoulder. Only install couplings or nozzle holders that provide a tight fit on hose. Use only manufacturer's recommended coupling screws. Check all gaskets several times during a working day for wear, distortion and softness. Replace coupling gaskets FREQUENTLY to prevent leakage. Abrasive leakage can result in coupling failure. Install safety pins at all coupling connections to reduce risk of accidental disengagement during hose movement. Always attach safety cables at ALL air hose AND blast hose coupling connections. Cables relieve tension on hose and also control whipping action in the event of a coupling failure.

ADDITIONAL TECHNICAL DATA

The associations listed below offer information, materials and videos pertaining to abrasive blasting and safe operating practices.

American Society for Testing and Materials (ASTM)

100 Barr Harbor Drive, W. Conshohocken, PA 19428
Phone: (610) 832-9500
FAX: (610) 832-9555

National Association of Corrosion Engineers (NACE)

1440 South Creek Drive, Houston TX 77084
Phone: (713) 492-0535
FAX: (713) 492-8254

Office of General Industry Compliance Assistance (OSHA)

Room N - 3107 United States Department of Labor
200 Constitution Avenue NW, Washington, DC 20210
Phone: (202) 219-8041

Steel Structures Painting Council (SSPC)

40-24th Street 6th Floor, Pittsburgh PA 15222
Phone: (412) 281-2331
FAX: (412) 281-9993

MAINTENANCE



ALWAYS DEPRESSURIZE AND LOCKOUT THE BLAST SYSTEM BEFORE ANY MAINTENANCE OR TROUBLESHOOTING IS ATTEMPTED. FAILURE TO DEPRESSURIZE WILL RESULT IN RELEASE OF HIGH SPEED MEDIA AND COMPRESSED AIR CAUSING DEATH OR SERIOUS INJURY.

THIS EQUIPMENT IS NOT INTENDED FOR USE IN ANY AREA THAT MIGHT BE CONSIDERED A HAZARDOUS LOCATION AS DESCRIBED IN THE NATIONAL ELECTRIC CODE NFPA 70 1996, ARTICLE 500. USE OF THIS EQUIPMENT IN A HAZARDOUS LOCATION MAY CAUSE AN EXPLOSION OR ELECTROCUTION RESULTING IN SERIOUS INJURY OR DEATH.

WARRANTY

Seller warrants to the original purchaser that the Product covered by this Warranty will remain free from defects in workmanship or material under normal commercial use and service for a period of one year from the date of shipment to the original Purchaser. This Warranty shall not apply to defects arising, in whole or in part, from any accident, negligence, alteration, misuse or abuse of the Product, operation not in accordance with applicable instructions or manuals or under conditions more severe than, or otherwise exceeding, those set forth in the written specifications for the Product, nor shall this Warranty extend to repairs or alterations of the Product by persons other than Seller or Seller's authorized representatives, or to maintenance parts.

DISCLAIMER OF WARRANTIES

THE FOREGOING WARRANTY IS EXCLUSIVE AND IS IN LIEU OF ALL OTHER WARRANTIES OF QUALITY, WHETHER ORAL OR WRITTEN AND WHETHER EXPRESS OR IMPLIED. ALL WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY EXCLUDED AND ARE INAPPLICABLE TO THE PRODUCT.

