

HOLLO-BLAST
INTERNAL-PIPE BLAST TOOL
O. M. 06158

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! WARNING

Do not proceed with these instructions* until you have READ the orange cover of this MANUAL and YOU UNDERSTAND its contents.

These WARNINGS are included for the health and safety of the operator and those in the immediate vicinity.

***If you are using a Clemco Distributor Maintenance and Part Guide, refer to the orange warnings insert preceding the Index before continuing with the enclosed instructions.**

Electronic files include a Preface containing the same important information as the orange cover.

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WARNING

- Employers are responsible for identifying all job site hazards, educating and training all persons who will operate and maintain these products, and ensuring that all blast operators and their assistants understand the warnings and information contained in these instructions relating to safe and proper operation and maintenance of this equipment.
- Serious injury or death can result from failure to comply with all Occupational Safety and Health Administration (OSHA) regulations and all manufacturer's instructions.
- This equipment is not intended for use in any area considered hazardous per National Electric Code NFPA 70 2011, Article 500.
- Read this document and follow all instructions before using this equipment.

OSHA regulations relating to abrasive blasting are contained in the Code of Federal Regulations, Title 29 (29 CFR 1910 General Industry; 1915 Maritime; 1926 Construction). The most pertinent include: 1910.94 Ventilation, 1910.95 Occupational Noise Exposure, 1910.132 Personal Protective Equipment, 1910.133 Eye and Face Protection, 1910.134 Respiratory Protection, 1910.135 Head Protection, 1910.244 (b) Remote Controls. Consult www.osha.gov for complete information.

NOTICE TO PURCHASERS AND USERS OF OUR PRODUCTS AND THIS INFORMATIONAL MATERIAL

Clemco proudly provides products for the abrasive blast industry and is confident that industry professionals will use their knowledge and expertise for the safe and efficient use of these products.

The products described in this material, and the information relating to these products, are intended for knowledgeable, experienced users.

No representation is intended or made as to: the suitability of the products described here for any purpose or application, or to the efficiency, production rate, or useful life of these products. All estimates regarding production rates or finishes are the responsibility of the user and must be derived solely from the user's experience and expertise, not from information contained in this material.

It is possible that the products described in this material may be combined with other products by the user for purposes determined solely by the user. No representations are intended or made as to the suitability of or engineering balance of or compliance with regulations or standard practice of any such combination of products or components the user may employ.

Abrasive blast equipment is only one component of an abrasive blasting job. Other products, such as air compressors, air filters and receivers, abrasives, scaffolding, hydraulic work platforms or booms, equipment for lighting, painting, ventilating, dehumidifying, parts handling, or specialized respirators or other equipment, even if offered by Clemco, may have been manufactured or supplied by others. The information Clemco provides is intended to support the products Clemco manufactures. Users must contact each manufacturer and supplier of products used in the blast job for warnings, information, training, and instruction relating to the proper and safe use of their equipment.

GENERAL INSTRUCTIONS

This material describes some, but not all, of the major requirements for safe and productive use of blast machines, remote controls, respirator systems, and related accessories. All equipment and accessories must be installed, tested, operated and maintained only by trained, knowledgeable, experienced users.

The blast operator and all workers in the vicinity must be properly protected from all job site hazards including those hazards generated by blasting.

Work environments involving abrasive blasting present numerous hazards. Hazards relate to the blast process from many sources that include, but are not limited to, dust generated by blasting or from material present on the surface being blasted. The hazards from toxic materials may include, but are not limited to, silica, cyanide, arsenic, or other toxins in the abrasives or in the coatings, such as lead or heavy metals. Other hazards from toxins include, but are not limited to, fumes from coating application, carbon monoxide from engine exhaust, contaminated water, chemicals or asbestos. In addition, physical hazards that may be present include, but are not limited to, uneven work surfaces, poor visibility, excessive noise, and electricity. Employers must identify all job site hazards and protect workers in accordance with OSHA regulations.

Never modify Clemco equipment or components or substitute parts from other manufacturers for any Clemco components or parts. Any unauthorized modification or substitution of supplied-air respirator parts violates OSHA regulations and voids the NIOSH approval.

IMPORTANT

Contact Clemco for free booklets:

Blast Off 2 – Guide to Safe, Productive, and Efficient Abrasive Blasting, and Abrasive Blasting Safety Practices – Guide to Safe Abrasive Blasting.

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OPERATIONAL INSTRUCTIONS

OPERATOR SAFETY EQUIPMENT

WARNING

- OSHA regulation 1910.134 requires appropriate respiratory protection for blast operators and workers in the vicinity of blasting. These workers must wear properly-fitted, properly-maintained, NIOSH-approved, respiratory protection that is suitable for the job site hazards. Blast respirators are to be worn only in atmospheres not immediately dangerous to life or health from which wearers can escape without use of the respirator.
- The employer must develop and implement a written respiratory protection program with required worksite- specific procedures and elements for required respirator use. The employer must provide effective training to employees who are required to use respirators. The training must be comprehensive, understandable, and recur annually, and more often if necessary.
- NEVER use abrasives containing more than one percent crystalline silica. Fatal diseases, such as silicosis, asbestosis, lead or other poisoning, can result from inhalation of toxic dusts, which include, but are not limited to, crystalline silica, asbestos, and lead paint. Refer to NIOSH Alert 92-102; and OSHA CPL 03-00-007: “National Emphasis Program – Crystalline Silica”, in which OSHA describes policies and procedures for implementing a national emphasis program to identify and reduce or eliminate health hazards from exposure to crystalline silica. Numerous topics associated with the hazards of crystalline silica in silica blasting sand can be found on [http:// osha.gov/](http://osha.gov/). Clemco urges users of silica blasting sand to visit this website, and read and heed the information it contains.
- Always make sure the breathing air supply (respirator hose) is not connected to plant lines that supply gases that include, but are not limited to, oxygen, nitrogen, acetylene, or other non-breathable gas. Never modify or change respirator air line connections without first testing the content of the line for safe breathing air. Failure to test the line may result in death to the respirator user.

- Breathing air quality must be at least Grade D, as defined by the Compressed Gas Association specification G-7.1, per OSHA Regulation 29 CFR 1910.134. When compressed air is the breathing air source, a Clemco CPF (suitable sorbent bed filter) should be used. Respirator hose connecting the respirator to the filter must be NIOSH approved. Non- approved hose can cause illness from chemicals employed to manufacture the hose.

- All workers must always wear NIOSH-approved respirators when any dust is present. Exposure to dust can occur when handling or loading abrasive, blasting, cleaning up abrasive, or working in the vicinity of blasting. Before removing the respirator, test the air with a monitoring device to ensure it is safe to breathe.

- Clemco respirators DO NOT remove or protect against carbon monoxide or any other toxic gas. Monitoring devices must be used in conjunction with the respirator to ensure safe breathing air. Always locate compressors and ambient air pumps where contaminated air will not enter the air intake.

- Always use Clemco lenses with Clemco respirators; installing non-approved lenses voids the NIOSH approval. Respirator lenses are designed to protect the wearer from rebounding abrasive; they do not protect against flying objects, heavy high-speed materials, glare, liquids, or radiation.

INDUSTRY ORGANIZATIONS

For additional information, consult:

Occupational Safety and Health Administration (OSHA) - www.osha.gov

Compressed Gas Association (CGA) - www.cganet.com

The Society for Protective Coatings (SSPC) - www.sspc.org

National Association of Corrosion Engineers (NACE) - www.nace.org

American Society for Testing and Materials (ASTM) - www.astm.org

National Institute of Occupational Safety and Health (NIOSH) - www.niosh.gov

American National Standards Institute (ANSI) - www.ansi.org

PREFACE

BLAST MACHINES AND REMOTE CONTROLS

⚠ WARNING

OSHA regulation 1910.169 describes the necessity of pressure relief valves on compressed air equipment. Do not operate blast machines with air compressors that are not equipped with properly functioning pressure relief valves.

OSHA regulation 1910.244(b) requires the use of remote controls on blast machines.

