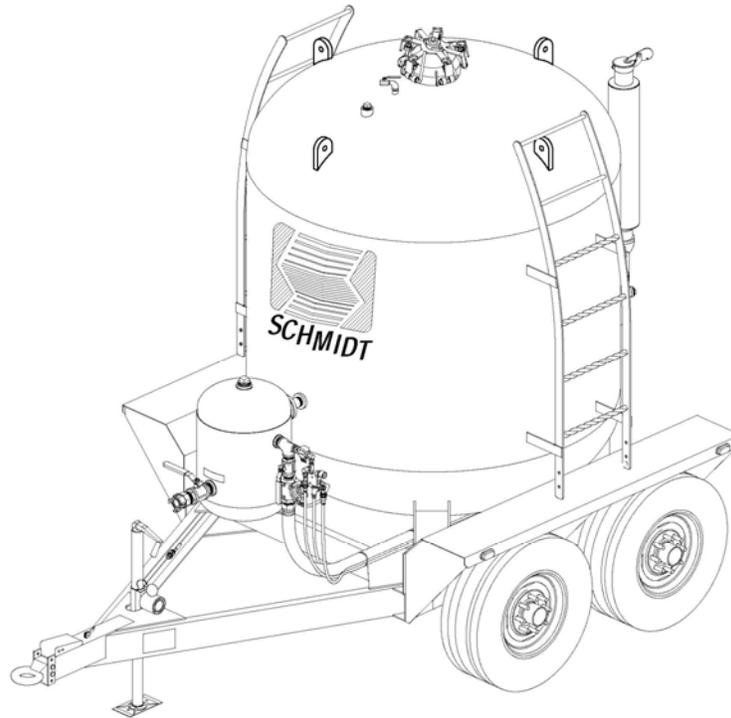


Bulk Abrasive Blaster

OPERATION AND MAINTENANCE MANUAL

February 2020



SCHMIDT®

SAVE THIS MANUAL AND MAKE AVAILABLE
TO ALL USERS OF THIS EQUIPMENT!

Manual Part Number 7200-205 (Rev 6-24-20)
(Available for downloading from www.SchmidtAbrasiveBlasting.com)



Website

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Manual

WARNING

1. Any person intending to operate this equipment or any person intending to be in the vicinity during its operation must receive proper training from his/her supervisor, employer and/or supplier. If this equipment is to be leased or rented, the supplier must assure that the lessee or renter has received proper training before the lessee or renter takes possession of the equipment. Consult Axxiom Manufacturing, Inc.
2. Any person authorized to operate this equipment or any person intending to be in the vicinity during its operation and who is not capable of reading and understanding this manual must be fully trained regarding the *Rules for Safer Operation* and all operating procedures, and must be made aware of all the Dangers, Warnings, and Cautions identified herein. Consult Axxiom Manufacturing, Inc.
3. Do Not operate any abrasive blaster or blast equipment before reading and completely understanding all the warnings, operating procedures and instructions, and the *Rules for Safer Operation* contained in this manual.
4. Do Not operate any abrasive blaster or blast equipment without following the *Rules for Safer Operation* and all the operating procedures and instructions. Failure to properly use blast equipment could result in serious injury or death.
5. Do Not perform any maintenance on any abrasive blaster or blast equipment while it is pressurized. Always depressurize the abrasive blaster vessel before loading abrasive or performing any maintenance.
6. Do Not use abrasives containing free silica. Silica can cause silicosis or other related respiratory damage. All operators must wear personal protective equipment for all abrasive blasting operations. Observe all applicable local, state and federal safety regulations in conjunction with airline filters and respiratory protection. Reference OSHA 29 CFR 1910.134.
7. Do Not enter areas during abrasive blasting operations without breathing protection. All personnel in the vicinity of abrasive blasting operations should wear NIOSH approved air fed respirators, hoods or helmets.
8. Do Not modify or alter any abrasive blaster, blast equipment or controls thereof without written consent from Axxiom Manufacturing, Inc.
9. Do Not use bleeder type deadman valves on any Schmidt® abrasive blaster. The use of A-BEC, Clemco or a similar bleeder type deadman valve can cause unintentional start-up without warning, which can result in serious personal injury.
10. Do Not sell, rent, or operate abrasive blasters without remote controls. OSHA regulations require remote controls on all blast machines. Failure to use remote controls can cause serious injury or death to the operator(s) or other personnel in the blasting area. Reference OSHA 29 CFR 1910.244(b).
11. Do Not repair or replace any portion of Schmidt® equipment using components that are not Schmidt® original factory replacement parts. Use of replacement components that are not Schmidt® original factory replacement parts may result in equipment failure which can result in serious personal injury and in addition will void all warranties.
12. Do Not transport trailer mounted bulk blasters on public roadways with abrasive loaded in pressure vessel.
13. Do Not tow trailer mounted bulk blasters at speeds exceeding 65 mph.

Instructions for use of manual sections

This manual contains information needed to operate and maintain your abrasive blaster. Read this entire operations and maintenance manual before using your abrasive blaster. Pay close attention to the *Rules for Safer Operation* (Section 1.0), and the Dangers, Warnings, and Cautions identified.

The purpose of safety symbols and explanations are to alert you of the possible hazards and explain how to avoid them. The safety symbols and explanations do not by themselves eliminate any danger. However, following the instructions given and taking proper accident prevention measures will greatly lower the risk of injury to personnel. Below are the three hazard levels as used in this manual.

DANGER

WHITE LETTERS with RED BACKGROUND

DANGER: Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations.

WARNING

BLACK LETTERS with ORANGE BACKGROUND

WARNING: Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION

BLACK LETTERS with YELLOW BACKGROUND

CAUTION: Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices that may cause property damage.

NOTICE

WHITE LETTERS with BLUE BACKGROUND

NOTICE: Indicates that equipment could malfunction or potentially become damaged if certain instructions are not followed.

This manual contains terms that may be specific to the abrasive blast industry. Understanding these terms will help you understand the procedures and instructions given in this manual. Please familiarize yourself with the following terms and refer to them as needed while reading this manual.

Term	Definition
Pressure Vessel	A fabricated tank (or reservoir) that is part of the abrasive blaster which is filled with compressed air and abrasive. (Also referred to as “blast vessel” or “vessel”.)
Pressurize	To manually or automatically fill the abrasive blast vessel with compressed air.
Depressurize	To manually or automatically release all the compressed air from inside the abrasive blast vessel. (Also referred to as “blowdown”.)
Blowdown	To manually or automatically release all the compressed air from inside the abrasive blast vessel. (Also referred to as “depressurize”.)
Deadman	A manually operated valve or switch that allows remote starting and stopping of the blast operation. [Also referred to as “deadman valve” (pneumatic blast controls) or “deadman switch” (electric blast controls.)]
Closure	A manually operated hinged opening at the top of the bulk abrasive blaster used as the abrasive inlet and as an inspection port.
Abrasive	A granular substance used in an air blast operation that is the means for blasting the surface of an object. (Also referred to as abrasive blasting media or media.)
Silica	The crystalline chemical compound silicon dioxide (SiO ₂) which can be found in many natural abrasives and other substances. Breathing silica dust can cause respiratory diseases such as silicosis. (Also referred to as crystalline silica)

0.0 Warning Decal Identification and Location

Listed below are the warning decals and the corresponding hazards related to this equipment. Refer to Figure 0.1a, 0.1b and 0.1c for images of the warning decals. Refer to Figure 0.2 for the locations of these warning decals on the bulk abrasive blaster.

No.	Qty	Part no.	Description	Hazard
1.	1	7031-000	Large “Schmidt”	Not Applicable
2.	3	7031-054	“Warning” Airborne particles and loud noise hazards	Airborne particles and loud noise from blast nozzle and blowdown can cause injury and loss of hearing. Wear approved eye and ear protection. See Section 1.0 and 3.10.
3.	2	7031-012A	“Danger” Pressurized vessel	Propelled objects will cause serious injury or death. Depressurize vessel before opening closure. See Section 6.2.
4.	2	7031-070	“Safety Instructions”	Propelled objects can cause serious injury or death. Read and understand closure operating procedures before operating this equipment. See Sections 6.2, 6.3, and 6.4.
5.a	1	7034-001	Welded “Warning” plate or decal. General hazard and advisory notes.	Steel “Warning” plate welded to pressure vessel which is a general list of required actions to take before and during the operation of this equipment. See Section 1.0.
5.b	1	7031-084		“Warning” decal on pressure vessel which is a general list of required actions to take before and during the operation of this equipment. See Section 1.0.
6.	1	7031-057	“Warning” Read manual before using this machine.	Read and understand operator’s manual before using this machine. Failure to follow operating instructions could result in injury or damage to equipment. See Section 1.0.
7.	4	7031-009A	“Warning” Accident Hazard	Loose wheel can cause loss of vehicle control. Tighten lug nuts frequently. See Section 8.16.
8.	3	7031-007A	“Danger” Pressurized vessel	Propelled objects will cause serious injury or death. Depressurize vessel prior to performing any maintenance. See Section 6.2.
9.	1	7031-082	“Danger” Pressurized vessel Manway components	Propelled objects will cause serious injury or death. Incorrect or damaged handway or manway cover components can result in failure. See Section 6.5.



1) 7031-000

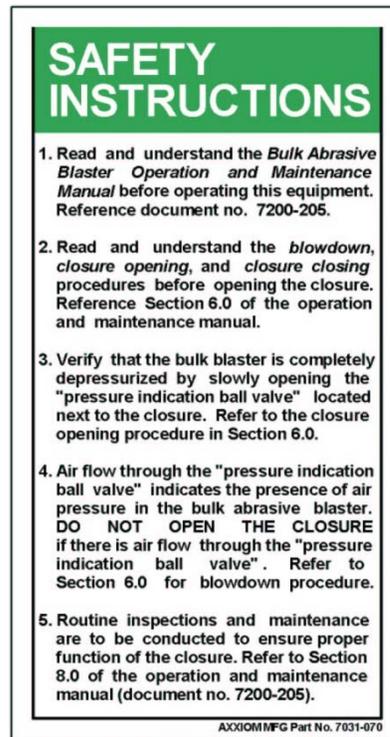


2) 7031-054

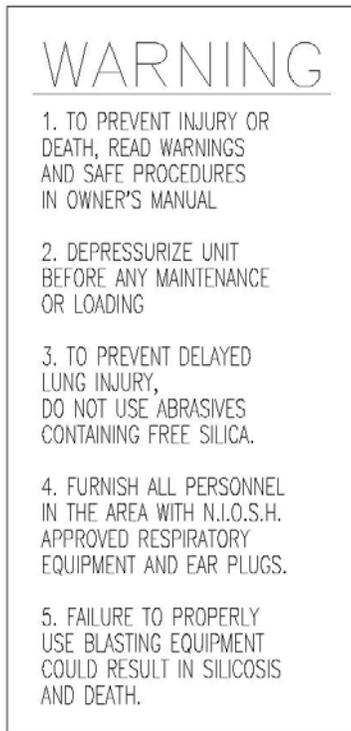
Figure 0.1a –Warning decal summary



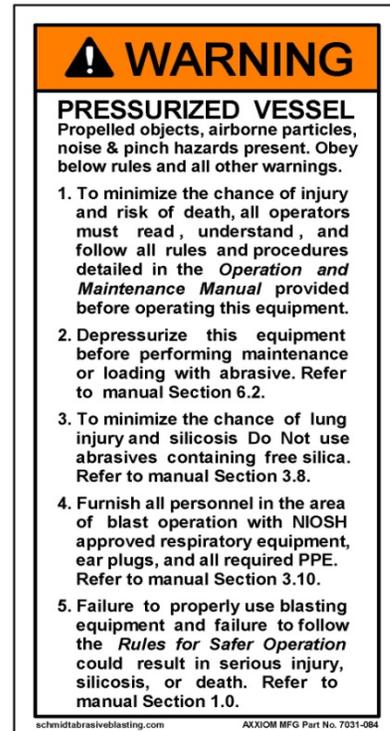
3) 7031-012A



4) 7031-070



5a) 7034-001



5b) 7031-084 (decal)
Units manufactured after July 2017)

Figure 0.1b –Warning decal summary continued



6) 7031-057



7) 7031-009A (Trailer mounted units only)

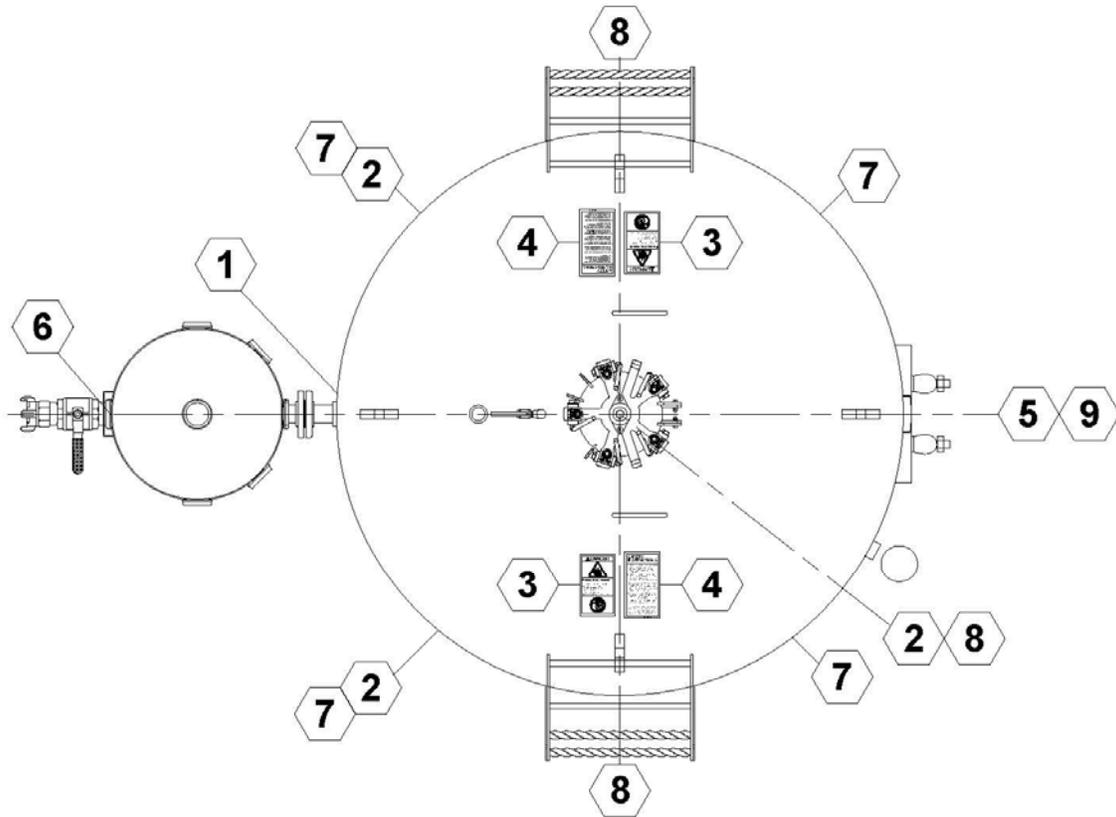


8) 7031-007A

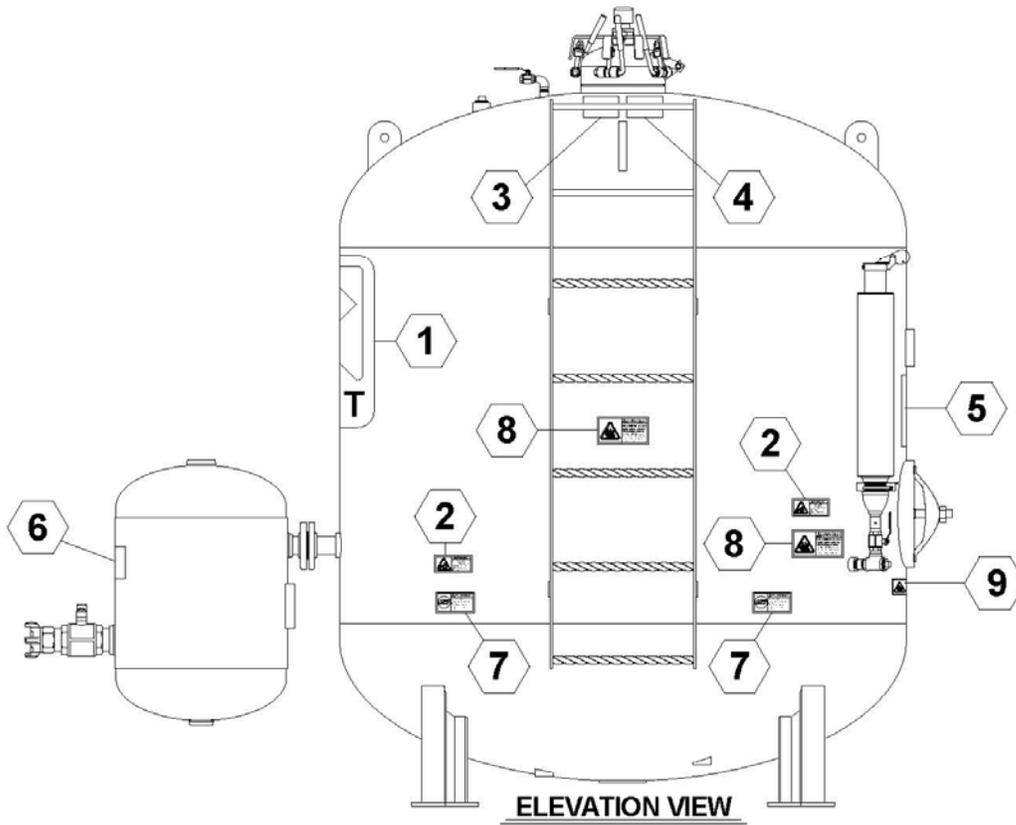


9) 7031-082

Figure 0.1(c) –Warning decal summary continued



ORIENTATION VIEW



ELEVATION VIEW

Figure 0.2 – Warning decal location

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1.0 Rules for Safer Operation

1.1. GENERAL RULE FOR SAFER OPERATION.

SCHMIDT® BULK ABRASIVE BLASTERS HAVE BEEN DESIGNED TO BE SAFE WHEN USED IN THE PROPER MANNER. ALL ABRASIVE BLASTERS ARE POTENTIALLY DANGEROUS IF ALL SAFETY PRECAUTIONS ARE NOT RIGOROUSLY FOLLOWED. PROPER TRAINING IS REQUIRED BEFORE OPERATION. PROPER PROCEDURES MUST BE FOLLOWED. THE ABRASIVE BLASTER AND ALL COMPONENTS MUST BE PROPERLY MAINTAINED. FAILURE TO OPERATE, SERVICE AND MAINTAIN THE ABRASIVE BLASTER AS SET FORTH IN THIS MANUAL MAY CAUSE INJURY OR EVEN DEATH TO ANY PERSON USING, SERVICING OR IN THE VICINITY OF THE ABRASIVE BLASTER.

THIS MANUAL IDENTIFIES POTENTIAL HAZARDS BY DANGER, WARNING, AND CAUTION SYMBOLS. HOWEVER, ALL THE RULES, PROCEDURES AND RECOMMENDATIONS MUST BE FOLLOWED. FAILURE TO OPERATE PROPERLY IS VERY LIKELY TO PLACE PERSONS AND PROPERTY AT HIGH RISK OF DAMAGE, INJURY OR EVEN DEATH.

DANGER

ABRASIVE BLASTERS AND THE ABRASIVE BLAST OPERATION ARE POTENTIALLY DANGEROUS IF ALL SAFETY PRECAUTIONS ARE NOT FOLLOWED. FAILURE TO OPERATE THE ABRASIVE BLASTER WITHOUT FOLLOWING ALL THE *RULES FOR SAFER OPERATION* MAY RESULT IN SERIOUS INJURY OR DEATH TO OPERATING PERSONNEL OR PERSONS IN THE OPERATING VICINITY.

1.2. KNOW YOUR EQUIPMENT.

Do Not operate this equipment in a manner other than its intended application (see Section 4.0). Do Not operate this equipment or any other Schmidt® equipment without following the *Rules for Safer Operation* and all the operating procedures and instructions. Learn the applications and limitations as well as the specific potential hazards related to this machine. Failure to do so could result in serious injury or death.

1.3. RECEIVE PROPER TRAINING.

Do Not operate this equipment unless you have received operational and maintenance training. Begin by thoroughly reading and understanding this operation and maintenance manual and all included information. Consult an authorized Schmidt distributor or Axxiom manufacturing, Inc.

1.4. PROTECT YOUR FEET.

Do Not operate this equipment without wearing OSHA approved foot protection. Observe all applicable local, state and federal regulations. See Section 3.10 and OSHA 29 CFR 1910.136.

CAUTION

Heavy objects can shift while being blasted and may fall on operators. All operators and personnel in the vicinity must wear OSHA approved foot protection during the operation of this equipment. See Section 3.10 and OSHA 29 CFR 1910.136.

1.5. PROTECT YOUR EYES.

Do Not operate this equipment without wearing OSHA approved safety glasses. Observe all applicable local, state and federal safety regulations. See Section 3.10 and OSHA 29 CFR 1910.133.



When filling the blast vessel and during the blast operation, abrasive can be blown in the face and eyes of operators. All operators and personnel in the vicinity must wear OSHA approved safety glasses during the operation of this equipment. See Section 3.10 and OSHA 29 CFR 1910.133.

1.6. PROTECT YOUR LUNGS.

Do Not operate this equipment without wearing OSHA approved respiratory protection. Abrasive blasting produces dust contaminated with toxic substances from the abrasive used, the coating being removed, and the object being blasted. This dust may contain silica which can cause severe and permanent lung damage, cancer, and other serious diseases. DO NOT breathe the dust. Do Not rely on your sight or smell to determine if dust is in the air. Silica and other toxic substances may be in the air without a visible dust cloud. If air-monitoring equipment for silica is not provided at the worksite, then all personnel MUST wear appropriate respiratory protection when using or servicing this equipment. Breathing air supplied to respirators must be of acceptable quality. Consult your employer and OSHA regarding the appropriate respiratory protection and breathing air quality. See Sections 3.9, 3.10, and OSHA 29 CFR 1910.134.



Abrasive blasting produces dust which may contain silica and other toxic substances that can cause severe and permanent lung damage, cancer, and other serious diseases if inhaled. All operators and personnel in the vicinity must wear OSHA approved respiratory protection during the operation of this equipment. See Sections 3.9, 3.10, and OSHA 29 CFR 1910.134.

1.7. BREATHING AIR QUALITY.

Do Not use breathing air that does not meet OSHA Class D standards. Use extreme caution when selecting a source of breathing air. Breathing air provided by an oil-lubricated air compressor can contain carbon monoxide; therefore, use of a carbon monoxide detector is required (See Section 3.10). Carbon monoxide can be in the compressed air produced by an oil-lubricated air compressor when it is operated at extremely high temperature; therefore a high temperature alarm is required to alert the operators when this condition exists. See Section 3.9 and reference OSHA 29 CFR 1910.134(i).

Extreme caution must be taken when connecting to factory air sources. Factories can have sources of compressed gases such as nitrogen which is fatal if used as a breathing air source. Verify that the air source is breathable air.



Breathing air must meet OSHA Class D standards. Use of breathing air sources that do not meet Class D standards can cause asphyxiation and result in death. Verify that all air sources are breathable quality and use a high-temperature alarm and a carbon monoxide monitor when required. See Sections 3.9, 3.10 and OSHA 29 CFR 1910.134(i).

Enclosed blast areas must be ventilated to reduce airborne dust to an acceptable level as required by OSHA 29 CFR 1910.1000 and 1910.94.

1.8. PROTECT YOUR HEARING.

Do Not operate this equipment without wearing OSHA approved hearing protection. Observe all applicable local, state and federal safety regulations. See Section 3.10 and refer to OSHA 29 CFR 1910.15 and 1926.101.



Loud noise is generated by the blast nozzle and the blowdown operation of this equipment. All operators and personnel in the vicinity must wear OSHA approved hearing protection during the operation of this equipment. See Section 3.10 and refer to OSHA 29 CFR 1910.95 and 1926.101.

1.9. PROTECT YOUR PERSON.

Abrasive blasting produces dust contaminated with toxic substances from the abrasive used, the coating being removed, and the object being blasted. All blast operators and other personnel involved in the blast operation or in the vicinity of the blast operation should wear protective clothing. The protective clothing should be disposable or washable work clothes that should be removed at the worksite so that contaminated dust is not transferred into automobiles or homes. See Section 3.10 and refer to OSHA 29 CFR 1910.134 and 1910.132.

1.10. ADHERE TO ALL REGULATIONS.

Do Not operate this equipment without observing all local, state, and federal safety regulations including, but not limited to, OSHA (Occupational Health and Safety Administration).

1.11. STAY ALERT.

Do Not operate this equipment when you are tired or fatigued. Use caution and common sense while operating and/or performing maintenance on this equipment.

1.12. DO NOT USE DRUGS, ALCOHOL, or MEDICATION.

Do Not operate this equipment while under the influence of drugs, alcohol, or any medication.

1.13. PROTECT BYSTANDERS.

Do Not allow blast equipment operators and other personnel to enter the vicinity of the blast operation without providing respiratory protective equipment that meets OSHA regulations. If dust concentration levels exceed the limitations set in OSHA 29 CFR 1910.1000 then respirators are required.

1.14. KEEP CHILDREN AND VISITORS AWAY.

Do Not allow children or other non-operating personnel to contact this equipment or the connecting hoses and cords. Keep children and non-operating personnel away from work area.

1.15. AVOID DANGEROUS ENVIRONMENTS.

Do Not operate this equipment without familiarizing yourself with the surrounding environment. The blast operation creates high level of noise which may prevent the operator from hearing other possible dangers (i.e. traffic or moving equipment). In such situations a stand-by watch person may be necessary to protect against injury to personnel.

1.16. AVOID DANGEROUS ENVIRONMENTS.

Do Not use this equipment in areas cluttered with debris. Debris in the work area can create tripping hazards which can cause the operator to lose control of the blast hose and result in injury to operating personnel. Keep work area clean and well lit. When working at an elevated location, pay attention to articles and persons below.

1.17. AVOID DANGEROUS ENVIRONMENTS.

Do Not operate this equipment in elevated areas without using fall protection equipment. Certain applications of this equipment may require the use of scaffolding. Use of scaffolding creates hazardous situations such as tripping and fall hazards which can result in serious injury or death to operating personnel. Consult OSHA 29 CFR 1910 Subpart D.

1.18. AVOID DANGEROUS ENVIRONMENTS.

Do Not blast objects that are not properly secured. The blast operation can cause the blasted object to shift or move. Extremely large objects to be blasted can create a crush hazard to operating personnel which can result in serious injury or death. Properly secure the object to be blasted.

1.19. AVOID DANGEROUS ENVIRONMENTS.

Do Not blast objects used to store flammable materials. The blast operation can cause sparks which can ignite fumes or residual flammable materials inside enclosed containers which can explode resulting in serious injury or death to operating personnel.

1.20. AVOID DANGEROUS ENVIORNMENTS

It has been determined that blast abrasives approved for use in blast equipment are not ignitable nor do they present a dust explosion hazard in environments approved for use. However; airborne substances that make up the items and substrates being blasted can be ignitable when mixed with airborne dust from the blast abrasive. To mitigate risk of dust explosion avoid blasting in confined spaces without proper ventilation. Consult plant authorities, OSHA 29 CFR 1910.146 and 1910.94.



Explosion Hazard. Do Not operate blast equipment in confined spaces without proper ventilation. Consult plant authorities, OSHA 29 CFR 1910.146 and 1910.94.

1.21. ELECTRICALLY GROUND EQUIPMENT.

Static electricity is generated by the abrasive flow through the blast hose and/or vacuum hose. To minimize chance of static electrical shock to operating personnel only use anti-static blast hose and/or vacuum hose, properly electrically bond the blast nozzle, blast hose couplings, and the equipment, and properly install a earth ground to the abrasive blaster. See Section 5.12.

1.22. MAINTAIN VESSEL INTEGRITY.

Do Not operate this equipment with the pressure vessel damaged, or with any part of it worn or damaged. Do Not operate this equipment in a condition that may cause failure of the pressure vessel. See Rules 1.22 through 1.34 below.



An abrasive blaster is a Pressurized Vessel. Alterations, damage, or misuse of the pressure vessel can result in rupturing. Damaged or incorrect components used on the abrasive blaster can result in rupturing. The compressed air inside a pressurized vessel contains a dangerously high level of energy which can propel objects and cause serious injury or death.

1.23. NEVER OPERATE OVER MAXIMUM WORKING PRESSURE.

Do Not operate this equipment above maximum allowable working pressure (MAWP) at maximum operating temperature (°F) shown on the ASME nameplate attached to the vessel. See Section 2.2 and 8.1.

1.24. INSTALL PRESSURE RELIEF DEVICE.

Do Not operate this equipment without a pressure relief device in place. The ASME Code requires that all vessels be equipped with pressure relief devices prior to installation. The pressure relief device must be set at the maximum allowable working pressure of the abrasive blaster. See the ASME nameplate attached to the vessel typically located above the manway. See Section 3.11 for information regarding the pressure relief valve.

1.25. NEVER OPERATE BEYOND ALLOWABLE TEMPERATURE RANGE.

Do Not operate this equipment above the maximum allowable temperature at the allowable pressure or below the minimum design metal temperature (MDMT) shown on the pressure vessel nameplate. The characteristics of the pressure vessel metal are weakened when the temperature is outside the operating range. Operating the pressure vessel outside of allowable temperature range can result in rupturing and cause serious injury or death.

1.26. ASME NAMEPLATE REQUIRED.

Do Not operate this equipment if the ASME pressure vessel nameplate is missing. Contact Axxiom Manufacturing, Inc. for technical support.

1.27. DO NOT MODIFY VESSEL.

Do Not modify or alter any abrasive blaster, blast equipment, or controls thereof without written consent from Axxiom Manufacturing, Inc. Do Not weld, grind, or sand the pressure vessel. *It will not be safe to operate.* Non-authorized modifications could lead to serious injury or death. Non-authorized modifications will void the warranty and the ASME/NB integrity.

1.28. DO NOT HAMMER ON VESSEL.

Do Not hammer on or strike any part of the pressure vessel. Hammering on the pressure vessel can create cracks and cause rupturing.

1.29. FIRE DAMAGE NOTICE.

Do Not operate if the pressure vessel has been damaged by fire. If damaged, take out of service immediately and have it inspected and/or repaired by a qualified facility. Contact Axxiom Manufacturing, Inc. for technical support.

1.30. INSPECT VESSEL REGULARLY.

Do Not operate this equipment with damage to the pressure vessel. *It is not safe.* Inspect outside and inside of the pressure vessel regularly for corrosion or damage (i.e. dents, gouges or bulges). If damaged, take out of service immediately and have it inspected and/or repaired by a qualified facility. Contact Axxiom Manufacturing, Inc. for technical support. See Section 8.0.

1.31. CHECK FOR LEAKS IN VESSEL.

Do Not operate this equipment if there is a leak in the pressure vessel. If leaking, take out of service immediately and have it inspected and/or repaired by a qualified facility. Contact Axxiom Manufacturing, Inc. for technical support. See Section 8.0.

1.32. INSPECT CLOSURE ASSEMBLY.

Do Not operate the closure assembly without first inspecting the camlock handle assemblies and all other parts for proper working condition. See Section 8.4 and 8.5.

1.33. INSPECT MANWAY ASSEMBLY.

Do Not operate the abrasive blaster without first inspecting the manway assembly. To insure proper operation all manway components must be the correct size for the vessel manway opening. See Section 6.5.

1.34. NEVER MODIFY BLOWDOWN.

Do Not connect the blowdown on this equipment onto a common header with any other unit of any description, or any other source of compressed air, without first making sure a check valve is used between the header and this unit. Do Not install this equipment sharing piping with another unit of higher discharge pressure and capacity. A safety hazard could occur in the form of a back-flow condition. Do Not install a muffler or silencer on the blowdown that is not designed for use on abrasive blast equipment it can cause a malfunction and can result in a hazardous condition. See Section 5.4 and Section 6.2.

1.35. DEPRESSURIZE VESSEL BEFORE PERFORMING MAINTENANCE.

Do Not remove, repair, or replace any item on this equipment while it is pressurized. Do Not attempt to perform maintenance or load abrasive while this equipment is pressurized or is even capable of being pressurized. This means the inlet ball valve should be closed and the air supply should be shut off or disconnected. Anytime the manual blowdown valve is closed it should be assumed that the abrasive blast vessel is pressurized.



An abrasive blaster is a Pressurized Vessel. The compressed air inside a pressurized vessel contains a dangerously high level of energy which can propel objects and cause serious injury or death. Depressurize vessel before performing any maintenance. See Section 6.2.

1.36. ALWAYS USE REMOTE CONTROLS.

Do Not sell, rent, or operate abrasive blasters without remote controls. OSHA regulations require remote controls on all abrasive blasters. All abrasive blasters must be equipped with automatic (deadman) type remote controls (either pneumatic or electric). Failure to use remote controls can cause serious injury or death to the operator(s) or other personnel in the blasting area. Reference OSHA 29 CFR 1910.244(b).

1.37. NEVER USE BLEEDER TYPE DEADMAN VALVES.

Do Not use bleeder type deadman valves on any Schmidt® abrasive blaster. The use of A-BEC, Clemco, or a similar bleeder type deadman valve can, without warning, cause unintentional start-up which can result in serious personal injury. A particle of dirt from the air hose can plug the bleed hole in the deadman valve and cause the blast outlet to turn on.

1.38. CHECK FOR DAMAGED PARTS.

Do Not use this equipment with damaged components. Periodically check all valves, hoses, fittings, pipe and pipe fittings (internal and external) to see that they are in good condition. Repair or replace any component that shows any sign of wear, leakage, or any other damage. See Section 8.0.



Damaged components can fail during operation and result in serious injury or death to operating personnel.

1.39. ALWAYS USE SAFETY PINS ON HOSE COUPLING CONNECTIONS.

Do Not use this equipment without hose coupling safety pins in place and hose whip checks installed on all air and blast hoses. All blast hose couplings and air hose couplings have pin holes that must be safety pinned to protect against accidental disconnections. Accidental hose disconnection can cause serious injury or death. See Section 5.14 and 8.7.

1.40. ALWAYS USE CORRECT REPLACEMENT PARTS AND ACCESSORIES.

Do Not use replacement parts or accessories that are not rated for pressures equal to or higher than the abrasive blaster's operating pressure. Improper hoses and/or fittings used on, or connected to the abrasive blaster can rupture and cause serious injury or death.

Do Not use replacement parts that are not Schmidt® original factory replacement parts. Non-original parts may not fit properly and can cause equipment damage and/or failure which can result in serious injury to operating personnel. Consult Axxiom Manufacturing, Inc.



Use of replacement components that are not Schmidt® original factory replacement parts may result in equipment failure which can result in serious injury to operating personnel.

1.41. ALWAYS USE CORRECT PRESSURE RATED ACCESSORIES.

Do Not use air reservoirs or moisture separator tanks that are not rated for use in compressed air applications. Air reservoirs and moisture separator tanks larger than 6 inches inside diameter must have an ASME code stamp.



An air reservoir or moisture separator tank is a Pressurized Vessel. The compressed air inside a pressurized vessel contains a dangerously high level of energy which can explode propelling objects and result in serious injury or death to operating personnel. Air reservoir and moisture separator tanks must be ASME coded tanks.

1.42. NEVER AIM BLAST NOZZLE TOWARDS ANY PERSON.

Do Not aim the blast nozzle towards yourself or any person. A system malfunction or a blocked blast nozzle that clears can trigger accidental start up resulting in injury to personnel.

1.43. NEVER USE ABRASIVE NOT INTENDED FOR BLAST EQUIPMENT.

Do Not use abrasive blast media containing free silica. Silica can cause silicosis or other related respiratory damage. Verify that the abrasive is intended for use in blasting equipment. Personal protective equipment, including airline filters and respirators, must be used for all abrasive blasting operations. Observe all applicable local, state and federal safety regulations. See Section 3.8, 3.10, and reference OSHA 29 CFR 1910.134.

1.44. CHECK ABRASIVE FOR DEBRIS.

Do Not use blast abrasive that contains trash or other debris. Trash or debris can create a blockage and cause equipment malfunction. Screen recycled abrasive to remove trash.

1.45. STOP OPERATION IMMEDIATELY IF ANY ABNORMALITY IS DETECTED.

Do Not operate this equipment if anything abnormal is seen during operation. Stop operation immediately for inspection. Refer to Section 8.0 for maintenance and inspection details.

1.46. DO NOT OVERLOAD THE LIFT EYES.

Do Not load the lifting eyes above the rated capacity. Do Not lift the blast vessel by any point other than the lifting eyes. Do Not lift the blast vessel while it is pressurized. See Section 2.6.

1.47. DO NOT CLIMB ON TOP HEAD.

Do Not climb on the top head of the abrasive blast vessel. All parts of the top head, including the closure for abrasive filling, are fully accessible from the ladders that are provided for that purpose. Under no circumstances should the top head be climbed on, stood on, or walked on. The curved surface of the top head is for holding air pressure and is not a work surface.

1.48. TIGHTEN WHEEL LUG NUTS PERIODICALLY.

Do Not transport the bulk abrasive blaster before retightening the wheel lug nuts. This is most important after the first load when the lug nuts are establishing a seat. On new highway trailer mounted units transported on public roads, it is recommended that the lug nuts be re-torqued after the first fifty miles and periodically thereafter. See Section 8.16.

- 1.49. TIGHTEN PRESSURE VESSEL MOUNT BOLTS PERIODICALLY.**
Do Not transport the bulk abrasive blaster before retightening the pressure vessel mount bolts. On new highway trailer mounted units transported on public roads, it is recommended that the mount bolts be re-torqued after the first fifty miles and periodically thereafter. See Section 8.17.
- 1.50. DO NOT SIDE LOAD BULK ABRASIVE BLASTER TRAILER.**
Do Not exert side loads on the trailer wheels. An example of side loading would be pushing the trailer mounted bulk abrasive blaster on its side with a fork lift or other similar heavy equipment. Move the bulk abrasive blaster only by pushing or pulling at the hitch or brake actuator.
- 1.51. CLOSE BRAKE LINE BALL VALVE BEFORE BACKING UP.**
(On units with hydraulic brakes only) Do Not attempt to back up before closing ball valve (#15) on brake line since the backward pressure will activate brakes. See Section 9.3(a).
- 1.52. DO NOT EXCEED TRAILER AXLE RATING.**
Do Not load the bulk abrasive blaster with abrasives that will load the axles above the manufacturer's load rating. The trailer load capacity is designed for use of abrasives with a bulk density of 100 pounds per cubic foot. For abrasives of higher density reduce the volume of abrasive loaded into pressure vessel. See Section 2.2.
- 1.53. DO NOT HAUL YARD TRAILERS ON PUBLIC ROADS.**
Do Not tow yard trailer mounted bulk abrasive blasters on public roads. Only highway trailers which are equipped with hydraulic or electric brakes, wheels fenders, and lights are permitted on public highways. Consult local state DOT requirements.
- 1.54. DO NOT HAUL TRAILER MOUNTED BULK ABRASIVE BLASTER LOADED.**
Do Not tow trailer mounted bulk abrasive blasters on public roads with abrasive loaded inside of vessel. Highway trailers are rated for transporting abrasive at low speeds only (15 mph).
- 1.55. DO NOT EXCEED 65 MPH TRAILER SPEED.**
Do Not tow highway trailer mounted bulk abrasive blasters at speeds exceeding the 65 mph tire rating. Replacement tires must be of equivalent speed and load ratings. See Section 9.3.
- 1.56. DO NOT TRANSPORT BLAST EQUIPMENT LOADED WITH ABRASIVE.**
Portable abrasive blasters are not intended to be moved or transported loaded with abrasive. Do Not attempt to roll portable abrasive blasters with abrasive loaded in or on the pressure vessel as equipment damage or personal injury may result.
- 1.57. MAINTAIN WARNING DECALS.**
Do Not remove, cover, obstruct, or paint over any warnings, cautions, or instructional material attached. Warning decals must be installed, maintained, and located to be visible and with enough light for legibility. See Section 0.0 and 8.13.
- 1.58. SAVE THIS OPERATION AND MAINTENANCE MANUAL.**
Refer to this operation and maintenance manual as needed as well as any additional information included from other manufacturers. Never permit anyone to operate this equipment without having him/her first read this manual and receive proper training. Make this manual readily available to all operating and maintenance personnel. If the manual becomes lost or illegible replace it immediately. This operation and maintenance manual should be read periodically to maintain the highest skill level; it may minimize chance of a serious accident.
- 1.59. SAFETY REFERENCES.**
See Section 12.4 for safety information sources and contact information. Use these sources to obtain additional information regarding all aspects of blast operation safety.

