# 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

- **Read and follow ALL instructions before using this equipment.**
- **Failure to comply with ALL instructions can result in serious injury or death.**
- **In the event that the user, or any assistants of the user of this equipment cannot read or cannot completely understand the warnings and information contained in these instructions, the employer of the user and his assistants must thoroughly educate and train them on the proper operation and safety procedures of this equipment.**

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

The products described in this material, and the information relating to those products, is intended for knowledgeable, experienced users of abrasive blasting equipment.

No representation is intended or made as to the suitability of the products described herein for any particular purpose or application. No representations are intended or made as to the efficiency, production rate, or the useful life of the products described herein. Any estimate regarding production rates or production finishes are the responsibility of the user and must be derived solely from the user's experience and expertise, and must not be based on information in this material.

The products described in this material may be combined by the user in a variety of ways for purposes determined solely by the user. No representations are intended or made as to the suitability or engineering balance of the combination of products determined by the user in his selection, nor as to the compliance with regulations or standard practice of such combinations of components or products.

Abrasive Blast Equipment is only a component of the range of equipment used in an abrasive blasting job. Other products may include an air compressor, abrasive, scaffolding, hydraulic work platforms or booms, paint spray equipment, dehumidification equipment, air filters and receivers, lights, ventilation equipment, parts handling equipment, specialized respirators, or equipment that while offered by Clemco may have been supplied by others. Each manufacturer and supplier of the other products used in the abrasive blasting job must be contacted for information, training, instruction and warnings with regard to the proper and safe use of their equipment in the particular application for which the equipment is being used. The information provided by Clemco is intended to provide instruction only on Clemco products. All operators must be trained in the proper, safe, use of this equipment. It is the responsibility of the users to familiarize themselves with, and comply with, all appropriate laws, regulations, and safe practices that apply to the use of these products. Consult with your employer about training programs and materials that are available.

Our company is proud to provide a variety of products to the abrasive blasting industry, and we have confidence that the professionals in our industry will utilize their knowledge and expertise in the safe efficient use of these products.

### GENERAL INSTRUCTIONS

**Described herein are some, BUT NOT ALL, of the major requirements for safe and productive use of blast machines, remote control systems, operator respirator assemblies, and related accessories. Completely read ALL instruction manuals prior to using equipment.**

**The user's work environment may include certain HAZARDS related to the abrasive blasting operation. Proper protection for the blaster, as well as anyone else that may be EXPOSED to the hazards generated by the blasting process, is the responsibility of the user and/or the employer. Operators MUST consult with their employer about what hazards may be present in the work environment including, but not limited to, exposure to dust that may contain TOXIC MATERIALS due to the presence of silica, cyanide, arsenic or other toxins in the abrasive, or materials present in the surface to be blasted such as lead or heavy metals in coatings. The environment may also include fumes that may be present from adjacent coatings application, contaminated water, engine exhaust, chemicals, and asbestos. The work area may include PHYSICAL HAZARDS such as an uneven work surface, poor visibility, excess noise, and electrical hazards. The operator MUST consult with his employer on the identification of potential hazards, and the appropriate measures that MUST be taken to protect the blaster and others that might be exposed to these hazards.**

**ALL machines, components and accessories MUST be installed, tested, operated and maintained only by trained, knowledgeable, experienced users.**

**DO NOT modify or substitute any Clemco parts with other types or brands of equipment. Unauthorized modification and parts substitution on supplied air respirators is a violation of OSHA regulations and voids the NIOSH approval.**

### OPERATIONAL INSTRUCTIONS

#### OPERATOR SAFETY EQUIPMENT

## ⚠ WARNING

- **Blast operators and others working in the vicinity of abrasive blasting must always wear properly-maintained, NIOSH-approved, respiratory protection appropriate for the job site hazards.**
- **DO NOT USE abrasives containing more than one percent crystalline (free) silica. Ref. NIOSH Alert #92-102**
- **Inhalation of toxic dust (crystalline silica, asbestos, lead paint and other toxins) can lead to serious or fatal disease (silicosis, asbestosis, lead or other poisoning).**

- ALWAYS wear NIOSH-approved supplied-air respirators as required by OSHA, in the presence of any dust including, but not limited to, handling or loading abrasive; blasting or working in the vicinity of blast jobs; and cleanup of expended abrasive. Prior to removing respirator, an air monitoring

instrument should be used to determine when surrounding atmosphere is clear of dust and safe to breathe.