Serious injury or death can result from many sources, among them:

- Involuntary activation of the remote controls. Never modify or substitute remote control parts; parts are not compatible among different manufacturers. Welding hose is not suitable for remote control hose. Its ID and material composition make it unsafe for remote control use.
- Exceeding the maximum working pressure. Clemco blast machines are built to ASME-code and carry a 'U' or 'UM' stamp, and National Board/serial number. Every machine is marked with its maximum working pressure. Never exceed the maximum working pressure limits of the blast machine.
- Uncontrolled blast stream. High-velocity abrasive particles will inflict serious injury. Always point the blast nozzle in the direction of the blast surface only. Keep unprotected workers out of the blast area.
- Welding on the blast machine. Never weld on the blast machine; welding voids the National Board approval and may affect the dimensional integrity of the vessel.
- Moving the blast machine. Never manually move a blast machine containing abrasive, any machine containing abrasive must be moved with appropriate mechanical lifting equipment.

HOSES, COUPLINGS, AND NOZZLE HOLDERS

- The inside diameter (ID) of air hoses, fittings, and connections should be at least four times larger than the nozzle orifice size. Blast hose ID should be three to four times the size of the nozzle orifice. Example: a #6 nozzle (3/8" diameter orifice) calls for 1-1/2" ID blast hose and 1-1/2" ID or larger compressor hose. All hose runs should be kept as short as possible and run in as straight a line as possible to reduce pressure loss.
- To install, squarely cut the end of the hose so that it fits snugly against the coupling or hose end shoulder. Always use the screws recommended by the manufacturer ensuring that they do not penetrate the inner wall. Make sure the couplings tightly fit the hose. Install cotter pins at every connection or use couplings with built-in lock-springs to prevent disengagement. Install safety cables at all connections to prevent whipping if hoses disengage or blow out.

MAINTENANCE AND REPAIR

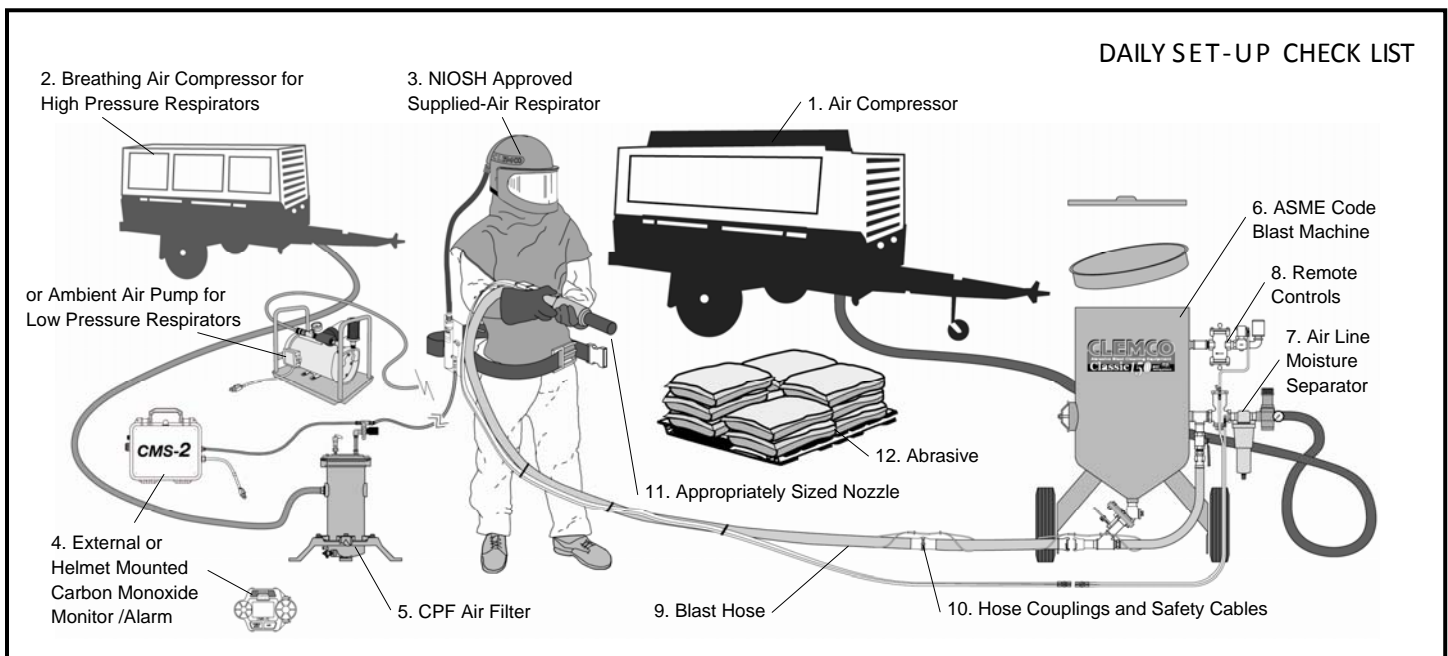
- Completely read and follow all service instructions and recommended maintenance intervals. Always shut off compressor and depressurize blast machine before performing any maintenance. At every service interval, clean all filters, screens, and alarm systems. If spring-loaded abrasive valves are used, always cage spring before disassembly.

WARRANTY

The following is in lieu of all warranties, express, implied or statutory, and in no event shall seller or its agents, successors, nominees or assignees, or either, be liable for special or consequential damage arising out of a breach of warranty. This warranty does not apply to any damage or defect resulting from negligent or improper assembly or use of any item by the buyer or its agent or from alteration or attempted repair by any person other than an authorized agent of seller. All used, repaired, modified, or altered items are purchased "as is" and with all faults. In no event shall seller be liable for consequential or incidental damages. The sole and exclusive remedy of buyer for breach of warranty by seller shall be repair or replacement of defective parts or, at seller's option, refund of purchase price, as set forth below

1. Seller makes no warranty with respect to products used other than in accordance hereunder.
 2. On products seller manufactures, seller warrants that all products are to be free from defects in workmanship and materials for a period of one year from date of shipment to buyer, but no warranty is made that the products are fit for a particular purpose.
 3. On products which seller buys and resells pursuant to this order, seller warrants that the products shall carry the then standard warranties of the manufacturers thereof, a copy of which shall be made available to the customer upon request.
 4. The use of any sample or model in connection with this order is for illustrative purposes only and is not to be construed as a warranty that the product will conform to the sample or model.
 5. Seller makes no warranty that the products are delivered free of the rightful claim of any third party by way of patent infringement or the like.
 6. This warranty is conditioned upon seller's receipt within ten (10) days after buyer's discovery of a defect, of a written notice stating in what specific material respects the product failed to meet this warranty. If such notice is timely given, seller will, at its option, either modify the product or part to correct the defect, replace the product or part with complying products or parts, or refund the amount paid for the defective product, any one of which will constitute the sole liability of the seller and a full settlement of all claims. No allowance will be made for alterations or repairs made by other than those authorized by seller without prior written consent of seller. Buyer shall afford seller prompt and reasonable opportunity to inspect the products for which any claim is made as above stated.
- Except as expressly set forth above, all warranties, express, implied or statutory, including implied warranty of merchantability, are hereby disclaimed.

PREFACE



DAILY SET-UP CHECK LIST

Make sure all blast operators are properly trained and suitably attired with a blast suit, safety boots, leather gloves, respiratory and hearing protection. Every day before start up, check all equipment components, including piping, fittings, and hoses, and valves, for leaks, tightness, and wear. Repair or replace as needed. Use the following checklist.