EXCLUSIVE REMEDY FOR WARRANTY CLAIMS

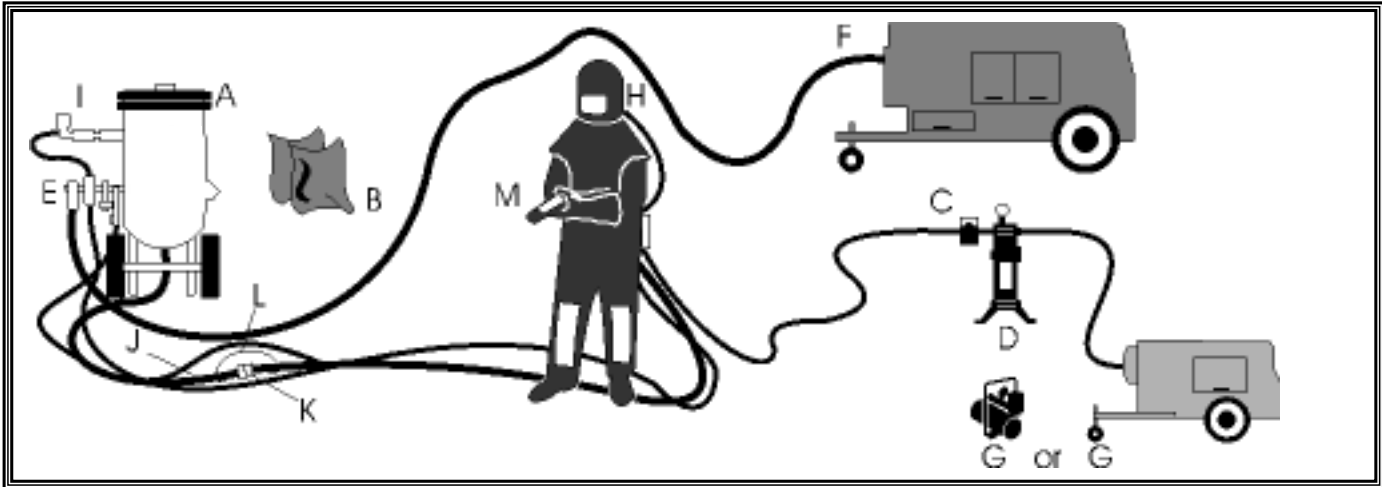
The sole and exclusive remedy of Purchaser for under the foregoing Warranty covering this Product shall be repair or replacement, free of charge, F.O.B. point of manufacture, of any defective part or parts of the Product that were manufactured by Seller, and which are returned to Seller at Seller's principal place of business, postage prepaid. This sole and exclusive remedy is conditioned upon Purchaser's prompt written notice to Seller at Seller's place of business that a defect has been discovered, together with a reasonably detailed description of the defect in the Product, within thirty (30) days after discovery of the defect, otherwise such claims shall be deemed waived. No allowance will be granted for any repairs or alterations made by Purchaser or others without Seller's prior written consent. If such notice is timely given, Seller will have the option to either modify the Product or component part thereof to correct the defect, replace the Product or part with complying Products or parts, or refund the amount paid for the defective Product, any one of which will constitute the sole liability of Seller and full settlement of all claims. Purchaser shall afford Seller prompt and reasonable opportunity to inspect the Product for which claim is made. The sole purpose of the foregoing stipulated exclusive remedy shall be to repair or replace defective Products or components thereof, or to refund Purchaser the purchase price thereof. This stipulated exclusive remedy shall not be deemed to have failed of its essential purpose so long as Seller is willing and able to repair or replace the defective parts or refund the purchase price in accordance with the terms hereof.

LIMITATION OF REMEDY

THE FOREGOING STIPULATED EXCLUSIVE REMEDY IS IN LIEU OF ALL OTHER REMEDIES FOR BREACH OF CONTRACT OR WARRANTY SELLER SHALL NOT BE LIABLE FOR ANY LOSS OR DAMAGE RESULTING, DIRECTLY OR INDIRECTLY, FROM THE USE OF LOSS OF USE OF THE PRODUCT WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, THIS EXCLUSION EMBRACES THE PURCHASER'S EXPENSES FOR DOWNTIME OR FOR MAKING UP DOWNTIME, DAMAGES FOR WHICH THE PURCHASER MAY BE LIABLE TO OTHER PERSONS, DAMAGES TO PROPERTY, AND INJURY TO OR DEATH OF ANY PERSONS, AND IS ALSO EXCLUSIVE OF ANY CLAIMS FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LOSS OF PROFITS, REGARDLESS OF WHETHER SELLER HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. SELLER NEITHER ASSUMES NOR AUTHORIZES ANY PERSON TO ASSUME FOR IT ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OR USE OF ANY PRODUCTS COVERED BY THE FOREGOING WARRANTY AND DISCLAIMERS, AND THERE ARE NO ORAL AGREEMENTS RELATING TO REMEDIES WHICH ARE COLLATERAL TO OR WHICH AFFECT THIS LIMITATION.