- NIOSH-approved, supplied-air respirators are to be worn ONLY in atmospheres:
  - NOT IMMEDIATELY dangerous to life or health and,
  - from which a user can escape WITHOUT using the respirator.

- Clemco supplied-air respirators **DO NOT REMOVE OR PROTECT AGAINST CARBON MONOXIDE (CO) OR ANY OTHER TOXIC GAS.** Carbon monoxide and toxic gas removal and/or monitoring device must be used in conjunction with respirator to insure safe breathing air.

- Air supplied to respirator MUST BE AT LEAST GRADE D QUALITY as described in Compressed Gas Association Commodity Specification G-7.1, and as specified by OSHA Regulation 1910.139 (d).

- ALWAYS locate compressors to prevent contaminated air (such as CO from engine exhaust) from entering the air intake system. A suitable in-line air purifying sorbent bed and filter or CO Monitor should be installed to assure breathing air quality.

- ALWAYS use a NIOSH-approved breathing air hose to connect an appropriate air filter to the respirator. Use of a non-approved air hose can subject the operator to illness caused by the release of chemical agents used in the manufacture of non-approved breathing air hose.

- ALWAYS check to make sure air filter and respirator system hoses are NOT CONNECTED to in-plant lines that contain nitrogen, acetylene or any other non-breathable gas. NEVER use oxygen with air line respirators. NEVER modify air line connections to accommodate air filter/respirator breathing hose WITHOUT FIRST testing content of the air line. **FAILURE TO TEST THE AIR LINE MAY RESULT IN DEATH TO THE RESPIRATOR USER.**

- Respirator lenses are designed to protect against rebounding abrasive. They do not protect against flying objects, glare, liquids, radiation or high speed heavy materials. Substitute lenses from sources other than the original respirator manufacturer will void NIOSH-approval of this respirator.

## BLAST MACHINES AND REMOTE CONTROLS

**⚠ WARNING**

- **ALWAYS equip abrasive blast machines with remote controls.**
- **Abrasive blast machine operators must wear NIOSH-approved supplied-air respirators (ref: OSHA regulations 1910.94, 1910.132, 1910.139 and 1910.244).**

- NEVER modify OR substitute remote control parts. Parts from different manufacturers are NOT compatible with Clemco equipment. If controls are altered, involuntary activation, which may cause serious injury, can occur.

- Inspect the air control orifice DAILY for cleanliness. NEVER use welding hose in place of twinline control hose. The internal diameter and rubber composition are UNSAFE for remote control use.

- UNLESS OTHERWISE SPECIFIED, maximum working pressure of blast machines and related components MUST NOT exceed National Board approved 125 psig (8.5 BAR).

- NEVER weld on blast machine. Welding may affect dimensional integrity of steel wall and WILL VOID National Board approval.

- Point nozzle ONLY at structure being blasted. High velocity abrasive particles WILL inflict serious injury. Keep unprotected workers OUT of blast area.

- NEVER attempt to manually move blast machine when it contains abrasive. EMPTY machines, up to 6 cu. ft.(270kg) capacity, are designed to be moved:
  - on flat, smooth surfaces by AT LEAST two people;
  - with the Clemco "Mule"; or
  - with other specially designed machine moving devices.

- Larger empty blast machines or ANY blast machine containing abrasive MUST be transported by mechanical lifting equipment.

## AIR HOSE, BLAST HOSE, COUPLINGS, AND NOZZLE HOLDERS

- Air hose, air hose fittings and connectors at compressors and blast machines MUST be FOUR times the size of the nozzle orifice. Air hose lengths MUST be kept as short as possible AND in a straight line. Inspect DAILY and repair leakage IMMEDIATELY.

- Blast hose inside diameter MUST be THREE to FOUR times the size of the nozzle orifice. AVOID sharp bends that wear out hose rapidly. Use SHORTEST hose lengths possible to reduce pressure loss. Check blast hose DAILY for soft spots. Repair or replace IMMEDIATELY.

- ALWAYS cut loose hose ends square when installing hose couplings and nozzle holders to allow uniform fit of hose to coupling shoulder. NEVER install couplings or nozzle holders that DO NOT provide a TIGHT fit on hose. ALWAYS use manufacturers recommended coupling screws.