- 1. PROPERLY-MAINTAINED AIR COMPRESSOR** sized to provide sufficient volume (cfm) at given pressure for nozzle and other tools. ADD 50% volume (cfm) reserve to allow for nozzle wear. Use large compressor outlet and air hose (at least 4 times the nozzle orifice diameter). For oil-lubricated compressors, the employer shall use a high- temperature or carbon monoxide alarm, or both, to monitor carbon monoxide levels. If only high-temperature alarms are used, the air supply shall be monitored at intervals sufficient to prevent carbon monoxide in the breathing air from exceeding 10 ppm. Follow the manufacturer's checklist and maintenance instructions.
- 2. BREATHING-AIR COMPRESSOR** (or oil-less ambient air pump) capable of providing Grade D quality air, located in a dust free area. Read # 1 above.
- 3. CLEAN, PROPERLY-MAINTAINED NIOSH-APPROVED SUPPLIED-AIR RESPIRATOR** worn by blast operators, and other workers exposed to blast dust. Make sure all respirator components are in place — all lenses, inner collar, and cape. Thoroughly inspect all components for wear. The NIOSH approval (approval number is listed in the owner's manual) is for a complete assembly from point of attachment on the CPF (sorbet bed) filter to the complete respirator. Substitution of any part voids the NIOSH approval.
- 4. CARBON MONOXIDE MONITOR/ALARM** installed at the CPF filter or inside the supplied-air respirator for monitoring for the presence of deadly CO gas and warning the operator(s) when the CO level reaches an unacceptable level. When an ambient air pump is used for breathing air, a CO monitor provides a measure of safety. Read # 1 above.
- 5. BREATHING-AIR FILTER (OSHA-REQUIRED sorbet bed filter)** for removal of moisture and particulate matter in the compressed air breathing-air supply. Monitor the condition of the cartridge and replace when odor is detected or at 3 month intervals, whichever comes sooner. The breathing air filter does NOT detect or remove carbon monoxide (CO). Always install a CO monitor/alarm.
- 6. BLAST MACHINE** (bearing U or UM stamp, National Board Number, and Maximum Working Pressure) sized to hold a 30-minute abrasive supply. Examine pop-up valve for alignment. Check piping, fittings, screens, valves for tightness, leaks, and wear. Always ground the machine to eliminate hazard of static shock. Install a blast machine screen to keep out foreign objects. Use a blast machine cover if left outdoors overnight. Never exceed the maximum working pressure of the vessel.
- 7. AIR LINE FILTER** (moisture separator) installed as close as possible to the blast machine inlet and sized to match the size of the inlet piping or larger air supply line. Clean filter and drain often. Damp abrasive causes operational problems.
- 8. REMOTE CONTROLS** are required by OSHA and must be in perfect operating condition. Test and check all components to ensure all parts are present and fully functional. Use genuine replacement parts. NEVER mix parts from different manufacturers. Never use welding hose for remote control hose.
- 9. BLAST HOSE** should have an inside diameter sized to suit the blast nozzle. The ID should be three to four times the size of the nozzle orifice diameter. Blast hose should be arranged in as straight a line as possible from the blast machine to the work area, avoiding sharp bends.
- 10. COUPLINGS AND NOZZLE HOLDERS** should fit snugly on the hose and be installed with manufacturer recommended screws. Coupling lugs must snap firmly into locking position. Gasket must always be used to form a positive seal, and cotter pins must be installed. Replace gasket when wear, softness or distortion is detected. Check nozzle holder for thread wear; replace at any sign of wear. Install safety cables at all connections.
- 11. NOZZLE** orifice size should be checked and nozzle replaced when worn 1/16" from original size. (No. 5 nozzle has 5/16" orifice diameter; replace when it measures 3/8"). Threads should be inspected daily for wear and nozzle should be replaced when wear is detected. Always use a nozzle washer.
- 12. ABRASIVE** must be a material specifically manufactured for blasting. It should be properly sized for the job. Check material safety data sheet for free-silica, cyanide, arsenic, lead and other toxins and avoid use when these toxic, harmful substances are present.
- SURFACE TO BE BLASTED** should be examined for hazardous substances. Take appropriate protective measures as required by OSHA to ensure the blast operator, other workers in the vicinity, and any bystanders are properly protected.

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1.0 INTRODUCTION

1.1 Scope

1.1.1 These instructions cover set-up, operation, maintenance, troubleshooting, and replacement parts for Clemco's Hollo-Blast internal pipe blasting tool.

1.1.2 These instructions contain important information required to safely operate of the Hollo-Blast tool. The tool requires a blast machine and accessories to deliver the blast stream to the tool. Before using the Hollo-Blast all personnel associated with the operation must read this entire manual, including the orange cover, and have knowledge of how to safely operate the blast machine and all accessories.

1.1.3 All personnel involved with the abrasive blasting process must be made aware of the hazards associated with abrasive blasting. The Clemco booklet "Abrasive Blasting Safety Practices" (Stock No. 22090) also available in Spanish (Stock No. 22931) contains important safety information about abrasive blasting that may not be included in equipment operation manuals. To request additional copies, email info@clemcoindustries.com.

1.2 Safety Alerts

1.2.1 Clemco uses safety alert signal words, based on ANSI Z535.4-2011, to alert the user of a potentially hazardous situation that may be encountered while operating this equipment. ANSI's definitions of the signal words are as follows:



This is the safety alert symbol. It is used to alert you to potential physical injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

NOTICE

Notice indicates information that is considered important, but not hazard-related, if not avoided, could result in property damage.

CAUTION

Caution indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

WARNING

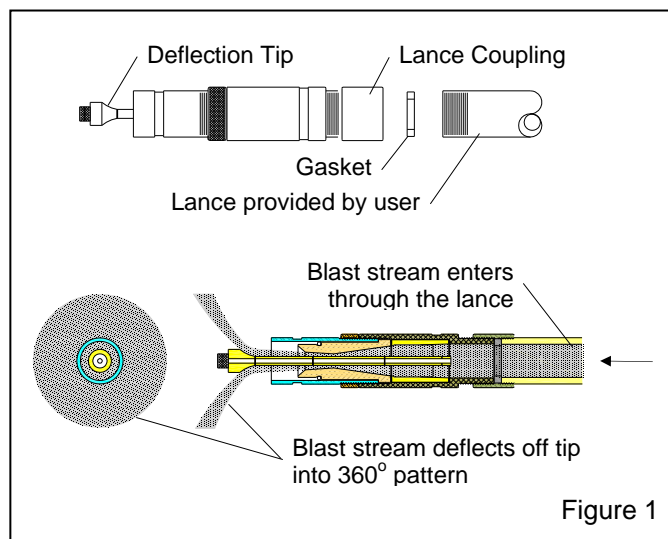
Warning indicates a hazardous situation that, if not avoided, could result in death or serious injury.

DANGER

Danger indicates a hazardous situation that, if not avoided, will result in death or serious injury.

1.3 Theory of Operation

1.3.1 Refer to Figure 1. When correctly connected to a blast hose and lance, and the blast machine is pressurized, the blast stream flows through the tool and deflects off the deflection tip. This spreads the blast stream into a 360° blast pattern, cleaning the inside of the pipe without having to rotate it.



2.0 ANCILLARY EQUIPMENT REQUIREMENTS

2.1 Blast Machine and Accessories.

2.1.1 The Hollo-Blast tool attaches to the end of a pipe lance (section(s) of 1-1/4" NPT rigid pipe) and blast hose in place of a standard nozzle.

2.1.2 The blast machine should have a minimum external piping size of 1-1/4" inside diameter (ID), a blast hose assembly with a minimum of 1-1/4" ID, and quick couplings on both ends (Refer to Section 2.4 for

exceptions). The blast hose should be long enough to feed the lance from the pipe's entrance to the far end.

2.2 Centering Devices

2.2.1 The tool will blast the inside of 2-inch ID pipe without using a centering carriage.

2.2.2 Use one of the following carriages to center the tool in larger diameter pipe.

- Stock No. 01124, Model HBC-1 Collar and Button Set centers the tool in 3" to 5" ID pipe. Refer to Section 3.1.
- Stock No. 01131, Model HBC-2 Adjustable Carriage fully adjustable carriage centers the tool in 5" through 12" ID pipe. Refer to Section 3.2.

2.3 Compressed Air Requirements

2.3.1 The compressor and air supply lines must be sized to support a blast operation at the pressure and cfm shown in the air consumption table below. The cfm consumption shown are approximate and are based on blasting with pressure set at 100 psi.

Nozzle Stock No.	Orifice Size	New Nozzle and Sleeve	Worn Nozzle and Sleeve
01406	1/2"	200 cfm	340 cfm
01407	5/8"	350 cfm	550 cfm

Nozzles are considered worn out when the orifice increases by 1/16". Carbide sleeves are considered worn out when they are worn to about 1/4".

2.4 Pipe Lance Provided by User

2.4.1 The purpose of the lance

2.4.1.1 The lance is section(s) of 1-1/4" NPT pipe that fits between the blast hose and Hollo-Blast tool, and is usually the same length as the pipe being blasted.