2.0 Specifications and General Information

2.1. Notes to Distributors and Owners.

- 2.1.1. Remove the manway cover and verify that the deadman, twinlines (or cords), and the operation and maintenance manual are inside the blaster vessel when it is received. Verify that the deadman, twinlines (or cords), and the operation and maintenance manual are inside the blaster vessel when it is delivered to the purchaser.
- 2.1.2. Some trailer mounted abrasive bulk blasters are shipped with the trailer wheels removed. Mount the trailer wheels and torque the wheel nuts per Section 8.16.
- 2.1.3. This equipment is intended for knowledgeable and experienced users. No person or persons should be allowed to operate this equipment without first receiving proper training in abrasive blasting operation and use of this equipment.
- 2.1.4. Immediately notify Axxiom Manufacturing, Inc. of any instances of use of this equipment in any manner other than the intended application. See Section 4.0.
- 2.1.5. Only qualified personnel should load and unload this equipment for shipping. Slings or other lifting devices must only be attached to the designated lifting points. See the lifting diagrams shown in Section 2.6.
- 2.1.6. For further information contact:
Axxiom Manufacturing, Inc.
11927 South Highway 6
Fresno, Texas 77545
Phone: 1-800-231-2085
Fax: 1-281-431-1717
Website: www.SchmidtAbrasiveBlasting.com

2.2. Bulk Abrasive Blasting System Operational Specifications.

Maximum Working Pressure	125 or 150 psig @ 250°F (see ASME nameplate) All bulk blasters manufactured after July 2009 are 150 psi standard.
Minimum Metal Temperature	-20°F @ 125 or 150 psig (see ASME nameplate)
Air Consumption	See Section 13.0 table 1
Abrasive Consumption	See Section 13.0 table 2
Blast Hose Size	See Section 13.0 table 3
Electrical requirements	See Section 3.7
Bulk Trailer GVWR (Gross Vehicle Weight Rating)	Model 120: 12,000 lbs. Model 160: 16,000 lbs.
Vessel Abrasive Capacity (stationary static load)	Model 120: 7,800 lbs. Model 160: 10,790 lbs.
Bulk Trailer Maximum Speed	Yard Trailer: 15 mph Highway Trailer: 65 mph

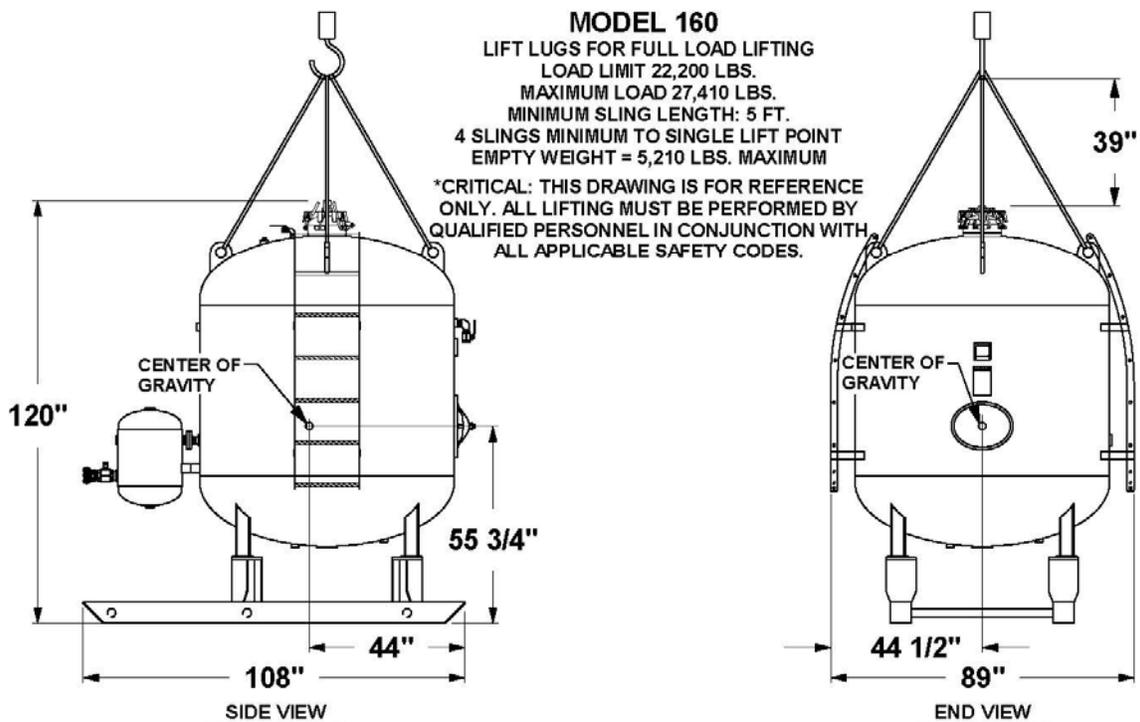
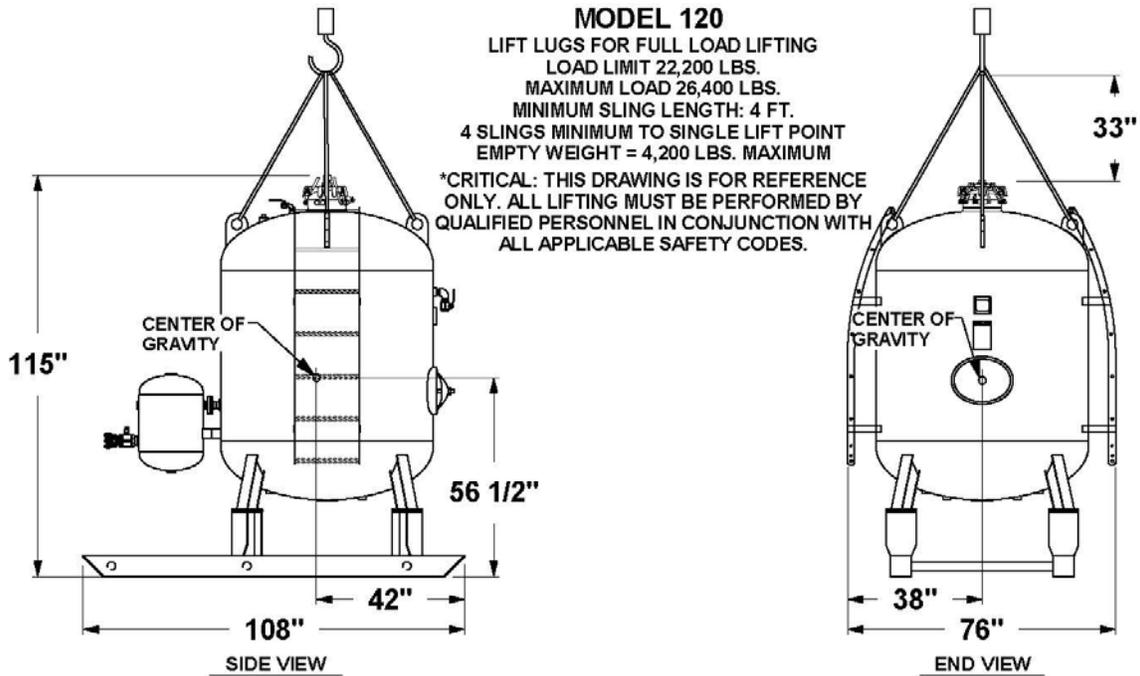
2.6(a). Bulk Abrasive Blaster Lifting Diagrams.

⚠ DANGER

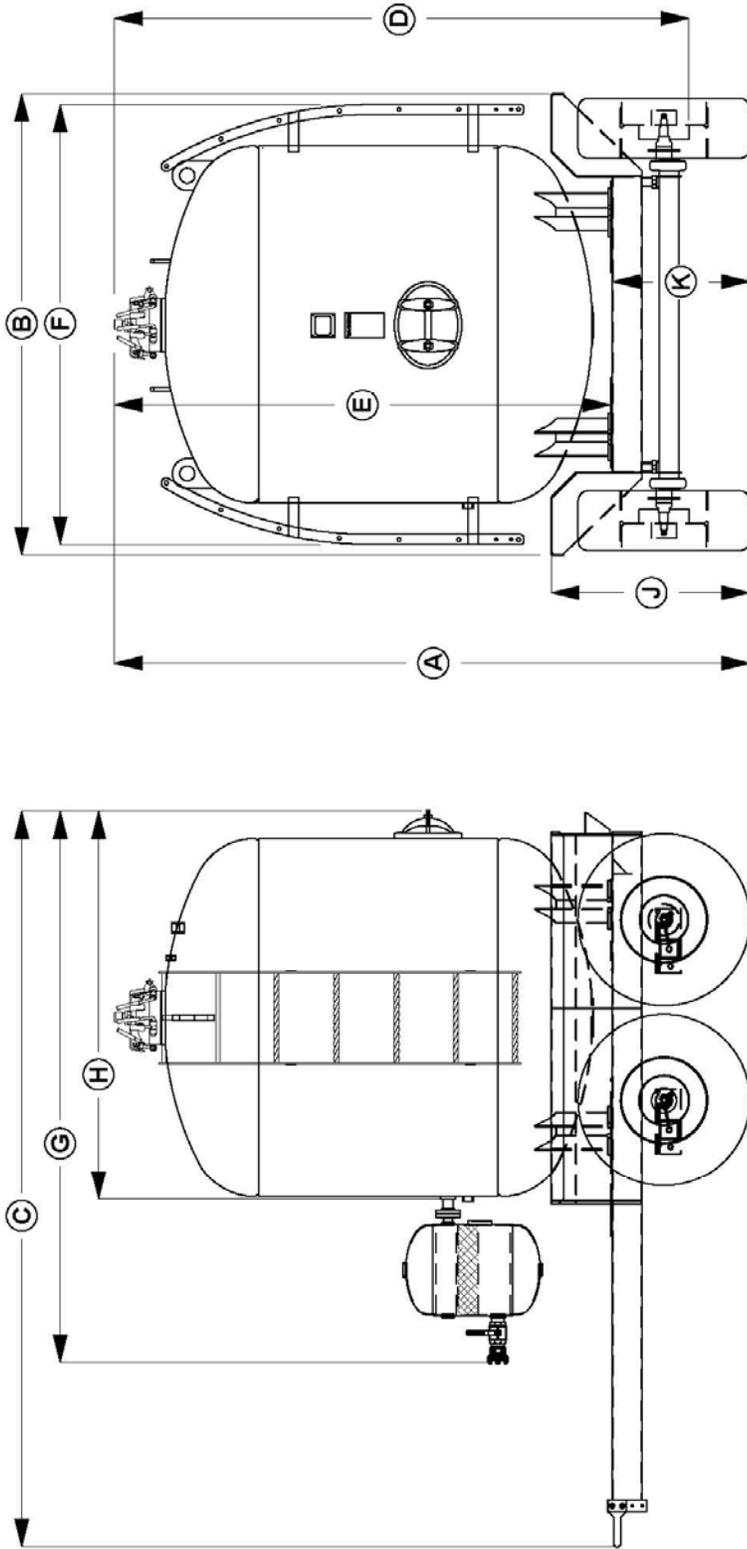
An abrasive blaster is a Pressurized Vessel. The compressed air inside a pressurized vessel contains a dangerously high level of energy which can propel objects and cause serious injury or death. Depressurize vessel and empty before lifting, moving, or transporting. See Section 6.2.

⚠ CAUTION

Only 120/160cf units manufactured after February 2013 are built with four lift eyes rated for full load lifting as shown below. 500, 650, and 800cf bulk system lift eyes are for empty lifting only. Consult an authorized Schmidt® distributor or Axxiom manufacturing, Inc.

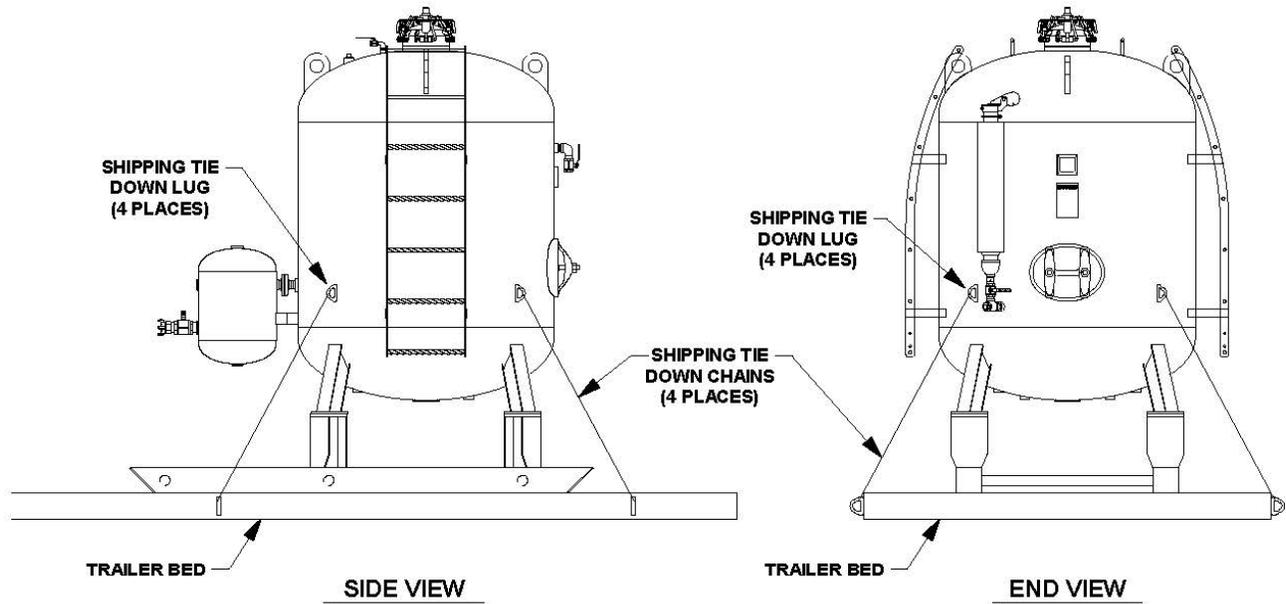


2.6(b). Bulk Abrasive Blaster Dimensional Specifications.



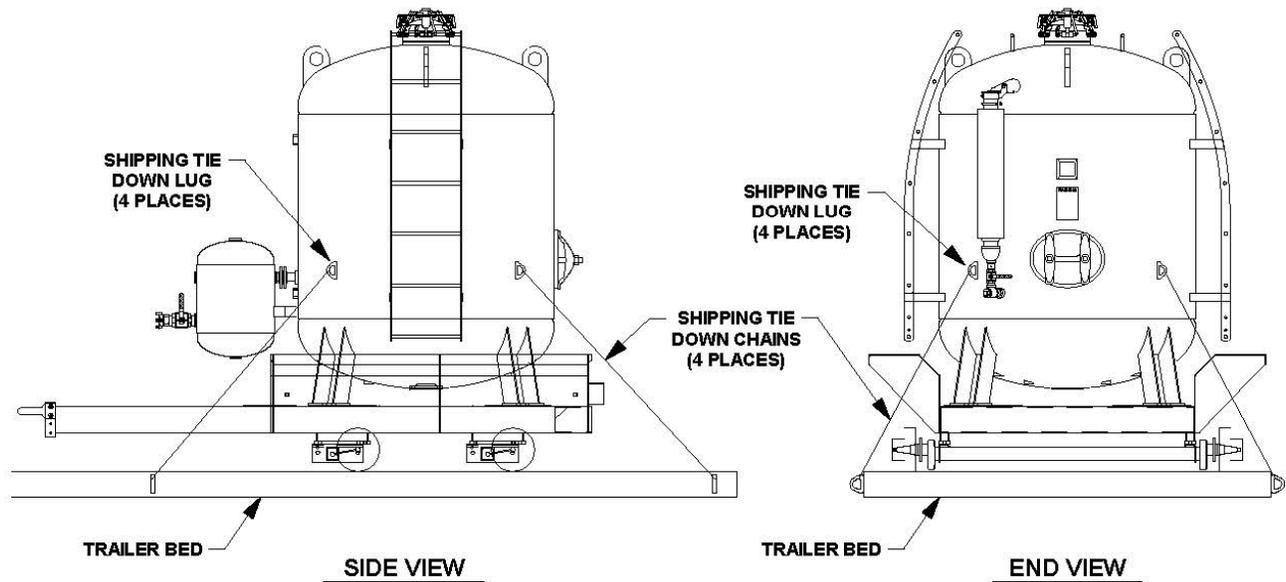
MODEL	STYLE	A	B	C	D	E	F	G	H	J	K	WEIGHT
120	SHIPPING LEGS	105" (2667)	76" (1930)	100" (2540)	-	95" (2413)	76" (1930)	100" (2540)	67" (1702)	-	10" (254)	2350 (1066)
	STATIONARY LEGS	115" (2921)	76" (1930)	100" (2540)	-	95" (2413)	76" (1930)	100" (2540)	67" (1702)	-	20" (508)	2506 (1137)
	SKID	114" (2896)	76" (1930)	108" (2743)	-	95" (2413)	76" (1930)	100" (2540)	67" (1702)	-	19" (483)	2865 (1300)
	TORSION	121" (3073)	85" (2159)	143" (3632)	111" (2819)	95" (2413)	76" (1930)	100" (2540)	67" (1702)	31" (787)	26" (660)	3590 (1628)
	HIGHWAY	121" (3073)	93" (2362)	148" (3759)	111" (2819)	95" (2413)	76" (1930)	100" (2540)	67" (1702)	38" (965)	26" (660)	4200 (1905)
	SHIPPING LEGS	111" (2819)	89" (2261)	111" (2819)	-	101" (2565)	89" (2261)	112" (2845)	79" (2007)	-	10" (254)	2950 (1338)
160	STATIONARY LEGS	121" (3073)	89" (2261)	111" (2819)	-	101" (2565)	89" (2261)	112" (2845)	79" (2007)	-	20" (508)	3106 (1409)
	SKID	120" (3048)	89" (2261)	111" (2819)	-	101" (2565)	89" (2261)	112" (2845)	79" (2007)	-	19" (483)	3465 (1572)
	TORSION	129" (3277)	91" (2311)	150" (3810)	116" (2946)	101" (2565)	89" (2261)	112" (2845)	79" (2007)	35" (889)	28" (711)	4500 (2041)
	HIGHWAY	129" (3277)	93" (2362)	150" (3810)	116" (2946)	101" (2565)	89" (2261)	112" (2845)	79" (2007)	40" (1016)	28" (711)	5210 (2363)

2.6(c). Bulk Abrasive Blaster Shipping Detail.



MODEL 120 & 160 SKID MOUNT

ATTACH CHAINS TO DESIGNATED SHIPPING TIE DOWN LUGS ONLY (4 PLACES).



MODEL 120 & 160 TRAILER MOUNT

ATTACH CHAINS TO DESIGNATED SHIPPING TIE DOWN LUGS ONLY (4 PLACES).
POSITION CHAINS NOT TO CONTACT TRAILER FENDERS (4 PLACES).
REMOVE WHEEL ASSEMBLIES TO INSURE THAT HEIGHT LIMIT IS NOT EXCEEDED.

3.0 System Requirements and Personal Protective Equipment

Carefully read and follow all the recommendations regarding the abrasive blast system installation requirements. Improper installation can result in equipment malfunction and significant lost time expenses. Consult an authorized Schmidt® distributor or Axxiom Manufacturing, Inc.

3.1. Abrasive Blast System Installation Location.

- i. *Portable units:* Units equipped with trailers are portable and can be rolled to locations where blast jobs are performed. Locate the unit to allow accessibility to the manway and for ease of abrasive filling. Pay close attention to objects that may be in the path of the pressure vessel exhaust air (depressurization).
- ii. *Stationary units:* Units that will be installed in permanent locations require careful consideration. Stationary units can be installed below an abrasive hopper with a support structure that can limit access to the abrasive blast system. Install stationary blast systems in a position that will allow access to the manway and the blaster piping. These areas must be accessible to perform required maintenance. Pay close attention to objects that may be in the path of the pressure vessel exhaust air (depressurization). See Section 6.2. The bulk abrasive blaster manual blowdown valve typically does not have an exhaust hose however; one can be installed to direct the exhaust air flow into a blast room. **NOTE:** A long blowdown exhaust hose can lengthen the blowdown time and also presents the possibility of blockage. **Caution:** Units equipped with the CEN Exhaust System are not suited for this modification.
- iii. The bulk abrasive blaster is provided with mounting holes in the bottom leg foot pad. These holes can be used for securing the blaster to the floor or mounting structure.

3.2. Compressed Air Requirements (blast nozzle).

The blast nozzle size and blast pressure determine the compressed air requirements. Available air flow capacity and/or air compressor size must be considered before selecting the blast nozzle size. An air source dedicated to the abrasive blast system is preferred to reduce system pressure drops and back flow of air. If an existing air compressor will be used or a limited air supply is available, then the blast nozzle must be selected based on these conditions. Be aware that as the blast nozzle wears the air demand will increase. See Table 1 in Section 13.0 for air consumption by nozzle size at various pressures.

3.3. Air Compressor Size.

Air compressor size is crucial to the operation of the abrasive blast system. Blast nozzle selection and desired productivity must be evaluated to determine the air flow requirements prior to selecting the air compressor size. Sufficient air supply capacity is necessary to maintain the system air pressure. Insufficient air flow capacity will result in reduced blast nozzle pressure and lost productivity. The air compressor must be large enough to supply:

- i. The sum of blast air requirements for each nozzle at the highest pressure that will be used (see Section 13.0, Table 1).
- ii. The 12 CFM breathing air supplied to each blast operator respirator. **NOTE:** Reference OSHA regulations regarding requirements for breathing air, especially when an oil-lubricated air compressor is used.

3.4. Blast System Air Supply Line.

The air supply hose and fittings must be rated at a minimum of 150 psi operating pressure. The air supply hose from the air compressor to the blast unit should be at least the same diameter as the air inlet piping (see Section 9.0). This size hose will be large enough to supply the required airflow to operate the blast unit controls and each blast nozzle. See Sections 5.11 for further information on air hose connection and Section 5.3 for connection sizes.

NOTE: If the abrasive blast system will be installed in a permanent location the inlet connection can be hard piped. **DO NOT** install hard piping that is smaller than the piping size of the blast system. Smaller piping size will reduce the air flow capacity. If other equipment will be using the same source of air as the abrasive blaster, install a check valve at the air inlet. This will protect against back flow of air pressure that can carry abrasive into the blast controls.

Hard piping connected to the abrasive blaster must be structurally supported so not to apply any loading on the pressure vessel at the points of connection. Unsupported piping can create bending loads at the connections on the pressure vessel and cause failure. Hard piping connections to the pressure vessel must be designed and installed by qualified personnel experienced with piping systems and the applicable codes pertaining to them.



External loading at piping connection can cause failure of the pressure vessel. Hard piping connected to the pressure vessel must include rigid supports to eliminate the possibility of applying a load on the pressure vessel.

3.5. Blast System Air Pressure.

The maximum allowable working pressure (MAWP) for the blast unit is stamped on the ASME nameplate attached to the vessel. For most abrasive blast systems the MAWP is 150psig. **DO NOT** exceed the MAWP. An air pressure regulator can be installed to reduce air supply pressure that is higher than the MAWP. To minimize chance of air pressure backflow only use a non-relieving air regulator. Air pressure backflow will carry abrasive from the blast vessel and contaminate the blast control system. **CRITICAL:** A regulator with sufficient air flow capacity must be selected for proper operation of the blast system. Insufficient air flow capacity will cause pressure drop in the blast system resulting in equipment malfunction, abrasive backflow, and reduced blast productivity. Select a valve that will operate with little or no pressure drop (3psi max.) at the required cfm air flow.

Installing an air pressure regulator allows the option of blasting at low pressure. When blasting at low pressure the air supply to the deadman blast control system must be at least 80psig (see Figure 5.3 and 5.4). The valves in the abrasive blast system are “spring closed” and therefore require at least 80psig to operate properly. If the air pressure regulator is set below 80psig the air supply to the blast controls must be taken upstream of the regulator.

3.6. Blast System Air Quality.

Air quality is crucial to the operation of an abrasive blaster. Moisture and contaminants can cause components to malfunction. Moisture condensation in a blast system causes abrasive flow problems. Condensation occurs when the hot vapor-filled compressed air cools as it reaches the abrasive blaster. Water droplets formed during condensation can be absorbed by the abrasive in the blast vessel which can cause erratic flow to the abrasive valve. Therefore, a moisture removal device installed for the blast system air supply is recommended (i.e. coalescing moisture separator, air-cooled aftercooler or deliquescent dryer). Contact a local authorized Schmidt® distributor or Axxiom Manufacturing, Inc. to locate one near you.

3.7. Electrical Requirements.

On units equipped with electric blast controls the supply voltage is 12Vdc or 24Vac. The maximum power required is:

Each outlet:	7 watts	Each outlet with abrasive cutoff:	14 watts
4-outlet:	28 watts	4-outlet with abrasive cutoff:	56 watts

NOTE: Insufficient electric power output will result in malfunctioning of the electric blast control system. A power transformer or power supply can be used if the above voltages are not readily available.



Electric shock hazard. Abrasive blasters with electric deadman blast control systems must operate on low voltage supply (12-24 volts). To minimize shock hazard only use low voltage sources and use caution when connecting the power to the abrasive blaster.

3.8. Abrasive Selection.

Abrasive selection is likely the most difficult decision related to the blast operation. Choice of abrasive is based on factors such as blast application type, desired finish and coating requirements, characteristics of object to be blasted, cost and ability to recycle, available equipment, safety, and environmental constraints.

There are many abrasives available that are either natural, manufactured, or processing by-products. Abrasives are available in varying sizes, shapes, and hardness. These characteristics determine the resulting effect on the surface to be blasted and limitations of its use. The effects on the blasted surface are measured by its degree of cleanliness and the surface profile. Standards and required levels of these measurements are established by organizations such as Steel Structures Painting Council (SSPC), National Association of Corrosion Engineers (NACE) and coating manufacturers. See Section 12.5 for contact information of these organizations. Use these sources to obtain information regarding all aspects of surface preparation and abrasive selection guidelines.

The Thompson Valve and Micro Valve abrasive blasters are designed for high production open abrasive blasting with a wide range of abrasives. It is the responsibility of the employer and operators to select the proper abrasive. It is the responsibility of the employer to make certain that the abrasive selected is safe to use for abrasive blasting.

CRITICAL: Always obtain the Material Safety Data Sheet (MSDS) for the abrasive to be used. The MSDS provides the chemical makeup of the abrasive. Do Not use abrasives containing toxic materials. Refer to OSHA 29 CFR for acceptable limits of various toxic substances and additional measures to be taken to protect operating personnel. Always use abrasives containing less than 1% of crystalline silica. Always use a NIOSH approved respirator when handling, loading and cleaning up abrasives. Organic substances which are combustible may only be used in automated blast systems with ventilation that meets OSHA 29 CFR 1910.94.

3.9. Breathing Air Quality.

All blast operators must be supplied with and required to use NIOSH approved air-fed respirators. Breathing air supplied to these respirators must meet Grade D air quality standards as specified by OSHA 29 CFR 1910.134(i) and the Compressed Gas Association Specifications ANSI/CGA G-7.1. Consult these specifications when selecting a source of breathing air.

Breathing air must be clean, dry, contaminant-free, and provided at a pressure and volume specified by NIOSH. Use NIOSH approved air filters on all sources of breathing air. See Section 3.10.



Breathing air filters do not remove carbon monoxide or any other toxic gases. Use a carbon monoxide monitor to detect unacceptable levels. Consult OSHA 29 CFR 1910.134(i).

Many sources of breathing air are available such as air cylinders, free-air pumps, oil-less air compressors, and oil lubricated air compressors. The most used source is the same air compressor that is used for the blast air which most often is oil lubricated. Breathing air provided by an oil-lubricated air compressor can contain carbon monoxide and therefore requires the use of a carbon monoxide detector (See Section 3.10). Carbon monoxide can be in the compressed air produced by an oil-lubricated air compressor when it is operated at extremely high temperature; therefore, a high temperature alarm is required to alert the operators when this condition exists.



Oil lubricated air compressors can produce carbon monoxide. Carbon monoxide can cause asphyxiation and result in death. Use a high-temperature alarm and a carbon monoxide monitor when an oil lubricated air compressor is used to supply breathing air. Consult OSHA 29 CFR 1910.134(i).

3.10. Personal Protective Equipment (PPE).

Abrasive blasting has many hazards that may cause injuries to operators. To minimize risk of injury to operators, each must be supplied with and required to use Personal Protective Equipment. The Occupational Health and Safety Administration (OSHA) requires the employer to assess the workplace to determine what PPE is necessary and supplied to each operator (Reference 29 CFR 1910 Subpart I). OSHA requires that this equipment meet or be equivalent to standards developed by the American National Standards Institute (ANSI). Figure 3.10 below identifies the minimum personal protective equipment required for each abrasive blast operator. Also identified are the OSHA references for each and the ANSI standard each PPE item must meet. All PPE clothing and equipment should be selected for safe design and quality of construction. Select each for proper fit and for comfort which will encourage operator use.



Safety Glasses

Reference OSHA 29 CFR 1910.133
Must meet ANSI Z87.1



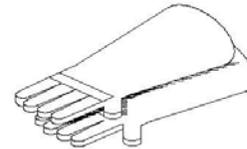
Safety Boots

Reference OSHA 29 CFR 1910.136
Must meet ANSI Z41.1



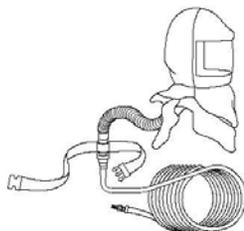
Ear Plugs

Reference OSHA 29 CFR 1926.101
Must meet ANSI S3.19
(Also see OSHA 29 CFR 1910.95)



Gloves

Reference OSHA 29 CFR 1910.138
No Applicable ANSI Standard



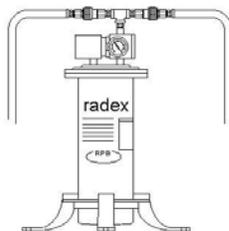
Respirator

Reference OSHA 29 CFR 1910.134
Must be NIOSH approved



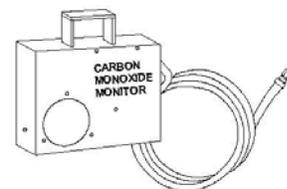
Protective Clothing

Reference OSHA 29 CFR 1910.132
No Applicable ANSI Standard



Airline Filter

Reference OSHA 29 CFR 1910.134
Must be NIOSH approved



Carbon Monoxide Monitor

Reference OSHA 29 CFR 1910.134

Figure 3.10 - Personal Protective Equipment

3.11. Pressure Relief Valve Installation.

Do Not operate this equipment without a pressure relief device installed to protect the blaster pressure vessel from over-pressurization. The ASME Code requires that all vessels be operated with pressure relief devices in place.

If the compressed air system does not provide for the installation of a pressure relief valve one can be installed on the blowdown port on the pressure vessel. Refer to Figure 3.11 for an alternate location of the air pressure relief valve.

Local regulations set the specifications for pressure relief valves; therefore it is the responsibility of the owner of the abrasive blaster to install a pressure relief valve that meets *all* applicable regulations. The pressure relief device must be set at the maximum allowable working pressure of the abrasive blaster pressure vessel See the ASME/CE vessel nameplates attached to the pressure vessel.

⚠ WARNING

In special cases per request of customer a pressure relief valve may be included with the equipment. It is the responsibility of the owner/user to confirm that the supplied pressure relief valve meets all local regulations.

⚠ DANGER

Rupture Hazard. Operating the pressure vessel above the maximum allowable working pressure can result in rupturing the pressure vessel. Install an air pressure relief valve to protect against over pressurization of the blast vessel.

⚠ WARNING

Airborne particles and loud noise hazards from relief valve exhaust air can cause serious injury and loss of hearing. Wear approved eye and ear protection. Stay clear of exhaust air path. **DO NOT** place hands or other body parts in the exhaust air path. Make sure no personnel are in the exhaust air path. Direct the relief valve exhaust away from work area.

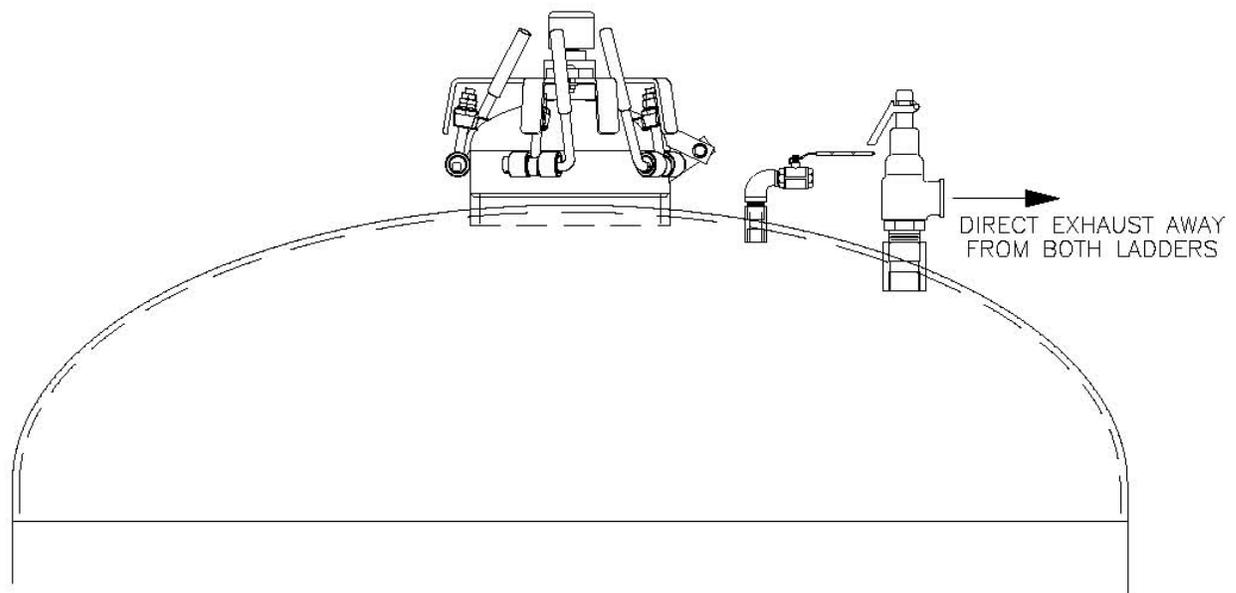


Figure 3.11 – Suggested location for air pressure relief valve

3.12. INSTALLATION CHECKLIST (Photocopy this page to use as a worksheet)

- Deadman/Twinline (or cords):** confirm delivery with the abrasive blaster.
- Manway covers & crab assemblies:** confirm delivery with the abrasive blaster.
- Blast accessories:** confirm receipt as purchased with the blaster.
- Inspect blaster:** check for possible damage during shipment. See Section 8.0 for inspection instructions.
- Closure assembly:** inspect closure and camlock handle assemblies. See Section 8.4 for inspection & adjustment instructions.
- Clean blaster:** remove manway cover and check for debris inside. Trapped debris can vibrate loose during shipment and later block abrasive flow. If necessary vacuum the bottom of tank. Replace manway cover per instructions in Section 6.5.
- Install trailer wheels:** mount and torque the wheels per Section 8.16.
- Accessible location:** install stationary blasters so that the manway is accessible for maintenance. See Section 3.1 for additional information.
- CFM available:** determine available air supply (cfm) and record here. _____
See Sections 3.2, 3.3, and 3.5 for information on determining air requirements.
- Air supply connection:** install air supply piping or connect an air supply hose that is the same size as the air inlet size or larger. See Section 3.4 for details.
- Air quality:** install moisture separator or AirPrep System to remove moisture from blast air supply to protect against abrasive flow problems. See Section 3.6.
- Electric power:** provide power for electric deadman controls. See Section 3.7.
- Blast abrasive:** select abrasive suited for application. See Section 3.8.
- Breathing air:** provide Grade D air source for blast operators. See Section 3.9.
- PPE:** provide all the necessary personal protective equipment. See Section 3.10.
- Pressure relief valve:** install a pressure relief valve if not provided on air compressor. See Section 3.11 for information on pressure relief valve installation.
- Blast nozzle:** select size based on available cfm noted above. See Section 3.2 & 5.13.
- Blast hose:** select size three times the nozzle size that will be used. See Section 5.12.
- Install ground:** install earth ground and bond nozzle/hose/blaster. See Section 5.12.
- Operator training:** all operators must completely read and understand the operation and maintenance manual and be properly trained in equipment and blast operations.
- Abrasive Blaster Setup:** follow procedures in Section 6.1.

4.0 Abrasive Blast System General Operation

The function of the Schmidt® abrasive blaster is to provide a mixture of dry abrasive and compressed air to a blast nozzle. The abrasive blast stream through the blast nozzle is used for removing rust, paint, or other unwanted surface defects. After abrasive blasting, the surface is ready for new paint or coating.

The Bulk Abrasive Blaster is one of a group of components used in an abrasive blasting job. The typical components are an air compressor, moisture removal device, an abrasive blaster, blast hose, a blast nozzle, operator personal protective equipment, and blast abrasive. See Figure 4.1.

The blast abrasive is loaded into the abrasive blaster through a top fill port. All the compressed air must be removed from inside the abrasive blaster before it can be filled with abrasive. The abrasive can be bag loaded, or loaded from a Schmidt storage hopper. To begin blasting the fill port is closed and the abrasive blaster is filled with compressed air from the air compressor. Since moisture creates problems in the blast operation, it is common for the compressed air to be fed through a moisture removal device, such as a Schmidt Air Prep System. The air pressure in the abrasive blast vessel is equal to the air pressure in the blast hose where it connects at the Thompson® Valve. This equal pressure is needed to allow the blast abrasive to flow downward by gravity. The abrasive flow is controlled by the Thompson Valve at the bottom of the blaster. From the metering valve the blast abrasive flows into the blast air stream and through the blast hose. The speed of blast air and abrasive mixture is greatly increased by the blast nozzle onto the work surface. The high speed of the air and abrasive is what gives it the energy to blast rust and paint from work surfaces. The abrasive blast stream and the dust it creates are harmful; therefore, all blast operators must use personal protective equipment during the blast operation.

All the components required for the blast operation (except for the air compressor) are available from Axxiom Manufacturing, Inc. Call Axxiom to locate a distributor.