- Replace coupling gaskets FREQUENTLY to prevent leakage. Abrasive leakage can result in dangerous coupling failure. ALL gaskets MUST be checked SEVERAL times during a working day for wear, distortion and softness.

- Install safety pins at EVERY coupling connection to prevent accidental disengagement during hose movement.

- ALWAYS attach safety cables at ALL air hose AND blast hose coupling connections. Cables relieve tension on hose and control whipping action in the event of a coupling blow-out.

**MAINTENANCE**

- ALWAYS shut off compressor and depressurize blast machine BEFORE doing ANY maintenance.

- Always check and clean ALL filters, screens and alarm systems when doing any maintenance.

- ALWAYS cage springs BEFORE disassembling valves IF spring-loaded abrasive control valves are used.

- ALWAYS completely follow owner's manual instructions and maintain equipment at RECOMMENDED intervals.

## ADDITIONAL ASSISTANCE

- Training and Educational Programs.

Clemco Industries Corp. offers a booklet, Blast-Off 2, developed to educate personnel on abrasive blast equipment function and surface preparation techniques. Readers will learn safe and productive use of machines, components and various accessories, including selection of abrasive materials for specific surface profiles and degrees of cleanliness.

- The Society for Protective Coatings (SSPC) offers a video training series on protective coatings including one entitled "Surface Preparation." For loan or purchase information, contact SSPC at the address shown below.

## TECHNICAL DATA AND RESEARCH COMMITTEES

- The following associations offer information, materials and videos relating to abrasive blasting and safe operating practices.

**The Society for Protective Coatings (SSPC)**
40 24th Street, Pittsburgh PA 15222-4643
Phone: (412) 281-2331 • FAX (412) 281-9992
Email: research@sspc.org • Website: www.sspc.org

**National Association of Corrosion Engineers (NACE)**
1440 South Creek Drive, Houston TX 77084
Phone: (281) 228-6200 • FAX (281) 228-6300
Email: msd@mail.nace.org • Website: www.nace.org

**American Society for Testing and Materials (ASTM)**
100 Barr Harbor Dr., West Conshohocken, PA 19428
Phone (610) 832-9500 • FAX (610) 832-9555
Email: service@astm.org • Website: www.astm.org

## NOTICE

This equipment is not intended to be used in an area that might be considered a hazardous location as described in the National Electric Code NFPA 70 1996, article 500.

**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 the 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 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 a 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 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 the 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.

## DAILY SET-UP CHECK LIST

### ⚠ WARNING

- **ALL** piping, fittings and hoses MUST be checked DAILY for tightness and leakage.
- **ALL** equipment and components MUST be thoroughly checked for wear.
- **ALL** worn or suspicious parts MUST be replaced.
- **ALL** blast operators MUST be properly trained to operate equipment.
- **ALL** blast operators MUST be properly outfitted with abrasive resistant clothing, safety shoes, leather gloves and ear protection.
- **BEFORE** blasting ALWAYS use the following check list.

☐ **1. PROPERLY MAINTAINED AIR COMPRESSOR** sized to provide sufficient volume (cfm) for nozzle and other tools PLUS a 50% reserve to allow for nozzle wear. Use large compressor outlet and large air hose (4 times the nozzle orifice size). FOLLOW MANUFACTURERS MAINTENANCE INSTRUCTIONS.

☐ **2. BREATHING AIR COMPRESSOR** (oil-less air pump) capable of providing Grade D Quality air located in a dust free, contaminant free area. If oil-lubricated air compressor is used to supply respirator, it should have high temperature monitor and CO monitor or both. If CO monitor is not used, air MUST be tested FREQUENTLY to ensure proper air quality.

☐ **3. Clean, properly maintained NIOSH-APPROVED SUPPLIED-AIR RESPIRATOR.** ALL components should ALWAYS be present. NEVER operate without inner lens in place. Thoroughly inspect ALL components DAILY for cleanliness and wear. ANY substitution of parts voids NIOSH approval i.e. cape, lenses, breathing hose, breathing air supply hose, air control valve, cool air or climate control devices.

☐ **4. OSHA required BREATHING AIR FILTER** for removal of moisture and particulate matter from breathing air supply. THIS DEVICE DOES NOT REMOVE OR DETECT CARBON MONOXIDE (CO). ALWAYS USE CO MONITOR ALARM.