2.4.1.2 The rigid pipe lance provides a means to feed the tool through the pipe. It also affords a straight path for the blast stream to enter the tool, which prevents hot spots and uneven wear. The only application in which a lance may not required is where the ID of the pipe is between 3" and 5" (in this situation the blast hose will not form a bend), and the pipe is short enough to feed the hose without the use of a rigid lance. This exception is shown in Figure 2. Otherwise a lance is always recommended.

2.4.1.3 A lance must be used on larger diameter pipe because the blast hose will bend near the point of attachment to the tool. Such a bend disrupts the smooth flow of the blast stream to the deflection tip, and leads to excessively rapid wear. A smooth, straight path into the tool is essential for optimum performance.

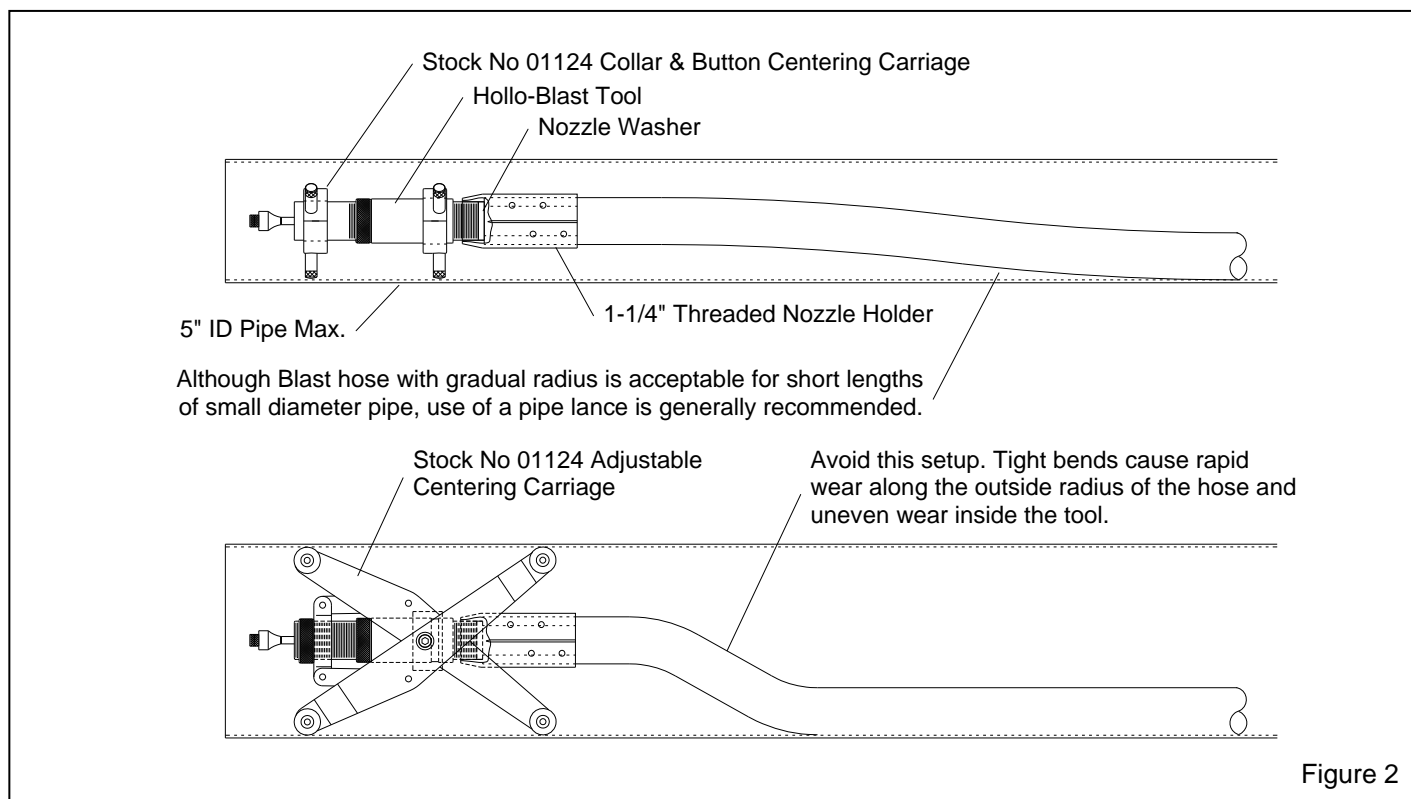
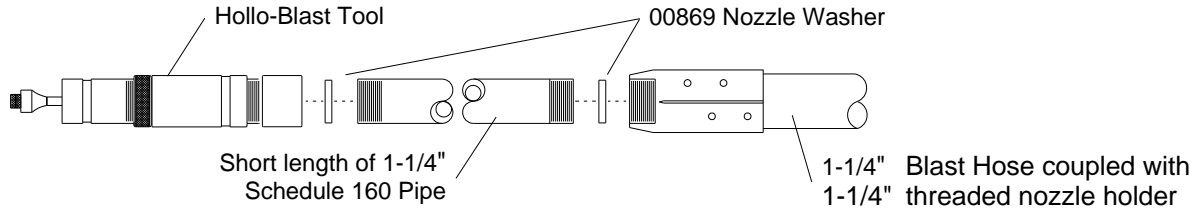


Figure 2

2.4.2 Lance setup

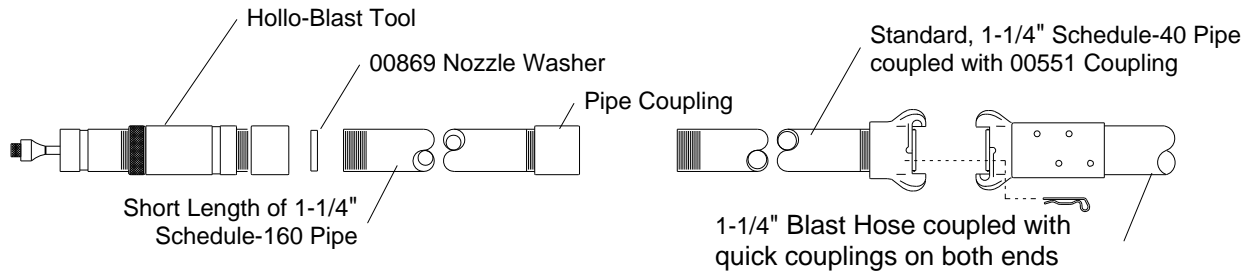
2.4.2.1 The Hollo-Blast has a 1-1/4" NPS-F threaded connection at the entrance of the tool to accommodate the pipe lance. The first two or three feet of the lance should be schedule-160 heavy-walled pipe. The heavy wall compresses the gasket better than thin-walled pipe, and protects the entrance of the tool from the abrasive

stream better than light-walled schedule-40 pipe. The illustrations in Figures 3 A-C show typical lance setups. Each uses the schedule-160 heavy-walled lance attached to the tool and standard schedule-40 pipe to make up the difference. Standard schedule-40, 1-1/4" pipe, comes in 21 ft. lengths. Use multiple lengths coupled as shown in Figures 3-B and 3-C to obtain the required length.



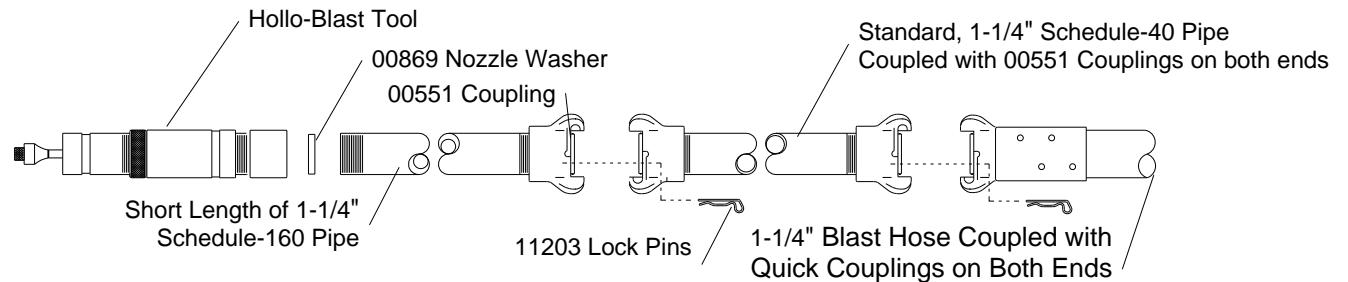
This is the basic setup. Alone it may be used to blast short lengths (three to five feet) of pipe or cylinders. Longer lengths of schedule 160 could be cost prohibitive and cause undue wear on heavy walled pipe.