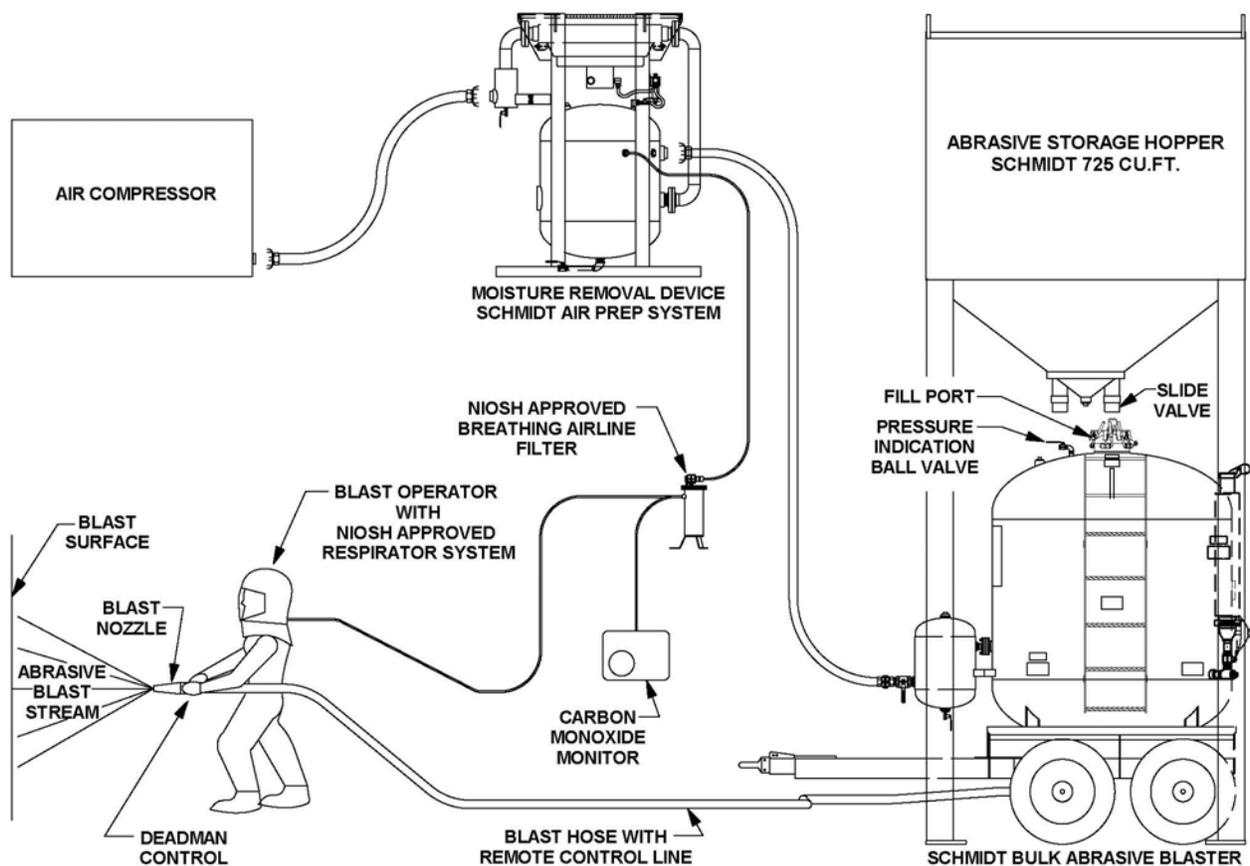


Figure 4.1 – Typical Bulk Abrasive Blast System

5.0 Abrasive Blaster General Operation

See Figure 5.1 below or Figure 8.7 to help understand the general operation. Do not attempt to operate the bulk abrasive blaster before reading all sections of this manual and following all setup procedures. See Sections 5.1 through 5.14 and Section 6.0.

The Bulk Abrasive Blaster (#4 & #8) will pressurize when the blowdown ball valve (#15) is closed and the air inlet ball valve (#7) is opened. The compressed air enters the moisture separator (#8) and then is branched off to the blast outlet piping and to pressurize the bulk abrasive blast vessel (#4).

Blasting begins when the deadman lever (#1) is pressed down which will pneumatically or electrically open the blast control valve (#12). When the control valve opens it sends an air signal that opens both the automatic air valve (#10) and the Thompson® Valve (#13). Compressed air will pressurize the blast hose (#19) when the automatic air valve (#10) is opened. At the same time the Thompson Valve (#13) will open and abrasive falls through and into the blast air stream. The abrasive flow can be increased or decreased by turning the knob (#20) on top of the Thompson Valve.

Blasting stops when the deadman lever (#1) is released. This will close the blast control valve (#12) and vent the air signal to the automatic air valve (#10) and the Thompson Valve (#13). When the signal air vents both valves spring return to the “normally closed” position. The Bulk Abrasive Blaster (#4 & #8) remains pressurized when the air and the metering valves are turned off.

The Bulk Abrasive Blaster (#4 & #8) is depressurized by closing the air inlet ball valve (#7) and opening the blowdown ball valve (#15) to completely vent the compressed air.

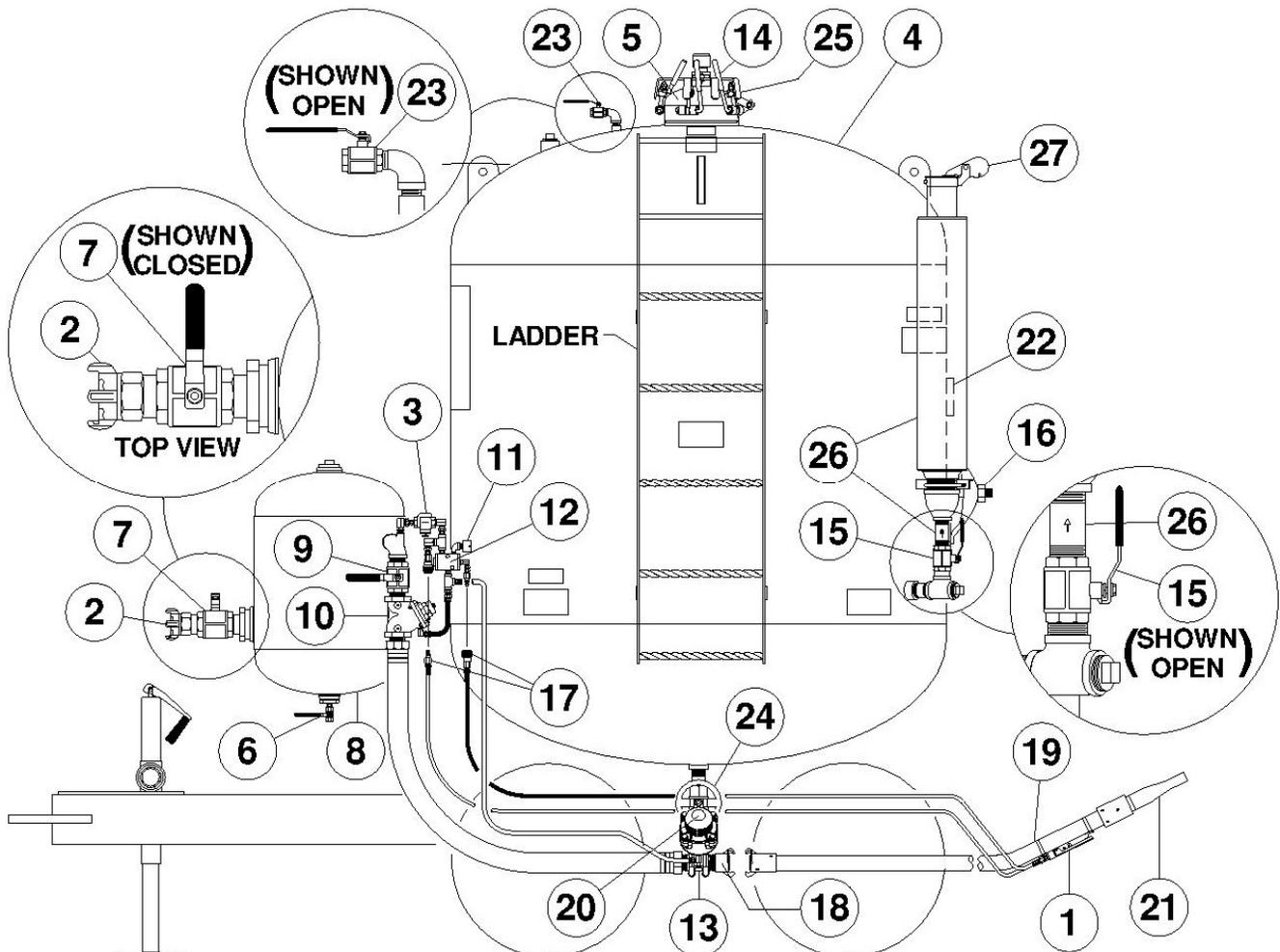


Figure 5.1 – Typical Bulk Abrasive Blaster

5.1. Closure (abrasive inlet).

The blaster is filled with abrasive through the closure abrasive inlet at the top of the pressure vessel. The closure is a manually operated 10” hinged opening that is opened only when the blast vessel is depressurized. Refer to Section 6.2 for depressurization procedure. The closure is opened and closed by following the procedures detailed in Sections 6.3 and 6.4.

Note: Bulk Abrasive Blasters manufactured after January 2010 are equipped with the Halok® System (#25) that guides the operator through the proper opening procedure. See Section 6.2 and 9.13.



The closure is part of a Pressurized Vessel. Propelled objects will cause serious injury or death. Depressurize vessel before opening closure. See Section 6.2.

5.2. Air Supply Connection.

Air is supplied to the abrasive blaster through a hose connection at the air inlet crowfoot (#2). The air supply hose connected to the abrasive blaster must be same diameter as the air supply piping and rated at a minimum of 150psi operating pressure. See the drawings and parts lists in Section 9.0 and refer to Sections 3.4 and 5.14.

5.3. Air Inlet Ball Valve (pressurize).

The air inlet ball valve (#7) is used to turn on and turn off the air flow to the abrasive blaster. Air enters the blaster through a hose connection at the air inlet crowfoot (#2). The air then passes through the moisture separator (#8) and into the blast vessel (#4). When the air inlet ball valve is opened the air flow will pressurize the blast vessel (#4 & #8).

Note 1: Units manufactured after November 2013 include a lockout feature on the inlet ball valve to stop air flow into the bulk abrasive blaster. Then depressurize per Section 6.2 to disable.

Note 2: The moisture separator (#8) supplied with the Bulk Abrasive Blaster has a maximum flow capacity of 1600 CFM. It is supplied with a 3”x2” bushing, 2” ball valve, and 2” hose connection. In applications using four blast outlets and/or large nozzles, the air inlet bushing and connected items (see top view figure 5.1) may be replaced with a 3” supply line. This will increase productivity by decreasing pressure losses and increasing air flow.

5.4. Blowdown Ball Valve (depressurize).

The blowdown ball valve (#15) is used to release all the compressed air (depressurize) from inside the abrasive blaster. The abrasive blaster must be depressurized before filling with abrasive or before performing any maintenance. The air inlet ball valve (#7) must be closed before depressurizing the abrasive blaster (See Section 6.2).

Note: Bulk Abrasive Blasters manufactured after January 2010 are equipped with the CEN Exhaust System. The CEN nozzle (#26) controls the exhaust air flow and minimizes freezing of the blowdown ball valve (#15). The system also includes a muffler to reduce the noise level of the exhaust air.



Airborne particles and loud noise hazards from blowdown exhaust air can cause serious injury and loss of hearing. Wear approved eye and ear protection. Stay clear of blowdown air path. DO NOT place hands or other body parts in the blowdown air path. Make sure no personnel are in the blowdown air path.

5.5. Moisture Separator.

Air flow into the blaster passes through the moisture separator (#8) which removes moisture, oil and dirt particles from the inlet air. The water that is removed by the separator is drained by opening the ball valve (#6) at the bottom of the separator. This ball valve should be left slightly opened anytime the blaster is in operation. This allows water to be drained as it is filtered from the blast air. After passing through the moisture separator, the air branches off to supply the blast controls (#9, #10, & #12) and pressurizes the bulk abrasive blast vessel (#4).

Note: Blasters not equipped with a moisture separator are furnished with a pipe manifold.

5.6. Choke Valve.

The choke valve (#9) is a ball valve located in the blast air line upstream of the Thompson® Valve. The choke valve (#9) is used to clear any trash that may get into the blast vessel and block the Thompson Valve orifice. Whenever trash (paint chip, cigarette butt, etc.) blocks the Thompson Valve orifice the procedure is to fully open the Thompson Valve knob, then press down the deadman lever (#1) to begin blasting. While blasting, have an assistant close the choke valve completely for about one second. This creates differential pressure at the Thompson Valve (high pressure above; low pressure below). The higher pressure from the blast vessel should be enough to loosen the trash blocking the Thompson Valve orifice and blast it through the blast nozzle (#21). To minimize excess wear of the Thompson Valve keep the choke valve fully open during normal blasting. **Note:** If the bulk abrasive blaster is equipped with the abrasive cut-off feature set the cut-off valve (or switch) to the on-position for the choke procedure. See Sections 9.11 and 9.12.

NOTICE

See Section 11.3.2 for further safety information regarding the choke procedure.

WARNING

Do not aim blast nozzle towards yourself or any person. System malfunction can cause accidental start up and result in injury to personnel.

A secondary purpose of the choke valve is as a manual shut off valve for the blast air supply. When the choke valve (#9) is closed it will shut off the blast air supply to the blast outlet.

5.7. Automatic Air Valve (blast air valve).

The automatic air valve (#10) is a normally closed valve that opens to supply blast air to the blast hose and blast nozzle (#19 & #21). The automatic air valve opens when it receives air to its signal port. This happens when the deadman lever (#1) is pressed down which opens the blast control valve (#12) sending an air signal to the automatic air valve. When the deadman lever is released the air signal from the blast control valve vents and automatic air valve spring closes to stop blast air to the blast hose and nozzle. See Section 9.7.

Note: Bulk Abrasive Blasters manufactured after July 2008 are equipped with the High Flow Automatic Air Valve that provides increased air flow capacity for larger blast nozzles.

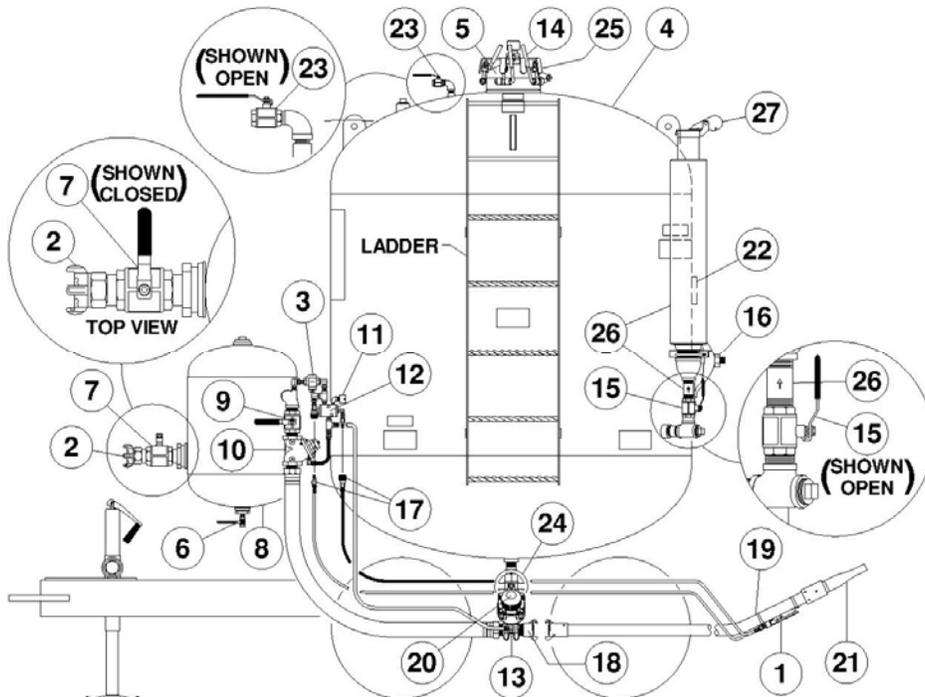


Figure 5.1 – Typical Bulk Abrasive Blaster

5.8. Thompson® Valve II (abrasive metering valve).

The Thompson Valve (#13) is a dual-purpose valve. First, it is a normally closed valve that opens to supply abrasive into the blast air stream. The Thompson Valve opens when it receives air to its signal port (See Sections 9.4 and 9.5). This happens when the deadman lever (#1) is pressed down which opens the blast control valve (#12) sending an air signal to the Thompson Valve. When the deadman lever is released the air signal from the blast control valve vents and Thompson Valve spring closes to stop abrasive flow to the blast hose and nozzle (#19 & #21). Secondly, the Thompson® Valve (#13) is an abrasive metering valve. When the Thompson Valve is open the abrasive flow is metered (controlled) by an adjustable orifice. The amount this orifice opens is controlled by turning the knob (#20) at the top of the Thompson Valve. The knob sets the stopping point of the plunger (See Section 9.4 & 9.5). Turn the knob clockwise to reduce the orifice size which decreases abrasive flow. Turning the knob counter-clockwise increases the orifice size which will increase the abrasive flow to the blast nozzle (#21). The Thompson Valve spring retainer has lines on the side to use as reference points to the amount that the orifice is open. Adjustments to the abrasive flow should be made by turning the knob a little at a time. Test the adjustment by starting the blast for a short period to determine if further adjustment is needed.

The Thompson Valve II has a built in cleanout port where a ball valve can be installed (see Section 9.5). This ball valve can be used to purge (blow out) trash that blocks abrasive flow. This is done by closing the union ball valve (#24), opening the clean out valve, and then pressing down the deadman lever (#1). The blast air flows through the Thompson Valve and purges any trash through the clean out valve. **Note:** If the abrasive blaster is equipped with the abrasive cut-off feature set the cut-off valve (or switch) to the on-position for the Thompson® Valve to open for purging. See Sections 9.11 and 9.12.

WARNING

Airborne particles and loud noise hazards from purge air can cause serious injury and loss of hearing. Wear approved eye and ear protection. Stay clear of purge air path. **DO NOT** place hands or other body parts in the purge air path. Make sure no personnel are in the purge air path.

5.9. Union End Ball Valve (abrasive shutoff).

The union ball valve (#24) is an optional valve that allows the user to remove the Thompson Valve from the blast vessel without emptying the abrasive. Turn the union ball valve handle to the horizontal position to block abrasive flow from the blast vessel (#4) into the Thompson Valve. Then loosen the nut to separate the two sections of the union ball valve and remove the Thompson Valve from blast vessel. The handle on the union ball valve can be difficult to turn at times; however there are punched holes at each arm of the handle where a standard ratchet wrench can be inserted and used as leverage to open or close the valve. **Note:** Units manufactured after January 2015 includes the ergonomic round handle design (see Figure 5.2).

Note: Purging the abrasive from the Thompson Valve will minimize chance of seizing of the union nut, allowing it to turn freely.

DANGER

The bulk abrasive blaster is a Pressurized Vessel. Propelled objects will cause serious injury or death. Depressurize vessel before performing any maintenance. See Section 6.2.

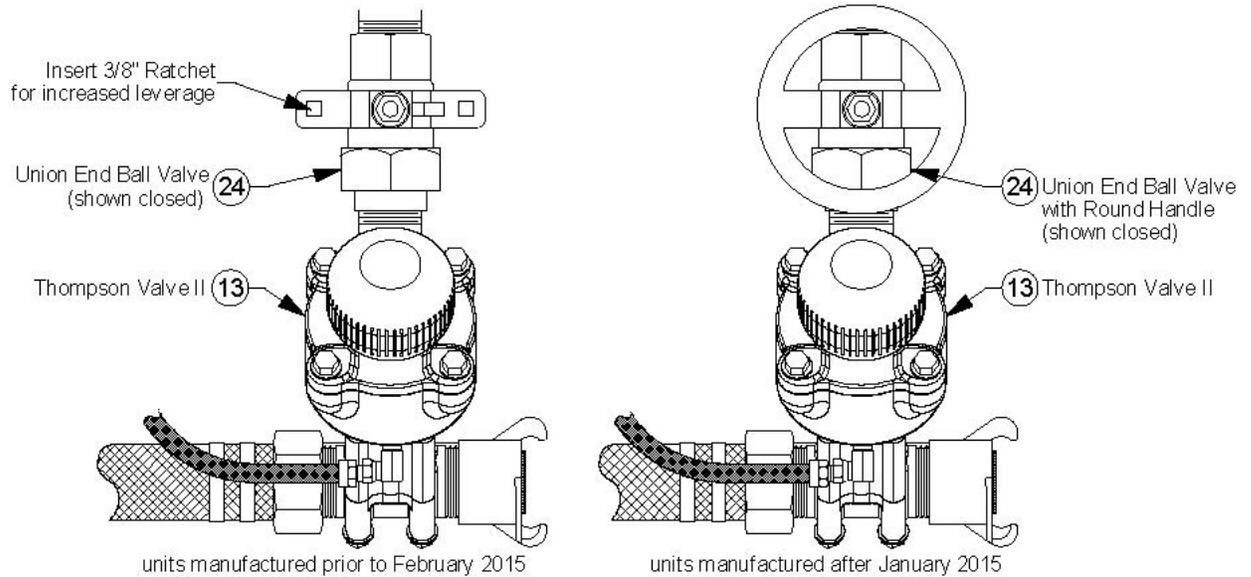


Figure 5.2 – Union End Ball Valve

5.10. Deadman Valve/Switch.

The Deadman valve/switch is part of a system that controls the blast operation. The deadman valve/switch (#1) allows the operator to remotely start and stop the blast operation. The Deadman is mounted at the end of the blast hose assembly (#19) close to the blast nozzle (#21) to give the operator easy control of the blast operation.

The Deadman is either a pneumatic valve or an electric switch depending on the type of abrasive blaster control system. When the deadman lever is pressed down it sends either a pneumatic or electric signal to the blast control valve (#12). The control valve opens and sends an air signal to the automatic air valve (#10) and the Thompson Valve (#13). See Sections 9.1, 9.2, 9.8 and 9.9.

5.10.1. Pneumatic Deadman System: When the pneumatic deadman lever is pressed down air supply from the orange hose of the twinline hose (#17) flows into the black hose. Air flows through the black hose to the signal port of the control valve (#12) causing it to open and send air signals to the auto air valve (#10) and the Thompson® Valve (#13). When the deadman lever is released the air signal is cut off and the remaining air vents from the breather (#11). See Figure 5.3 and the drawing in Section 9.1.

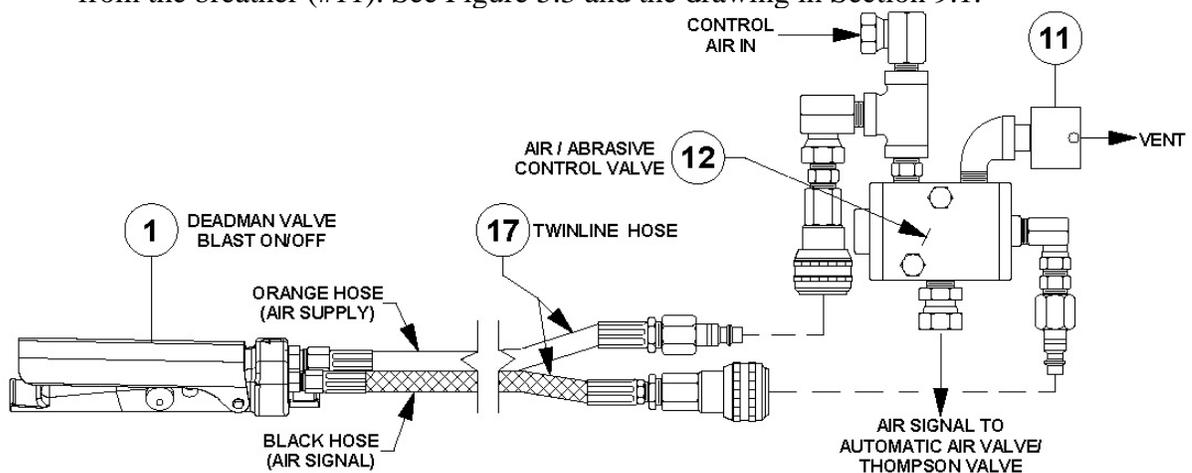


Figure 5.3 – Pneumatic Blast Control System

5.10.2. Electric Deadman System: When the electric deadman lever is pressed down it closes the electric circuit and supplies electric current to the control valve (#12). The control valve opens and sends air signals to the auto air valve (#10) and the Thompson® Valve (#13). When the deadman lever is released the electric circuit is cut off closing the control valve. The signal air vents from the breather (#11). See Figure 5.4 and the drawing in Section 9.2.

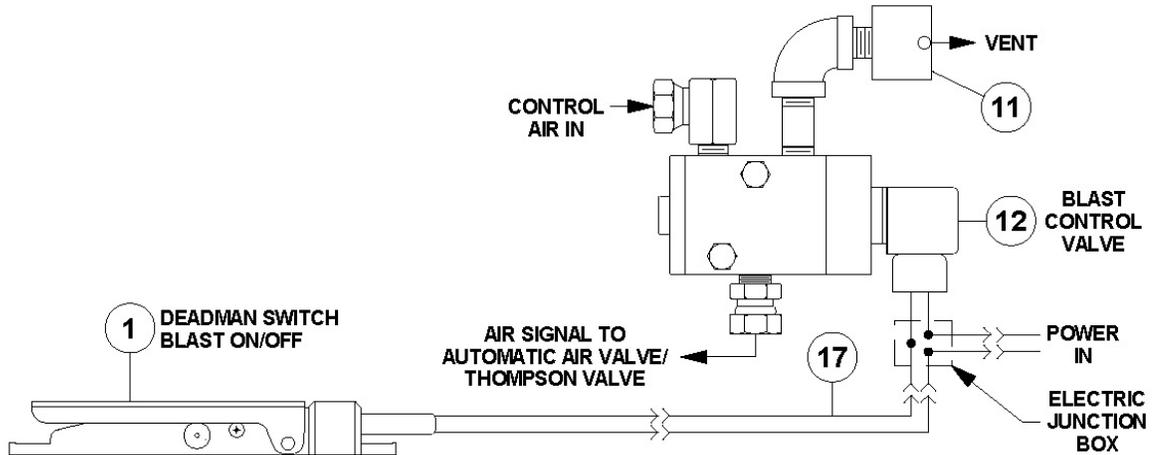


Figure 5.4 – Electric Blast Control System

5.11. Abrasive Cut-Off.

An optional feature of a blaster is an abrasive cut-off. The purpose of the abrasive cut-off is to allow flow of blasting air without abrasive. This is useful for blowing off abrasive from the blasted item. To blast with air only set the abrasive cut-off valve (or switch) to the off-position then press down the deadman lever (#1). This will send a control signal to the automatic air valve only; therefore, only blast air will exit the blast nozzle (#21). For the abrasive cut-off to work a second control valve is needed that provides a signal to the Thompson® Valve separate of the air signal to the automatic air valve. Refer to the drawings in Sections 9.11 and 9.12.

5.12. Blast Hose.

The blast air and abrasive mixture flows from the Thompson® Valve to the blast nozzle (#21) through the blast hose assembly (#19). The typical length of the blast hose is 50ft; however blast hose extensions can be added to increase length. For higher efficiency keep the blast hose as short as possible. Increased blast hose length causes pressure drop at the blast nozzle which reduces the blast efficiency. For higher efficiency use a blast hose with an inside diameter that is approximately three times the nozzle throat diameter. Keep blast hose as straight as possible. Sharp bends create high wear points. Static electricity is generated by the abrasive flow through the blast hose. To protect against static electrical shock to operating personnel only use anti-static blast hose and install a grounding strap on the abrasive blaster.



Static electric shock hazard. To minimize chance of static electrical shock to operating personnel only use anti-static blast hose, properly electrically bond the blast nozzle, blast hose couplings, and the equipment, and properly install a earth ground to the abrasive blaster.



Longer blast hoses require longer time to dissipate the blast stream when the deadman is released to end the blast operation. This extended dissipation time increases the risk of injury should there be an accidental loss of control of the blast hose.

5.13. Blast Nozzle.

The blast nozzle (#21) is an important part of the blast operation since the size of it determines the air flow and abrasive requirement. The amount of air flow and abrasive determine how quick blasting can be done. The larger the nozzle, the more the air and abrasive will be needed. The larger the nozzle size the greater the blast productivity. However, for a fixed amount of air supply, increasing the nozzle size will reduce the blast pressure. For best performance the blast pressure must be maintained as high as possible. Therefore, select the nozzle size based on the amount of air available and then adjust the abrasive flow at the Thompson® Valve as needed.

The nozzle size can be identified by the small number molded into the outer nozzle jacket. Or in the case of ceramic nozzles, by measuring the throat diameter (the smallest inside diameter). The throat diameter is measured in sixteenths of an inch; for example, a #5 nozzle has a throat diameter of 5/16". See the tables in Section 13.0 for approximate air and abrasive consumption for each nozzle. **Note:** For the best possible mixture of air to abrasive, the blast hose and piping must be at least three times the size of the blast nozzle.

5.14. Hose Connection.

All air hose, blast hose, and threaded couplings have pin holes that align when connected. To protect against accidental hose disconnections safety pins must be installed through these holes. As a secondary safety measure each hose connection should also include a hose whip check that will hold the hose if there is an accidental disconnection. Connect one loop to each side of the connection and stretch out as shown in Figure 5.5 below. All air hose, blast hose, and threaded couplings have a gasket that seals the connection and should be replaced when air is leaking.

⚠ WARNING

Failure to install safety pins on all blast and air hose couplings could result unintentional disconnection and cause serious injury or death.

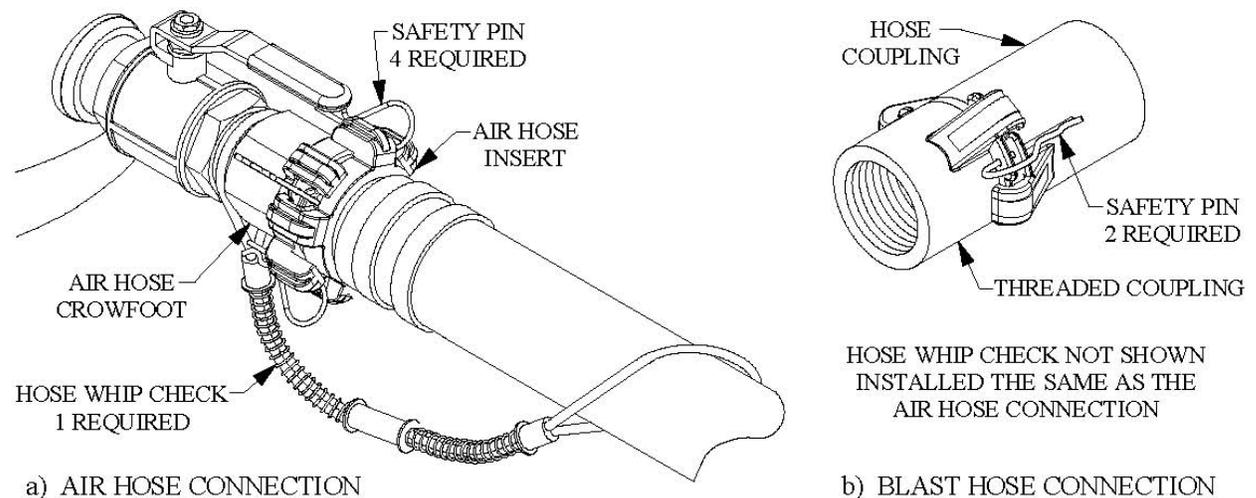


Figure 5.5 – Hose Connection Disconnect Protection

6.0 Pre-operation Procedures

DANGER

Failure to follow the procedures below could result in serious injury or death. In addition to these procedures, completely read and understand all sections of this *Bulk Abrasive Blaster Operation and Maintenance Manual*.

DANGER

Explosion Hazard. Do Not operate the AmphiBlast Abrasive Blast system in confined spaces without proper ventilation. Airborne substances that make up the items and substrates being blasted can be ignitable when mixed with airborne dust from the blast abrasive. Consult plant authorities.

DANGER

The closure assembly is part of a Pressurized Vessel. Propelled objects will cause serious injury or death. Depressurize vessel before opening the closure assembly.

6.1. Bulk Abrasive Blaster Setup Procedure (see Figure 6.2 or Figure 8.7).

- 6.1.1. Confirm that the bulk abrasive blaster is properly maintained and inspected as detailed in Section 8.0.
- 6.1.2. Static electricity is generated by the abrasive flow through the blast hose. To minimize chance of static electrical shock to operating personnel only use anti-static blast hose, properly electrically bond the blast nozzle, blast hose couplings, and the equipment, and properly install a earth ground to the abrasive blaster. See Section 5.12.

CAUTION

Static electric shock hazard. To minimize chance of static electrical shock to operating personnel only use anti-static blast hose, properly electrically bond the blast nozzle, blast hose couplings, and the equipment, and properly install a earth ground to the abrasive blaster. See Section 5.12.

- 6.1.3. To mitigate risk of dust explosion avoid blasting in confined spaces without proper ventilation. Consult plant authorities. See Section 1.20.

DANGER

Explosion Hazard. Self-Ignition of Dust. Do Not operate the AmphiBlast Abrasive Blast system in confined spaces without proper ventilation. Consult plant authorities. See Section 1.20.

- 6.1.4. Do Not operate this equipment without a pressure relief device in place. The ASME Code requires that all vessels be provided with pressure relief devices. See Section 3.11.

DANGER

Rupture Hazard. Operating the pressure vessel above the maximum allowable working pressure can result in rupturing the pressure vessel. Install an air pressure relief valve to minimize chance of over pressurization of the blast vessel. See Section 3.11.

- 6.1.5. Do Not operate this equipment without the pressure indication ball valve (#23) in place. This is an added feature that allows the operator to verify that the bulk abrasive blaster is completely depressurized before attempting to open the closure. See Figure 6.2.

- 6.1.6. Make certain that the bulk abrasive blaster is not pressurized. Follow the depressurizing procedure given in Section 6.2.

▲ WARNING

Airborne particles and loud noise hazards from blowdown exhaust air can cause serious injury and loss of hearing. Wear approved eye and ear protection. Stay clear of blowdown air path. **DO NOT** place hands or other body parts in the blowdown air path. Make sure no personnel are in the blowdown air path.

- 6.1.7. Thoroughly understand the operation of the closure before using the bulk abrasive blaster. See the closure opening and closing procedures given in Section 6.3 and 6.4.
- 6.1.8. Properly install the manway cover and gasket. See Section 6.5.
- 6.1.9. Verify that all required personal protective equipment is available for each operator and in good operating condition (safety glasses, safety shoes, ear plugs, gloves, airline filter, respirator, & carbon monoxide monitor). **Critical:** *Adhere to all local, state, and federal regulations including, but not limited to, OSHA (Occupational Health and Safety Administration). Pay close attention to requirements regarding breathing air quality. When an oil-lubricated air compressor is used, additional requirements for a high temperature alarm and/or a carbon monoxide monitor become necessary. See Sections 3.9 and 3.10.*

▲ WARNING

Failure to use personal protective equipment could result in serious injury or death.

- 6.1.10. Hose clamp the deadman (#1) onto the blast hose assembly in a comfortable position behind the nozzle holder. Then tie wrap the twinline hose or electric deadman extension cords to the blast hose (#19). On new units the deadman, twinline, or extension cords are placed inside the pressure vessel for shipping.
- 6.1.11. Screw nozzle (#21) into the nozzle holder at end of the blast hose assembly (#19).
- 6.1.12. Connect the blast hose coupling to the threaded coupling (#18) on the metering valve (#13). Then install safety pins and a hose whip check to minimize chance of accidental disconnections during operation. See Sections 5.14 and 8.7.

▲ WARNING

Failure to install safety pins on all blast hose couplings could result in serious injury or death. See Sections 5.14 and 8.7.

- 6.1.13. Connect the twinline hose quick disconnects (#17) or the electric deadman extension cords to the mating disconnects on the bulk abrasive blaster piping.

Be sure that each twinline is connected to the control valve disconnects (#12), automatic air valve (#10), and Thompson® Valve (#13) that supply the blast hose (#19) attached to it. If the blaster has electric controls, each must be connected to the matching junction box pigtail. See the drawings in Sections 9.1 and 9.2. Close all choke valves (#9) and abrasive shutoff valves (#24) then check that all connections are correct by pressing down each deadman lever to test.

▲ WARNING

On abrasive blasters with multiple outlets care must be taken while connecting the twinline hoses or electric deadman extension cords so not to cross connect them. Each must be connected to the matching blast outlet control. Cross connecting will result in unintentional blast startup and could result in serious injury or death.

6.2. Bulk Abrasive Blaster Depressurizing Procedure (Blowdown).

⚠ CAUTION

Do not leave the abrasive blaster pressurized during long periods of no usage. Undetected air leaks can cause costly wear damage to the pressure vessel (i.e. at abrasive inlet and manway).

- 6.2.1. Close the air inlet ball valve (#7). The ball valve is closed when the handle is fully turned to the position shown in Figure 6.2 (handle perpendicular to body). The handle tab will bottom against the ball valve body in the closed position.
- 6.2.2. Slowly and completely open the blowdown ball valve (#15) located near the bulk abrasive blaster manway (#16). This will depressurize the bulk abrasive blaster (#4 & #8). The exhaust air flow is controlled and muffled by the CEN system (#26). The CEN Exhaust System minimizes freezing at the blowdown and reduces noise level. Note: The CEN System is standard on Schmidt® bulk blasters manufactured after February 2010.

⚠ WARNING

Airborne particles and loud noise hazards from blowdown exhaust air can cause serious injury and loss of hearing. Wear approved eye and ear protection. Stay clear of blowdown air path. DO NOT place hands or other body parts in the blowdown air path. Make sure no personnel are in the blowdown air path.

- 6.2.3. The blowdown ball valve (#15) should be inspected for proper operation before each use of the abrasive blaster. Confirm that the blowdown ball valve handle turns open and closed without difficulty. See Section 8.0 for maintenance details.
- 6.2.4. The bulk abrasive blast vessel (#4 & #8) is completely depressurized when the air inlet ball valve (#7) is closed and the blowdown ball valve (#15) is open with no airflow from it. Air flow is indicated by movement of the muffler rain cap (#27). **Note:** Confirm that the blaster is depressurized by opening the pressure indication ball valve (#23) and checking for air flow. **CAUTION:** Air flow indicates that there is air pressure in the blast vessel (#4). Repeat above procedure and check for faulty components. See Section 8.0 for maintenance details.

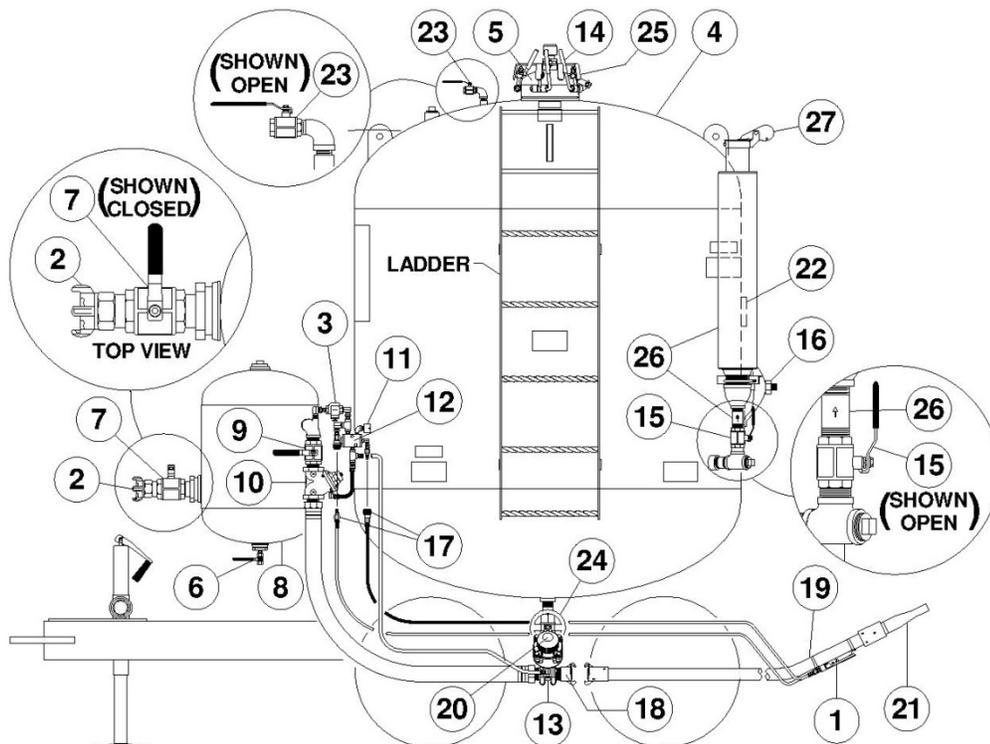


Figure 6.2 – Typical Bulk Abrasive Blaster

6.3. Closure Assembly Opening Procedure (See Figure 6.2, 6.3.1 and 6.3.2).

⚠ DANGER

The closure assembly is part of a Pressurized Vessel. Propelled objects will cause serious injury or death. Depressurize vessel before opening the closure assembly. See Section 6.2.