☐ **5. ASME CODED BLAST MACHINE** sized to hold 1/2 hour abrasive supply. ALWAYS ground machine to eliminate static electricity hazard. Examine pop up valve for alignment. Blast machine MUST be fitted with a screen to keep out foreign objects and a cover to prevent entry of moisture overnight.

☐ **6. AIR LINE FILTER** installed AS CLOSE AS POSSIBLE to machine inlet. Sized to match inlet piping or larger air supply line. Clean filter DAILY. Drain OFTEN.

☐ **7. REMOTE CONTROLS** MUST be in PERFECT operating condition. ONLY use APPROVED spare parts, including twin- line hose. DAILY: test system operation and check button bumper and spring action of lever and lever lock. DO NOT USE WELDING HOSE.

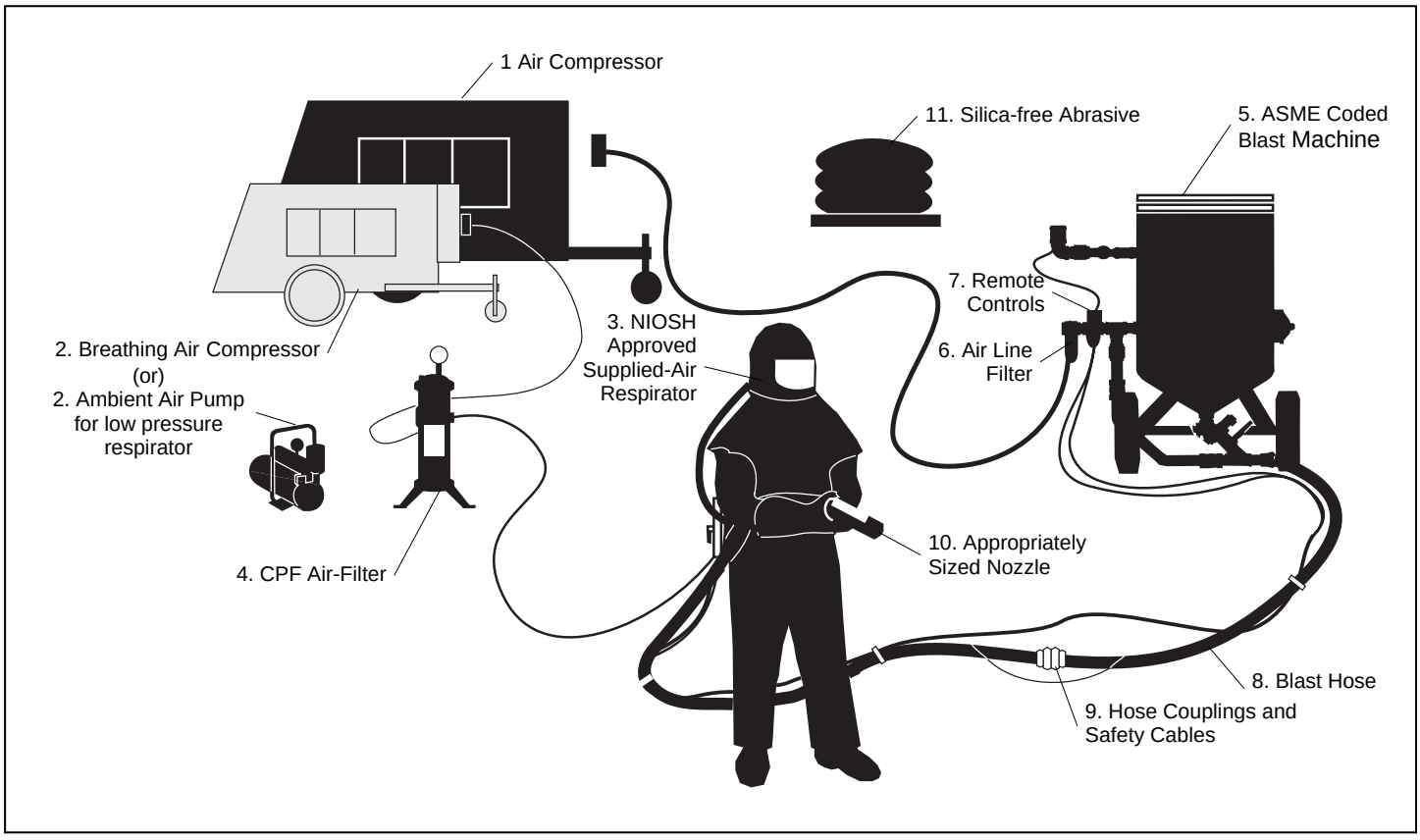
☐ **8. BLAST HOSE** with ID 3 to 4 times the nozzle orifice. Lines MUST be run AS STRAIGHT AS POSSIBLE from machine to work area with NO sharp bends. Check DAILY for internal wear and external damage.