Figure 3-A



This setup is suitable for blasting lengths of 2" ID to 3-1/4" ID pipe, or 25 foot lengths of larger diameter pipe.

Figure 3-B



This setup should be used when multiple lances are required for blasting longer lengths of 3-1/2" and larger diameter pipe.

Figure 3-C

Figure 3-A is the basic setup; it should be used with all lance setups. Alone it is suitable for blasting short lengths (the length of the heavy-walled lance) of pipe or cylinders.

Figure 3-B is the basic setup, plus additional standard 1-1/4 pipe lance, attached with threaded pipe couplings. This setup uses standard threaded pipe couplings to connect the lance sections together. Using threaded pipe couplings allows it to fit inside of 3-1/4" diameter and smaller pipe where a quick coupling will not fit. The threaded couplings require the lance be screwed on or off when adding or removing sections. The threads are prone to galling, so the setup in Figure 3-C should be used whenever possible.

Figure 3-C is the basic setup, plus additional standard 1-1/4 pipe lances, attached with quick couplings. This uses quick couplings to connect lance sections together. Quick couplings eliminate the need to rotate the lance when adding or removing sections. It is limited to use with pipe diameters that are 3-1/2" diameter and larger that will accommodate the quick couplings.

2.5 Abrasive

2.5.1 DO NOT USE abrasives containing more than one percent crystalline (free) silica. Obtain safety data sheets (SDS) for the blasting abrasive prior to blasting, paying particular attention the health risks and presence of any hazardous/toxic substances. Use only abrasives specifically manufactured for blasting, and that are compatible with the surface being blasted. Abrasive produced for other applications may be inconsistent in size and shape, and contain particles that could jam the abrasive metering valve, or cause irregular wear. Steel grit is an ideal media to use if adequate recovery means are available.

2.5.2 Silicon Carbide, Aluminum Oxide, and Garnet: Aggressive abrasives such as these should be avoided unless required by job specification. Service life will be reduced on any components which come in contact with these abrasives. When an aggressive abrasive must be used, use a boron carbide or composite deflection tip and boron sleeves. Boron tips may chip when using large, aggressive abrasive. Use a composite tip for 36-mesh and coarser aggressive abrasive.

2.5.3 Abrasive Size

2.5.3.1 The choice of abrasive size depends on the desired profile, cleaning rate, and nozzle size. Generally, larger and denser abrasives provide a deeper profile, while smaller abrasives clean faster. With the 1/2" orifice nozzle, use 25-mesh and finer; with the 5/8" orifice nozzle, use 16-mesh and finer.

3.0 Attach Centering Device

3.1 Collar and Buttons, 3" to 5", Model HBC-1 Figures 4-A and 4-B

Collars without buttons fit inside 2-3/4" ID pipe, which must be smooth and without seams or other protrusions.

3.1.1 The set comes with two collars of different inside diameters and six each of four different length buttons to center the tool in 3" to 5" pipe. Refer to the following steps for assembly. Additional collar and buttons could be used to support the lance.

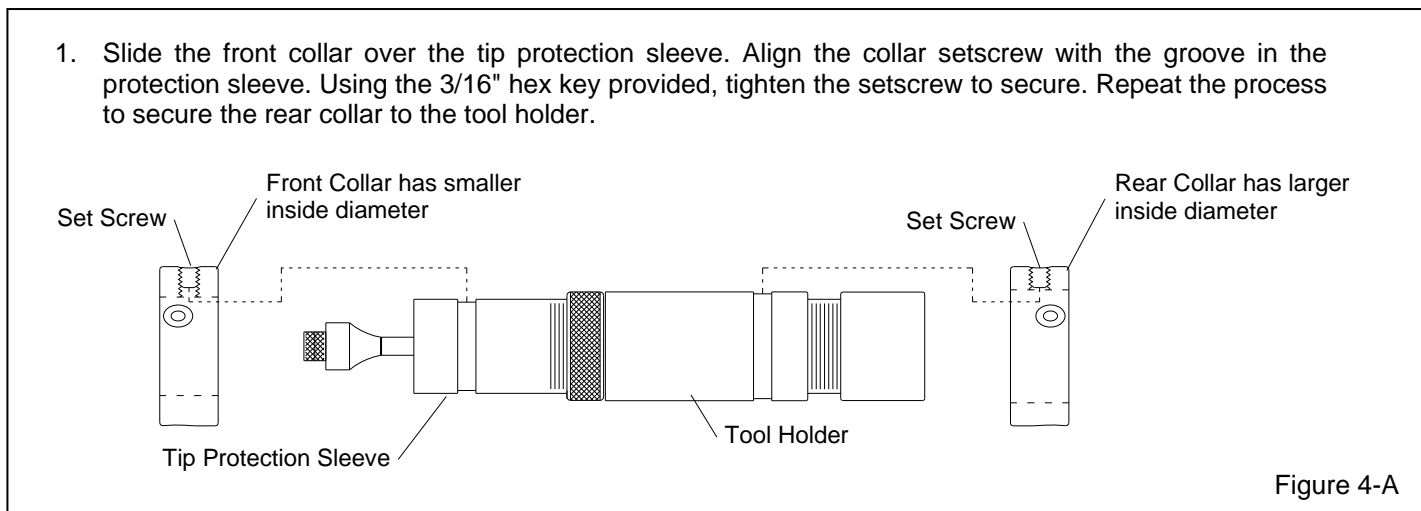
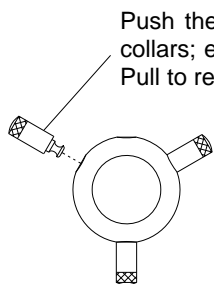
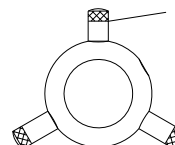
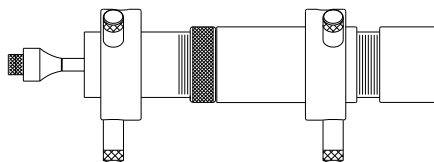


Figure 4-A

2. Determine which set of buttons centers the tool best and install them into the collars as shown.



Push the buttons into the holes on the collars; each button snaps into position. Pull to remove.



In some cases the tool may be too tight in the pipe. In those situations, position the collar as shown and place a shorter button at the top.

Figure 4-B

3.2 Adjustable Centering Carriage 5" to 12" Model HBC-2 Figures 5-A through 5-I

3.2.1 This carriage is completely adjustable to center the tool in 5" to 12" pipe. Refer to the following 10 steps for assembly.

1. Using the 3/16" hex key provided, loosen the setscrew, and then remove the knurled lock-ring and threaded sleeve.

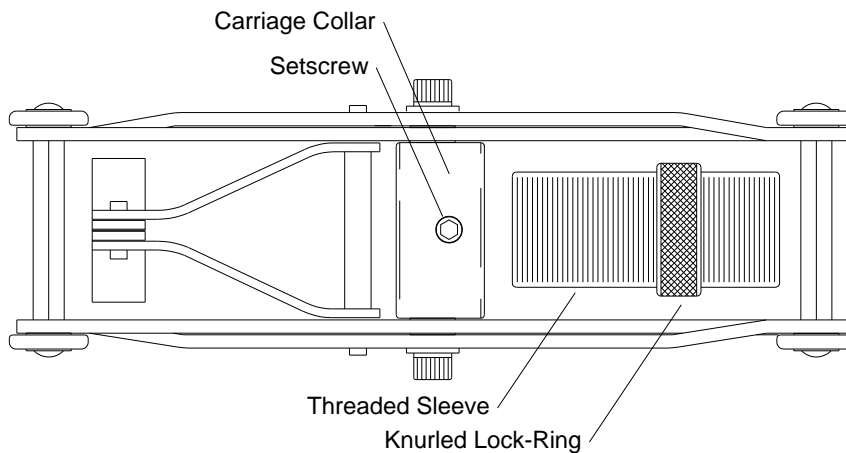


Figure 5-A

2. Loosen the knurled lock-ring on the chrome tip protection sleeve.

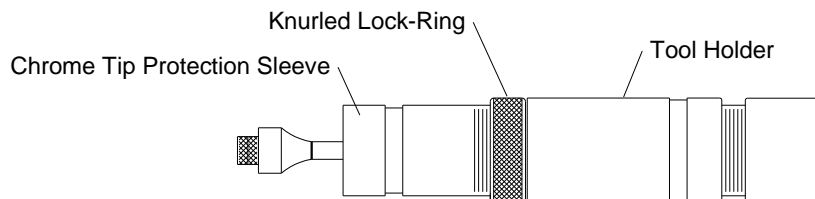


Figure 5-B

- Unscrew the chrome tip protection sleeve to remove it from tool holder assembly. It may be necessary to hold the nozzle while the chrome sleeve is removed to prevent the nozzle and deflection tip assembly from coming out of the tool holder. Note: The o-ring may slide off the nozzle, if so, retrieve it from inside the chrome sleeve and place into nozzle groove.