6.3.1. Taking the proper fall protection measures, access the closure (#5) using the bulk abrasive blaster ladder. See Figure 6.2.

6.3.2. The bulk abrasive blaster **MUST** be completely depressurized before attempting to open the closure assembly (See Section 6.2). Verify that the abrasive blaster is completely depressurized by opening the pressure indication ball valve (#23) next to the closure (see Figure 6.2). If any air leakage occurs, **DO NOT CONTINUE**. Follow the depressurizing procedure in Section 6.2. **DO NOT** depressurize the bulk abrasive blaster through the pressure indication ball valve (#23).

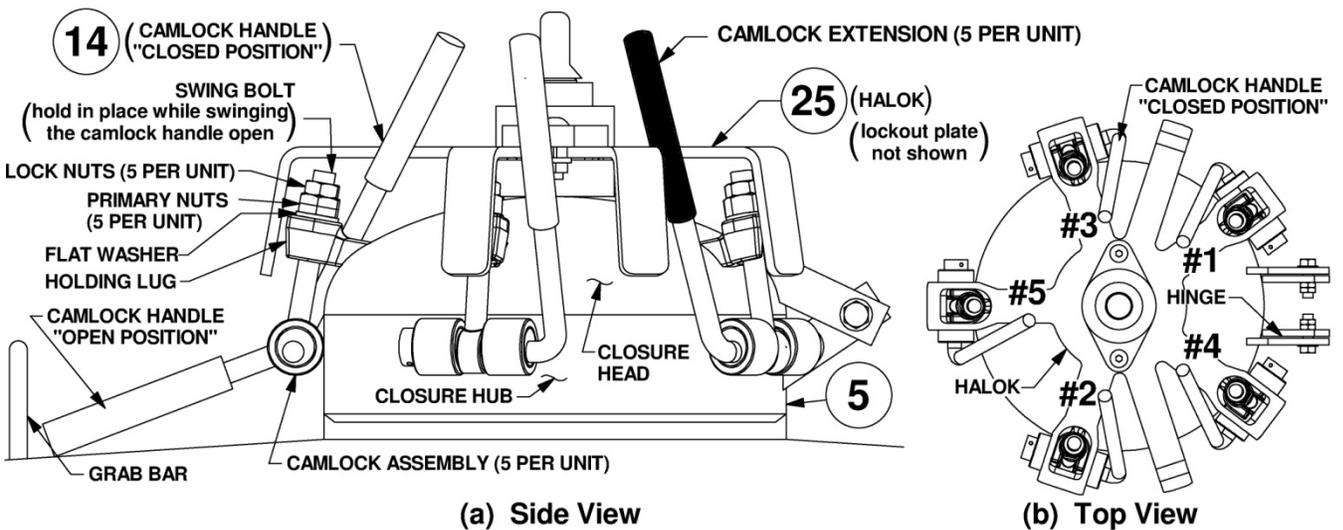


Figure 6.3.1 – Bulk Abrasive Blaster Closure Assembly

6.3.3. In the numbered sequence shown in Figure 6.3.1(b), swing each of the camlock handles (#14) of the closure (#5) into the “open position.” **DO NOT** swing any swing bolts out of the holding lugs. Hold the swing bolt within the holding lug with one hand, and swing each camlock handle down with the other hand. Note: The Halok® Assembly (#25) prevents the swing bolts from swinging out of the holding lugs until all camlock handles are in “open” position. See Figure 6.3.1.

⚠ DANGER

The closure assembly is part of a Pressurized Vessel. Component failure will propel objects causing serious injury or death.

DO NOT use a hammer, wrench, or any such tool or device to strike the camlock handles (#14) into position. Use of such tools or devices can cause damage to parts resulting in component failure. If necessary, a piece of 1” pipe (or ½” pipe for units without camlock extensions) 12 inches long can be slipped over the end of the camlock handle to increase leverage.

If there is difficulty in swinging any camlock handle to the “open position” **DO NOT CONTINUE**. Difficulty in swinging the camlock handles may be a sign of air pressure inside the bulk abrasive blast vessel. Opening the closure assembly with air pressure inside the bulk abrasive blast vessel will cause serious injury or death. Swing all the camlock handles back into the “closed position”, then follow the depressurizing procedure in Section 6.2 and check for faulty ball valves (#7 and #15). Contact Axxiom Manufacturing, Inc. for technical support.

⚠ DANGER

DO NOT swing any of the swing bolts out of the holding lugs at this time. Swinging any swing bolts at this time will disable the safety feature of the closure assembly.

When all the camlock handles are in the open position the closure head can move up slightly. However, the closure head cannot swing open since the swing bolts hold it down. Therefore, if there is air pressure in the abrasive vessel the closure head will move up slightly and air will leak. This air leak will alert the operator of danger. This is the safety feature of the closure assembly that only works if all the swing bolts stay in the holding lugs.

⚠ DANGER

If *any* air leakage is observed DO NOT CONTINUE. The bulk abrasive blaster is pressurized. Opening the closure assembly with air pressure inside the bulk abrasive blast vessel will cause serious injury or death. Swing all the camlock handles back into the “closed position”, then follow the depressurizing procedure in Section 6.2 and check for faulty ball valves (#7 and #15). Contact Axxiom Manufacturing, Inc. for technical support.

- 6.3.4. If no air leakage is observed after swinging over all five camlock handles, continue with the closure assembly opening procedure per the steps below.
- 6.3.5. With all the camlock handles (#14) in the “open” position the Halok can be rotated counter-clockwise to allow access to the swing bolts (see Figure 6.3.2). Manually swing each swing bolt out over the holding lug.

⚠ DANGER

The closure assembly is part of a Pressurized Vessel. Component failure will propel objects causing serious injury or death.

DO NOT use a hammer, wrench, or any such tool or device to strike the swing bolts out of the holding lug. Use of such tools or devices can cause damage to parts resulting in component failure.

If there is difficulty in swinging any swing bolt over the holding lugs DO NOT CONTINUE. Difficulty in swinging the swing bolts may be a sign of air pressure inside the bulk abrasive blast vessel. Opening the closure assembly with air pressure inside the bulk abrasive blast vessel will cause serious injury or death. Swing all swing bolts back into the holding lugs and swing all the camlock handles back into the “closed position.” Then follow the depressurizing procedure in Section 6.2 and check for faulty ball valves (#7 and #15). Contact Axxiom Manufacturing, Inc. for technical support.

- 6.3.6. After all the swing bolts are swung out of each holding lug the closure head can be opened. The closure assembly must be inspected at each opening for wear or damage as described in step 6.3.7. Also see Section 8.4.

6.3.7. Each time the closure assembly is opened all the camlock assemblies and hinge assemblies must be inspected for damage, including but not limited to, corrosion, cracks, and deformations. Make sure all the swing bolts, nuts, washers, cams, spring pins, and handles are in place (See Drawing 9.3(a)). Inspect the threads of each swing bolt and (2) nuts for corrosion or wear. Each camlock assembly and hinge must be tested for ease of operation. Any camlock, swing bolt, nut, or hinge that show signs of damage, corrosion, wear, or does not swing freely must be repaired or replaced *before* re-pressurizing the blast vessel. The camlock handles must be installed into the cam lugs as shown in Figure 6.3.2(b) so there is no interference with closure head handle or hinges and to insure proper operation of the closure Halok® (#25). The torque on the camlock assembly nuts must be properly adjusted. See Sections 8.4 and 8.5 for closure assembly maintenance instructions and adjustment procedures.



The closure assembly is part of a Pressurized Vessel. Component failure will propel objects causing serious injury or death.

DO NOT operate the bulk abrasive blaster with a closure assembly that has damaged or worn components. Use of the closure assembly with worn or damaged parts will result in component failure.

Note: Bulk abrasive blasters manufactured after November 2013 may include an optional Halok® lockout that prevents opening of the closure assembly when a locking device is installed. The purpose of the Halok lockout is to disable its operation and thereby protect against unauthorized opening of the closure assembly. See Figure 6.4.2 and Section 9.13.

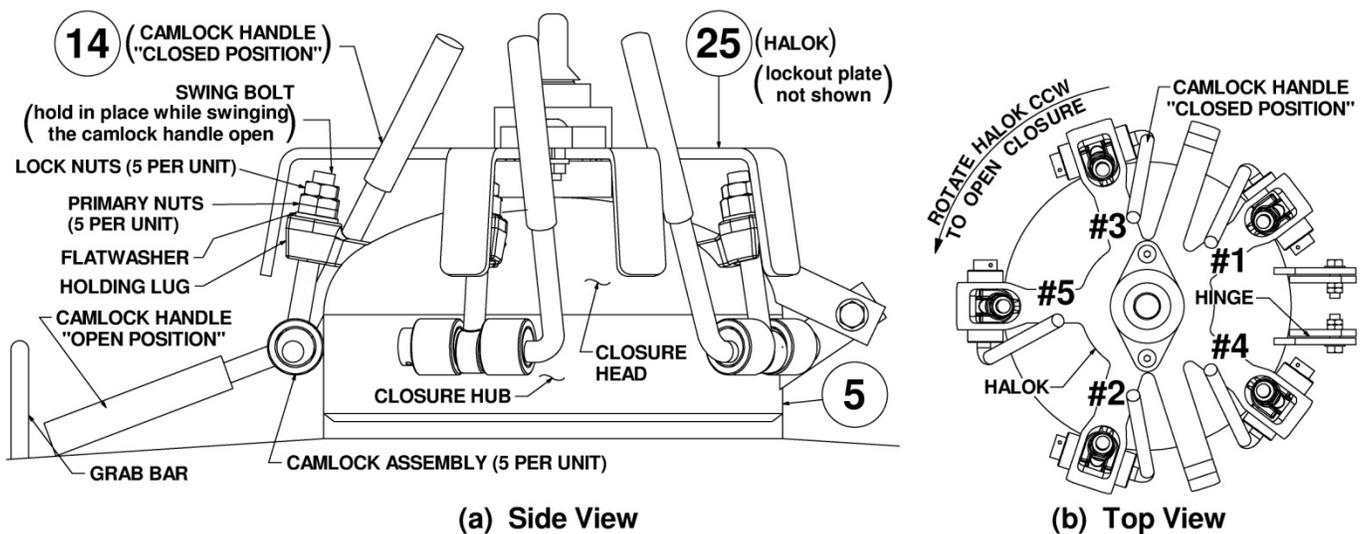


Figure 6.3.2 – Bulk Abrasive Blaster Closure Assembly

6.4. Closure Assembly Closing Procedure (See Figure 6.4.1 and 6.4.2).

- 6.4.1. Inspect the closure head and sealing surface for damage including, but not limited to, corrosion, cracks, or deformations. Check that the 10” O-ring is fitted in the groove at the bottom of the closure head. Remove and inspect the closure O-ring for cuts or tears. Replace if necessary. Replace the O-ring and adjust to remove kinks or twists.
- 6.4.2. Close the closure head and check for alignment with closure hub. If the closure head does not close properly, do not attempt to pressurize the bulk abrasive blaster. Take the bulk abrasive blaster out of service and have it inspected and/or repaired by a qualified facility. Contact Axxiom Manufacturing, Inc. for technical support.

DANGER

Do Not operate the bulk abrasive blaster with a closure head that does not close properly. Component failure will result. Component failure will cause serious injury or death.

- 6.4.3. Each time the closure assembly is opened all the camlock assemblies and hinge assemblies must be inspected for damage, including but not limited to, corrosion, cracks, and deformations. Make sure all the swing bolts, nuts, washers, cams, spring pins, and handles are in place (See Drawing 9.3(a)). Inspect the threads of each swing bolt and (2) nuts for corrosion or wear. Each camlock assembly and hinge must be tested for ease of operation. Any camlock, swing bolt, nut, or hinge that show signs of damage, corrosion, wear, or does not swing freely must be repaired or replaced *before* re-pressurizing the blast vessel. The camlock handles must be installed into the cam lugs as shown in Figure 6.4.1(b) so there is no interference with closure head handle or hinges and to insure proper operation of the closure Halok® (#25). The torque on the camlock assembly nuts must be properly adjusted. See Sections 8.4 and 8.5 for closure assembly maintenance instructions and adjustment procedures.

DANGER

The closure assembly is part of a Pressurized Vessel. Component failure will propel objects causing serious injury or death.

DO NOT operate the bulk abrasive blaster with a closure assembly that has damaged or worn components. Use of the closure assembly with worn or damaged parts will result in component failure.

- 6.4.4. Swing all the swing bolts into position within the holding lug. Be sure each swing bolt has the required (2) nuts and flat washer, and they are in good condition. See Figure 6.4.1.

DANGER

Do not use a hammer, wrench, or any such tool or device to strike the camlock handles (#14) or swing bolts into position. Use of such tools or devices can cause damage to parts resulting in component failure. Component failure will cause serious injury or death.

- 6.4.5. After all the swing bolts are in position within the holding lugs rotate the Halok® (#25) clockwise to allow access to the camlock handles (#14). See Figure 6.4.1.

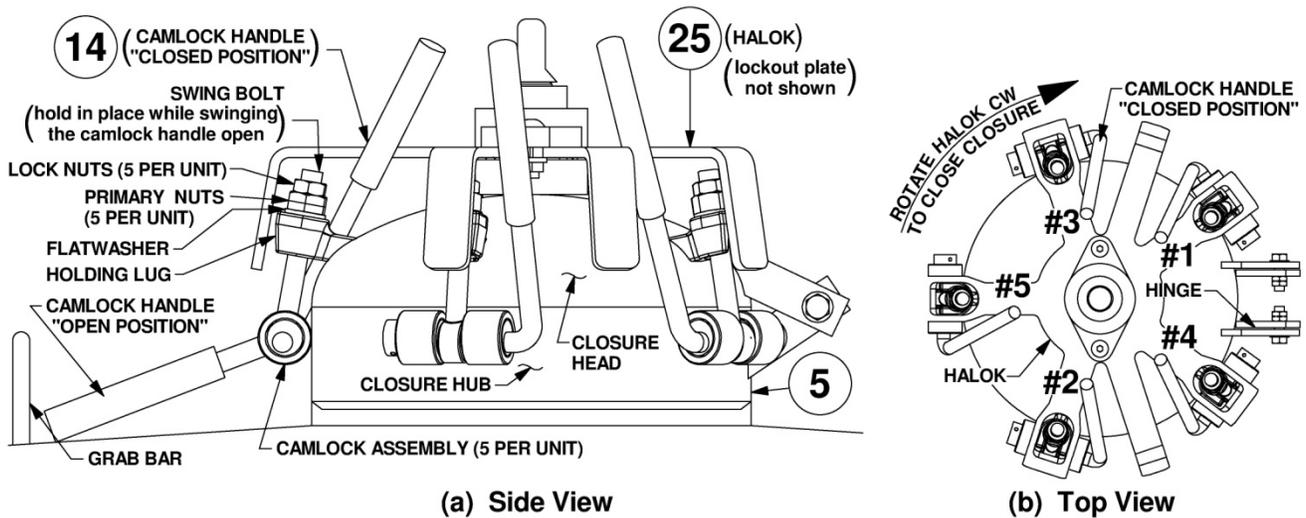


Figure 6.4.1 – Bulk Abrasive Blaster Closure Assembly

- 6.4.6. In the numbered sequence shown in Figure 6.4.1(b), tighten each swing bolt by swinging each of the five camlock handles into the “closed position” against the closure head. If necessary a 1/2” pipe 12 inches long can be slipped over the end of the camlock handle to increase leverage.
- 6.4.7. Complete all the pre-operation procedures in Section 6.0 then pressurize the bulk abrasive blast vessel per the instructions given in Section 7.2. After pressurizing check the closure assembly for air leaks. Periodically check the closure for leaks thereafter.

⚠ DANGER

The closure assembly is part of a Pressurized Vessel. Component failure will propel objects causing serious injury or death. If the closure assembly is leaking air, depressurize the bulk abrasive blaster per Section 6.2 and inspect per Section 8.4. Do Not use the bulk abrasive blaster with the closure assembly leaking air.

Note: Bulk abrasive blasters manufactured after November 2013 may include the optional Halok® lockout feature that prevents opening of the closure assembly when a locking device is installed. The purpose of the Halok lockout is to disable its operation and thereby protect against unauthorized opening of the closure assembly. See Figure 6.4.2 and Section 9.13.

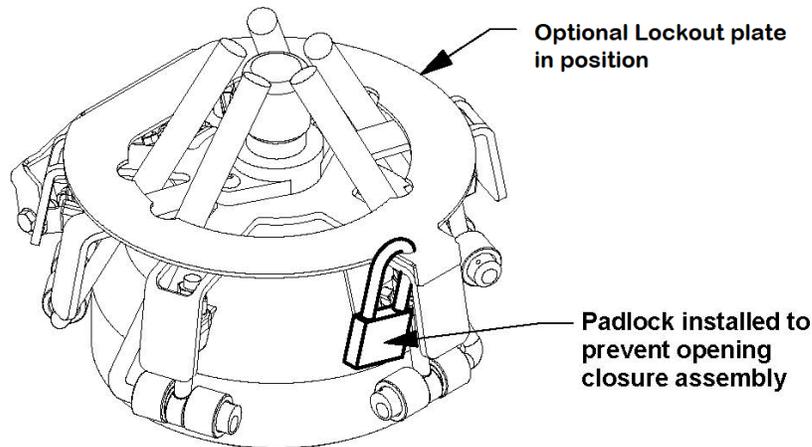


Figure 6.4.2 – Closure Assembly with Halok & Optional Lockout

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6.5. Manway Cover Installation Procedure (See Figure 6.5(a)).

- 6.5.1. Check that the manway cover, crabs, bolts, and gasket are dimensionally correct for the size manway weld ring of the pressure vessel.
 - a) Measure and write down the inside dimensions “A” and “B” of the manway weld ring. See Figure 6.5(a).
 - b) Identify the size of the manway assembly by comparing the weld ring measurements from step “a” to the dimensions shown in Table 6.5(c).
 - c) Verify that the dimensions of the cover, crabs, bolts, and gasket match the corresponding dimensions given in Table 6.5(c). **Note:** The actual dimensions may vary by up to 1/4" from those given in Table 6.5(c).
 - d) Replace any component that is not dimensionally correct. Incorrect dimensions indicate that the component is part of a different size manway assembly.



The manway assembly is part of a Pressurized Vessel. Use of incorrect manway components will result in assembly failure. Assembly failure will propel objects causing serious injury or death.

- 6.5.2. Once a month inspect the manway gasket for tears, cracks, or other wear. Replace if necessary.
- 6.5.3. Once a month inspect the manway weld ring sealing surface inside the vessel. Inspect the manway cover sealing surface. Both surfaces must be smooth.
- 6.5.4. Preassemble the bolts through each crab and thread on each nut a couple of turns.
- 6.5.5. Securely place the gasket on the manway cover fitting it under the Manway Stay Bracket tabs. The gasket is held in place by the tabs. Refer to Figure 6.5(b).
- 6.5.6. Fit the cover with gasket through the manway opening.
- 6.5.7. Place the cover and gasket in position against the inside edge of the manway weld ring with the long tab of the Manway Stay Bracket at the bottom of the weld ring as shown in Figure 6.5(a) Front View. Apply a pulling force to hold in position then proceed.
- 6.5.8. The Manway Stay Bracket centers the gasket and cover over the manway weld ring. Rotate the cover left or right until the long tab of the Manway Stay Bracket is level horizontally.
- 6.5.9. Slide each manway crab w/bolt into cover bracket slot until the bolt bottoms at the inside edge. Loosely tighten each nut. See Figure 6.5(a) and 6.5(b).
- 6.5.10. When all components are centered and the crab bolts are bottomed in the slots, tighten the nuts and bolts with a wrench until they are snug.
- 6.5.11. Only after completing all the pre-operation procedures in Section 6.0 and the bulk abrasive blast vessel is then pressurized, re-tighten the nuts and bolts with a wrench until they are snug again.
- 6.5.12. Do not over-tighten the crab nuts and bolts. Over-tightening could bend the crab out of shape resulting in malfunction of the assembly.
- 6.5.13. Periodically check for leaks.

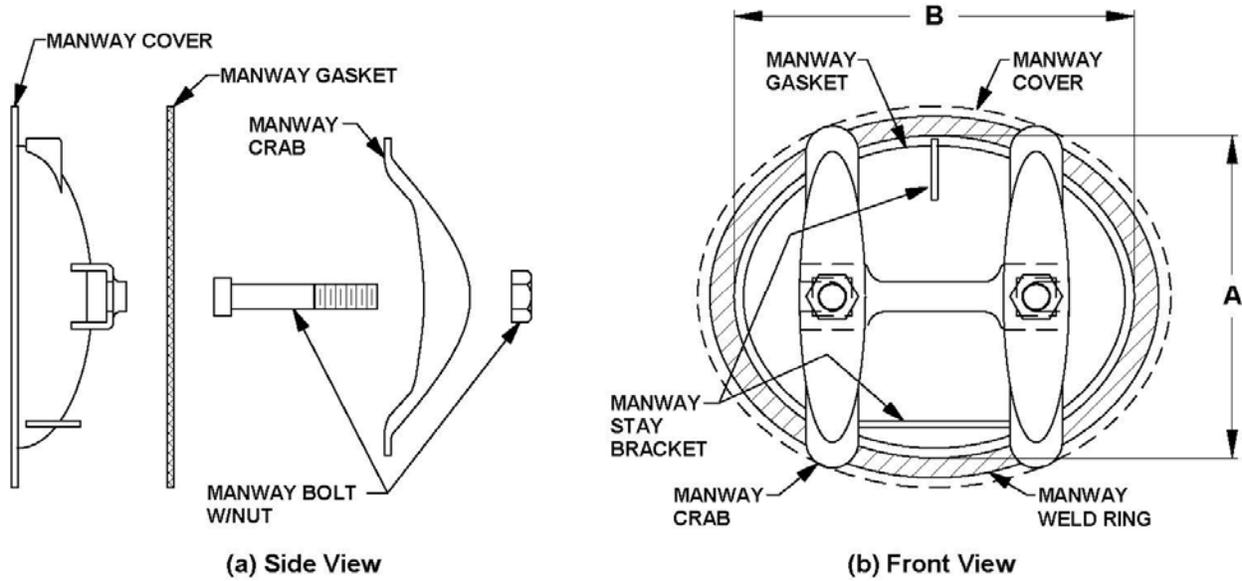


Figure 6.5 (a) – Manway Assembly

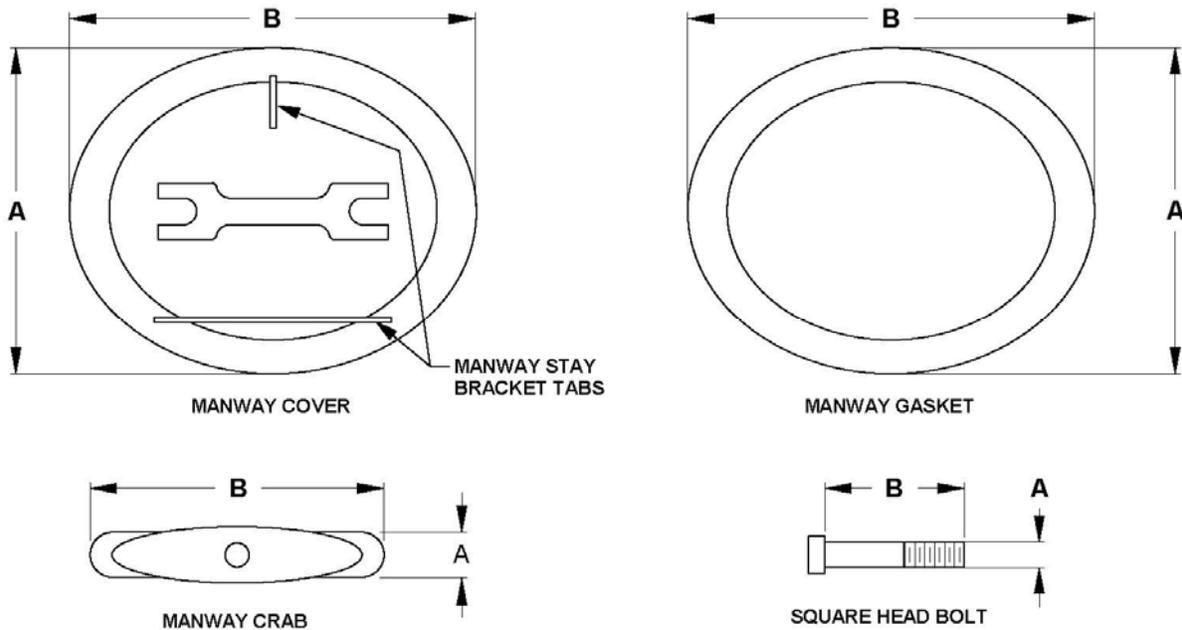


Figure 6.5 (b) – Manway Components

Manway Component Dimensions						
Component	*11" x 15"		**12" x 16"		***14" x 18"	
	A	B	A	B	A	B
Weld Ring	11-3/8"	15-3/8"	12-1/2"	16-3/8"	13-7/8"	17-7/8"
Manway Cover	14-1/8"	17-5/8"	14-3/4"	18-3/8"	16-3/4"	20-3/8"
Manway Gasket	14"	17-3/4"	14-3/4"	18-3/8"	16-1/2"	20-3/8"
Manway Crab	2"	12-1/4"	2-1/4"	13-1/4"	2-3/4"	14-7/16"
Square Head Bolt	1" UNC	5-1/2"	1" UNC	5-1/2"	1" UNC	5-1/2"

*11" x 15" Manway was used on bulk abrasive blasters manufactured prior to October 1994.
 **12" x 16" Manway is the standard size on bulk abrasive blasters manufactured since October 1994.
 ***14" x 18" Manway is an uncommon optional size.

Table 6.5 (c) – Manway Component Dimensions

7.0 Operating Instructions

7.1. Filling the Bulk Blaster with Abrasive.

- 7.1.1. The bulk abrasive blaster must be completely depressurized before filling can begin. Follow the depressurizing procedure in Section 6.2.

WARNING

Airborne particles and loud noise hazards from blowdown exhaust air can cause serious injury and loss of hearing. Wear approved eye and ear protection. Stay clear of blowdown air path. DO NOT place hands or other body parts in the blowdown air path. Make sure no personnel are in the blowdown air path.

- 7.1.2. Open the closure assembly per the procedure given in Section 6.3.

DANGER

The closure assembly is part of a Pressurized Vessel. Propelled objects will cause serious injury or death. Depressurize vessel before opening the closure. See Section 6.2.

- 7.1.3. Fill the bulk abrasive blaster as needed.

To fill from a Schmidt® storage hopper, pull the bulk abrasive blaster below it lining up the closure under the slide valve outlet. Open the slide valve and fill the bulk blaster as needed. See Figure 4.1.

The bulk abrasive blaster can also be filled by using a Schmidt Vacuum Loading System. See Schmidt operation and maintenance manual #7200-275 for operating instructions. See Section 9.10 for diagram.

To fill using a Schmidt® Bulk Bag Rack, see Operation and Maintenance Manual #7200-330 for operating instructions. See Section 9.15 for diagram.

- 7.1.4. When the level begins to approach to the bottom of the closure, be prepared to stop the abrasive flow. Close the slide valve to stop abrasive flow.
- 7.1.5. Inspect the closure assembly per the instructions given in Section 8.4.

DANGER

The closure assembly is part of a Pressurized Vessel. Component failure will propel objects causing serious injury or death.

DO NOT operate the bulk abrasive blaster with a closure assembly that has damaged or worn components. Use of the closure assembly with worn or damaged parts will result in component failure.

- 7.1.6. Close the closure assembly per the procedure given in Section 6.4.
- 7.1.7. Complete all the pre-operation procedures in Sections 6.0 and 7.1 then pressurize the bulk abrasive blast vessel per the instructions given in Section 7.2. After pressurizing check the closure assembly for air leaks. Periodically check the closure for leaks thereafter.

DANGER

The closure assembly is part of a Pressurized Vessel. Component failure will propel objects causing serious injury or death. If the closure assembly is leaking air, depressurize the bulk abrasive blaster per Section 6.2 and inspect per Section 8.4. Do Not use the bulk abrasive blaster with the closure assembly leaking air.

7.2. Beginning the Blasting Operation (See Figure 7.3 or Figure 8.7).

- 7.2.1. The bulk abrasive blaster must be properly prepared and all operating personnel must be thoroughly trained before beginning the blast operation. Completely read and understand all sections of this manual before beginning the blast operation. See the maintenance instructions in Section 8.0 and the pre-operation procedures given in Section 6.0.
- 7.2.2. Perform the required inspections and maintenance before beginning the blast operation. See the instructions given in Section 8.0.



The bulk abrasive blaster is a Pressurized Vessel. Propelled objects will cause serious injury or death. Depressurize vessel before performing any maintenance. See Section 6.2.

- 7.2.3. Open the abrasive shutoff valve (#24). See Figure 7.3.
- 7.2.4. Open the manual choke valves (#9) at the side of the moisture separator (#8). Leave the choke valves completely open at all times while blasting. Close the choke valve only for the “choke” procedure (see Section 11.3.2.). Do Not blast for long periods with the choke valve partially closed since this will cause excess wear in Thompson® Valve (#13).
- 7.2.5. Close the blowdown ball valve (#15) at the rear of the vessel near the manway (#16) and close the pressure indication ball valve (#23) next to the closure. See Figure 7.3.
- 7.2.6. The vessel may now be pressurized by slowly opening the air inlet ball valve (#7).
- 7.2.7. Check the closure assembly, manway, and piping for leaks after pressurizing. Periodically check for leaks thereafter.
- 7.2.8. Keep the ball valve (#6) on bottom of the moisture separator (#8) slightly open during the blast operation to allow moisture to continually drain. Once each day completely open the drain ball valve to blow out all moisture and dirt particles.
- 7.2.9. With one hand grip the blast hose assembly (#19) and with the other hand press in the deadman safety button. To begin blasting, aim the blast nozzle at the object to be blasted, then firmly press down the deadman lever (#1). Air and blast abrasive will flow into the blast hose (#19) and out of the blast nozzle (#21). Release the deadman lever to stop blasting.



Do Not aim the blast nozzle towards yourself or any person. A system malfunction or a blocked blast nozzle that clears can trigger accidental start up resulting in injury to personnel.

- 7.2.10. The abrasive flow can be adjusted with the knob (#20) on the Thompson Valve (#13). Turn clockwise for less abrasive flow and counter-clockwise for more abrasive. Due to the length of the blast hose there will be a slight delay in control of the abrasive flow at the nozzle, therefore allow a few seconds before adjusting further. Note: If the blaster is equipped with the optional abrasive cut-off feature set the valve (or switch) to the “on” position to blast with abrasive. See Sections 9.11 and 9.12.
- 7.2.11. Release the deadman lever (#1) to stop the blast operation.

7.3. Ending the Blast Operation (See Figure 7.3 or Figure 8.7).

CAUTION

Do not leave the abrasive blaster pressurized during long periods of no usage. Undetected air leaks can cause costly wear damage to the pressure vessel (i.e. at abrasive inlet and manway).

- 7.3.1. Close the air inlet ball valve (#7). The ball valve is closed when the handle is fully turned to the position shown in Figure 7.3 (handle perpendicular to body). The handle tab will bottom against the ball valve body in the closed position.

CAUTION

Do not turn off the air compressor and allow the abrasive blaster air pressure to back flow through the system. Back flow will carry abrasive into the moisture separator (#8) and contaminate the controls.

- 7.3.2. Completely depressurize the abrasive blast vessel (#4 & #8) by slowly and completely opening the blowdown ball valve (#15) that is located near the manway at the rear of the vessel. See Section 6.2 for blowdown procedure. Do Not leave the blast vessel pressurized while not in use.

WARNING

Airborne particles and loud noise hazards from blowdown exhaust air can cause serious injury and loss of hearing. Wear approved eye and ear protection. Stay clear of blowdown air path. DO NOT place hands or other body parts in the blowdown air path. Make sure no personnel are in the blowdown air path.

- 7.3.3. Completely open ball valve (#6) at the bottom of the moisture separator (#8) to allow all the accumulated moisture to be drained out.
- 7.3.4. For long periods of no usage, close all ball valves, closure, and manway to protect against moisture contamination of remaining blast abrasive.

CAUTION

Steel abrasive left inside the blast vessel can be contaminated by moisture and solidify inside causing costly damage.

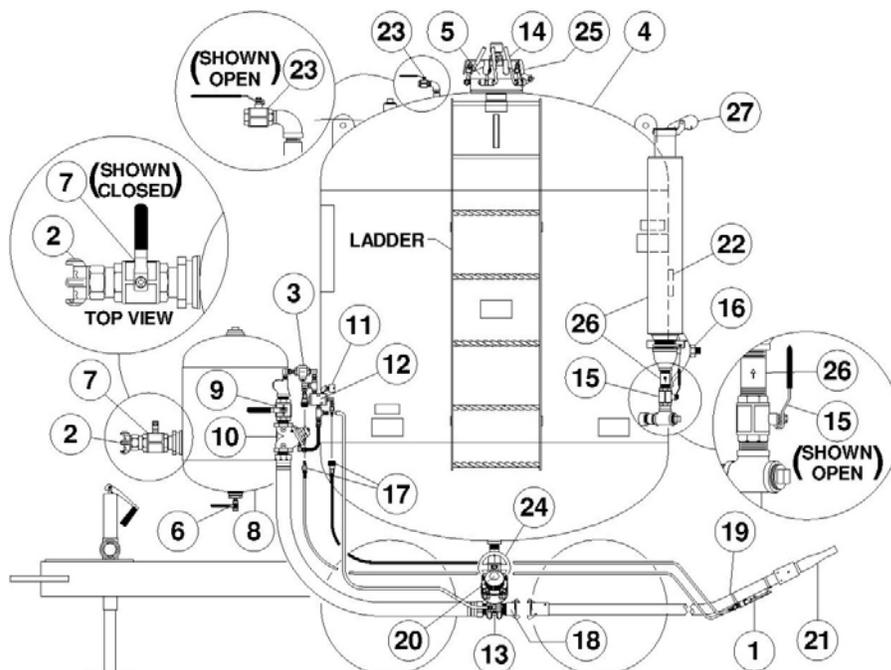


Figure 7.3 – Typical Bulk Abrasive Blaster

8.0 Maintenance and Inspection Instructions

DANGER

The bulk abrasive blaster is a Pressurized Vessel. Propelled objects will cause serious injury or death. Depressurize vessel before performing any maintenance. See Section 6.2.

WARNING

For proper operation, maintenance should be performed with the assistance of a qualified serviceman.

- 8.1. **Blaster Pressure Vessel:** The ASME Code is a standard covering materials, design, fabrication, and installation. Vessel integrity after purchase is the responsibility of the owner and/or user. At intervals required by state law and/or local authorities, the vessel should be subjected to a hydrostatic test as described in the ASME Code, Section VIII, Division 1. Do Not subject the abrasive blaster pressure vessel to a pneumatic proof test exceeding the maximum allowable working pressure. In no case should the hydrostatic test pressure exceed 1.3 times the maximum allowable working pressure (MAWP) shown on the pressure vessel nameplate (#22). Thoroughly clean and dry the vessel before re-assembly. Moisture or debris left in vessel can cause equipment malfunction.
- 8.2. **Blaster Pressure Vessel:** Any damage to an abrasive blaster can make it unsafe. Inspect the exterior of the abrasive blast vessel weekly for corrosion, pitting, or other damage (i.e. dents, gouges or bulges). If damaged, take out of service immediately and have it inspected and/or repaired by a qualified facility. Contact Axxiom Manufacturing, Inc. for technical support.
- 8.3. **Blaster Pressure Vessel:** The interior condition of the abrasive blast vessel (#4) should be inspected quarterly. Pitting caused by corrosion will reduce the wall thickness of the vessel. If excessive corrosion is found, have the abrasive blast vessel inspected by a qualified facility. Contact Axxiom Manufacturing, Inc. for technical support. Refer to the ASME U1-A Data report for the pressure vessel minimum thicknesses.

Check the pressure vessel internal piping for corrosion, cracks, wear, holes, or any other damage. Repair or replace damaged components. Remove and clean out the y-strainer element or GSV. See Sections 9.1(a) and 9.2(a).

- 8.4. **Closure Assembly:** Before pressurizing the bulk abrasive blaster the camlock handle assemblies (#14) and all other closure (#5) components must be closely inspected for defects as follows:

CLOSURE ASSEMBLY INSPECTION POINTS

- a) Inspect closure O-ring for shrinkage, swelling, cuts, or tears.
- b) Inspect O-ring sealing surfaces for corrosion, cracks, deformations, paint, or other trash.
- c) Inspect for presence of swing bolt nuts and washers.
- d) Inspect swing bolts for corrosion, wear, cracks, deformations, paint, or other trash.
- e) Inspect (2) nuts for corrosion, wear, cracks, or deformations.
- f) Inspect threads on swing bolts and nuts for corrosion or wear.
- g) Inspect cams for presence of spring pins.
- h) Inspect closure hinges for ease of operation.
- i) Inspect camlock handle assemblies for ease of operation.
- j) Periodically lubricate swing bolts with a hydrocarbon-base lubricant.

Clean debris off all components. Replace all missing and defective components. Any camlock, swing bolt, nut, or hinge that show signs of damage, corrosion, wear, or does not swing freely must be repaired or replaced prior to re-pressurizing the blast vessel. The camlock handles must be installed into the cam lugs as shown in Figure 8.1(b) so there is no interference with closure head handle or hinges, and to insure proper operation of the closure Halok (#25). The torque on the camlock assembly nuts must be properly adjusted. See Section 8.5 for camlock adjustment.

DANGER

The closure assembly is part of a Pressurized Vessel. Propelled objects will cause serious injury or death. Depressurize vessel before opening the closure assembly. See Section 6.2.

- 8.5. **Closure Assembly:** After any camlock assembly is disassembled or replaced the nut torque must be reset per the procedure described below. Check the camlock assembly nut torque weekly thereafter.

CAMLOCK ASSEMBLY ADJUSTMENT PROCEDURE

- Inspect all closure components per Section 8.4
- Remove the upper camlock assembly lock nuts.
- Swing all the bolts into place within the holding lugs. Confirm presence of flat washers.
- Following the numbered sequence shown in Figure 8.1 tighten each bolt in three steps.
- Final torque of each bolt should be 15 ft lb.
- After tightening all primary nuts re-install all the upper lock nuts.
- While wrench holding the lower primary nut, tighten each upper locking nut against it.
- Check all camlock assemblies for ease of operation.

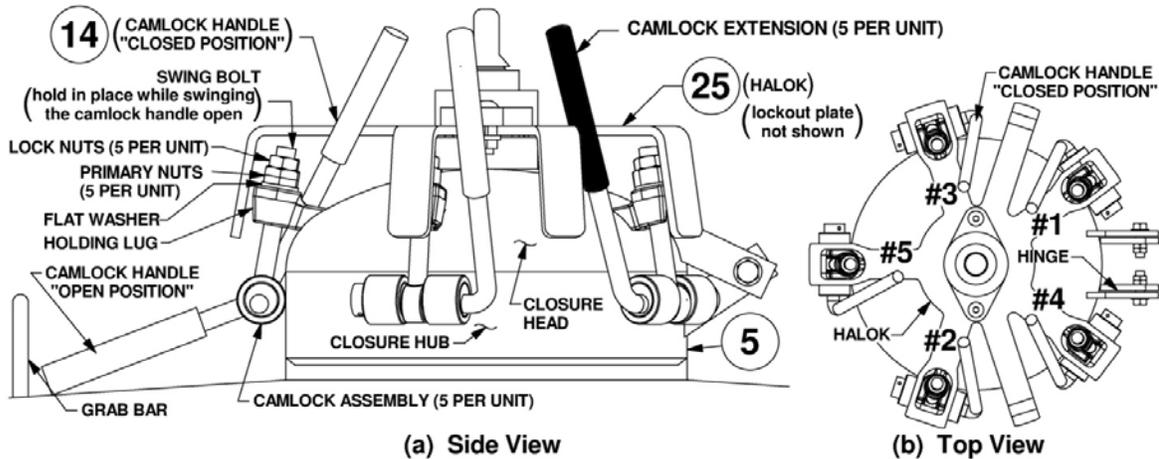


Figure 8.1 – Closure Assembly

- 8.6. **Blast/Air Hoses, Piping, Pipe Fittings, and Wires:** All air hoses, blast hoses, control hoses, pipe, pipe fittings, and wires are wear items on any abrasive blaster. These components should be inspected daily for air leaks, cracks, holes, dry rotting, cuts, or any other damage. Repair or replace any component that shows signs of damage.