☐ **9. HOSE COUPLINGS, NOZZLE HOLDERS** fitted SNUGLY to hose end and installed using PROPER coupling screws. Coupling lugs MUST be snapped FIRMLY into locking position. Gasket MUST form positive seal with safety pins inserted through pin holes. Check gaskets and replace if ANY sign of wear, softness or distortion. ALWAYS install safety cables at every connection to prevent disengagement. Check nozzle holder for worn threads. NEVER MIX DIFFERENT BRANDS OF COMPONENTS. Check each of these components DAILY.

☐ **10.** Inspect **NOZZLE and GASKET** DAILY for wear. Replace nozzle when 1/16" larger than original size or if liner appears cracked. Check nozzle threads for wear.

☐ **11.** Use abrasive that is properly sized and free of harmful substances; such as, free silica, cyanide, arsenic or lead. Check material data sheet for presence of toxic or harmful substances.

☐ **12.** Test surface to be blasted for toxic substances. Take appropriate, and NIOSH required, protective measures for operator and bystanders which pertain to substances found on the surface to be blasted.



## 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.

### 1.2 Safety Alerts

**1.2.1** Clemco uses safety alert signal words, based on ANSI Z535.4-1998, 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 the user of this equipment of potential personal injury hazards.
Obey all safety messages that follow this symbol to avoid possible injury or death.

**CAUTION**

**Caution used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.**

**⚠ CAUTION**

**Caution indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.**

**⚠ WARNING**

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

**⚠ DANGER**

**Danger indicates an imminently hazardous situation which, 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.

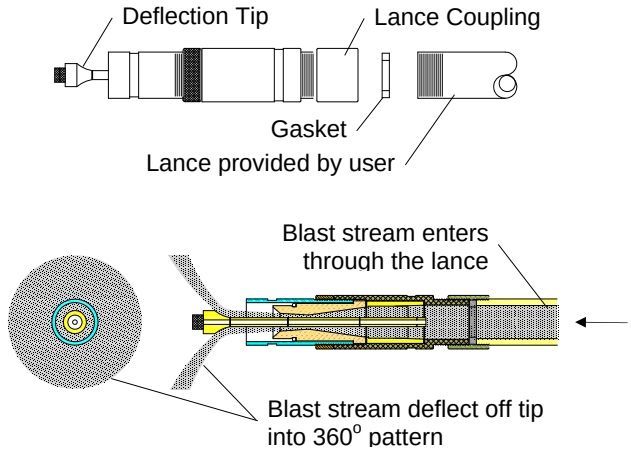


Figure 1

## 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 ridged 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 is increased 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 lance provides a ridged 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 spot and uneven wear. The only application when 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 ridged 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 which causes the blast hose to bend near the point of attachment to the tool. Such bends disrupt the smooth flow of the blast stream to the deflection tip, and lead to excessively rapid wear. A smooth, straight path into the tool is essential for optimum performance.