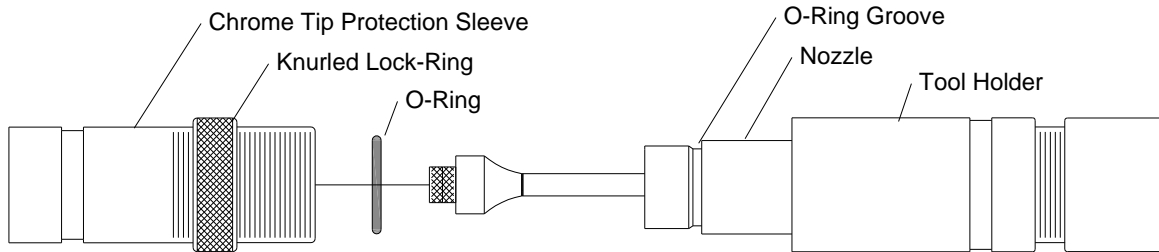


Figure 5-C

- Position the knurled lock-ring at about the middle of the threaded sleeve.
- Make sure the o-ring is in place in the nozzle o-ring groove.

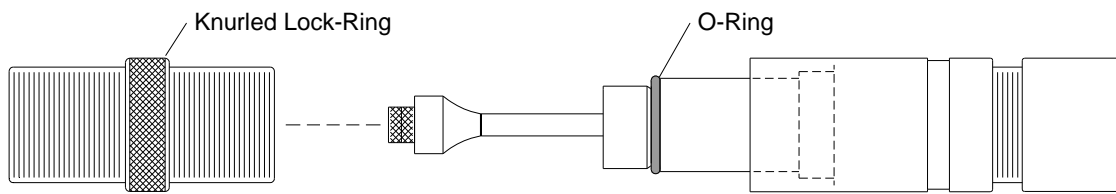


Figure 5-D

- Screw the threaded sleeve into the tool holder until it is tightly seated against the nozzle flange. Make sure it is the sleeve that is seated against the nozzle, and not the knurled lock ring seated against the tool holder. Rapid wear on the nozzle and tool holder will occur if the tool holder is not tight against the nozzle flange.

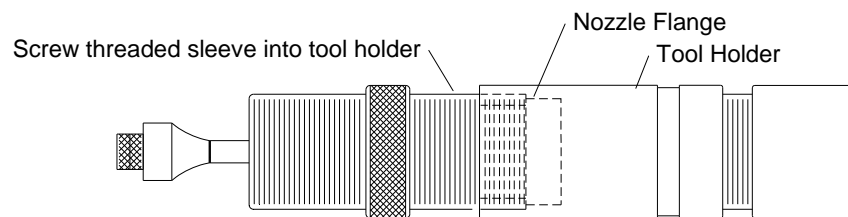


Figure 5-E

- Screw the lock-ring tightly against the tool holder to lock the threaded sleeve.

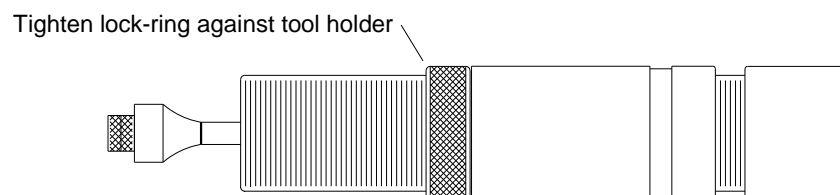


Figure 5-F

8. From the rear of the carriage, insert the reassembled tool through the carriage collar and yoke as shown. Align the groove in the tool holder with collar setscrew, and tighten the setscrew to secure.

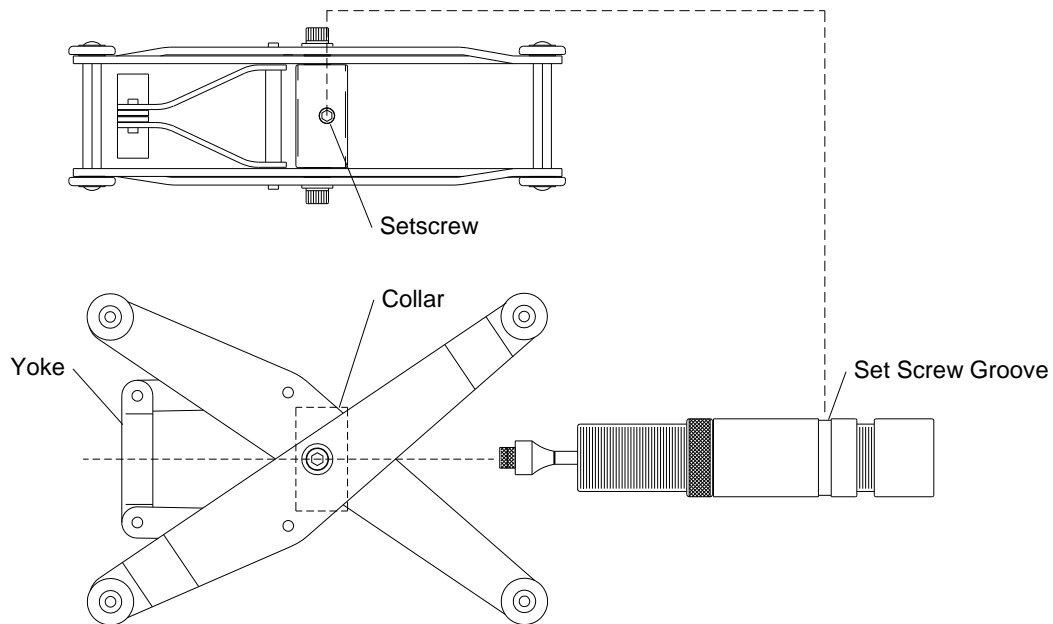


Figure 5-G

9. Screw the remaining lock-ring onto the threaded sleeve.

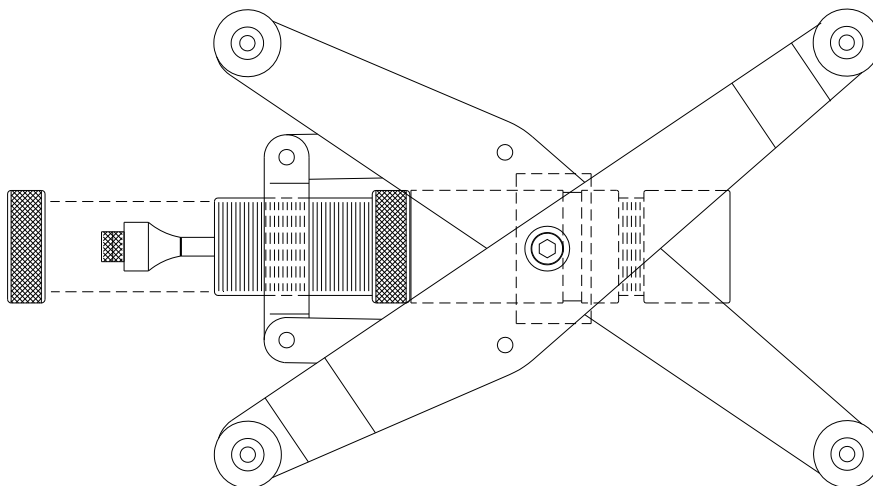


Figure 5-H

10. Adjust the carriage by turning the lock-ring onto the threaded sleeve; the farther the ring is screwed onto the sleeve, the more the carriage expands.