OPERATOR: Conduct the following maintenance procedures on a daily basis. Check all piping, fittings and hoses for tightness and leakage. Replace worn or damaged parts immediately.

PERSONNEL: Blast operators must receive thorough training on the use of abrasive resistant attire which includes: supplied air respirator, safety shoes, leather gloves, ear protection and eye protection. PROTECT both the operator and bystanders by complying with NIOSH and OSHA safety standards.



DAILY PRE-OPERATION CHECKLIST

- ⇒ GROUND Blast Machine (A) to help reduce static electricity hazard. Fit Blast Machine with a screen and cover to prevent foreign matter and moisture from entering.
- ⇒ CHECK Abrasive (B) material safety data sheet (MSDS) for presence of toxic or harmful substances. USE only properly sized abrasives which are free of harmful substances such as lead, silica, cyanide, or arsenic. Test surface to be blasted for toxic substances.
- ⇒ USE a CO Monitor Alarm (C) at all times. The OSHA required breathing Air Filter (D) removes moisture and particulate matter. It does NOT detect or remove Carbon Monoxide.
- ⇒ INSTALL Air Line Moisture Separator (E) as close to blast machine inlet as possible. The separator must fit either the inlet piping or air supply line. CLEAN filter if necessary and DRAIN moisture.
- ⇒ READ and follow air compressor (F) manufacturer's instructions for maintenance. Use correct size compressor to provide adequate volume (cfm) for nozzle and other tools, with an additional 50% to allow for nozzle wear. Select a compressor outlet and air hose four times the size of the nozzle orifice.
- ⇒ SELECT an oil-free Breathing Air Compressor (air pump) (G), which is capable of providing Grade D quality air in an atmosphere free of contaminants. Pump must be located in an area suitable to transfer Grade D quality air. Oil-lubricated air compressors should only be used in conjunction with a CO (Carbon Monoxide) monitor (C).
- ⇒ CLEAN and carefully MAINTAIN NIOSH approved Supplied Air Respirator (H). OPERATE only with all components, outer lens and inner lens in place. INSPECT all components for dirt, wear or damage. Do NOT substitute any respirator parts with non-approved sub-assemblies, as doing so will void NIOSH approval.
- ⇒ CHECK Remote Controls carefully to keep them in operating condition. USE only approved spare parts. Including twin line hose. Do NOT use welding hose. TEST system operation before system pressurization.
- ⇒ CHECK Blast Line Hoses (J) for external and internal wear, soft spots and damage. KEEP hoses free of kinks and bends and as straight as possible. It is recommended the blast hose have an ID three to four times the size of the nozzle orifice.
- ⇒ CHECK Hose Coupling (K) and Nozzle Holders to ensure a snug fit and they are secured with correct coupling screws. Check gaskets and replace if worn, soft or distorted. PLACE coupling lugs in LOCKED position. Gasket must provide positive seal with safety pins inserted through pin holes. INSTALL safety cables (L) at every connection to prevent disengagement. Do NOT mix different brands of components. CHECK nozzle holder for worn threads.
- ⇒ INSPECT Nozzle (M) and Gasket for wear. Replace nozzle when liner is cracked, damaged or when 1/16" larger than original size.



EVERYONE IN THE BLAST AREA SHOULD CORRECTLY USE AND MAINTAIN A NIOSH-APPROVED AIR-SUPPLIED RESPIRATOR AS REQUIRED BY OSHA, EVEN AFTER BLASTING HAS CEASED. HARMFUL DUST CAN REMAIN SUSPENDED IN THE AIR FOR LONG PERIODS OF TIME AFTER BLASTING HAS CEASED, CAUSING SERIOUS INJURY OR DEATH.