⚠ DANGER

Damaged hoses, piping, pipe fittings or wires can cause system malfunctions and can result in serious injury or death to operating personnel.

Blast hoses are a high wear component of the abrasive blast system. Sharp bends in the blast hose create high wear points resulting in soft spots that can rupture while blasting. Check the full length of the blast hose assembly for soft spots caused by wear. To protect against serious injury to personnel replace blast hoses with soft spots. **Note:** Static electricity is generated by the abrasive flow through the blast hose. To protect against static electrical shock to operating personnel only use anti-static blast hose and properly ground the abrasive blaster.

⚠ WARNING

Worn blast hose assemblies can rupture while blasting and the resulting abrasive blast stream can cause serious personal injury.

⚠ WARNING

Longer blast hoses require longer time to dissipate the blast stream when the deadman is released to end the blast operation. This extended dissipation time increases the risk of injury should there be an accidental loss of control of the blast hose.

⚠ CAUTION

Static electric shock hazard. To minimize chance of static electrical shock to operating personnel only use anti-static blast hose, properly electrically bond the blast nozzle, blast hose couplings, and the equipment, and properly install a earth ground to the abrasive blaster. See Section 5.12.

- 8.7. **Blast/Air Hose Couplings:** All air hose, blast hose, and threaded couplings have pin holes that align when connected. To protect against accidental hose disconnections safety pins must be installed through these holes. Each hose connection must also include a hose whip check that will hold the hose if there is an accidental disconnection. Connect one loop to each side of the connection and stretch out as shown in Figure 8.2 below. Check hose connections daily and replace missing or damaged pins and whip checks.

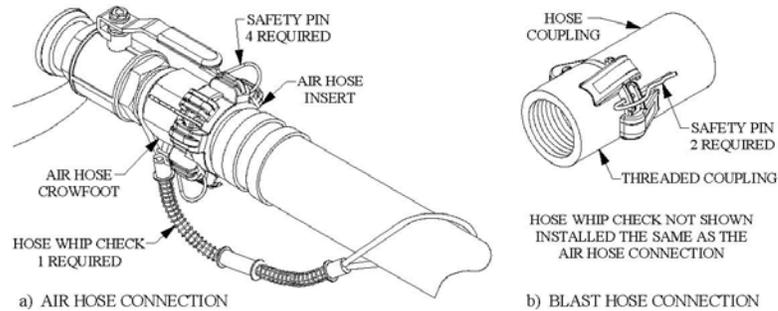


Figure 8.2 – Hose Connection Disconnect Protection

- 8.8. **Blast/Air Hose Coupling Gaskets:** All air hose, blast hose, and threaded couplings have gaskets that seal the connection. To reduce loss of air pressure and/or premature abrasive wear replace these gaskets when leaks are found. Inspect the couplings daily for leaks and wear. Replace gaskets when visible wear or leaks are found. When installing or replacing hose couplings cut the hose end square for secure fit (see Figure 8.3). To assure proper coupling connection always use fittings that are the same brand. See the drawings and part lists in Sections 9.1 and 9.2.

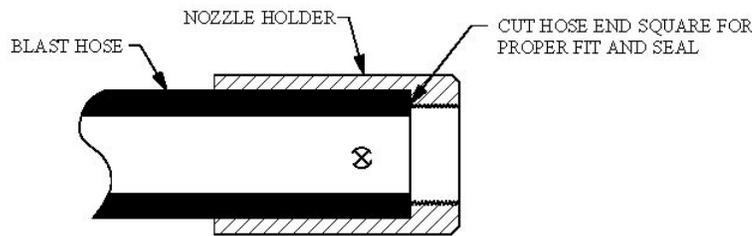


Figure 8.3 – Hose End Fit up

- 8.9. **Blast Nozzle(s):** Remove the blast nozzle daily and check the jacket and thread condition. Check nozzle throat diameter. An over-sized throat diameter reduces blast efficiency. Replace the blast nozzle if worn or damaged.
- 8.10. **Valves:** Thompson Valves, Automatic air valves, control valves, and deadman valves should be disassembled and inspected quarterly, or more frequently if heavily used. Ball valves should open and close without difficulty and should not leak air. Repair or replace any component that shows signs of damage. The Thompson Valve cylinder should be cleaned and lubricated with an anti-seize compound. Replace parts as needed with Schmidt® original factory replacement parts furnished by an authorized Schmidt distributor. Once a day check if air is leaking from end of blast nozzle when the blast operation is off. A worn Thompson® or TeraValve™ seat or trash in the valve usually causes this (See section 11.3.5). Clean or replace by removing the four bolts in the base of the valve to allow disassembly. Refer to valve drawings in Section 9.0 and specific valve maintenance manual.

⚠ DANGER

Depressurize vessel before performing any maintenance. See Section 6.2. Removing the Thompson valve bolts with the bulk blaster pressurized will result in serious injury or death.

⚠ WARNING

Use of replacement components that are not Schmidt original factory replacement parts may result in equipment failure which can result in serious personal injury.

- 8.11. **Blowdown Ball Valve:** The blowdown ball valve (#15) is used to depressurize the bulk abrasive blaster pressure vessel (#4 & #8). The blowdown air flow can carry abrasive from inside the pressure vessel which can wear the blowdown ball valve (#15) and piping. This wear will cause the blowdown ball valve (#4) to be difficult to open and/or close leading to the inability to close properly causing air leaks. The blowdown air flow will also wear the pipe fittings in line. If and when any of these conditions develop they will be noticeable during daily blowdown operation. When any malfunction is detected the blowdown ball valve (#15) and attaching fittings should be replaced.

▲ WARNING

Worn blowdown valve, piping, and pipe fittings can rupture during operation which can cause serious injury or death to operating personnel. Always repair or replace worn or damaged components.

The blowdown ball valve (#15) should be inspected for proper operation at each use of the abrasive blaster. Confirm that the blowdown ball valve handle turns open and closed without difficulty. Difficulty in turning the blowdown ball valve handle indicates grit contamination within the moving parts of the valve. **Note:** Once maintenance is completed as detailed in Section 8.0 and the abrasive blaster is re-pressurized, confirm there is no air leakage when the blowdown ball valve (#15) is closed. The ball valve is closed when the handle is fully turned to the position shown in Figure 8.4(a) (handle perpendicular to body). When any malfunction is detected the blowdown ball valve (#15) and attaching fittings should be replaced.

When replacing the blowdown ball valve (#15), also replace the pipe fittings upstream of the valve. These fittings are the 1-1/4" x 3" nipple, 1-1/4" tee, and the 1-1/4" pipe plug (see Figure 8.4(a)). Inspect the downstream fittings for wear and replace as necessary. These fittings include the CEN nozzle, bell reducer, nipple, muffler, and rain cap.

On units manufactured prior to February 2010 refer to Figure 8.4(b): When replacing the blowdown ball valve (#15) the additional fittings upstream of the blowdown ball valve (#15) that should also be replaced are the 1-1/4" close nipple and 90° street elbow.

On units manufactured prior to February 2010 that have been field modified to include the CEN System refer to Figure 8.4(c): When replacing the blowdown ball valve (#15) the additional fittings upstream of the blowdown ball valve (#15) that should also be replaced are the 1-1/4" close nipple and 90° street elbow. Inspect the downstream fittings for wear and replace as necessary. These fittings include the abrasive hose, hose fittings, threaded coupling, coupling gaskets, 90° elbows, CEN nozzle, bell reducer, nipples, muffler, and rain cap.

Inspect the abrasive blaster pressure vessel coupling prior to re-installing the blowdown ball valve and fittings. Check for thread damage caused by wear or corrosion. If damage is found remove the abrasive blaster from service and have it repaired by an authorized ASME Code repair shop.

- 8.12. **PPE:** Check daily to verify that all personal protective equipment is available for each blast operator. Check daily to verify that all personal protective equipment is in good operating condition. Consult the operating and maintenance instructions provided by the manufacturer of each PPE item. See Section 3.10 and reference OSHA 29 CFR 1910 Subpart I.

▲ WARNING

Failure to use personal protective equipment could result in serious injury or death.

- 8.13. **Warning Decals:** Check monthly to verify that all the warning decals are in position and legible. See Section 0.0 for full descriptions and locations.

▲ DANGER

Failure to maintain warning decals risks the possibility of not alerting the abrasive blaster operator to potential dangers which can result in serious injury or death. See Section 0.0.

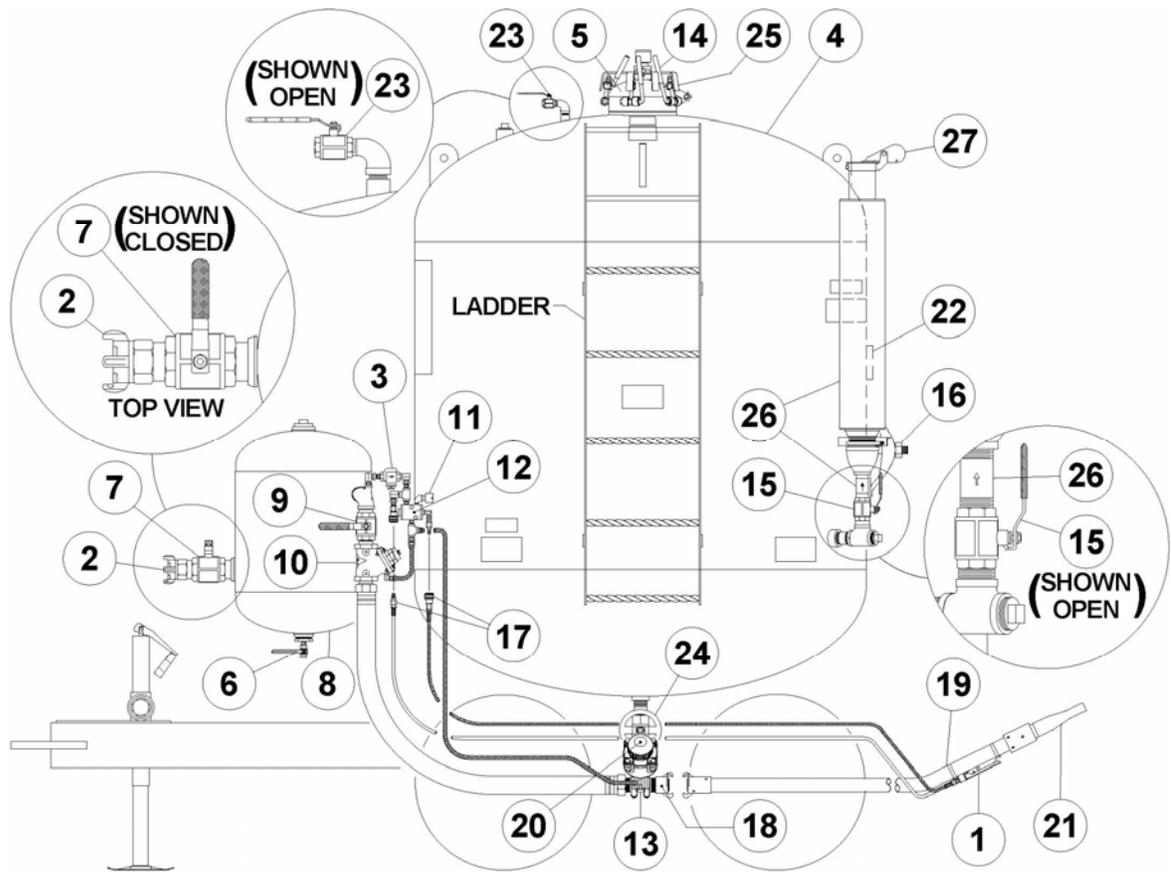


Figure 8.4(a) – Typical Bulk Abrasive Blaster w/CEN

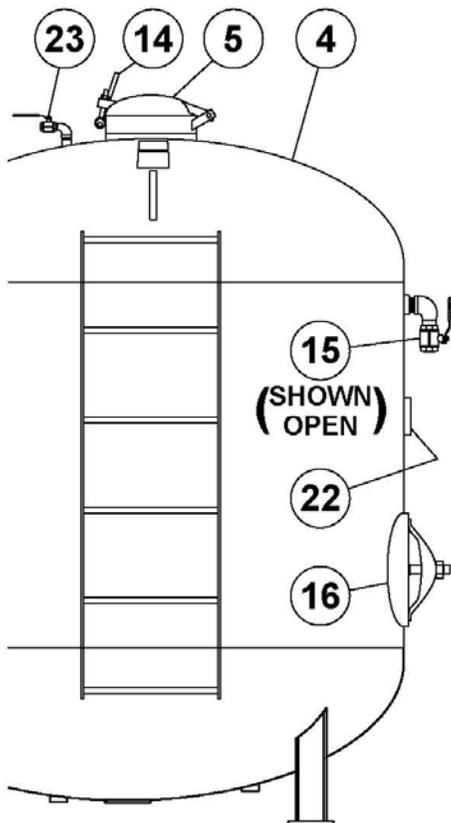


Figure 8.4(b) – Bulk Blaster without CEN

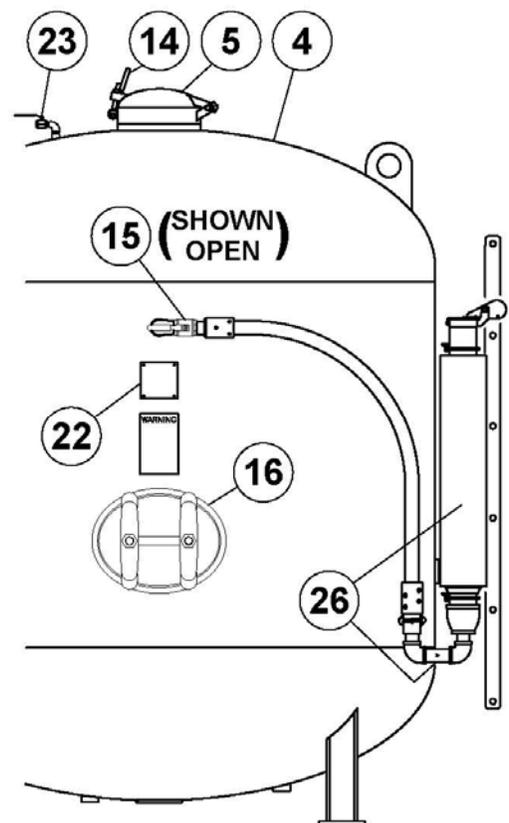


Figure 8.4(c) – Bulk Blaster with field added CEN

- 8.14. **Vessel Manway Assembly:** Check monthly for air leaks around the manway assembly. Confirm correct assembly components. Refer to Section 6.5 for installation and inspection procedures.
- 8.15. **Moisture Separator and Strainer:** With the air supply on, once a day completely open the moisture separator drain ball valve (#6 Figure 8.4(a)) and the control air strainer petcock (#3 Figure 8.4(a)) to purge all moisture and debris. Purge for about one minute then close the ball valve and petcock.
The moisture separator should be cleaned quarterly to improve air flow. Pressure wash downward through the top head coupling. A degreasing agent may be used to remove oil buildup. Clean thoroughly before placing back into service.
- 8.16. **Trailer Wheels:** Verify that the wheel to hub fit is correct and that the proper wheel lug nuts are being used. See Table 8.4 for lug nut type and Figure 8.6 for wheel to hub fit.

Check the trailer wheel lug nut torque upon delivery of the new bulk abrasive blaster. On new units, the lugs must be retightened after each load and before reloading. This is most important after the first load when the lug nuts are establishing a seat. Check the trailer wheel lug nut torque quarterly thereafter.

On new highway trailer mounted units transported on public roads, re-torque the wheel lug nuts after the first 50 miles of use. Check the trailer wheel lug nut torque quarterly thereafter. After mounting a wheel re-torque after the first 50 miles of use. Determine the model number of the bulk abrasive blaster and torque the wheel lug nuts to the specifications shown in Table 8.4. Torque the wheel lug nuts in the sequence shown in Figure 8.5.

Model	Bolt Pattern	Wheel Type	Thread Size	Lug Nut Type	Torque(ft-lb)
12,000 lb.	6 on 5.5" circle	Single	1/2" - 20	60 Degree cone	80 - 90
16,000 lb.	8 on 6.5" circle	Single	9/16" - 18	90 Degree cone	175 - 200
20,000 lb.	8 on 6.5" circle	Dual	5/8" - 18	1 Piece Flange	275 - 325

Table 8.4 – Trailer Wheel Torque Specifications

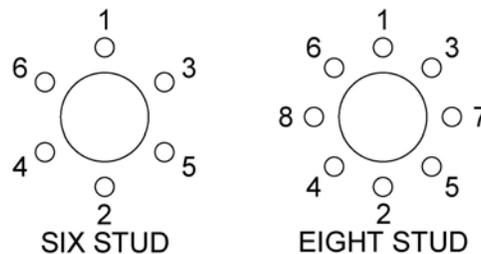


Figure 8.5 – Trailer Wheel Torque Sequence

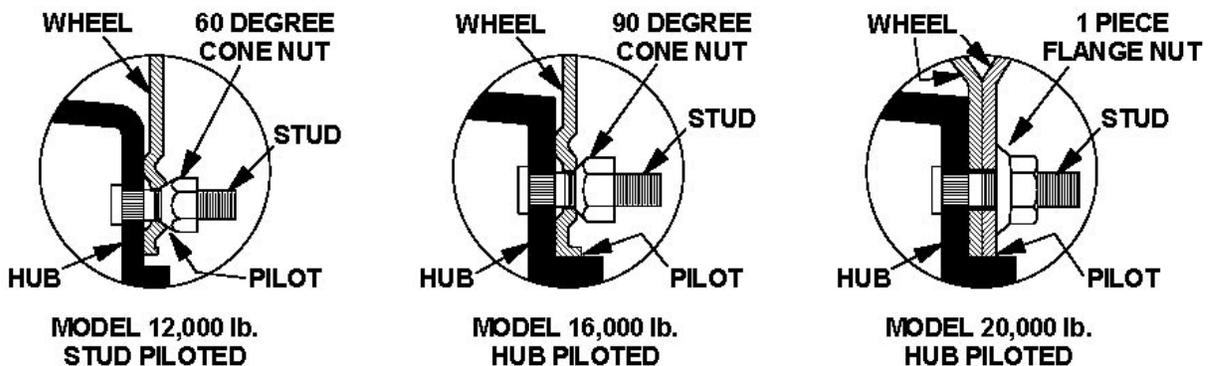


Figure 8.6 – Trailer Wheel to Hub Fit



Accident hazard. A loose wheel can cause loss of vehicle control. Tighten the wheel lug nuts frequently.

8.17. **Vessel Mount Bolts:** Check the vessel to trailer mounting bolt torque upon delivery of the new bulk abrasive blaster. Re-torque the mounting bolts after the first 50 miles of use. Check the mounting bolt torque quarterly thereafter. Torque the vessel to trailer mounting bolts to 98 ft lb. See the drawing in Section 9.3(a).

8.18. **Trailer Axle Maintenance:** (yearly hub/drum inspection and removal).

8.18.1. Removal of Hub

- (1) Remove wheel.
- (2) Remove dust cap.
- (3) Remove cotter pin.
- (4) Unscrew the spindle nut counter-clockwise.
- (5) Remove spindle washer.
- (6) Remove hub/drum from spindle.
- (7) Inspect hub/drum for abnormal wear or scoring. Replace if needed.

8.18.2. Seal Replacement

- (1) Seal should be replaced each time the hub is removed.
- (2) Pry the seal out of the hub with a screwdriver.
- (3) Tap new seal into place.

8.18.3. Bearing Maintenance, Adjustments, and Replacements

- (1) Inspect for corrosion and wear.
- (2) If any rust or wear exists on the bearing remove and replace it.
- (3) If bearings are found to be in good condition, then cleaning and repacking the grease is all that is needed. **Note: Do not spin bearings with compressed air.**
- (4) Hand pack each bearing individually using a premium water resistant wheel bearing grease.
- (5) Reinstall the hub, reversing the procedure above then adjust bearings per procedures below.

8.18.4. Bearing Adjustment

- (1) **Recommended Setting:** The typical trailer hub uses a hardened washer and slotted hex nut for bearing adjustment. Hubs are usually set with a free running clearance or endplay of 0.001" to 0.010". **The use of a dial indicator is the only satisfactory method of checking adjustment.**
- (2) **Feel and drag method:** Tighten the slotted nut until the hub drags slightly when rotated (Rotating the hub while tightening the nut seats the bearing.). Loosen the slotted nut 1/6th turn (1 Hex) to align nut slot with the cotter pin hole. Wheel should turn freely. Insert new cotter pin through nut and spindle. If necessary loosen, **never tighten**, nut to align the slot with the hole in the spindle. Bend one leg of the cotter pin over the end of the spindle and the other leg over the nut. Tap legs slightly to set. Cotter pin must be tight.
- (3) **Torque Wrench Method:** Make sure nut is loose. Tighten nut with torque wrench to an initial torque of 50 ft-lb. Loosen nut from initial torque and finger tighten. Insert new cotter pin through nut and spindle. If necessary loosen, **never tighten**, nut to align slot with the hole in the spindle. Bend one leg of cotter pin over the end of the spindle and the other leg over the nut. Tap legs slightly to set. Cotter pin must be tight.
- (4) **Perform Dial Indicator Test:** Attach dial indicator block to the wheel. With both hands, push the wheel towards the trailer. Set the sensory tip of the dial indicator against the outer edge of the spindle. Set the dial indicator to zero. Grasp the tire at the top and the bottom and gently pull out. Check the reading on the dial indicator for the amount of endplay present in the bearing. (0.001" to 0.010") Readjust the bearing if required.

8.19. **Trailer Components:**

Remaining trailer components must be inspected and repaired as needed by a qualified service mechanic. See the maintenance schedule for in Section 8.20 for required inspection intervals.

8.20. Maintenance Schedules Quick Reference Charts.

Note: The following are minimum requirements for inspection and maintenance; however, the equipment should be inspected and serviced immediately if abnormal operation is detected.

BULK ABRASIVE BLASTER MAINTENANCE SCHEDULE					
Item	Function Required	Daily	Weekly	Monthly	Quarterly
Blaster Vessel	Hydrostatic Test See Section 8.1	As required by state law and/or local authorities			
Blaster Vessel	Check for exterior damage (corrosion, dents, bulges) See Section 8.2		X		
Blaster Vessel	Check for interior wear, corrosion, & pitting. Check Y-strainer or GSV, & piping See Section 8.3				X
Closure	Check component operation and condition. See Section 8.4	Before every use			
Closure	Check camlock nut torque See Section 8.5		X		
Blast & Air Hoses	Check air & blast hoses for soft spots, wear, cracks, or air leaks See Section 8.6	X			
Remote Control Hoses	Check control air hoses for soft spots, wear, cracks, or air leaks See Section 8.6	X			
Blaster Piping & Pipe Fittings	Check pipe & pipe fittings for wear, cracks, or air leaks See Section 8.6	X			
Remote Control Wires	Inspect wiring for bare spots, fraying, cuts, or cracks See Section 8.6	X			
Blast & Air Hose Couplings	Check for safety pins and whip checks See Section 8.7	X			
Hose Coupling Gaskets	Check for leaks at the air, blast coupling and threaded hose coupling gaskets See Section 8.8	X			
Blast Nozzle	Check blast nozzle threads and jacket for wear, damage, or air leaks. See Section 8.9	X			
Valves	With valves off and blast vessel pressurized check for air leakage at blast nozzle. See Section 8.10	X			
Valves	Disassemble, inspect, and lubricate. Check for proper operation. See Section 8.10				X
Blowdown Ball Valve	Check for proper opening and closing. Check for wear, damage, or air leaks. See Section 8.11	At every use			
Personal Protective Equipment	Check for presence and condition of all personal protective equipment. See Section 3.10 and 8.12	X			
Warning Decals	Check for presence and condition of all warning decals See Section 0.0 and 8.13			X	
Vessel Manway	Check gasket for wear, cracking, or dry rotting. Check sealing surfaces for damage. See Sections 6.5 and 8.14.			X	
Moisture Separator & Strainer	Fully open moisture separator drain ball valve and strainer petcock to purge moisture and debris. See Section 8.15.	X			
Moisture Separator	Degrease internal demister element. See Section 8.15.				X
Vessel Mount Bolts	Tighten to specified torque. See Section 8.17.				X

BULK TRAILER MAINTENANCE SCHEDULE				
Item	Function Required	3 Months Or 3,000 miles	6 Months Or 6,000 miles	12 Months Or 12,000 miles
Brakes	Test that they are operational	Before every use		
Brake Adjustment	Adjust to proper operating clearance	X		
Brake Magnets	Inspect for wear and current draw		X	
Brake Linings	Inspect for wear and contamination			X
Brake Controller	Check for amperage and modulation		X	
Brake Cylinders	Check for fluid leaks, or sticking			X
Brake Lines	Inspect for cracks, fluid leaks, or kinks			X
Trailer Brake Wiring	Inspect wiring for bare spots, fraying, etc.			X
Breakaway Systems	Check battery charge and switch operation	Before every use		
Hub/Drum	Check for abnormal wear or scoring See Section 8.18			X
Wheel Bearings & Cups	Inspect for corrosion or wear; clean and repack See Section 8.18			X
Seals	Inspect for oil leakage; replaced if removed See Section 8.18			X
Springs	Inspect for wear or loss of arch			X
Suspension Parts	Inspect for bending, loose fasteners, wear		X	
Hangers	Inspect welds			X
Wheel Nuts & Bolts	Tighten to specified torque values See Section 8.16	X		
Wheels	Inspect for cracks, dents, or distortion	X		
Tire Inflation Pressure	Inflate tires to manufacturer specifications	Before every use		
Tire Condition	Inspect for cuts, wear, bulging, etc.	X		

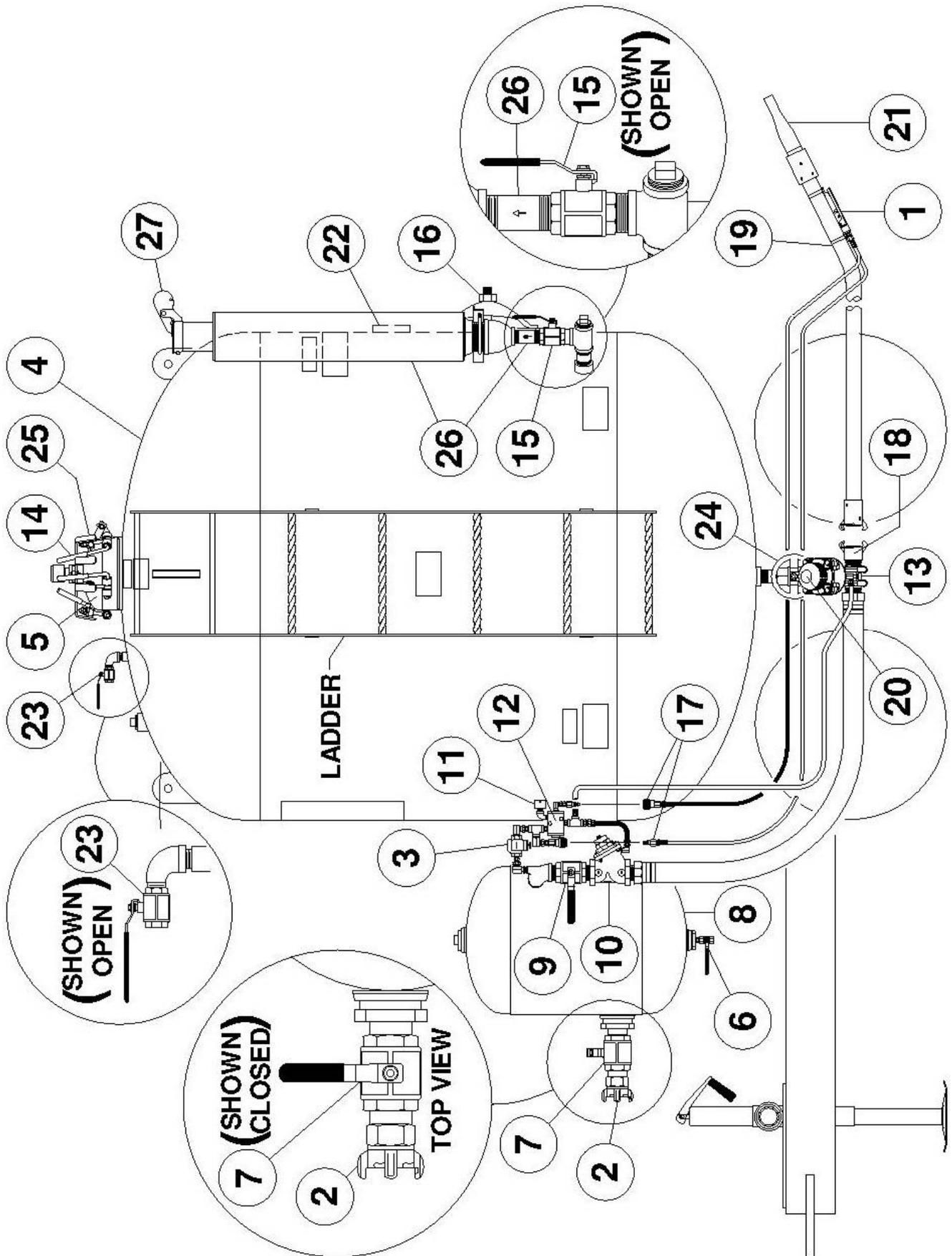
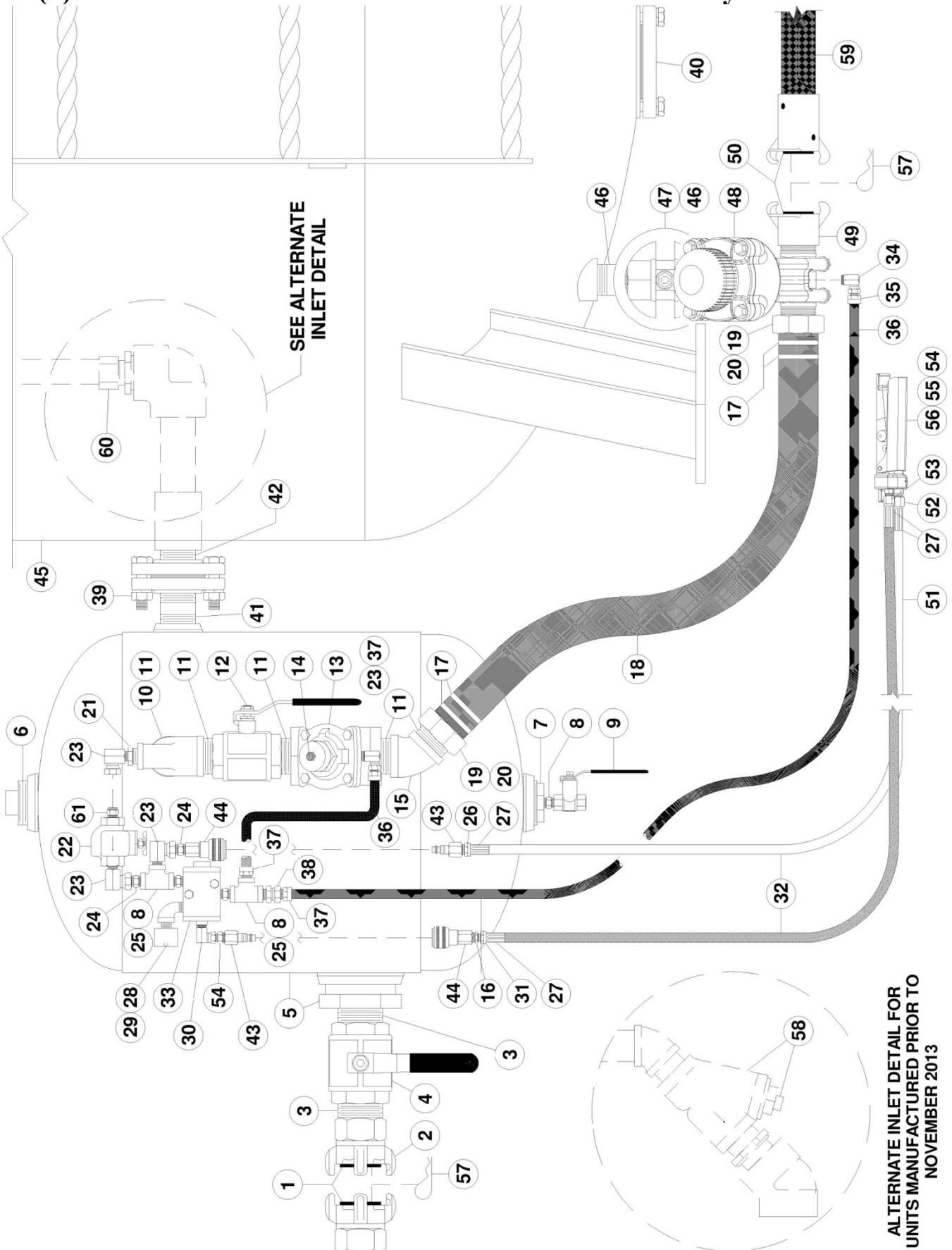


Figure 8.7 – Typical Bulk Abrasive Blaster

9.0 Drawings and Parts Lists

The following pages contain drawings representing typical blast control systems and components. Determine the type of control system the abrasive blast system is equipped with (pneumatic or electric controls), then reference the appropriate drawing and parts list to determine the required parts. To assure the proper operation of the blast system only use Schmidt® original factory replacement parts furnished by an authorized Schmidt distributor. See Section 1.40 and Section 12.2.12.