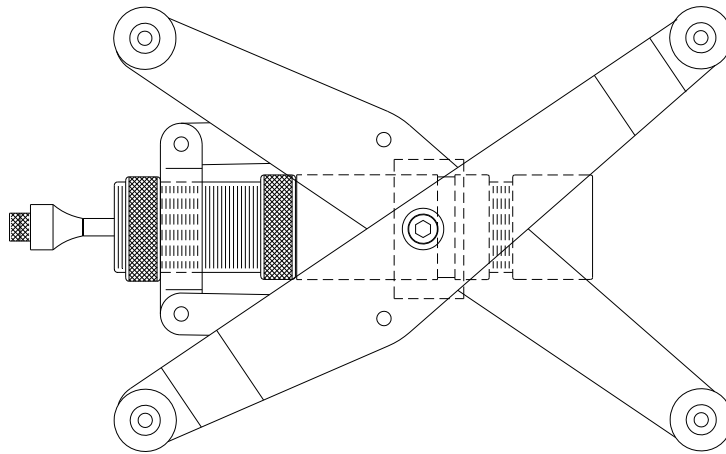


Figure 5-I

4.0 Set-Up and Operation

⚠ WARNING

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

- 4.1 Follow the instructions in the applicable owner's manuals and setup the blast machine and all accessory equipment.
- 4.2 Install the centering device and adjust it to center the tool to the inside diameter of the pipe.
- 4.3 Connect the blast hose and lance to the tool.
- 4.4 Place the tool inside the entrance of the pipe, being careful not to hit the deflection tip against the pipe.
- 4.5 Pressurize the blast machine and begin blasting. Adjust the abrasive flow lean; too much abrasive hampers blasting efficiency and results in heavier wear on the tool part and reduces production.
- 4.6 While the tool is at the entrance of the pipe, determine the best abrasive flow and speed that the tool should be moved to obtain the desired degree of blasting.

- 4.7 Stop blasting and push the tool to the far end of the pipe. Start blasting and pull the lance backward; otherwise abrasive could build-up inside the pipe and slow production. Spent abrasive will blow out the far end of the pipe.

- 4.8 Pipe that requires extensive cleaning may require a second pass. Examine the pipe and repeat the process if necessary. If abrasive remains inside the pipe, shut off the abrasive flow so only air comes out of the tool. Push the tool through the pipe to blow out remaining materials.

- 4.9 If it is necessary to remove the tool for any reason before blasting is completed, mark the lance so the tool can be inserted to the same spot.

- 4.10 Follow the instructions in the applicable owner's manuals and shutdown the blast machine and accessory equipment.

5.0 Maintenance

5.1 Preventive Maintenance, Refer to Figure 6

- 5.1.1 Carbide parts are extremely hard and therefore brittle; they break or chip easily. Be careful not to drop or bump the tool or any of the internal carbide parts.

5.1.2 When disassembling the tool for inspection, brush abrasive from the thread and clean the parts before reassembly.

5.1.3 Inspect the following before each use.

- Inspect the rubber nozzle washer and gaskets. Replace them before they wear through.
- Inspect the rubber lining in the tool holder. Replace the tool holder when the rubber is worn.
- Inspect the stem support casing and fins for wear. Replace the stem support before they are worn through.
- Inspect the nozzle and carbide sleeves. Replace the nozzle when the orifice is worn to 5/8". Replace the sleeves when the outside diameter is worn to 1/4".
- Make sure brass washers are placed at each end of the carbide sleeves. They help prevent the sleeves from chipping.
- Rotate the deflection tip for symmetrical wear. Replace the tip if it is undercut, or when any part of the straight outside diameter is worn away.
- Make sure parts are tightly assembled. Loose parts create voids causing turbulence and accelerate wear.

5.2 Disassembly

5.2.1 Remove the tool from the lance.

5.2.2 Hold the carbide end of the throat rod with a finger and unscrew the tip holding nut. Slide the deflection tip, brass washers (3), and carbide sleeves from the front of the tool.

5.2.3 Remove the throat rod from the back of the tool.

5.2.4 Loosen the knurled lock-ring and unscrew the tip protection sleeve and remove the nozzle. The nozzle o-ring may stay inside the protection sleeve. Remove it and replace it on the nozzle o-ring groove.

5.2.5 Remove the wide stem support washer, stem support, and narrow stem support washer from the front of the tool holder.

5.2.6 Unscrew the coupling and remove the nozzle washer.

5.2.7 Inspect all items for wear. Replace worn parts and clean all parts to be reused making sure to brush the threads clean. Always replace the nozzle washer and both stem support gaskets.

5.3 Reassembly

5.3.1 Place the narrow stem support gasket into the tool holder so it rests against the rubber shoulder. Place the stem support (carbide protrudes from the front and is recessed at the back) into the tool holder, and place the wide washer on top of it.

5.3.2 Place the o-ring on the nozzle. Lubricate the o-ring with silicone spray or other lubricant.

5.3.3 Thread the lock-ring onto the tip protection sleeve, placing it toward the ends of the threads. Insert the nozzle into the threaded end of the sleeve.

5.3.4 Thread the tip protection sleeve, with the nozzle fully inserted, into the tool holder. Continue threading it until it bottoms out. Make sure the lock-ring is not against the tool holder and the nozzle is fully seated against the wide stem support gasket.

5.3.5 When assured that the assembly is tight, firmly hand-tighten the lock-ring against the tool holder.

5.3.6 Working from the back of the tool, insert the throat rod through the stem support sleeve.

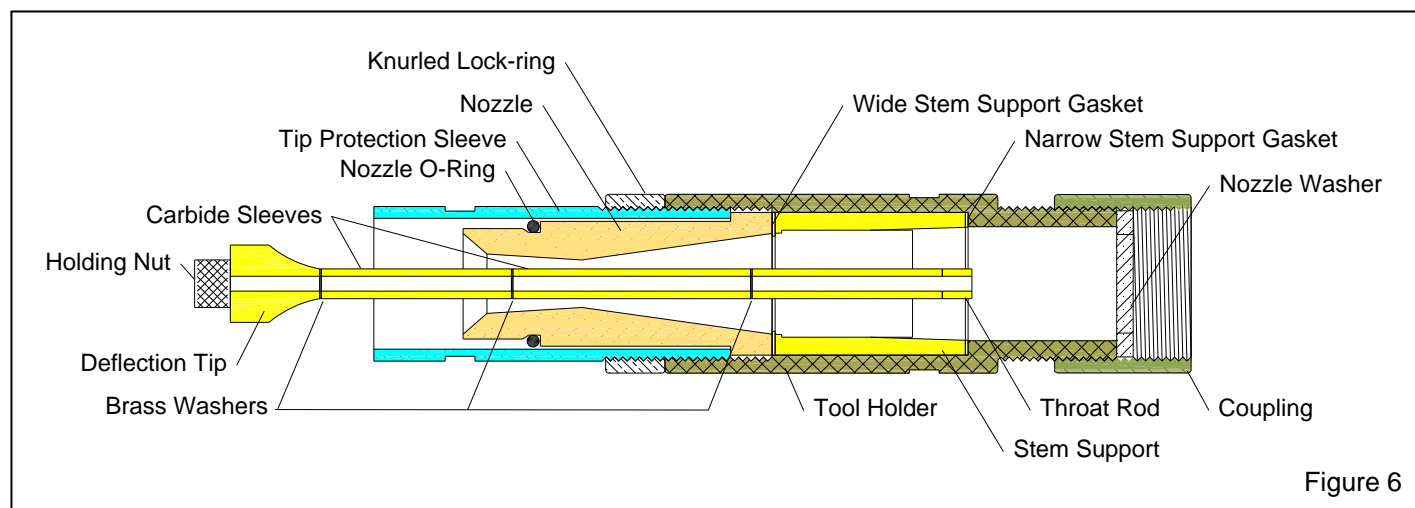


Figure 6

5.3.7 Hold the throat rod in place and install a brass washer and carbide throat sleeve (the longer of the two tungsten sleeves) Note: Boron sleeves are of equal length; so it does not matter which one goes on first. Install another brass washer and the stem extension sleeve (shorter of the tungsten sleeves). Install third brass washer and the deflection tip.