9.1(a) Bulk Abrasive Blaster with Pneumatic Control System

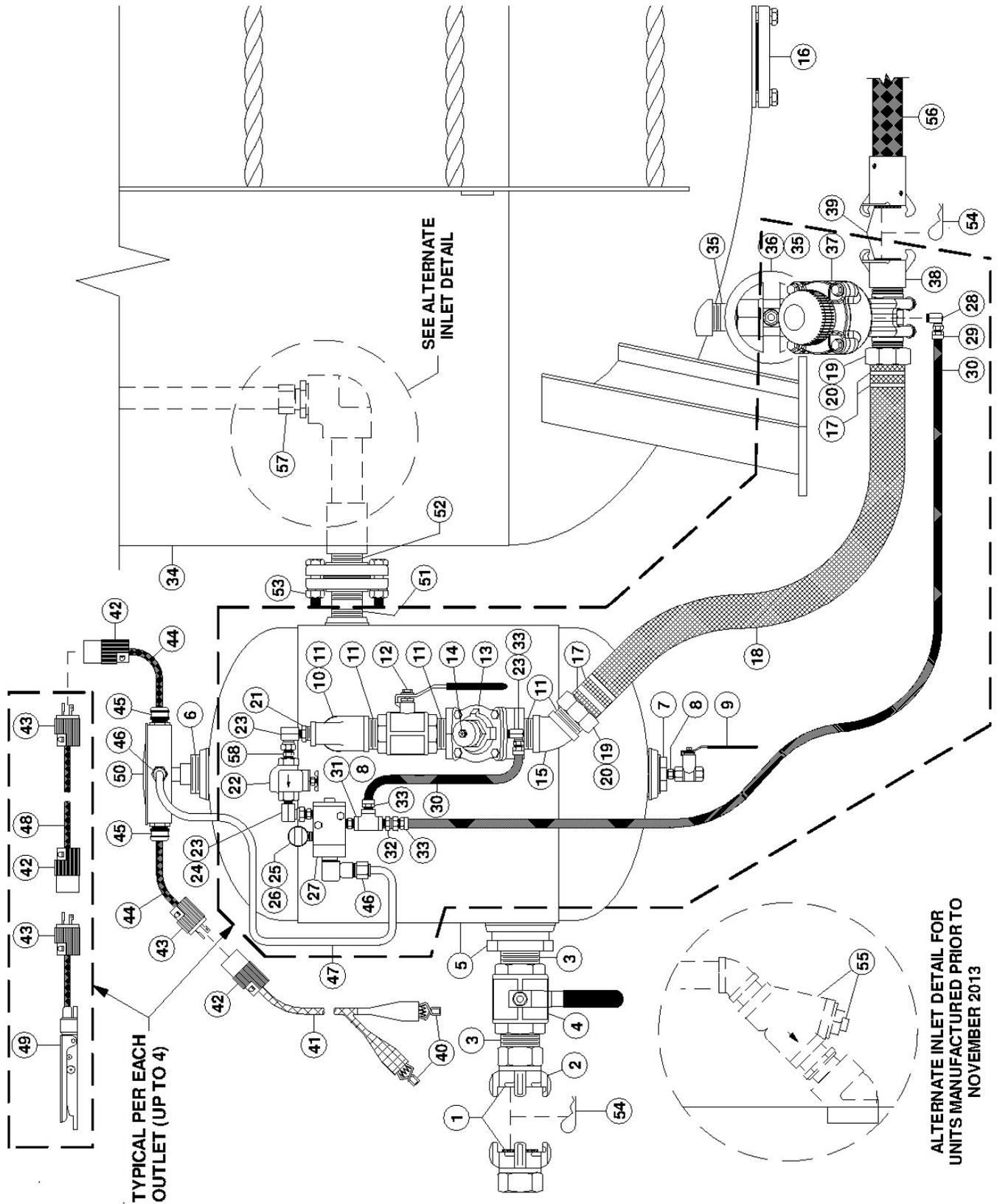


9.1(b) Pneumatic Control System Parts List

No.	Part No.	Description
34.	4203-500-00	90° Swivel, 1/8" x 1/8"
35.	4200-302-00	Push On Insert, 1/4" x 1/8"
36.	4101-002	Push On Hose, 1/4" (per foot)
37.	4200-302-02	Push On Insert, 1/4" x 1/4"
38.	4201-502-02	Straight Swivel, 1/4" x 1/4"
39.	7010-513-10	Hex Bolt, 9/16" UNC x 2 1/2"
	7028-558	Lock washer, 9/16"
	7017-513	Hex Nut, 9/16" UNC
40.	3014-013	Plug, 4"
	3014-011	Plug, 3"
	7003-411	Blind Flange, 3" 150#
	7003-011-01	Flange Gasket, 3" 150#
	7010-515-55	Bolt, 5/8" x 2-3/4"
	7028-552	Lock washer, 5/8"
41.	3036-008-11	Nipple, 1 1/2" x 3" Sch. 80
42.	3036-008-99	Nipple, 1 1/2" x Close Sch. 80
43.	4224-300-02	Male Quick Connect
44.	4224-301-02	Female Quick Connect
45.	1024-120	120 cu. ft. Vessel (4 Outlet-150 psi)
	1024-160	160 cu. ft. Vessel (4 Outlet-150 psi)
	1014-500	500 cu. ft. Vessel (4 Outlet-125 psi)
	1014-650	650 cu. ft. Vessel (4 Outlet-125 psi)
	1014-800	800 cu. ft. Vessel (4 Outlet-125 psi)
46.	3029-007-99	Nipple, 1 1/4" x close
	3029-007-09	Nipple, 1 1/4" x 2"
	3029-007-10	Nipple, 1 1/4" x 2 1/2"
	3029-007-11	Nipple, 1 1/4" x 3"
47.	2408-907	Union End Ball Valve, 1 1/4"
48.	2152-X08	Thompson Valve® II 1-1/2" (See Sections 9.4 & 9.5) (Specify Sleeve Type)
49.	4214-108-01	Threaded Coupling, 1 1/2" NPS
50.	4214-999	Coupling Gasket
51.	4100-701	110 ft. Twinline Hose Assembly
52.	4205-301-02	Swivel Insert, 3/16" x 1/4"
53.	4205-301-00	Swivel Insert, 3/16" x 1/8"
54.	3031-302-00	Hex Nipple, 1/8" x 1/4" Ball Seat
55.	3031-300-00	Hex Nipple, 1/8" x 1/8" Ball Seat
56.	2263-002	Pneumatic Deadman Valve (See Section 9.8)
57.	7119-002	Safety pin, Air/Blast Hose Coupling
58.	2300-007-00	Y-Strainer, 1-1/4" (200 mesh)
	3014-005	Plug, 3/4"
59.	4104-XXX-XX	Blast Hose Assembly (specify size)
60.	2497-706B	Grit Suppression Valve (GSV), 1" Bulk
61.	3031-512-02	Hex Nipple, 1/4" x 1/4" (plated steel)

No.	Part No.	Description
1.	4211-999	2" Crowfoot Gasket
2.	4211-109	2" Crowfoot with gasket
3.	3029-009-99	Nipple, 2" x close
4.	2401-509	Ball Valve, 2" full port
5.	1200-162-01	1600 CFM Moisture Separator
	7003-008	Flange
	7003-008-01	Flange gasket
	3026-011-09	Bushing, 3" x 2"
6.	3014-Plug, 1 1/2"	
	3014-009	Plug, 2"
7.	3026-008-02	Bushing, 1 1/2" x 1/4"
8.	3031-312-02	Hex Nipple, 1/4" x 1/4"
9.	2401-502	Ball Valve, 1/4" full port
10.	3013-008-05	Reducing Run Tee, 1 1/2" x 3/4"
11.	3029-008-99	Nipple, 1 1/2" x close
12.	2401-508	Ball Valve, 1 1/2" full port
13.		Automatic Air Valve (See Section 9.7)
	2123-108	1-1/2" Standard
	2123-108L	1-1/2" High Flow (units mfg'd after 7/09)
14.	2014-300	Breather Vent, 1/8"
15.	3003-008	45° Elbow, 1 1/2"
16.	3026-502-00	Bushing, 1/4" x 1/8"
17.	4235-008	Hose Clamp, 1 1/2" double bolt
18.	4102-008	Air Hose, 1 1/2" (per foot)
	4102-108-06	Air Hose Assy w/ (1) insert, 1-1/2" x 6ft
19.	4205-108	Swivel Insert, 1 1/2" with gasket
20.	4205-108-99	Gasket, 1 1/2" swivel
21.	3026-005-02	Bushing, 3/4" x 1/4"
22.	2301-902-90	Strainer, 1/4"
23.	4203-502-02	90° Swivel, 1/4" x 1/4"
24.	3031-302-02	Hex Nipple with Ball Seat, 1/4" x 1/4"
25.	3011-102	Tee, 1/4"
26.	4204-301-02	Rigid Insert, 3/16" x 1/4"
27.	7035-301	Ferrules
28.	3006-102	90° Street Elbow, 1/4"
29.	2013-402	Dust Eliminator, 1/4"
30.	4203-500-00	90° Swivel, 1/8" x 1/8"
31.	4204-301-00	Rigid Insert, 3/16" x 1/8"
32.	4100-001	Twinline Hose (per foot)
33.	2229-000	Pneumatic Control Valve (See Section 9.6)

9.2(a) Bulk Abrasive Blaster with Electric Control System

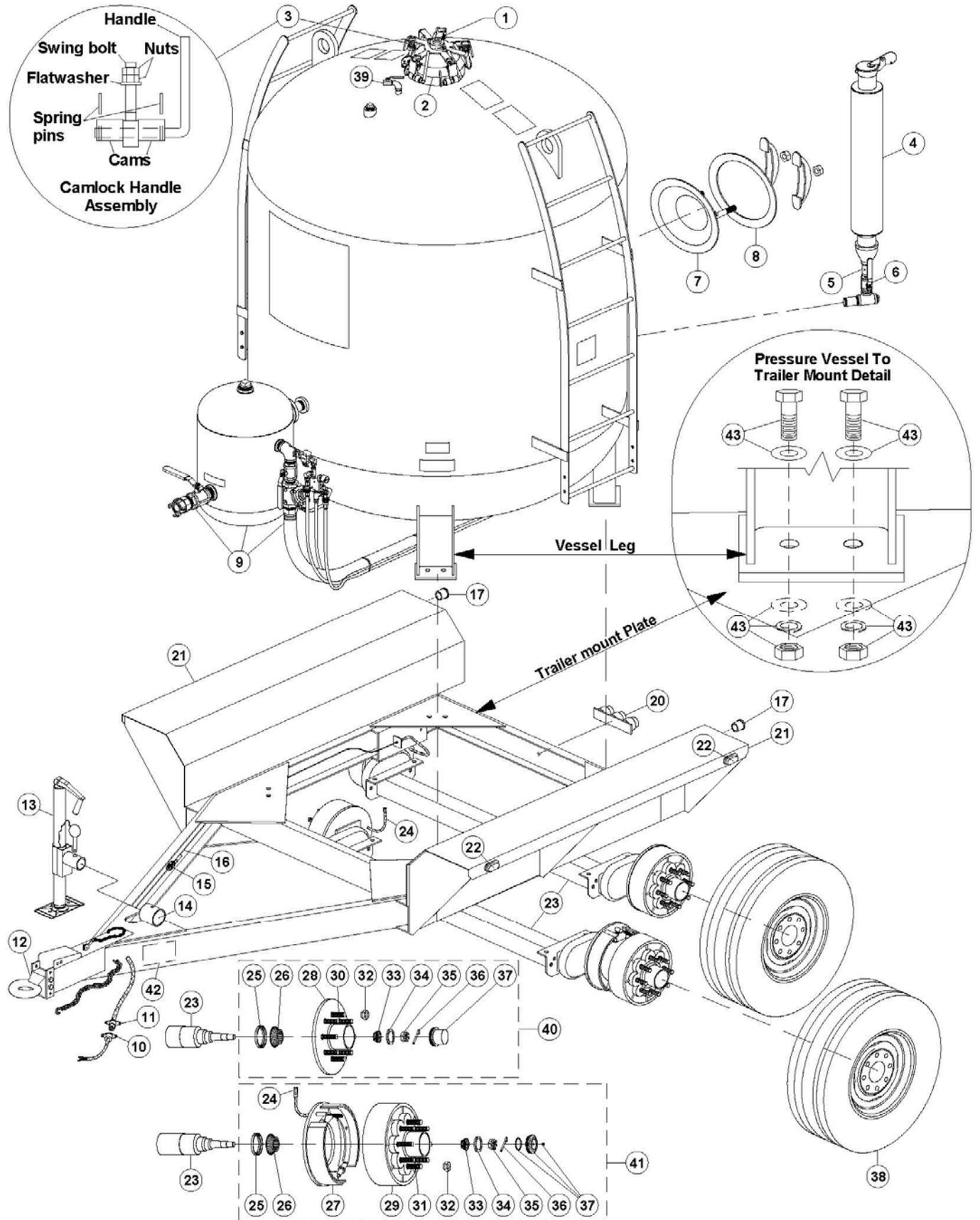


9.2(b) Electric Control System Parts List

No.	Part No.	Description	No.	Part No.	Description
1.	4211-999	2" Crowfoot Gasket	34.	1024-120	120 cu. ft. Vessel (4 Outlet-150 psi)
2.	4211-109	2" Crowfoot with gasket	1024-160	160 cu. ft. Vessel (4 Outlet-150 psi)	
3.	3029-009-99	Nipple, 2" x close	1014-500	500 cu. ft. Vessel (4 Outlet-125 psi)	
4.	2401-509	Ball Valve, 2" full port	1014-650	650 cu. ft. Vessel (4 Outlet-125 psi)	
5.	1200-162-01	1600 CFM Moisture Separator	1014-800	800 cu. ft. Vessel (4 Outlet-125 psi)	
	7003-008	Flange, 1-1/2"	3029-007-99	Nipple, 1 1/4" x Close	
	7003-008-01	Flange gasket, 1-1/2"	3029-007-09	Nipple, 1 1/4" x 2"	
	3026-011-09	Bushing, 3" x 2"	3029-007-10	Nipple, 1 1/4" x 2 1/2"	
6.	7112-608-04	Junction Box Mount, 1 1/2" x 1/2"	3029-007-11	Nipple, 1 1/4" x 3"	
	7112-609-04	Junction Box Mount, 2" x 1/2"	2408-907	Union End Ball Valve, 1 1/4"	
7.	3026-008-02	Bushing, 1 1/2" x 1/4"	2152-X08	Thompson Valve® II (See Sections 9.4 & 9.5) (specify sleeve type)	
8.	3031-312-02	Hex Nipple, 1/4" x 1/4"	4214-108-01	Threaded Coupling, 1 1/2" NPS	
9.	2401-502	Ball Valve, 1/4" full port	4214-999	Coupling Gasket	
10.	3013-008-05	Reducing Run Tee, 1 1/2" x 3/4"	7110-024	Battery Clips	
11.	3029-008-99	Nipple, 1 1/2" x close	7111-261	Insulator, red	
12.	2401-508	Ball Valve, 1 1/2" full port	7111-262	Insulator, black	
13.	2123-108	Automatic Air Valve (See Section 9.7)	7072-012	25 ft. Power Cord with battery clips	
	2123-108L	1-1/2" Standard	7072-110	25 ft. Power Cord with 3 prong electric plug	
14.	2014-300	1-1/2" High Flow (units mfg'd after 7/09)	7109-300	Female Twist-lock connector-plug, 3 prong	
15.	3003-008	Breather Vent, 1/8"	7109-301	Male Twist-lock connector-plug, 3 prong	
16.	3014-013	45° Elbow, 1 1/2"	7106-163	16/3 Electric cord	
	3014-011	Plug, 4"	7117-504	CGB Connector, 1/2"	
	7003-411	Plug, 3"	7100-504-04	Poly Tube fitting, 1/2" x 1/2"	
	7003-011-01	Blind Flange, 3" 150#	4116-004	Tubing, 1/2"	
	7010-515-55	Flange Gasket, 3" 150#	7074-110	110 ft. Extension Cord with connectors	
	7028-552	Bolt, 5/8" x 2-3/4"	2263-400-01	Electric Deadman Switch (See Section 9.9)	
17.	4235-008	Lock washer, 5/8"	7112-100	Junction Box w/Coils, 1 out 12 Vdc (See Section 9.14)	
18.	4102-008	Hose Clamp, 1 1/2" double bolt	7112-110	Junction Box w/Coils, 1 out 24 Vdc (See Section 9.14)	
	4102-108-06	Air Hose, 1 1/2" (per foot)	7112-200	Junction Box w/Coils, 2 out 12 Vdc (See Section 9.14)	
19.	4205-108	Air Hose Assy w/ (1) insert, 1-1/2" x 6ft	7112-210	Junction Box w/Coils, 2 out 24 Vdc (See Section 9.14)	
	4205-108-99	Swivel Insert, 1 1/2" with gasket	7112-300	Junction Box w/Coils, 3 out 12 Vdc (See Section 9.14)	
20.	4205-108-99	Gasket, 1 1/2" swivel	7112-310	Junction Box w/Coils, 3 out 24 Vdc (See Section 9.14)	
21.	3026-005-02	Bushing, 3/4" x 1/4"	7112-410	Junction Box w/Coils, 4 out 12 Vdc (See Section 9.14)	
22.	2301-902-90	Strainer, 1/4"	7112-500	Junction Box w/Coils, 4 out 24 Vdc (See Section 9.14)	
23.	4203-502-02	90° Swivel, 1/4" x 1/4"	7112-510	Junction Box w/Coils, 5 out 12 Vdc (See Section 9.14)	
24.	3031-302-02	Hex Nipple with Ball Seat, 1/4" x 1/4"	7112-704-02	Junction Box w/Coils, 5 out 24 Vdc (See Section 9.14)	
25.	3006-102	90° Street Elbow, 1/4"	7112-704-01	Junction Box Cover	
26.	2013-402	Dust Eliminator, 1/4"	3036-008-11	Junction Box Shell	
27.	See Section 9.6	Electric Control Valve	3036-008-99	Nipple, 1 1/2" Sch. 80 x 3"	
28.	4203-500-00	90° Swivel, 1/8" x 1/8"	7010-513-10	Nipple, 1 1/2" Sch. 80 x Close	
29.	4200-302-00	Push On Insert, 1/4" x 1/8"	7028-558	Hex Bolt, 9/16" UNC x 2 1/2"	
30.	4101-002	Push On Hose, 1/4" (per foot)	7017-513	Lock washer, 9/16"	
31.	3011-102	Tee, 1/4"	7119-002	Hex Nut, 9/16" UNC	
32.	4201-502-02	Straight Swivel, 1/4" x 1/4"	2300-007-00	Safety Pin, Air/Blast Hose Coupling	
33.	4200-302-02	Push On Insert, 1/4" x 1/4"	3014-005	Y-Strainer, 1-1/4" (200 mesh)	
			4104-XXX-XX	Plug, 3/4"	
			2497-706B	Blast Hose Assembly (specify size)	
			3031-512-02	Grid Suppression Valve (GSV), 1" Bulk	
				Hex Nipple, 1/4" x 1/4" (plated steel)	

9/30/2018 Electrical Control System Parts List.docx

9.3(a) Vessel and Trailer Assembly

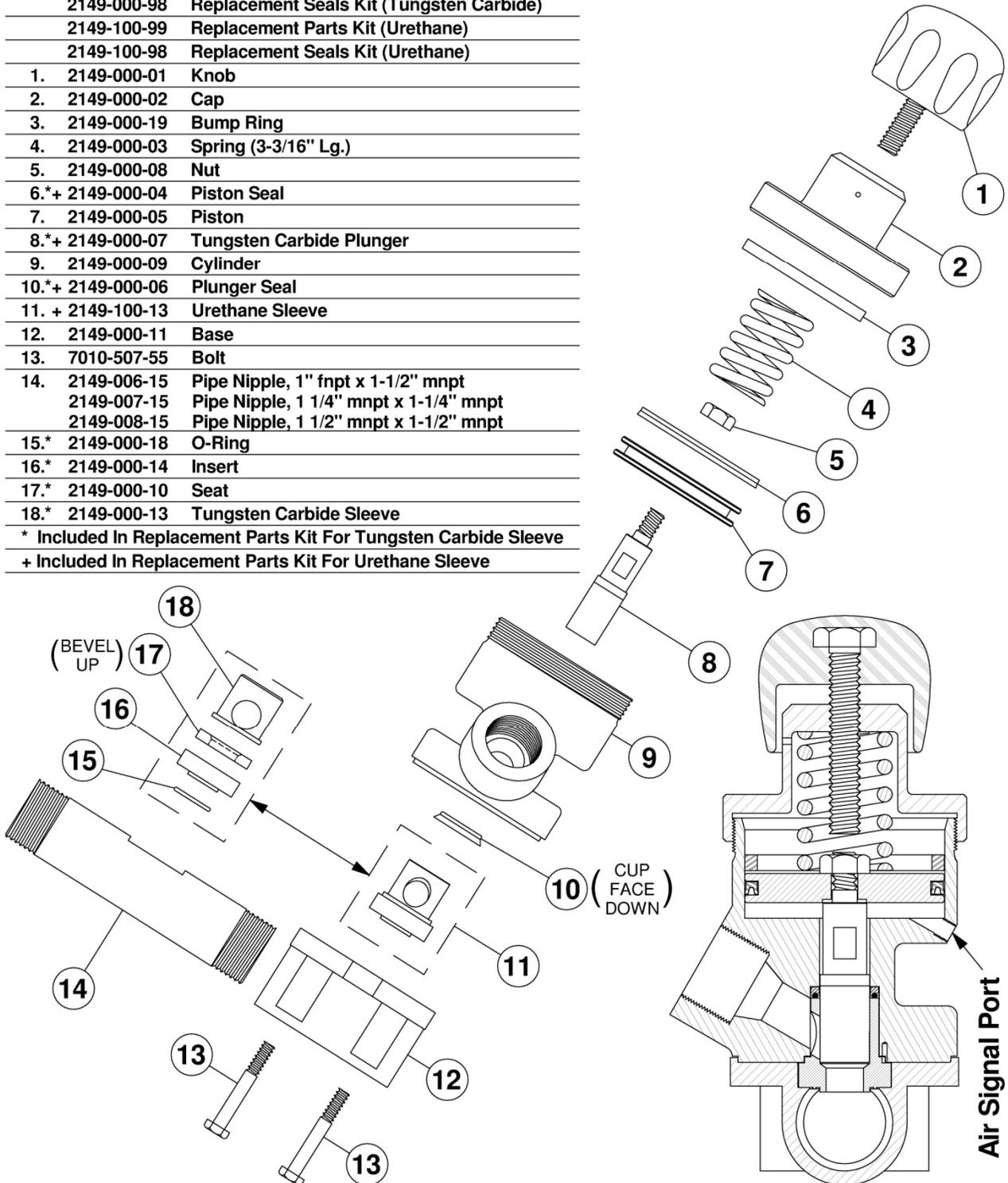


9.3(b) Vessel and Trailer Parts List

No.	Part No.	Description
1.	7007-519 8406-000-94	Closure Assembly, 10" 5-Lug Halok Assembly (See Section 9.13)
2.	7007-519-03	Closure O-Ring, 10"
3.	7007-519-02	Camlock Handle Assy. (5 lug closure)
4.	2011-011 2012-012	Muffler, 3" Rain Cap, 2-1/2"
5.	8406-000-44	CEN Blowdown Nozzle, 1-1/4"
6.	2401-507	Blowdown Ball Valve, 1-1/4"
7.	7000-004-07	Manway Crab Assembly, 12" x 16"
8.	7000-004-06	Manway Gasket, 12" x 16"
9.	Section 9.1 Section 9.2	Pneumatic Control System Electric Control System
10.	7052-001	Trailer Connector, female
11.	7052-002	Trailer Connector, male
12.	7139-010 7042-000	Trailer Tongue Hydraulic Actuator (Hydraulic Brakes Only)
13.	7050-XXX	Swivel Jack with foot (specify type)
14.	7050-002	Jack Adapter (weld on)
15.	2405-804	Brake Shut Off Valve (Hydraulic Brakes Only)
16.	7042-001	Steel Brake Line Kit (Hydraulic Brakes Only)
17.	7051-120 7051-130	Red Taillight Red Taillight for license plate
20.	7051-110	3 Red Light Bar
21.	7139-120-04 7139-160-04	Fender for 12,000 lb. trailer (specify left or right) Fender for 16,000 lb. trailer (specify left or right)
22.	7051-100 7051-101	Red Clearance Light Amber Clearance Light
23.	7040-206 7040-208	Torsion Axle (excludes hub assembly) for 12,000 lb. trailer Torsion Axle (excludes hub assembly) for 16,000 lb. trailer
24.	4114-002	Brake Hose for 12,000 lb. or 16,000 lb. trailer (Hydraulic Brakes Only)
25.	7045-106-10	Grease Seal for 12,000 lb. or 16,000 lb. trailer
26.	7045-106-09	Inner Bearing for 12,000 lb. or 16,000 lb. trailer
27.	7042-270 7042-271 7042-290 7042-291	Electric Right Brake Assembly for 12,000 lb. trailer Electric Left Brake Assembly for 12,000 lb. trailer Electric Right Brake Assembly for 16,000 lb. trailer Electric Left Brake Assembly for 16,000 lb. trailer
28.	7041-106-12 7041-108-12	Hub for 12,000 lb. yard trailer (6 lugs) Hub for 16,000 lb. yard trailer (8 lugs)
29.	7045-106-12 7045-108-12	Hub and Drum for 12,000 lb. highway trailer (6 lugs) Hub and Drum for 16,000 lb. highway trailer (8 lugs)
30.	7045-106-04 7045-108-XX	Lug Stud for 12,000 lb. yard trailer Lug Stud for 16,000 lb. yard trailer (Specify size)
31.	7045-106-05 7045-108-XX	Lug Stud for 12,000 lb. highway trailer Lug Stud for 16,000 lb. highway trailer (Specify size)
32.	7045-106-03 7045-108-XX	Lug Nut for 12,000 lb. trailer Lug Nut for 16,000 lb. trailer (Specify size)
33.	7045-106-08 7045-108-08	Outer Bearing for 12,000 lb. trailer Outer Bearing for 16,000 lb. trailer
34.	7045-106-07	Spindle Washer for 12,000 lb. or 16,000 lb. trailer
35.	7045-106-06	Spindle Nut for 12,000 lb. or 16,000 lb. trailer
36.	7119-001	Cotter Pin
37.	7045-106-02 7045-108-02 7045-108-01	Push on Dust Cap for 12,000 lb. trailer Push on Dust Cap for 16,000 lb. trailer Screw on Dust Cap with O-Ring and plug for 16,000 lb. trailer
38.	7046-106 7046-208 7043-106 7043-108	Tire & Wheel 12K# (6 lug) Load Range "E" 9.5 x 16.5LT (max 65mph) Tire & Wheel 16K# (8 lug) Load Range "F" 12 x 16.5LT (max 65mph) Wheel for 12,000 lb. trailer (6 lugs) 16.5 x 6.75 Wheel for 16,000 lb. trailer (8 lugs) 16.5 x 9.75
39.	2405-804	Ball Valve, 1/2" 2000#
40.	7041-106 7041-108	Hub Assembly, 6K# (6-Lug) Yard Trailer Hub Assembly, 8K# (8-Lug) Yard Trailer
41.	7045-110 7045-109	Hub & Drum Assembly (Electric), 6K# (6-Lug) Highway Trailer Hub & Drum Assembly (Electric), 8K# (8-Lug) Highway Trailer
42.	7139-483-02	Axle Break-Away Kit (Electric Brakes Only)
43.	7010-519-08 7027-505-01 7028-505 7017-519	Bolt, 3/4" NC x 2-1/2" (SAE Grade 5, zinc plated) Flat washer, 3/4" (SAE Grade 5, zinc plated) Lock washer, 3/4" (SAE Grade 5, zinc plated) Hex nut, 3/4" (SAE Grade %, zinc plated)
44.	7031-999-03 7031-999-04	Decal kit, Bulk Unit (portable unit) Decal kit, Bulk Unit (stationary unit)

9.4 Thompson® Valve

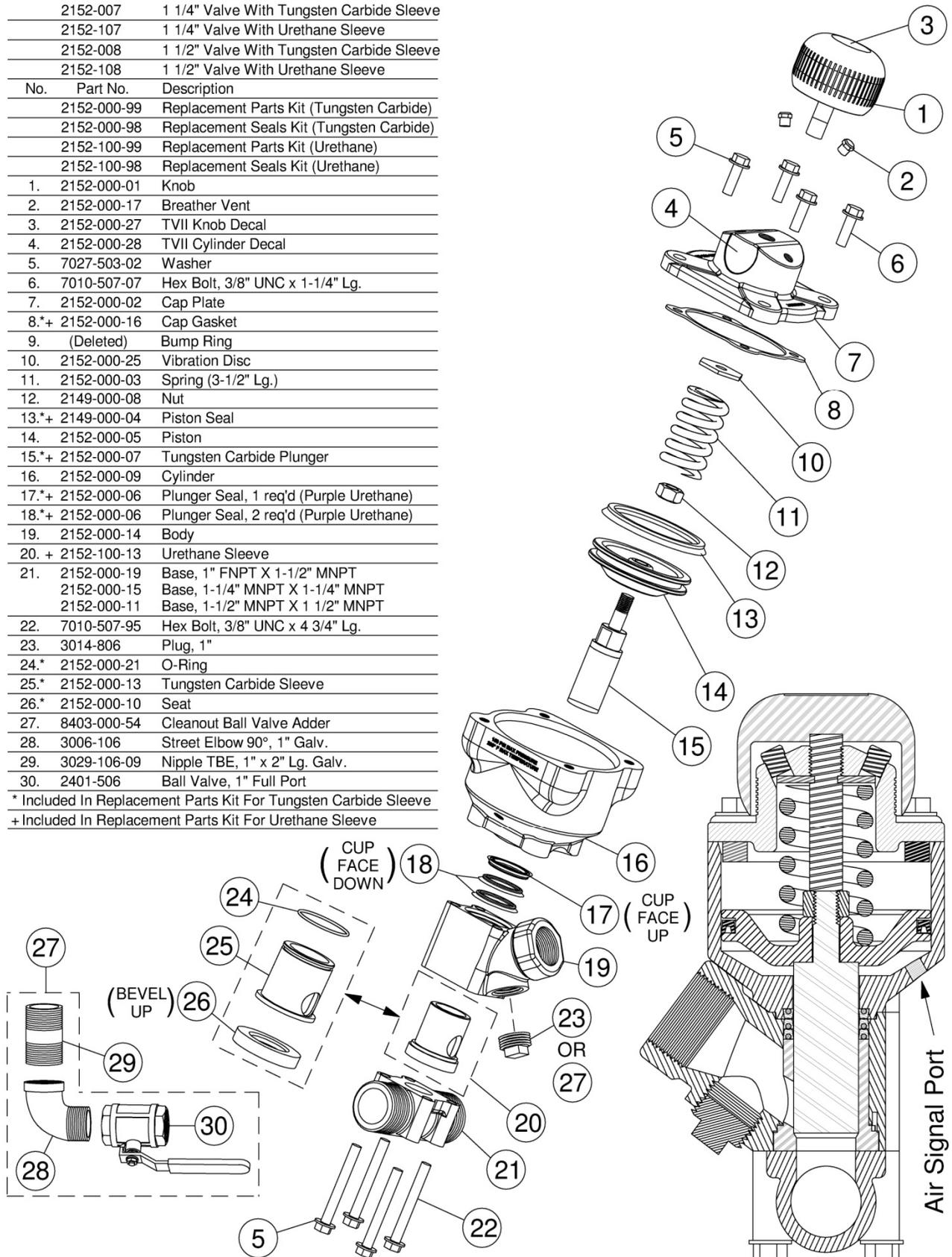
	2149-006	1" Valve With Tungsten Carbide Sleeve
	2149-106	1" Valve With Urethane Sleeve
	2149-007	1 1/4" Valve With Tungsten Carbide Sleeve
	2149-107	1 1/4" Valve With Urethane Sleeve
	2149-008	1 1/2" Valve With Tungsten Carbide Sleeve
	2149-108	1 1/2" Valve With Urethane Sleeve
No.	Part No.	Description
	2149-000-99	Replacement Parts Kit (Tungsten Carbide)
	2149-000-98	Replacement Seals Kit (Tungsten Carbide)
	2149-100-99	Replacement Parts Kit (Urethane)
	2149-100-98	Replacement Seals Kit (Urethane)
1.	2149-000-01	Knob
2.	2149-000-02	Cap
3.	2149-000-19	Bump Ring
4.	2149-000-03	Spring (3-3/16" Lg.)
5.	2149-000-08	Nut
6.*	2149-000-04	Piston Seal
7.	2149-000-05	Piston
8.*	2149-000-07	Tungsten Carbide Plunger
9.	2149-000-09	Cylinder
10.*	2149-000-06	Plunger Seal
11. +	2149-100-13	Urethane Sleeve
12.	2149-000-11	Base
13.	7010-507-55	Bolt
14.	2149-006-15	Pipe Nipple, 1" fnpt x 1-1/2" mnpt
	2149-007-15	Pipe Nipple, 1 1/4" mnpt x 1-1/4" mnpt
	2149-008-15	Pipe Nipple, 1 1/2" mnpt x 1-1/2" mnpt
15.*	2149-000-18	O-Ring
16.*	2149-000-14	Insert
17.*	2149-000-10	Seat
18.*	2149-000-13	Tungsten Carbide Sleeve
* Included In Replacement Parts Kit For Tungsten Carbide Sleeve		
+ Included In Replacement Parts Kit For Urethane Sleeve		



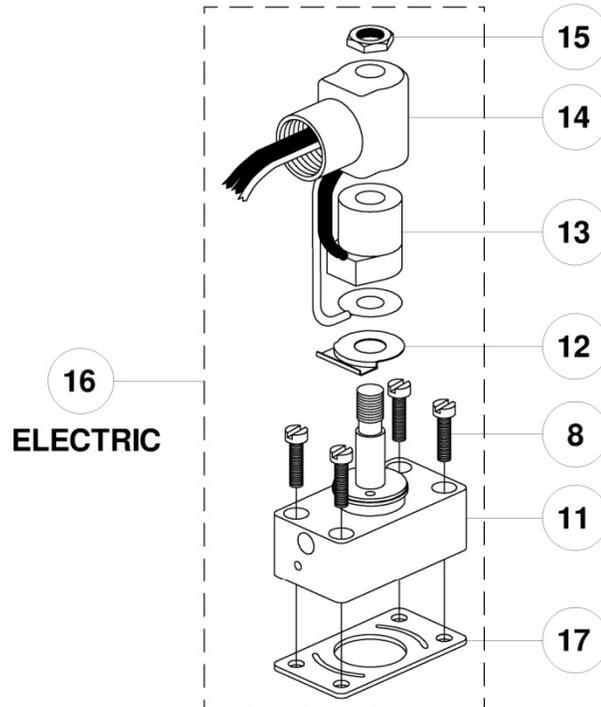
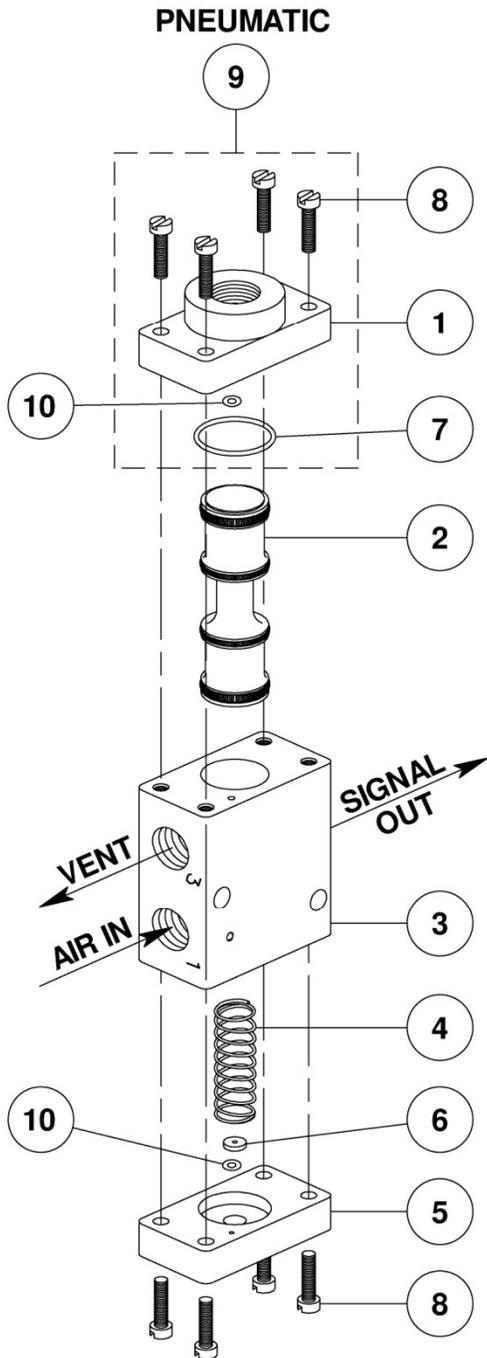
9.5 Thompson® Valve II

	2152-006	1" Valve With Tungsten Carbide Sleeve
	2152-106	1" Valve With Urethane Sleeve
	2152-007	1 1/4" Valve With Tungsten Carbide Sleeve
	2152-107	1 1/4" Valve With Urethane Sleeve
	2152-008	1 1/2" Valve With Tungsten Carbide Sleeve
	2152-108	1 1/2" Valve With Urethane Sleeve
No.	Part No.	Description
	2152-000-99	Replacement Parts Kit (Tungsten Carbide)
	2152-000-98	Replacement Seals Kit (Tungsten Carbide)
	2152-100-99	Replacement Parts Kit (Urethane)
	2152-100-98	Replacement Seals Kit (Urethane)
1.	2152-000-01	Knob
2.	2152-000-17	Breather Vent
3.	2152-000-27	TVII Knob Decal
4.	2152-000-28	TVII Cylinder Decal
5.	7027-503-02	Washer
6.	7010-507-07	Hex Bolt, 3/8" UNC x 1-1/4" Lg.
7.	2152-000-02	Cap Plate
8.*	2152-000-16	Cap Gasket
9.	(Deleted)	Bump Ring
10.	2152-000-25	Vibration Disc
11.	2152-000-03	Spring (3-1/2" Lg.)
12.	2149-000-08	Nut
13.*	2149-000-04	Piston Seal
14.	2152-000-05	Piston
15.*	2152-000-07	Tungsten Carbide Plunger
16.	2152-000-09	Cylinder
17.*	2152-000-06	Plunger Seal, 1 req'd (Purple Urethane)
18.*	2152-000-06	Plunger Seal, 2 req'd (Purple Urethane)
19.	2152-000-14	Body
20. +	2152-100-13	Urethane Sleeve
21.	2152-000-19	Base, 1" FNPT X 1-1/2" MNPT
	2152-000-15	Base, 1-1/4" MNPT X 1-1/4" MNPT
	2152-000-11	Base, 1-1/2" MNPT X 1 1/2" MNPT
22.	7010-507-95	Hex Bolt, 3/8" UNC x 4 3/4" Lg.
23.	3014-806	Plug, 1"
24.*	2152-000-21	O-Ring
25.*	2152-000-13	Tungsten Carbide Sleeve
26.*	2152-000-10	Seat
27.	8403-000-54	Cleanout Ball Valve Adder
28.	3006-106	Street Elbow 90°, 1" Galv.
29.	3029-106-09	Nipple TBE, 1" x 2" Lg. Galv.
30.	2401-506	Ball Valve, 1" Full Port

* Included In Replacement Parts Kit For Tungsten Carbide Sleeve
 + Included In Replacement Parts Kit For Urethane Sleeve



9.6 Control Valves (pneumatic and electric)

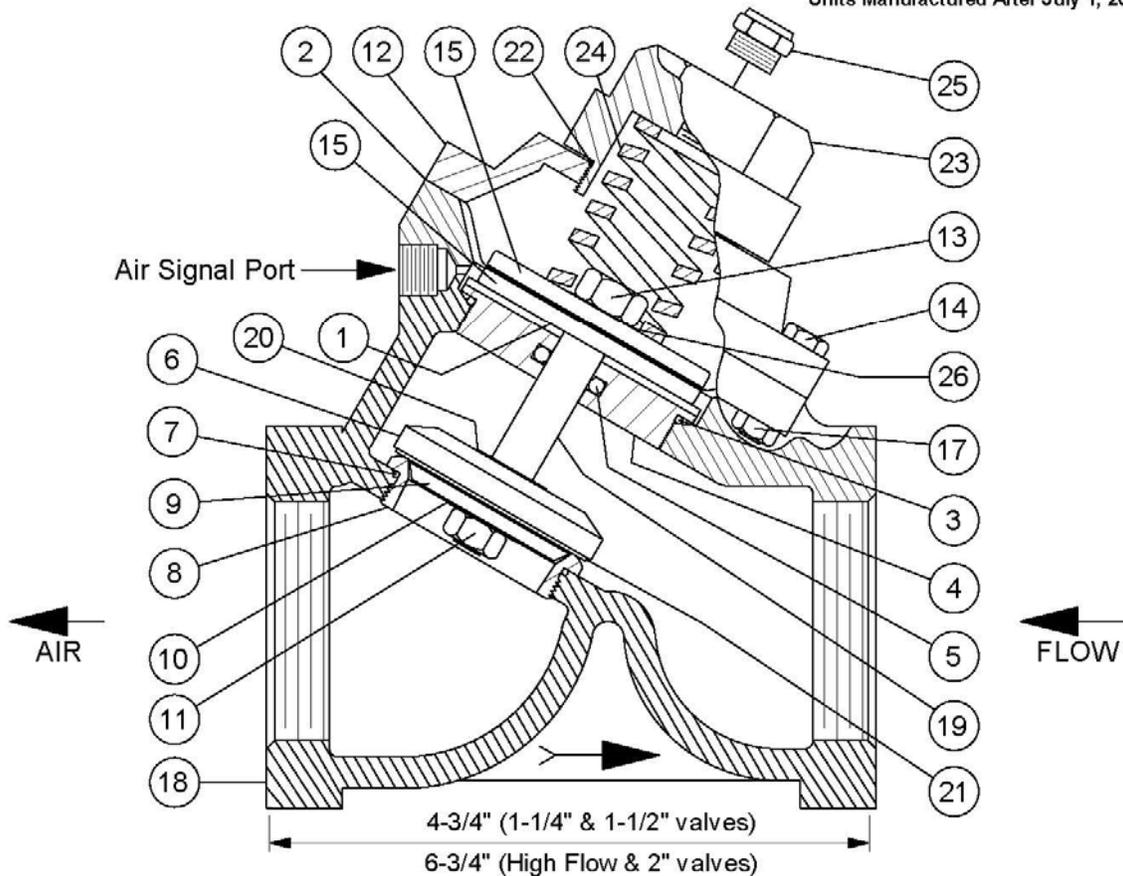


	2229-000	Pneumatic Control Valve
	2229-100	Electric Control Valve, 12 Volt D.C.
	2229-101	Electric Control Valve, 12 Volt A.C.
	2229-102	Electric Control Valve, 24 Volt D.C.
	2229-100	Electric Control Valve, 24 Volt A.C.
	2229-105	Electric Control Valve, 120 Volt A.C.
No.	Part No.	Description
	2229-000-99	Replacement Parts Kit (Pneumatic)
	2229-100-99	Replacement Parts Kit (Electric)
1.	Not Available	Air Operator Cap
2.*	2229-000-02	Plunger w/O-Rings
3.	Not Available	Valve Body
4.*	2229-000-04	Spring
5.	Not Available	Spring Retainer
6.*	2229-000-06	Filter Disk
7.*	2229-000-07	O-Ring (Large)
8.	Not Available	Screw (8)
9.	2229-000-09	Air Operator Assembly
10.*	2229-000-10	O-Ring (2 ea)
11.	Not Available	Electric Operator Cap
12.	Not Available	Coil Cover Bottom
13.	2229-100-03	Coil 12 Volt D.C.
	2229-101-03	Coil 12 Volt A.C.
	2229-102-03	Coil 24 Volt D.C.
	2229-100-03	Coil 24 Volt A.C.
	2229-105-03	Coil 120 Volt A.C.
14.	Not Available	Coil Cover
15.	Not Available	Nut
16.	2229-100-06	Solenoid Pilot Assembly, 12 Volt D.C.
	2229-101-06	Solenoid Pilot Assembly, 12 Volt A.C.
	2229-102-06	Solenoid Pilot Assembly, 24 Volt D.C.
	2229-100-06	Solenoid Pilot Assembly, 24 Volt A.C.
	2229-105-06	Solenoid Pilot Assembly, 120 Volt A.C.
17. +	2229-100-07	Gasket (Electric Only)
* Included in replacement parts kit-pneumatic		
+ Included in replacement parts kit-electric		