5.3.8 Firmly hand-tighten the tip holding nut to secure.

5.3.9 Install the rear coupling, nozzle washer, lance and centering device.

6.0 REPLACEMENT PARTS

**6.1 Hollo-Blast Tools, Refer to Figure 7
(Does Not Include Centering Device)**

Description	Stock No.
Hollo-Blast with tungsten tip and sleeves	
Hollo-Blast with 1/2" orifice nozzle	01076
Hollo-Blast with 5/8" orifice nozzle	08446
Hollo-Blast less nozzle	01077
Hollo-Blast with boron tip and sleeves	
Hollo-Blast, boron with 1/2" orifice nozzle	21190
Hollo-Blast, boron with 5/8" orifice nozzle	25725
Hollo-Blast, boron less nozzle	21191

6.2 Hollo-Blast

Item	Description	Stock No.
1.	Nozzle (includes o-ring, item 15) Model HBN-8, 1/2" orifice,.....	01406
	Model HBN-10, 5/8" orifice	01407
2.	Tool holder	01079
3.	Deflection tip Tungsten carbide, standard	01078
	Boron carbide, optional, for use with 40 and finer aggressive abrasive	20968
	Composite, optional, for use with 36 and coarser aggressive abrasive	25077
4.	Stem support assembly, includes item 8 ...	01080
5.	Throat sleeve, long, tungsten	01084
6.	Stem extension sleeve, short, tungsten	01085
7.	Throat sleeve, optional boron carbide equal lengths, each, 2 required	20969
8.	Throat rod with tip	01086
9.	Nut, tip holding	01089
10.	Tip protection sleeve	01090
11.	Lock nut, knurled	01092
12.	Gasket, stem support front, wide	01093
13.	Gasket, stem support rear, narrow	01094
14.	Washer, brass, 3 required	01096
15.	O-ring, 1-1/8" nominal ID	01097
16.	Coupling, rear	01095
17.	Washer, nozzle, NW-4 pack of 10	00869

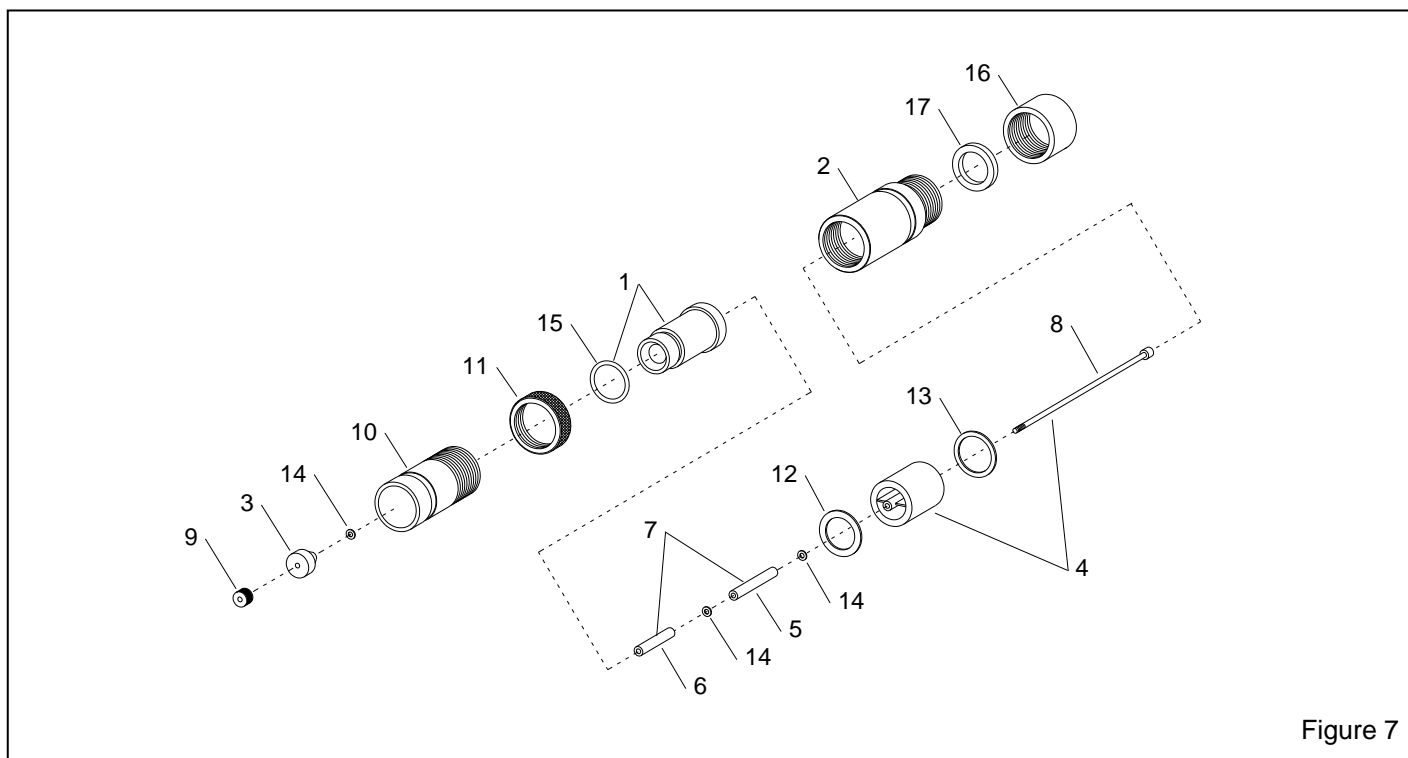
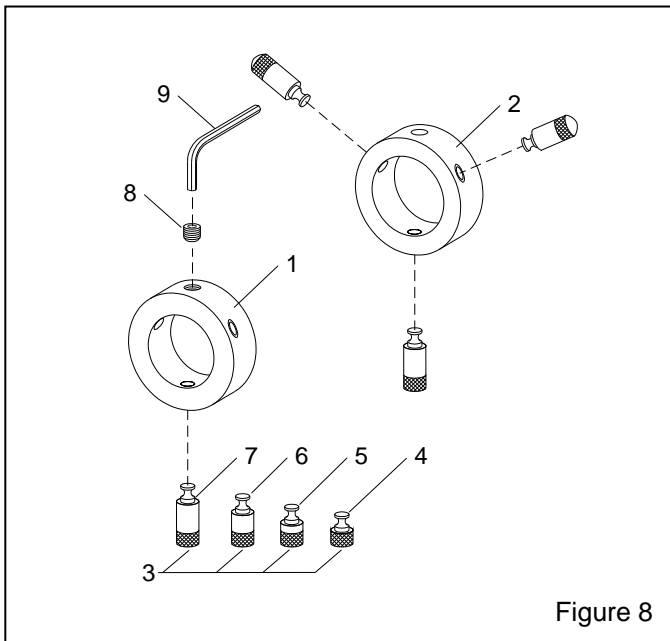


Figure 7

6.3 HBC-1 Centering Device
For 3" to 5" ID Pipe, Refer to Figure 8

Item	Description	Stock No.
(-)	HBC-1 Collar and button set, complete	01124
1.	Collar, front, 1-11/16" nominal ID	01125
2.	Collar, rear, 1-7/8" nominal ID	01126
3.	Button set, includes items 4, 5, 6, & 7	01158
4.	Buttons, 5/16", set of 6, for 3-1/2" pipe	01154
5.	Buttons, 9/16", set of 6, for 4" pipe	01155
6.	Buttons, 13/16", set of 6, for 4-1/2" pipe ...	01156
7.	Buttons, 1-1/16", set of 6, for 5" pipe	01157
8.	Screw, set, 3/8-NC cup point	03271
9.	Key, 3/16" hex	01139



6.4 HBC-2 Adjustable Carriage
For 5" to 12" ID Pipe, Refer to Figure 9

Item	Description	Stock No.
(-)	HBC-2 adjustable carriage, complete	01131
1.	Tip protection sleeve, threaded	01091
2.	Lock-nut, knurled	01092
3.	Bushing kit, HB and SB carriage wheel	03706
4.	Wheel, each	01153
5.	Screw, set, 3/8-NC cup point	03271
6.	Axle spacer, each	01166
7.	Arm pin, 1-1/8"	01142
8.	Retaining ring	01143
9.	Screw, 3/8-NC x 3/4" Soc. Head	03319
10.	Washer, 3/8 flat	03317
11.	Key, 3/16" hex	01139