9.7 Automatic Air Valve (normally closed)

2123-106 1" Valve			2123-107 1 1/4" Valve			** 2123-108L 1-1/2" High Flow Valve		
No.	Part No.	Description	No.	Part No.	Description	No.	Part No.	Description
2123-006-99 Replacement Parts Kit			2123-108 1 1/2" Valve			2123-109 2" Valve		
2123-006-97 Hard Parts Kit			2123-007-99 Replacement Parts Kit			2123-009-99 Replacement Parts Kit		
1.*	2123-007-20	Gasket	2123-007-97 Hard Parts Kit			2123-009-97 Hard Parts Kit		
2.*	2123-006-02	Diaphragm	1.*	2123-009-01	Gasket	1.*	2123-009-01	Gasket
3.*	2123-006-03	O-ring	2.*	2123-007-02	Diaphragm	2.*	2123-009-02	Diaphragm
4.	2123-006-04	Retainer Bushing	3.*	2123-007-03	O-ring	3.*	2123-009-03	O-ring
5.*	2123-007-05	O-ring	4.	2123-007-04	Retainer Bushing	4.	2123-009-04	Retainer Bushing
6.*	2123-006-06	Disk Retainer	5.*	2123-007-05	O-ring	5.*	2123-009-05	O-ring
7.*	2123-006-07	O-ring	6.+	2123-007-06	Disk Retainer	6.+	2123-009-06	Disk Retainer
8.	2123-006-08	Seat	7.*	2123-007-07	O-ring	7.*	2123-009-07	O-ring
9.+	2123-006-09	Disc Plate	8.	2123-007-08	Seat	8.	2123-009-08	Seat
10.	"Deleted"	Lock Washer, Internal	9.+	2123-007-09	Disc Plate	9.+	2123-007-15	Disc Plate
11.*	7082-504	Lock Nut	10.	"Deleted"	Lock Washer, Internal	10.	"Deleted"	Lock Washer, Internal
12.	2123-106-12	Cap	11.*	7082-504	Lock Nut	11.*	7082-506	Lock Nut
13.*	2123-006-13	Lock Nut	12.	2123-107-12	Cap	12.	2123-109-12	Cap
14.	7010-503-06	Cap Screw	13.*	7082-506	Lock Nut	13.*	7082-506	Lock Nut
15.+	2123-006-15	Diaphragm Plate	14.	7010-503-07	Cap Screw	14.	7010-505-07	Cap Screw
17.	7082-503	Lock Nut	15.+	2123-007-15	Diaphragm Plate	15.+	2123-009-15	Diaphragm Plate
18.	2123-006-18	Body, 1"	17.	7082-503	Lock Nut	17.	7082-505	Hex Nut
19.**	2123-006-19	Shaft	18.	2123-007-18	Body, 1 1/4"	18.	2123-009-27	Body, 1-1/2" high flow
20.*	2123-007-20	Gasket	2123-008-18	Body, 1 1/2"	2123-009-18	Body, 2"		
21.*	2123-006-21	Disc	19.**	2123-007-19	Shaft	19.**	2123-009-19	Shaft
22.**	2123-106-22	O-ring	20.*	2123-007-20	Gasket	20.*	2123-009-01	Gasket
23.+	2123-106-23	Spring Retainer	21.*	2123-007-21	Disc	21.*	2123-009-21	Disc
24.	2123-106-24	Spring	22.**	2123-107-22	O-ring	22.**	2123-107-22	O-ring
25.*	2014-300	Vent, 1/8"	23.+	2123-107-23	Spring Retainer	23.+	2123-109-23	Spring Retainer
26.*	2123-007-20	Gasket	24.	2123-107-24	Spring	24.	2123-109-24	Spring
* Included In Replacement Parts Kit			25.*	2014-300	Vent, 1/8"	25.*	2014-300	Vent, 1/8"
+ Included In Hard Parts Replacement Kit			26.*	2123-009-01	Gasket	26.*	2123-009-28	Washer
			* Included In Replacement Parts Kit			* Included In Replacement Parts Kit		
			+ Included In Hard Parts Replacement Kit			+ Included In Hard Parts Replacement Kit		

** 1-1/2" High Flow Valve is Standard On Units Manufactured After July 1, 2008

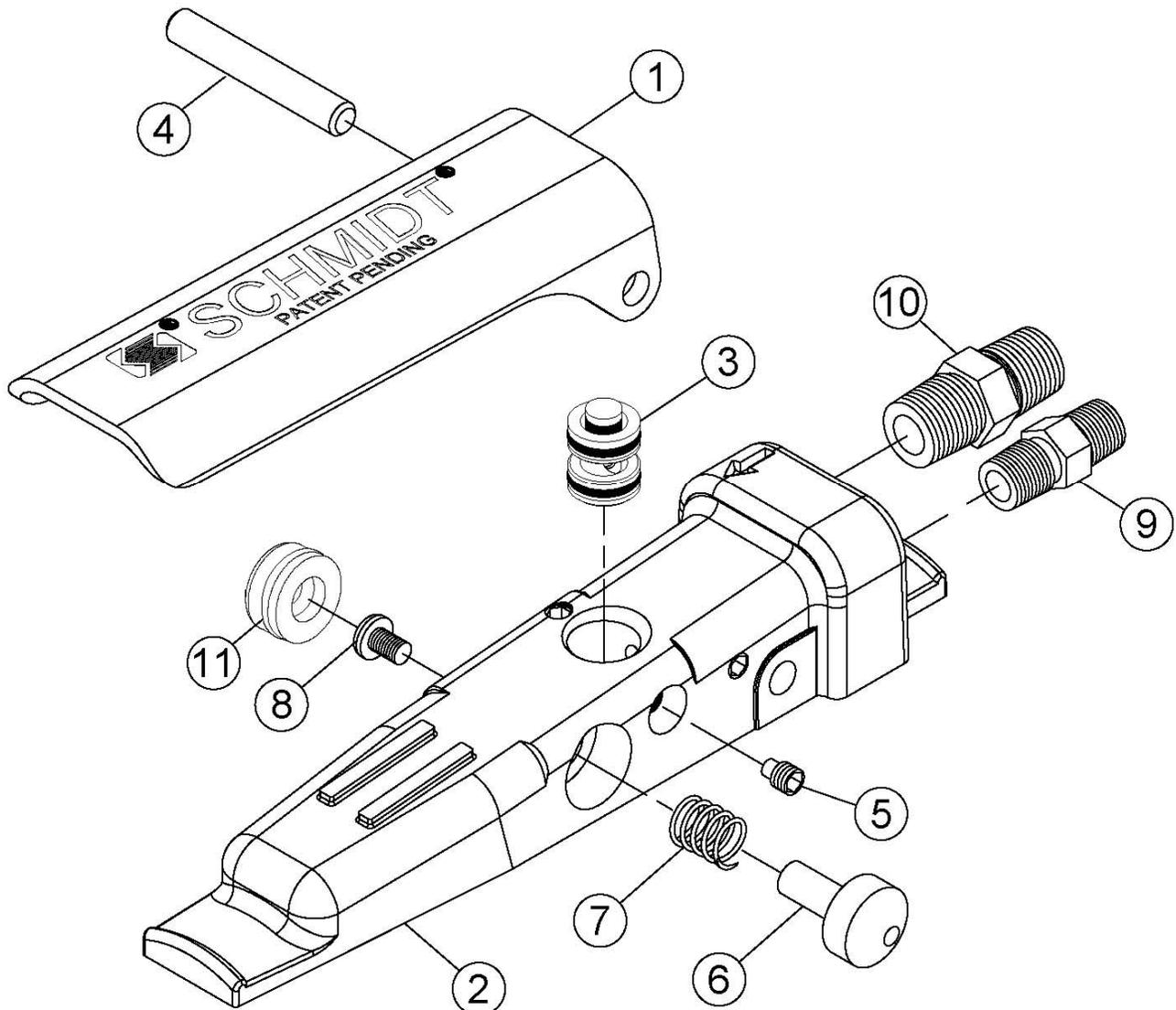


NOTE: With spring closed valve air flow is in opposite direction from arrow on valve body.

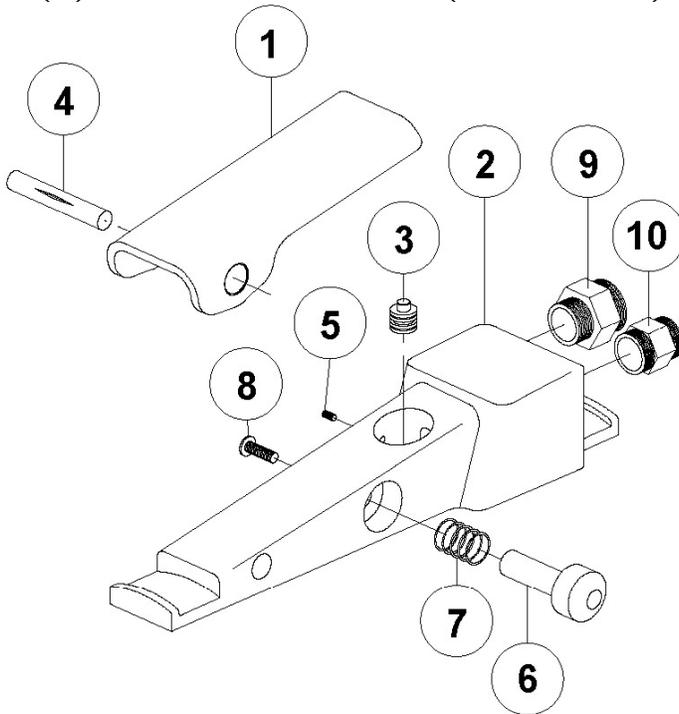
9.8(a) G2 Pneumatic Deadman

Item	Part No.	Description
	2263-002	G2 Pneumatic Deadman
	2263-002-99	G2 Replacement Parts Kit
1.	2263-002-01	G2 Deadman Lever
2.	2263-002-02	G2 Deadman Body
* 3.	2263-002-03	G2 Deadman Cartridge Assembly
4.	2263-002-04	G2 Deadman Hinge Pin
* 5.	2263-002-05	G2 Deadman Cartridge Set Screw
6.	2263-002-06	G2 Deadman Button
* 7.	2263-002-07	Deadman Spring
* 8.	2263-000-08	Deadman Screw For Button
9.	3031-300-00	Hex Nipple, 1/8" x 1/8" With Ball Seat
10.	3031-302-02	Hex Nipple, 1/4" x 1/4" With Ball Seat
* 11.	2263-002-10	G2 Deadman Dust Plug

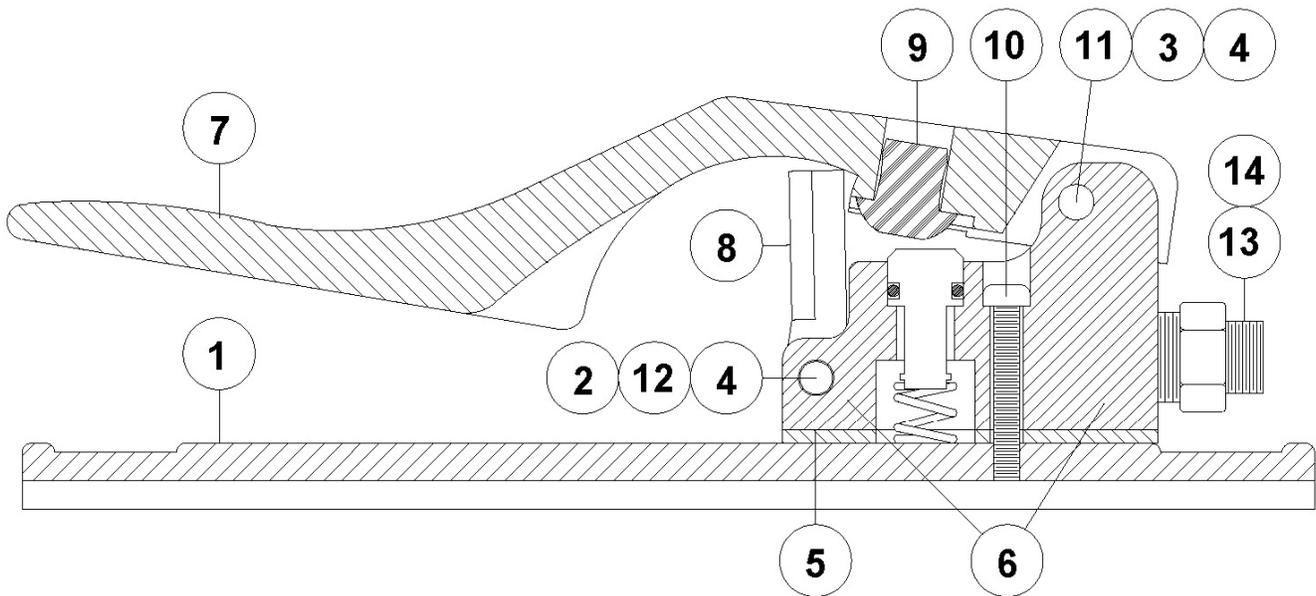
* Items included in Replacement Kit



9.8(b) Deadman Valves (Pneumatic)

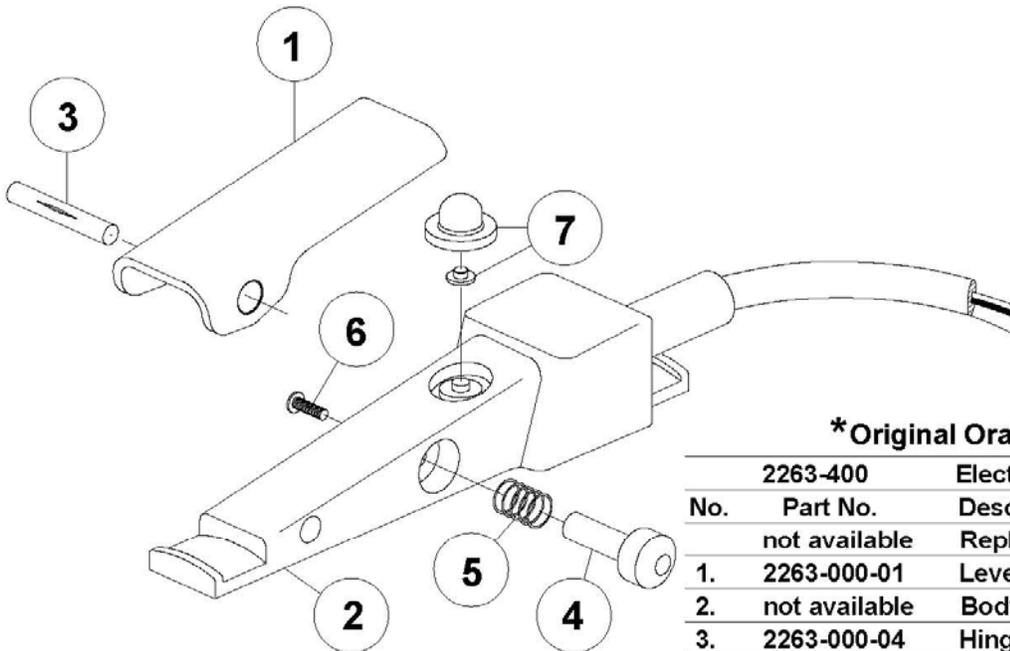


2263-000		Pneumatic Deadman
No.	Part No.	Description
	2263-000-99	Replacement Parts Kit
1.	2263-000-01	Lever
2.	2263-000-02	Body
*3.	2263-000-03	Cartridge
4.	2263-000-04	Hinge Pin
*5.	2263-000-05	Set Screw
6.	2263-000-06	Safety Button
*7.	2263-000-07	Spring
*8.	2263-000-08	Screw for Button
9.	3031-302-00	Hex Nipple, 1/8" x 1/4"
10.	3031-300-00	Hex Nipple, 1/8" x 1/8"
* Included in replacement parts kit		



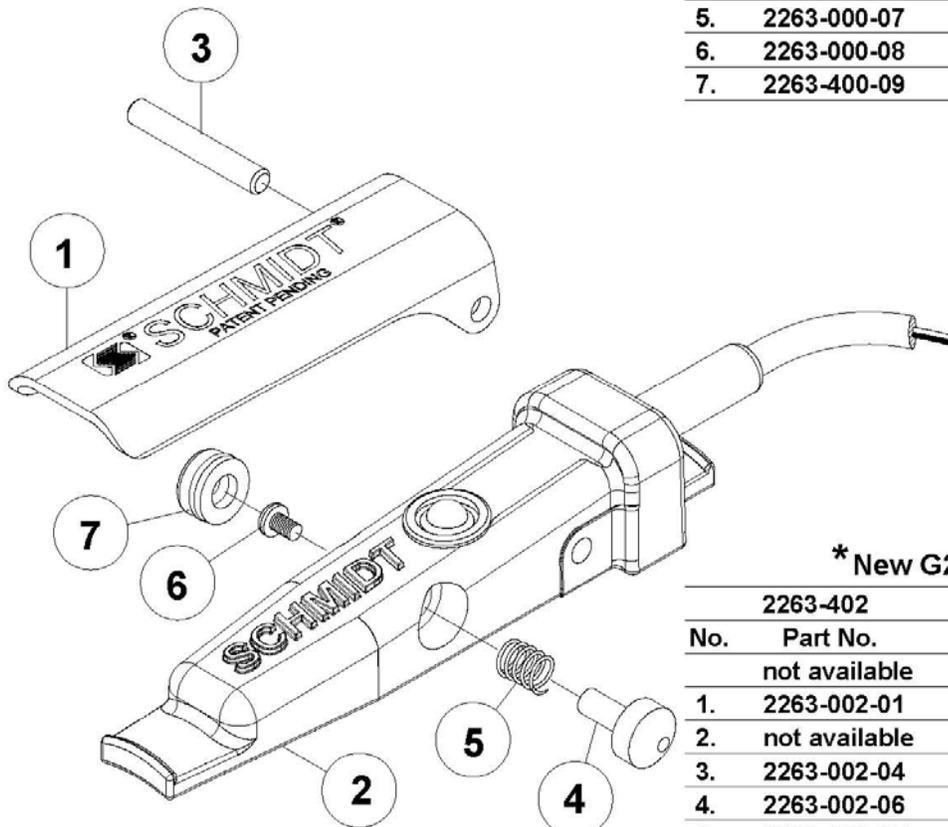
2263-001		Pneumatic Deadman II
No.	Part No.	Description
	2263-001-99	Replacement Parts Kit Level I
	2263-001-98	Replacement Parts Kit Level II
1.	2263-001-01	Base
2. +	2263-001-02	Safety Flap Spring
3. +	2263-001-03	Lever Hinge Screw
4.	2263-001-04	Hinge Pin Nut
5.**	2263-001-05	Body Gasket
6.**	2263-001-06	Valve Body Assembly
7.	2263-001-07	Lever
8. +	2263-001-08	Safety Flap
9.**	2263-001-09	Plunger Plug
10.	2263-001-10	Body Mounting Screw
11.	2263-001-11	Lever Spring
12. +	2263-001-12	Flap Hinge Screw
13.	3031-302-00	Hex Nipple, 1/8" x 1/4"
14.	3031-300-00	Hex Nipple, 1/8" x 1/8"
* Included in replacement parts kit, Level I		
** Included in replacement parts kit, Level II		

9.9 Deadman Switches (Electric)



*Original Orange

No.	Part No.	Description
	2263-400	Electric Deadman
	not available	Replacement Parts Kit
1.	2263-000-01	Lever
2.	not available	Body w/Molded Switch
3.	2263-000-04	Hinge Pin
4.	2263-000-06	Safety Button
5.	2263-000-07	Spring
6.	2263-000-08	Screw for Button
7.	2263-400-09	Dust Cover w/Insert



*New G2 Electric

No.	Part No.	Description
	2263-402	G2 Electric Deadman
	not available	Replacement Parts Kit
1.	2263-002-01	G2 Lever
2.	not available	G2 Body w/Switch
3.	2263-002-04	G2 Hinge Pin
4.	2263-002-06	G2 Safety Button
5.	2263-002-07	G2 Spring
6.	2263-000-08	Screw for Button
7.	2263-002-10	G2 Dust Plug

⚠ WARNING

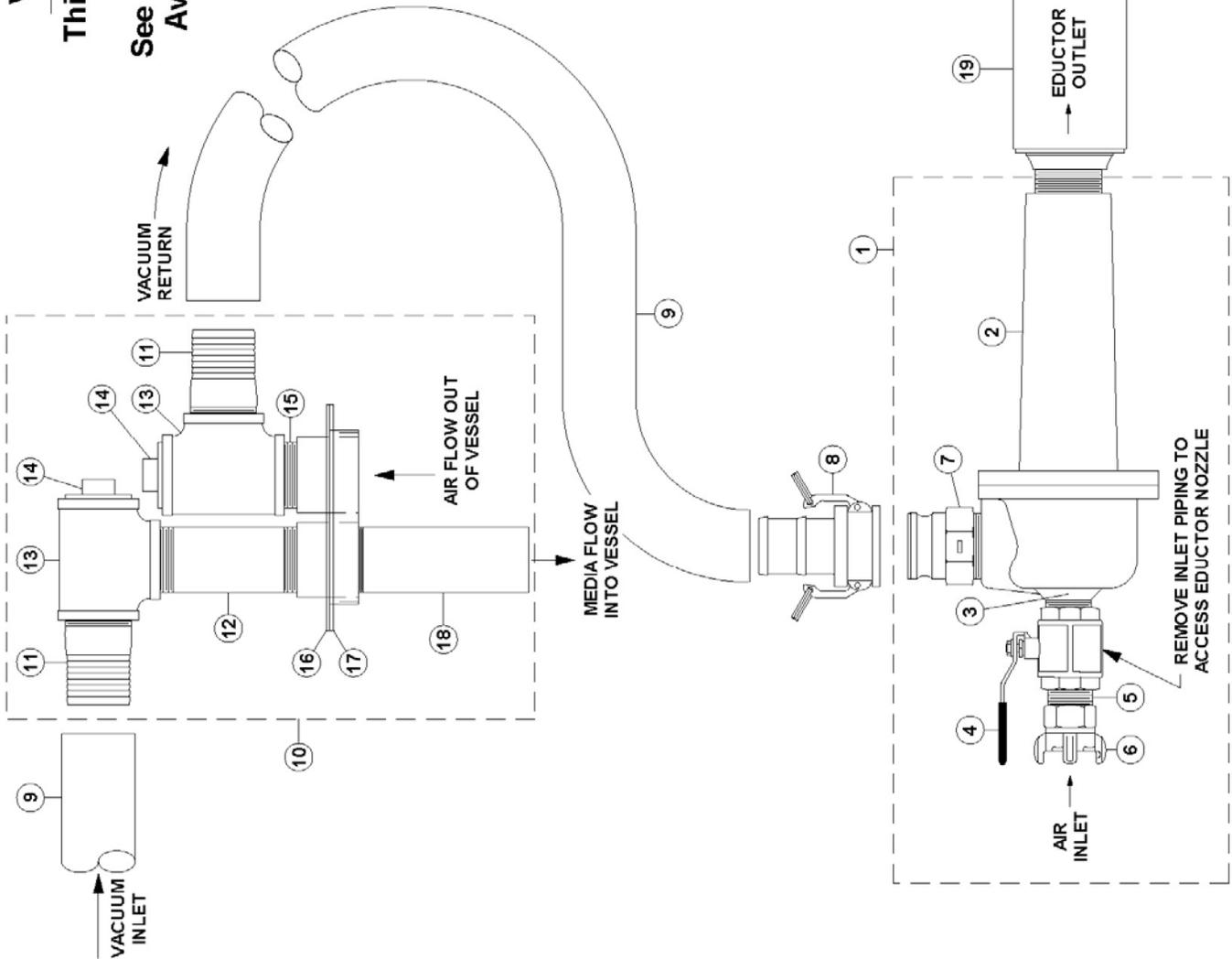
*Electric shock hazard. To minimize shock hazard use electric deadman in low voltage applications only (12-24 volts).

9.10 Vacuum Loading System

VACUUM LOADING SYSTEM

This system transfers media by vacuum into a Bulk Abrasive Blaster
 See Manual #7200-275 for operating instructions
 Available with 150, 225, 350, 440, or 550 CFM
 Urethane Eductor Pump Assembly
 Contact a Schmidt Distributor

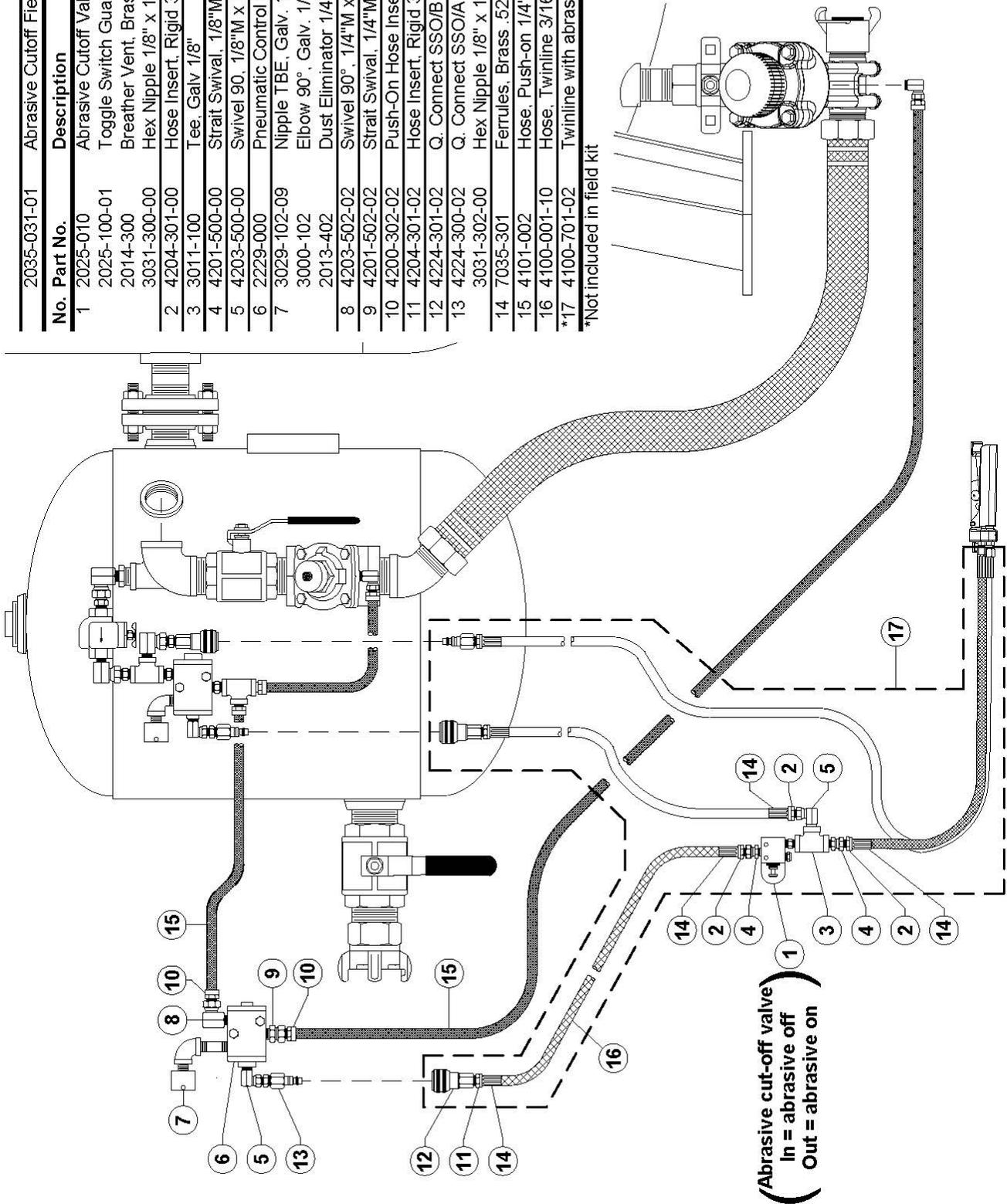
No.	Part No.	Description
1	2018-111-00	Urethane Eductor Pump Assembly 150 CFM
	2018-211-00	Urethane Eductor Pump Assembly 225 CFM
	2018-311-00	Urethane Eductor Pump Assembly 350 CFM
	2018-411-00	Urethane Eductor Pump Assembly 440 CFM
	2018-511-00	Urethane Eductor Pump Assembly 550 CFM
2	2018-011	Urethane Eductor, 3"
3	2018-111-01	Eductor Nozzle 150 CFM
	2018-211-01	Eductor Nozzle 225 CFM
	2018-311-01	Eductor Nozzle 350 CFM
	2018-411-01	Eductor Nozzle 440 CFM
	2018-511-01	Eductor Nozzle 550 CFM
4	2401-509	Ball Valve, 2" Full Port
5	3029-009-99	Nipple TBE, 2" x Close
6	4211-109	Crowfoot, 4-Lug 2" FNPT
7	4217-411	Camlock Type A, 3"
8	4219-411	Camlock Type C, 3"
9	4107-011	Vacuum Hose, 3"
10	5024-010	Transfer Plate Assembly For 10" Closure
11	4212-011	KC Nipple, 3"
12	3029-011-17	Nipple TBE, 3" x 8"
13	3011-011	Tee, 3"
14	3014-011	Plug, 3"
15	3029-011-99	Nipple TBE, 3" x Close
16	5024-012	Transfer Plate
17	5024-011	Transfer Plate Gasket
18	3030-011-19	Nipple TOE, 3" x 10"
19	2011-011	Muffler, 3" FNPT



9.11 Remote Abrasive Cut-off (Pneumatic)

No. Part No.	Description
1	2025-010 Abrasive Cutoff Valve
2	2025-100-01 Toggle Switch Guard
3	2014-300 Breather Vent, Brass 1/8"
4	3031-300-00 Hex Nipple 1/8" x 1/8"
5	2024-301-00 Hose Insert, Rigid 3/16" x 1/8" Brass
6	3011-100 Tee, Galv 1/8"
7	4201-500-00 Strait Swival, 1/8"M x 1/8"F
8	4203-500-00 Swivel 90°, 1/8"M x 1/8"F
9	2229-000 Pneumatic Control Valve
10	3029-102-09 Nipple TBE, Galv, 1/4" x 2"
11	3000-102 Elbow 90°, Galv, 1/4"
12	2013-402 Dust Eliminator 1/4" MNPT
13	4203-502-02 Swivel 90°, 1/4"M x 1/4"F
14	4201-502-02 Strait Swival, 1/4"M x 1/4"F
15	4200-302-02 Push-On Hose Insert 1/4" x 1/4"
16	4204-301-02 Hose Insert, Rigid 3/16" x 1/4" Brass
17	4224-301-02 Q. Connect SSO/BR Socket 1/4"
18	4224-300-02 Q. Connect SSO/AL Plug 1/4"
19	3031-302-00 Hex Nipple 1/8" x 1/4"
20	14 Ferrules, Brass .525
21	15 4101-002 Hose, Push-on 1/4"
22	16 4100-001-10 Hose, Twinline 3/16" (Green)
23	*17 4100-701-02 Twinline with abrasive cutoff, 110ft

*Not included in field kit

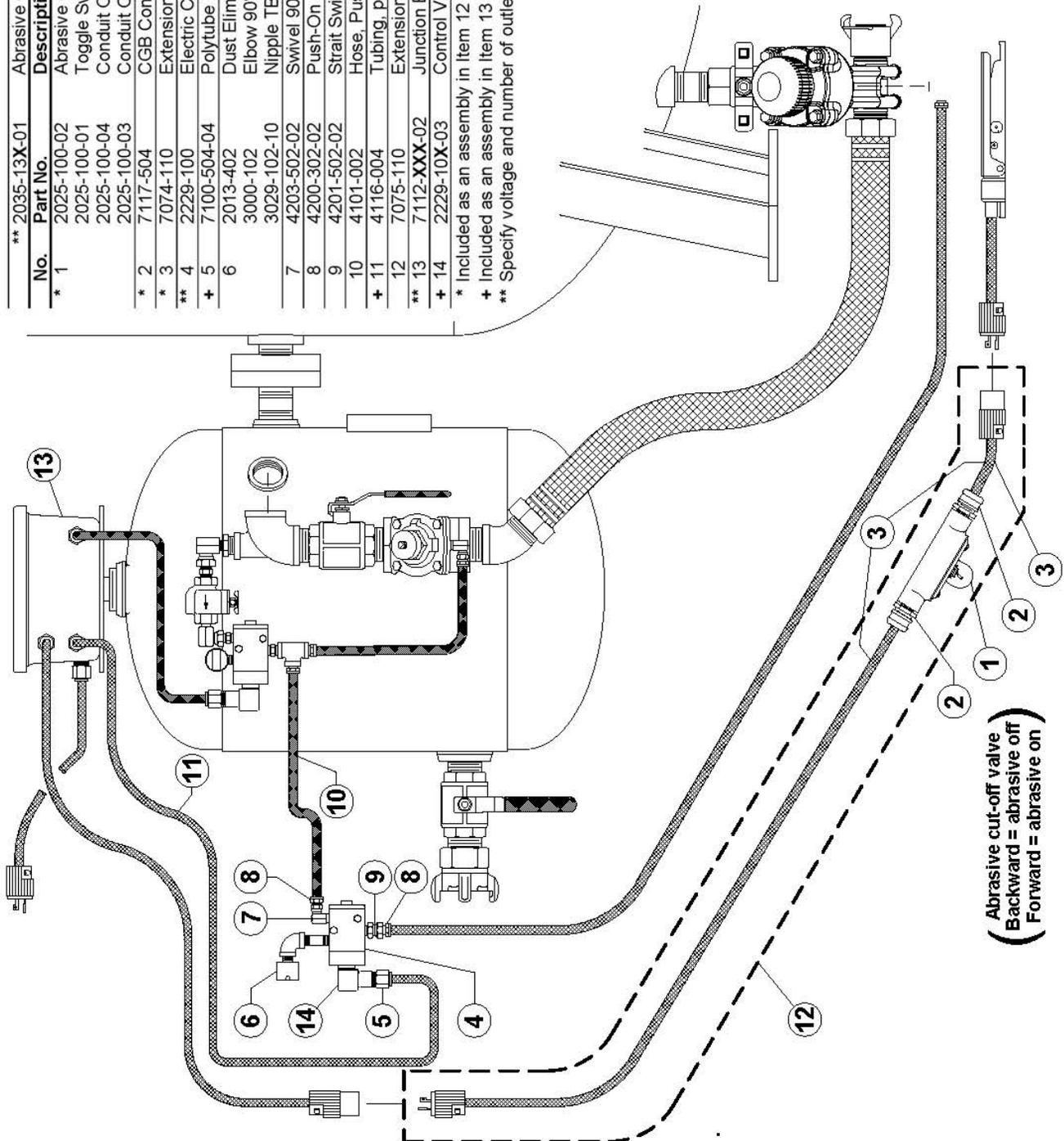


(Abrasive cut-off valve
In = abrasive off
Out = abrasive on)

9.12 Remote Abrasive Cut-off (Electric)

No.	Part No.	Description
** 2035-13X-01 Abrasive Cutoff Field Kit (12Vdc)		
* 1	2025-100-02	Abrasive Cutoff Switch
	2025-100-01	Toggle Switch Guard
	2025-100-04	Conduit Outlet Body, 1/2"
	2025-100-03	Conduit Outlet Body Cover, 1/2"
* 2	7117-504	CGB Connector, 1/2"
* 3	7074-110	Extension cord w/connectors, 110 ft
** 4	2229-100	Electric Control Valve (See Section 9.6)
+ 5	7100-504-04	Polytube Fitting 1/2" x 1/2"
6	2013-402	Dust Eliminator 1/4" MNPT
	3000-102	Elbow 90°, Galv. 1/4"
	3029-102-10	Nipple TBE, Galv 1/4" x 2-1/2"
7	4203-502-02	Swivel 90°, 1/4"M x 1/4"F
8	4200-302-02	Push-On Hose Insert 1/4" x 1/4"
9	4201-502-02	Straight Swival, 1/4"M x 1/4"F
10	4101-002	Hose, Push-on 1/4"
+ 11	4116-004	Tubing, polyethylene 1/2"
12	7075-110	Extension cord with abrasive cutoff, 110ft
** 13	7112-XXX-02	Junction Box Assembly, w/ACO & coils
+ 14	2229-10X-03	Control Valve Coil (See Section 9.6)

* Included as an assembly in Item 12
 + Included as an assembly in Item 13
 ** Specify voltage and number of outlets

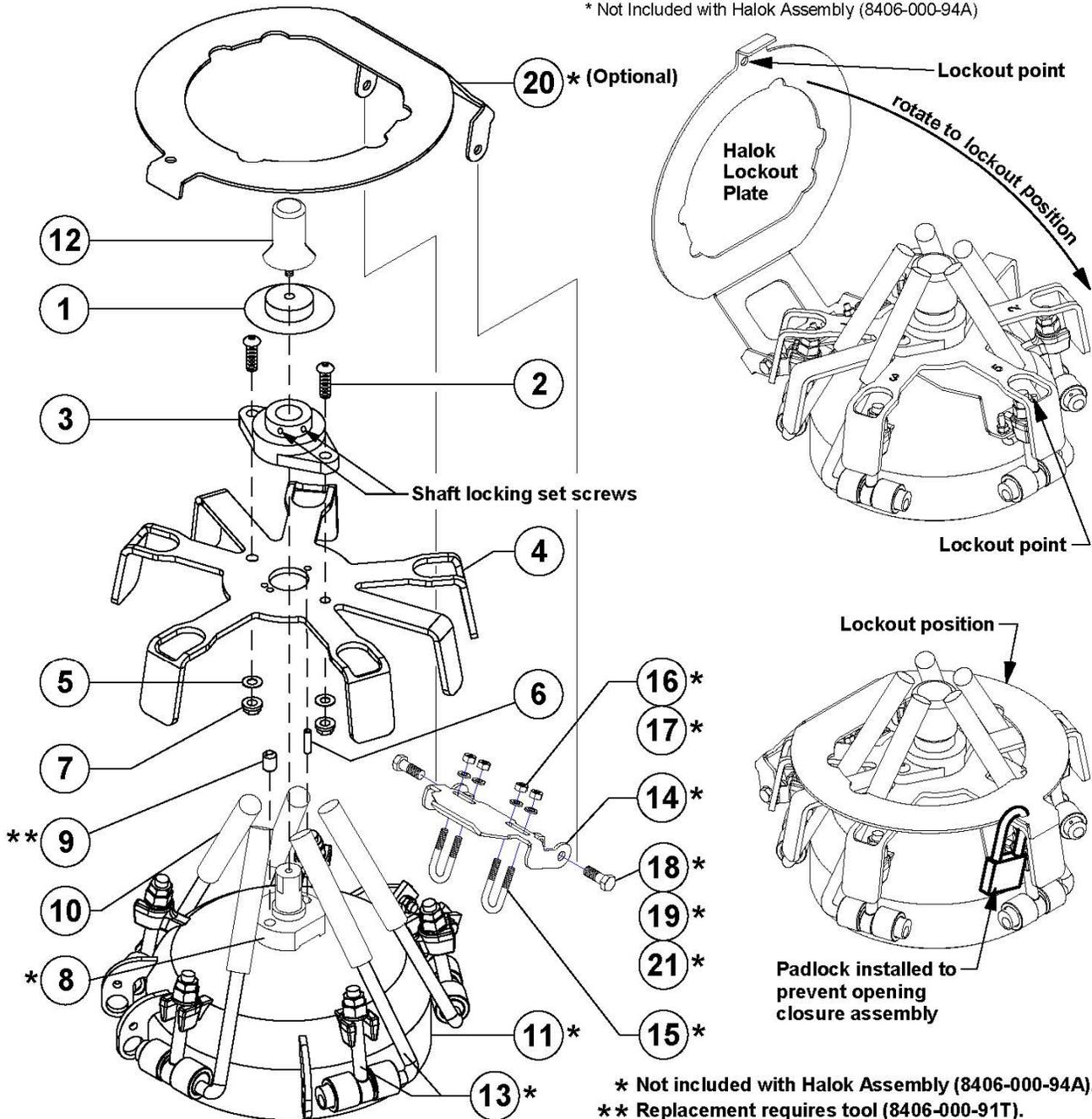


9.13 Halok® Assembly

No.	Part No.	Description
	8406-000-94A	Halok Assembly
1.	8407-000-47	Halok Bearing Cover
2.	7010-509-07	Bolt, Hex 7/16" UNC x 1 1/4" Lg
3.	8406-000-92	Halok Bearing
4.	8406-000-94	Halok Interlock Plate
5.	7028-564	Lockwasher 7/16"
6.	7119-010	Spring Pin, 1/4" x 1" Lg.
7.	7017-509	Hex Nut 7/16" UNC
* 8.	8406-000-90	Halok Hub Base
9.	8406-000-91	Halok Ball Nose Spring Plunger
10.	8408-000-81	Camlock Handle Extension
* 11.	7007-519	Closure Assembly, 10" 5-Lug

No.	Part No.	Description
12.	8408-000-80	Halok Bumper
* 13.	7007-519-02	Camlock Assembly, 10" 5-Lug
	8408-000-82	Halok Lockout Assembly (Optional)
* 14.	8408-000-82A	Halok Lockout Retrofit Plate
* 15.	7025-503-05	U-Bolt, 1/4" UNC x 2" Lg
* 16.	7027-502-01	Flat Washer, 1/4"
* 17.	7019-503	Nylock Nut, 1/4" UNC
* 18.	7010-507-06	Bolt, Hex 3/8" UNC x 1" Lg
* 19.	7019-507	Nylock Nut, 3/8" UNC
* 20.	8408-000-79B	Halok Lockout Plate
* 21.	7027-503-01	Flat Washer, 3/8"

* Not Included with Halok Assembly (8406-000-94A)

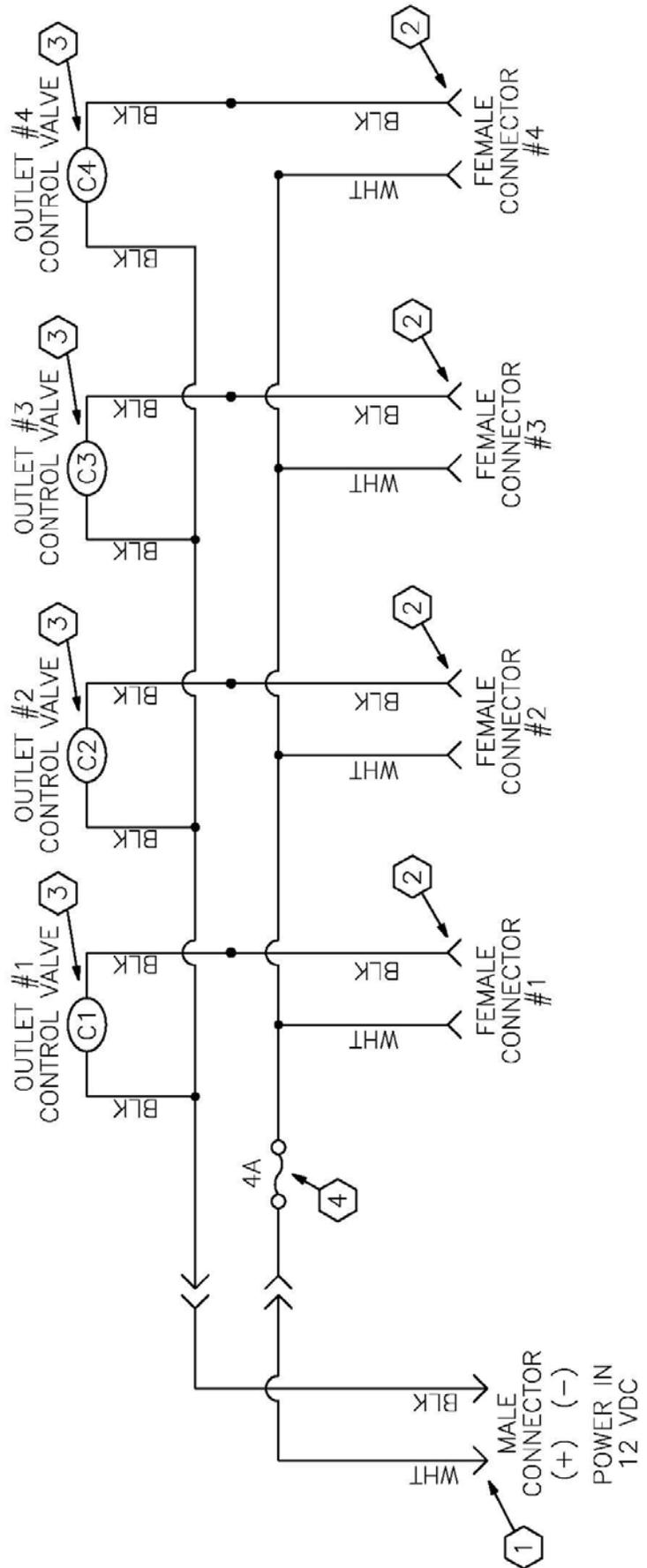


* Not included with Halok Assembly (8406-000-94A).
 ** Replacement requires tool (8406-000-91T).

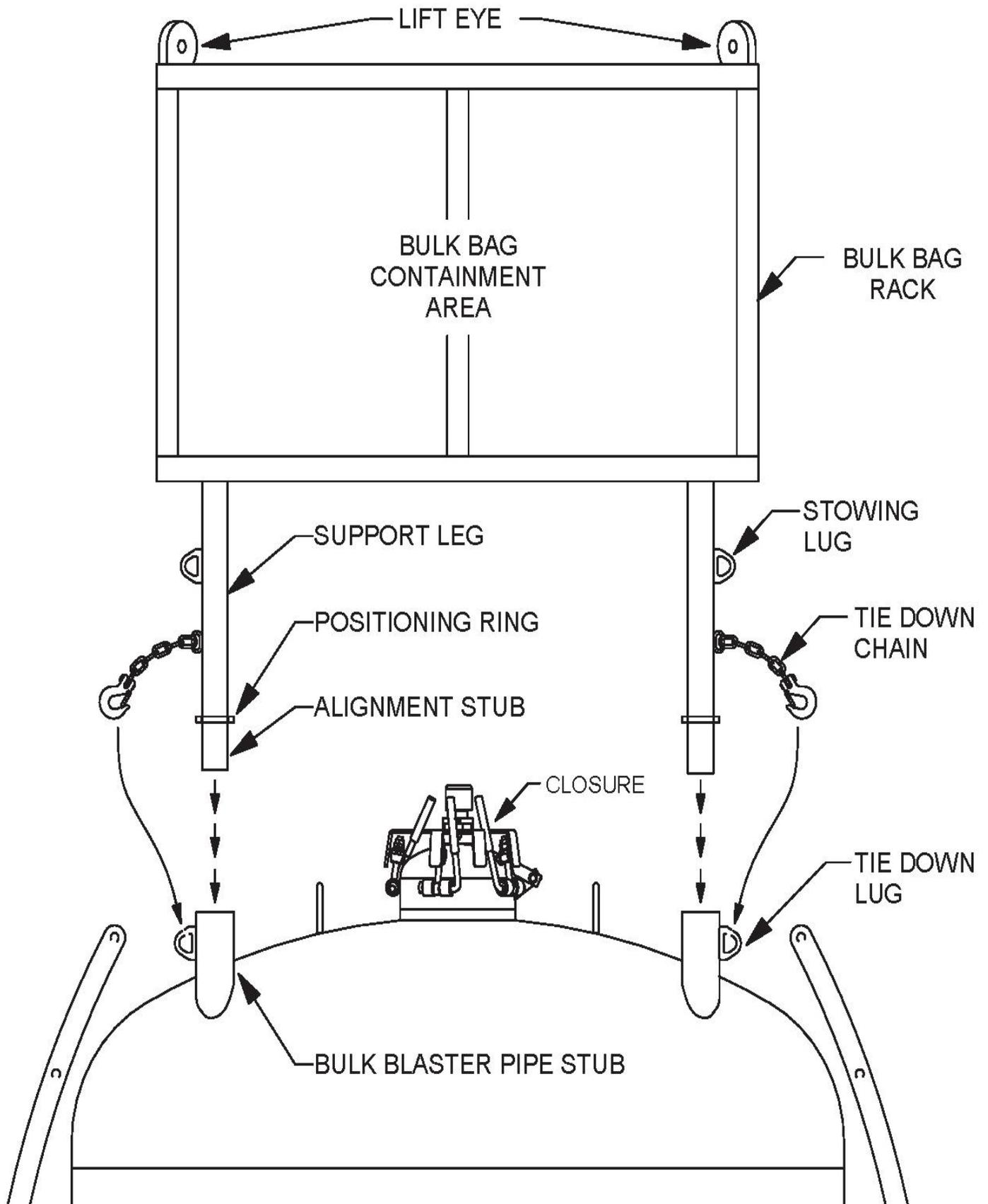
Revision 6-24-20

9.14 Electric Schematic

NO.	PART NUMBER	DESCRIPTION
1	7109-301-01	ELEC. PLUG, TW-LK 3-PRG W/16" CORD
2	7109-300-01	ELEC. CONN., TW-LK 3-PRG W/16" CORD
3	2229-10X-03	COIL (SPECIFY VOLTAGE) (SEE SECTION 9.6)
4	7115-005	INLINE FUSE HOLDER W/ 3 AMP FUSE



9.15 Bulk Bag Rack



10.0 Recommended Spare Parts Lists

Annual Recommended Spare Parts For A Bulk Abrasive Blaster (4-outlet)		
A) ELECTRIC and PNEUMATIC CONTROLS (see note below)		
QTY	PART #	DESCRIPTION
3	2123-00X-02	Auto Air Valve Diaphragm (specify size)
6	2123-00X-99	Auto Air Valve Replacement Parts Kit (specify size)
1	2123-10X	Auto Air Valve (specify size) (See Section 9.7)
6	2123-10X-24	Auto Air Valve Spring (specify size)
3	2152-000-03	Thompson® Valve II Spring
3	2152-000-09	Thompson Valve II Cylinder
3	2152-000-11	Thompson Valve II Base
4	2152-XXX-99	Thompson Valve II Replacement Parts Kit (specify urethane or carbide sleeve)
2	2152-XXX	1 1/2" Thompson Valve II (specify urethane or carbide sleeve) (See Section 9.5)
1	2401-502	1/4" Ball Valve
1	2401-507	1 1/4" Ball Valve
1	2401-509	2" Ball Valve
1	4211-109	2" 4-Lug Crowfoot, Female
12	4211-999	Gasket, 4-Lug Crowfoot
1	2401-508	1 1/2" Ball Valve
5	7007-519-02	Camlock Handle Assembly (5 lug)
5	8408-000-81	Camlock Handle Extension
1	8408-000-80	Halok® Bumper
1	7007-519-03	Closure O-ring, 10"
1	7000-004-07	Manway Crab Assembly, 12" x 16"
1	7000-004-06	Manway Gasket, 12" x 16"
20	4214-999	Hose Coupling Gasket
20	4205-108-99	Insert Gasket
20	7119-002	Safety Pin, Air/Blast Hose Coupling
B) ITEMS FOR PNEUMATIC CONTROLS ONLY (see note below)		
QTY	PART #	DESCRIPTION
4	2229-000	Pneumatic Control Valve
8	2229-000-99	Pneumatic Control Valve Replacement Parts Kit
4	2263-002	G2 Pneumatic Deadman Valve
8	2263-002-99	G2 Pneumatic Deadman Valve Replacement Parts Kit
4	4100-701	Twinline hose, 110ft.
4	4224-301-02	Female Quick Disconnect
4	4224-300-02	Male Quick Disconnect
C) ITEMS FOR ELECTRIC CONTROLS ONLY (see note below)		
4	2229-10X	Electric Control Valve (specify voltage) (see Section 9.6)
8	2229-100-99	Electric Control Valve Replacement Parts Kit
4	2263-402-01	G2E Electric Deadman Switch With Plug
4	7074-110	Extension Cord, 110'
4	7109-300	Female Twist-lock connector, 3-Prong
4	7109-301	Male Twist-lock Plug, 3-Prong

NOTE: Determine the type of blast controls on the bulk abrasive blaster (either electric or pneumatic). The required list of spare parts is List "A" plus either List "B" or "C". Example: If the bulk abrasive blaster has pneumatic controls, then the recommended spare parts needed are the items included in List "A" plus the items in List "C".

11.0 Troubleshooting

This section lists probable causes of problems that may occur during operation of the abrasive blaster. Not all of the “probable causes” may apply to each particular abrasive blaster. The probable cause may not apply because of the control type and accessories on the abrasive blaster. Refer to Figure 11.1 or Figure 8.7 and the drawings in Section 9.0.

DANGER

The bulk abrasive blaster is a Pressurized Vessel. Propelled objects will cause serious injury or death. Depressurize vessel before performing any maintenance. See Section 6.2.

11.1. Malfunction with Deadman Lever In the “Off” Position.

11.1.1. Blast air stops but abrasive will not shut off.

- (1) Trash stuck between plunger and seat in Thompson® Valve (#13).
- (2) Defective valve plunger in Thompson Valve (#13).
- (3) Defective sleeve in Thompson Valve (#13).
- (4) Blocked signal air hose to Thompson Valve (#13).
- (5) Defective spring in Thompson Valve (#13) (check length of spring).
- (6) Thompson Valve cap (or spring retainer) not screwed all the way down (hand tighten only).
- (7) Defective control Valve (#12) or stuck in “ON” position.

11.1.2. Abrasive stops but blast air will not shut off.

- (1) Defective spring in automatic air valve (#10).
- (2) Defective seat in automatic air valve (#10).
- (3) Blocked air hose to automatic air valve (#10).
- (4) Defective O-ring in automatic air valve (#10) (around shaft).
- (5) Defective control Valve (#12) or stuck in “ON” position.

11.1.3. Both blast air and abrasive will not shut off.

- (1) Control lines to deadman valve (#1) are crossed.
- (2) Non-Schmidt deadman (#1) has been installed.
- (3) Defective control valve (#12) or stuck in the “ON” position.
- (4) Blocked control lines.
- (5) Defective deadman valve (#1). Pneumatic deadman cartridge plunger stuck in the “ON” position (down). Cartridge plunger is visible below deadman handle.

11.1.4. Blast outlet turns on accidentally.

- (1) The deadman lever (#1) is worn out.
- (2) The safety button on the deadman is missing. See drawings in Section 9.8 and 9.9.
- (3) A bleeder type deadman valve has been installed. A bleeder type deadman valve *is not safe* because a particle of dirt from the air hose can plug the bleed hole and cause the blast outlet to turn on. See *Warnings and Rules for Safer Operation* in Section 1.0.
- (4) Defective electric deadman switch or electric wiring (check for an electric short).

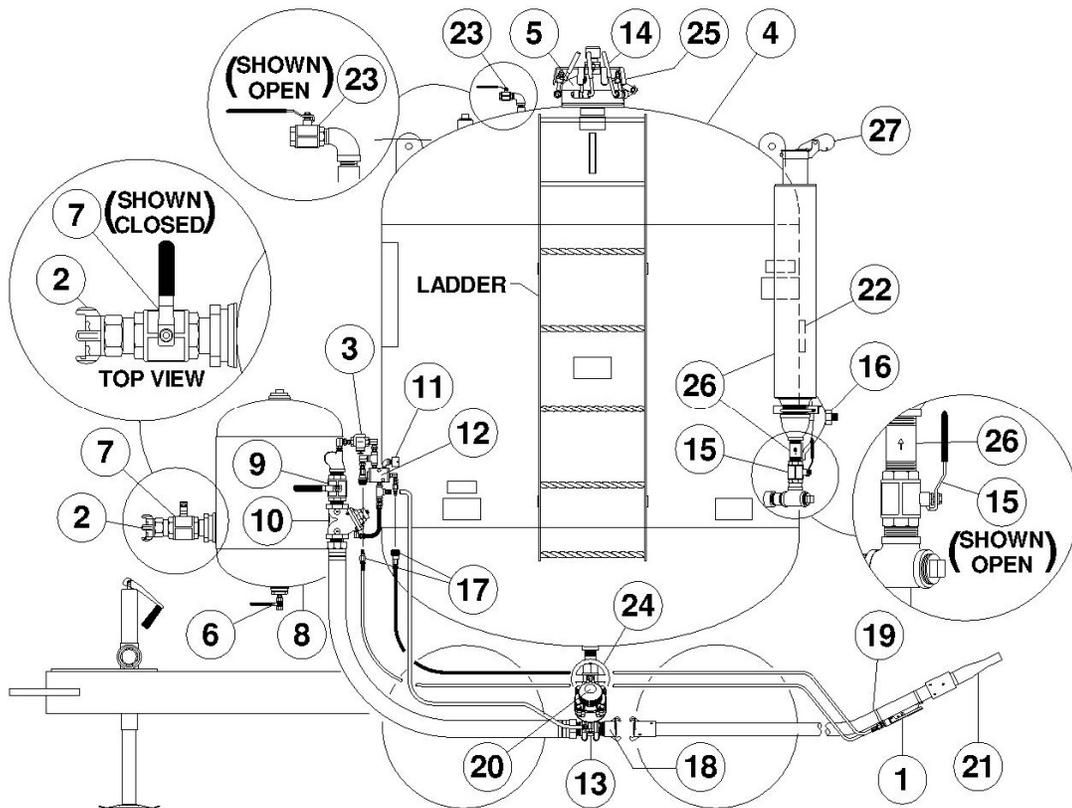


Figure 11.1 – Typical Bulk Abrasive Blaster

11.2. Malfunction with Deadman Lever in the “On” Position.

11.2.1. Air blasts with no abrasive

- (1) Check abrasive level in the blast vessel even if one outlet continues to blast normally.
- (2) Blocked control hose to Thompson® Valve (#13).
- (3) Thompson Valve plunger stuck in closed position.
- (4) Trash plugging opening from tank to Thompson Valve (#13). See Section 11.3.
- (5) Insufficient air pressure to open Thompson Valve (fully open requires 80 psig).
- (6) Abrasive flow problems. See Section 11.3.
- (7) Defective Thompson Valve piston seal (air will leak from breather).
- (8) Blast vessel leak (closure or manway) reduces pressure slowing abrasive flow.
- (9) Air leak at Thompson Valve. Clean out (#13) plug.
- (10) Control valve (#12) stuck in exhaust position or midway (air will leak from breather #11).
- (11) Defective abrasive cut-off switch (optional).

11.2.2. Abrasive choking out of blast hose with low blast air pressure

- (1) Thompson Valve abrasive adjustment knob (#20) is open too far.
- (2) Control hose to automatic air valve (#10) is blocked.
- (3) Choke valve (#9) is partially closed.
- (4) Low air compressor output cfm (unit may cycle on and off). See Section 3.0.
- (5) Blocked automatic air valve (#10) breather vent prevents full opening.
- (6) Control valve (#12) stuck in exhaust position or midway (air will leak from breather #11).

11.2.3. Reduced Pressure at the Nozzle (with or without abrasive flow)

- (1) Low air compressor output cfm. See Section 3.0 for air requirements.
- (2) Air hose too small.
- (3) Thompson Valve abrasive adjustment knob (#20) is open too far.
- (4) Check for leaks in blast vessel or control piping.
- (5) Choke valve (#9) is partially closed.
- (6) Blocked automatic air valve (#10) breather vent prevents full opening.

- (7) Trash blocking the blast nozzle orifice (#21). Release deadman and allow the air pressure in the blast hose (#19) to dissipate. Close the air inlet ball valve (#5). **Note:** Only after the air in the blast hose has dissipated then remove the blast nozzle (#21) and clear blockage.

⚠ DANGER

Confirm the air in the blast hose has dissipated before removing the blast nozzle. Squeeze or step on the blast hose. Firmness or stiffness indicates that the blast hose is pressurized. Do Not attempt to remove the blast nozzle. Allow the air to dissipate before proceeding.

⚠ WARNING

Do Not aim the blast nozzle towards yourself or any person. A system malfunction or a blocked blast nozzle that clears can trigger accidental start up resulting in injury to personnel.

11.2.4. Blast is slow to turn on or will not turn on when deadman lever is pressed down

- (1) Check quick couplings (#17) on control hoses to see if they are connected properly.
- (2) Control valve (#12) stuck in exhaust position or midway (air will leak from breather (#11)).
- (3) 1/4" strainer (#3) blocked.
- (4) Control hoses blocked.
- (5) Cartridge in deadman valve (#1) is blocked.
- (6) Low air compressor output cfm (unit may cycle on and off). See Section 3.0.
- (7) Air leaks in control hose from the deadman valve (#1) to control valve (#12).
- (8) Trash blocking nozzle orifice (#21). See Item (7) in Section 11.2.3 above.
- (9) Blocked automatic air valve (#10) breather vent prevents full opening.

11.3. Notes on Abrasive Flow Problems.

11.3.1. Thompson® Valve operation

If abrasive flow is a problem, remember; the Thompson Valve only opens and closes. The total travel to full open is approximately 3/4 of an inch. This can be quickly checked with the adjustment knob on the abrasive valve.

For this procedure manually close the choke valve (#9) and the abrasive shutoff valve (#24) to stop blast flow. This test is to verify that the Thompson Valve is opening.

With the deadman off, screw the Thompson Valve knob down until it stops. Notice that the knob turns easily when the deadman is off. Next, back the knob out 3/4 of an inch or slightly less, then press the deadman lever down to open the Thompson Valve. The knob should get tight or more difficult to turn because the valve has opened against the adjustment. This guarantees that the valve is fully open. If the material will not flow with the valve fully open, there is an abrasive flow problem, not a problem with the Thompson Valve. The abrasive may be wet, or there may be trash blocking the opening. Try choking the blast outlet to clear the opening. Proceed to step 11.3.2. If the knob does not get tighter during this test troubleshoot the controls and the Thompson Valve piston seal.

⚠ DANGER

Do Not hammer on any part of the pressure vessel to improve abrasive flow. This will cause cracks that may lead to pressure vessel rupture.

11.3.2. Choking the blast outlet

The choke valve (#9) is used to clear any trash that may get into the blast vessel and block the Thompson Valve orifice. Whenever trash (paint chip, cigarette butt, etc.) blocks the Thompson Valve orifice, the procedure is to fully open the Thompson Valve knob, then press down the deadman lever (#1) to begin blasting. While blasting,

have an assistant close the choke valve completely for about one second. This creates differential pressure at the Thompson Valve (high pressure above; low pressure below). The higher pressure from the blast vessel should be enough to loosen the trash blocking the Thompson Valve orifice and blast it through the blast nozzle (#21). To minimize chance of excess wear of the Thompson Valve keep the choke valve fully open during normal blasting. If the blaster is equipped with the abrasive cut-off feature set the valve (or switch) to the on-position for the choke procedure. See Sections 9.11 and 9.12.

Note: The Thompson Valve II has a cleanout port to use for this procedure. See the Thompson Valve II drawing in Section 9.5 (Item 27).

WARNING

Trash cleared during the choking process may block the nozzle orifice. Refer to Item (7) in Section 11.2.3 for procedure to clear nozzle.

11.3.3. Blast control hoses

Remember, the blaster controls and valves are normally closed. Therefore, the control hoses are depressurized to turn the blast off and pressurized to turn the blast on. If a needle gauge is available, it is the quickest way to check to see if there is pressure or not. If no needle gauge is available, disconnect each control hose fitting one at a time until the problem is located.

11.3.4. Contaminated Abrasive

Air quality is crucial to the operation of an abrasive blaster. Moisture and contaminants can cause components to malfunction. Moisture condensation in a blast system causes abrasive flow problems. Condensation occurs when the hot vapor-filled compressed air cools as it reaches the abrasive blaster. Water droplets formed during condensation can be absorbed by the abrasive in the blast vessel which can cause erratic flow to the abrasive valve. To minimize the chance of abrasive flow problems a moisture removal device installed for the blast system air supply is highly recommended (i.e. coalescing moisture separator, air-cooled aftercooler or deliquescent dryer). Contact a local authorized Schmidt® distributor or Axxiom Manufacturing, Inc. to locate one near you.

DANGER

Do Not hammer on any part of the pressure vessel to improve abrasive flow. This can cause cracks that may lead to pressure vessel rupture.

11.3.5. Recycled Abrasives

Used & recycled abrasives can contain trash & coating particles removed from previously blasted items (particularly sticky coatings) that can cause abrasive to clump together and block the metering valve orifice and stop flow. Prior to use recycled abrasive must be passed through a screen with openings no larger than 1/4" round. Some applications may require smaller openings. Refer to Section 11.3.4

Trash in recycled abrasive can also prevent the abrasive valve plunger from properly seating. The result will be air leakage at the blast nozzle in the off mode. This leak will gradually worsen due to the blasting effect of the leak. This leak will cause premature wear of the seat, plunger, and sleeve.

NOTICE

Recycled abrasive can contain trash that can cause equipment malfunction. Prior to use, recycled abrasive must be passed through a screen with openings no larger than 1/4" round. Some applications may require smaller openings.

11.4. Troubleshooting Trailer Hydraulic Brakes.

11.4.1. Dragging Brakes

- (1) Check brake adjustment.
- (2) Check for faulty master cylinder.
- (3) Check for improperly installed backing plate.
- (4) Check for corroded brake assembly.
- (5) Improper weight on trailer tongue.

11.4.2. Noisy Brakes

- (1) Check brake adjustment.
- (2) Check for worn brake shoes.
- (3) Check for contaminated brake linings.
- (4) Check for loose parts in drum.
- (5) Check for bent backing plate.
- (6) Check wheel bearing adjustment.
- (7) Check for damaged wheel bearing.

11.4.3. Locking Brakes

- (1) Check for improper brake adjustment.
- (2) Check for broken or loose brake parts.
- (3) Check for damaged or out of round brake drums.

11.4.4. No Brakes

- (1) Low brake fluid level.
- (2) Broken brake line.
- (3) Loose brake line connection.
- (4) Air in the brake lines.
- (5) Master cylinder not working.
- (6) Excessive weight on tow bar.

11.4.5. Weak Brakes

- (1) Trailer is overloaded.
- (2) Not enough brakes on trailer.
- (3) Improper brake adjustment.
- (4) Corroded brake parts.
- (5) Worn brake cylinder.
- (6) Incorrect brake shoe or lining.
- (7) Lining is glazed.
- (8) Grease on lining.
- (9) Worn out brake drum(s).
- (10) Air in brake lines.
- (11) Brakes are overheated.

11.4.6. Surging Brakes

- (1) Brake drum(s) are damaged or out of round.
- (2) Shoe linings have grease or oil on them.

11.5. Troubleshooting Trailer Electric Brake.

11.5.1. Dragging Brakes

- (1) Check brake adjustment.
- (2) Check for defective controller.
- (3) Check for improperly installed backing plate.
- (4) Check for corroded brake assembly.
- (5) Check for weak or broken brake shoe return spring.
- (6) Check for worn or damaged lever arm between magnet and brake shoe.
- (7) Check for correct controller position.

11.5.2. Noisy Brakes

- (1) Check brake adjustment.
- (2) Check for worn brake shoes.
- (3) Check for contaminated brake linings.
- (4) Check for weak or broken brake shoe return springs.
- (5) Check for bent backing plate.
- (6) Check for improperly installed backing plate.
- (7) Check wheel bearings adjustment.
- (8) Check for worn or damaged wheel bearings.
- (9) Check for worn or damaged magnets.

11.5.3. Brakes Locked and Brake Pedals Not Depressed

- (1) Check stoplight switch adjustment.
- (2) Check for short between stoplight switch circuit and power supply circuit.
- (3) If brakes are locked when 4-way flashers are operated, check for pulse preventor installed in circuit.

11.5.4. LED Light Comes On Dim & Gets Brighter as Brakes Applied

- (1) If trailer is connected, this indicates normal operation.
- (2) If trailer is not connected, check for short in electro-magnet circuit between controller and trailer connector at rear of vehicle.

11.5.5. LED Light Comes On Bright & Stays Bright

- (1) If trailer is hooked up, this indicates system is not operating. Check trailer brakes and all connecting wiring.
- (2) If trailer is not connected, this indicates that system is ready to function.

11.5.6. Inoperative Breakaway Switch

- (1) Check for dead or weak trailer 12-volt battery.
- (2) Check all wiring and connections.
- (3) Check breakaway switch
- (4) If only one brake is operating, check other magnets.

11.5.7. Uneven Tire Wear

On tandem axle trailers, check voltage at front axle and rear axle with brakes applied. At times, the front axle will “lift” allowing front wheel to lock and slide. Correction can be made by installing a resistor in front brake circuit or combination of axle resistor and an adjusted controller.

11.5.8. No Brakes

- (1) Check for defective circuit breakers.
- (2) Check for open or shorted circuit.
- (3) Check for properly wired system, including ground between towing vehicle and trailer.
- (4) Check for defective controller or loose wiring at controller.
- (5) Check brake adjustment.
- (6) Check for defective resistor or loose wiring at resistor.
- (7) Check for worn or defective magnet(s).
- (8) Check for a damaged or worn connector between towing vehicle/trailer.
- (9) Check for a burned out resistor.
- (10) Check that correct controller is installed

11.5.9. Intermittent or Surging Brakes

- (1) Check for out-of-round brake drums.
- (2) Check for properly wired system, including ground between towing vehicle and trailer.
- (3) Check for defective magnet or wiring
- (4) Check for loose/worn wheel bearings.

11.5.10. Ineffective or Weak Brakes

- (1) Check that trailer is not overloaded (see Section 2.0).
- (2) Check for loose or corroded connections.
- (3) Check for properly wired system.
- (4) Check for a shorted circuit.
- (5) Check variable resistor for correct resistance to trailer.
- (6) Check for worn or defective magnet.
- (7) Check brake adjustment.
- (8) Check for bent backing plate.
- (9) Check for contaminated brake linings.
- (10) Check brake system wiring.
- (11) Check for worn, damaged brake linings.
- (12) Check for weak or broken brake shoe return springs.
- (13) Check for defective or worn brake drums.
- (14) Check for loose axle.
- (15) Check that correct controller is installed.
- (16) Check for correct controller position.

11.5.11. Grabbing or Locking Brakes

- (1) Check for improperly installed backing plate.
- (2) Check for contaminated brake linings.
- (3) Check for weak or broken brake shoe return springs.
- (4) Check for out-of-round brake drums.
- (5) Check variable resistor.
- (6) Check that a variable resistor is installed (if necessary).
- (7) Check that correct controller is installed.
- (8) Check for defective controller.
- (9) Check for rust on armature plate or brake drum.
- (10) Check for loose/worn wheel bearings.
- (11) Check for correct controller position.

12.0 Warranty and Reference Information

12.1. Warranty

This following section is to be used as a guide in determining warranty policies and procedures for SCHMIDT® products. It is to be used in determining whether a warranty is justified and as a procedural guide in completing a SCHMIDT warranty claim.

12.2. Warranty Policy

1. All SCHMIDT products are guaranteed to be free of defects in material and workmanship at time of shipment. Axxiom Manufacturing, Inc. warrants its products against defects in material and workmanship under normal and proper use for a period of ninety (90) days from the date of delivery. Such warranty is extended only to the buyer who purchases the equipment directly from Axxiom Manufacturing, Inc. or its authorized distributors. This warranty does not include expendable parts such as, but not limited to, hoses, nozzles, and seals.
2. The obligation under this warranty is strictly limited to the replacement or repair, at Axxiom's option, of machines and does not include the cost of transportation, loss of operating time, or normal maintenance services. Axxiom Manufacturing, Inc. shall have no liability for labor, consequential damages, freight or special charges.
3. This warranty does not apply to failure occurring due to abuse, misuse, negligence, corrosion, erosion, normal wear and tear, alterations or modifications made to the machine without express written consent of Axxiom Manufacturing, Inc.
4. Warranty requests must be submitted in writing within thirty (30) days after failure.
5. Written authorization to return merchandise under warranty must first be obtained from Axxiom Manufacturing, Inc. In no case is merchandise to be returned to Axxiom for credit without authorization. At the time of authorization, Axxiom will issue a return authorization number that must be included on all packages and correspondence. Any material returned without prior authorization will remain the property of the sender and Axxiom will not be responsible for it.
6. All returns must be shipped prepaid freight. All returns may be exchanged for other equipment or parts of equal dollar value. If goods are not exchanged, they are subject to a 20% restocking charge. Any cost incurred by Axxiom Manufacturing, Inc. to restore such goods to first class condition will be charged to the customer.
7. Axxiom Manufacturing, Inc. reserves the right to inspect and make the final decision on any merchandise returned under warranty.
8. Axxiom Manufacturing, Inc. offers no warranty with respect to accessories, including but not limited to, engines, motors, batteries, tires and any other parts not manufactured by Axxiom Manufacturing, Inc., but which the original manufacturer warrants.

9. Axxiom Manufacturing, Inc. reserves the right to make product changes or improvements without prior notice and without imposing any obligation upon itself to install the same on its products previously sold.
10. The above warranty conditions can only be altered by Axxiom Manufacturing, Inc. Axxiom must confirm alterations in writing for each specific transaction.
11. Axxiom Manufacturing, Inc. reserves the right to establish specific warranty terms for used or demo machines on an individual transaction basis. Invoices covering such merchandise will clearly state the provisions of the applicable warranty for each specific transaction.
12. USE OF NON-ORIGINAL SCHMIDT® FACTORY REPLACEMENT PARTS ON ANY SCHMIDT EQUIPMENT VOIDS ALL WARRANTIES.
13. AXXIOM MANUFACTURING, INC. DOES NOT AUTHORIZE ANY PERSON, REPRESENTATIVE OR SERVICE OR SALES ORGANIZATION TO MAKE ANY OTHER WARRANTY OR TO ASSUME ON BEHALF OF AXXIOM MANUFACTURING, INC. ANY LIABILITY IN CONNECTION WITH THE SALE OF OUR PRODUCTS OTHER THAN THOSE CONTAINED HEREIN.
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12.3. Trademarks, Patents, and Proprietary Statements

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Products manufactured and marketed by Axxiom Manufacturing, Inc. are protected by patents issued or pending in the United States and other countries.

The text, diagrams, and drawings contained in this manual are proprietary information intended solely for instruction in the operation of the specified equipment. Use of any text, diagrams, or drawings contained in this manual for any reason other than its intended purpose without the written consent of Axxiom Manufacturing, Inc. is strictly prohibited.

12.4. Safety Information Sources

Axxiom Manufacturing, Inc

This equipment and all Schmidt® equipment are manufactured exclusively by Axxiom Manufacturing, Inc. If any operational or safety related questions arise relating to this equipment contact Axxiom Manufacturing, Inc.

Phone: 1-800-231-2085

Website: www.SchmidtAbrasiveBlasting.com

Axxiom Manufacturing, Inc.
11927 South Highway 6
Fresno, Texas 77459

Occupational Safety and Health Administration (OSHA) establishes and enforces regulations regarding safety practices in the workplace including the abrasive blasting industry. Any questions, reporting of work related injuries, or reporting of unsafe work practices can be made to the following contact information. Answers to most any safety related questions can be found at the OSHA website shown below.

Phone: 1-800-321-6742

Website: www.osha.gov

U.S. Department of Labor
Occupational Safety and Health Administration
200 Constitution Avenue, NW
Room Number N3626
Washington D.C. 20210

National Institute of Occupational Safety and Health (NIOSH) is a federal agency responsible for conducting research and recommendations for the prevention of work related injuries and sickness.

Phone: 1-800-232-4636

Website: www.cdc.gov/niosh

National Institute of Occupational Safety and Health
Patriots Plaza 1
395 E Street, SW, Suite 9200
Washington, DC 20201

American National Standards Institute (ANSI) coordinates the development and use of voluntary consensus standards including safety standards.

Phone: 1-202-293-8020

Website: www.ansi.org

American National Standards Institute
1899 L Street, NW
11th Floor
Washington, DC 20036

12.5. Surface Preparation Information Sources

The Society for Protective Coatings (SSPC) consists of research and testing committees, conducts seminars and establishes industry standards on surface preparation methods, abrasive and coatings.

Phone: 1-877-281-7772
Website: www.sspc.org

The Society for Protective Coatings
800 Trumbull Dr.
Pittsburg, PA 15205

National Association of Corrosion Engineers (NACE) develops test methods and recommended practices on surface preparation techniques and coatings.

Phone: 1-800-797-6223
Website: www.nace.org

National Association of Corrosion Engineers
15835 Park Ten Place
Houston, TX 77084

12.6. Table of Blast Abrasive Characteristics

Abrasive Type	Hardness (Mohs)	Grain Shape	Density Lbs./ft ³	Color	Free Silica Content	No. of Recycles	Initial Cost	Typical Use
Corn Cobs	2	angular	35-45	tan	none	4-5	low	stripping paint from delicate substrates
Sodium Bicarbonate	2.8	crystal	60	white	none	4-5	medium	cleaning and stripping paint from delicate substrates
Walnut Shell	3	angular	45	lt. brown	none	4.5	low	stripping paint from delicate substrates
Plastic	3.2	angular	45-60	white	none	8-10	medium	Paint stripping, deburring, and cleaning
Glass Beads	4.5	spherical	90	crystal	none	8-10	low	cleaning finishing
Starblast XL	6.5	spherical	128	lt. brown	<1%	4-5	medium	outdoor blasting
Coal Slag	7	angular	85	black	none	1-2	medium	outdoor blasting
Copper Slag	7	angular	112	black	none	1-2	medium	outdoor blasting
Garnet	7	angular	147	pink	<2%	4-5	medium	outdoor blasting
Steel Shot	8	spherical	280	steel grey	none	200	low	cleaning and peening
Steel Grit	8	angular	280	steel grey	none	200	medium	removing heavy scale
Aluminum Oxide	9	angular	120	brown	<1%	6-8	medium	cleaning and finishing, deburring and etching

13.0 Blasting Data

13.1. Table 1 Approximate Air Consumption (cfm) Per Blast Nozzle

NOZZLE SIZE		NOZZLE PRESSURE						
		60 psi	70 psi	80 psi	90 psi	100 psi	120 psi	140 psi
No.2	1/8"	14	16	18	20	22	26	30
No.3	3/16"	32	36	41	45	49	58	66
No.4	1/4"	57	65	72	80	90	105	121
No.5	5/16"	90	101	113	125	140	160	185
No.6	3/8"	126	145	163	182	200	235	270
No.7	7/16"	170	193	215	240	270	315	360
No.8	1/2"	230	260	290	320	350	410	470
No.10	5/8"	360	406	454	500	550	640	740
No.12	3/4"	518	585	652	720	790	925	1060

13.2. Table 2 Abrasive Consumption (lbs. per hour) Per Blast Nozzle

NOZZLE SIZE		NOZZLE PRESSURE						
		60 psi	70 psi	80 psi	90 psi	100 psi	120 psi	140 psi
No.2	1/8"	90	105	115	130	140	165	190
No.3	3/16"	205	230	260	290	320	375	430
No.4	1/4"	365	420	460	500	560	660	760
No.5	5/16"	575	650	725	825	900	1050	1200
No.6	3/8"	840	945	1050	1155	1260	1475	1700
No.7	7/16"	1150	1300	1450	1600	1750	2050	2350
No.8	1/2"	1460	1660	1850	2000	2250	2650	3000
No.10	5/8"	2290	2600	2900	3125	3520	4100	4750
No.12	3/4"	3300	3750	4180	4500	5060	5950	6800

13.3. Table 3 Hose Selection Guide (blasting @ 100 Psi)

NOZZLE SIZE	No.4 1/4"	No.5 5/16"	No.6 3/8"	No.7 7/16"	No.8 1/2"
CFM @ 100psi	90	140	200	270	350
AIR HOSE	1 1/4"	1 1/4"	1 1/2"	1 1/2"	2"
BLAST HOSE	1"	1 1/4"	1 1/4"	1 1/2"	1 1/2"
ABRASIVE (lbs. per hr.)	560	900	1260	1750	2250

13.4. Additional Information on Blasting Productivity

Air volume and pressure are very important. The blasting production rate will increase with higher blasting pressures and decrease with lower blasting pressures. The National Association of Corrosion Engineers' data suggests that for each 1 psi reduction in nozzle pressure, there is a 1.5% production loss. Pressure drop through a Schmidt® blast unit is normally less than 1 psi, while blast units manufactured by some of our competitors have pressure losses as high as 12 psi resulting in an 18% loss of production. Air pressure loss can also be avoided by using the shortest possible hose of adequate size. The inside diameter of both the blast hose (other than whip hose) and the air hose should be approximately three times the diameter of the orifice in the blast nozzle. Standard Schmidt blast units are rated for a maximum pressure of 150 psi. For Units manufactured prior to July 2009 150 psi was optional. Check the pressure vessel nameplate.