#### 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.

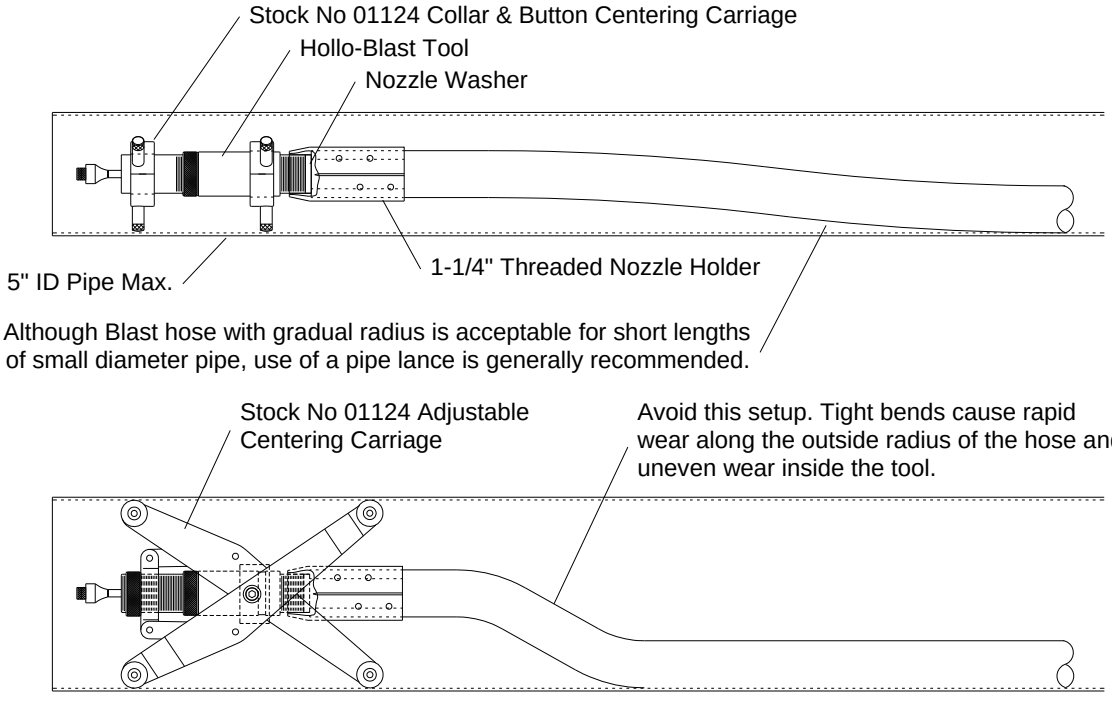
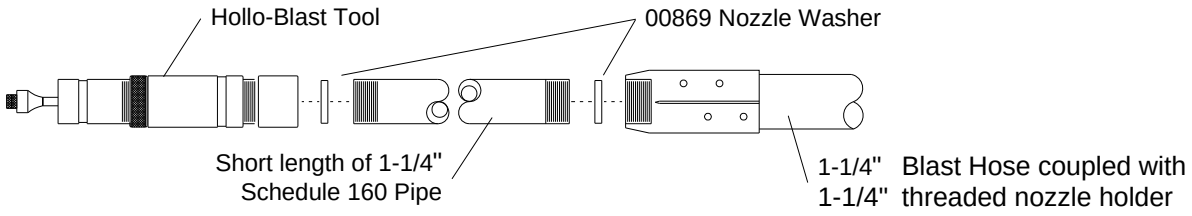



Figure 2

**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.

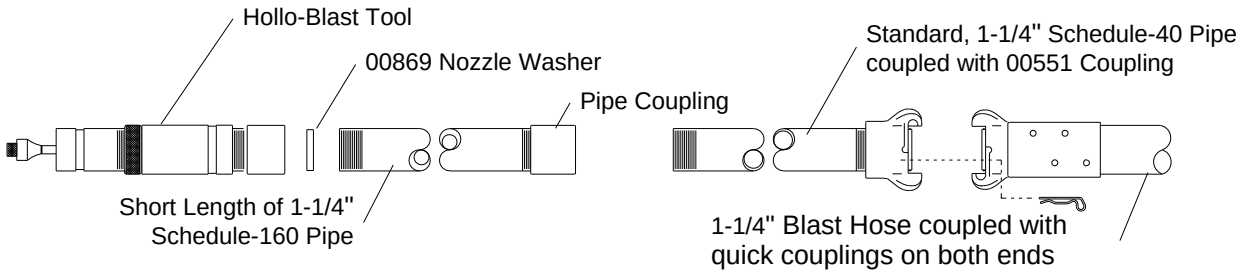
**Figure 3-B** is the basic setup, plus additional standard 1-1/4 pipe lance attached with threaded pipe couplings. This uses standard threaded pipe couplings to connect the lance sections together. The use of threaded couplings allows it to fit inside of 3-1/4" diameter and smaller pipe where a quick 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 lance 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.



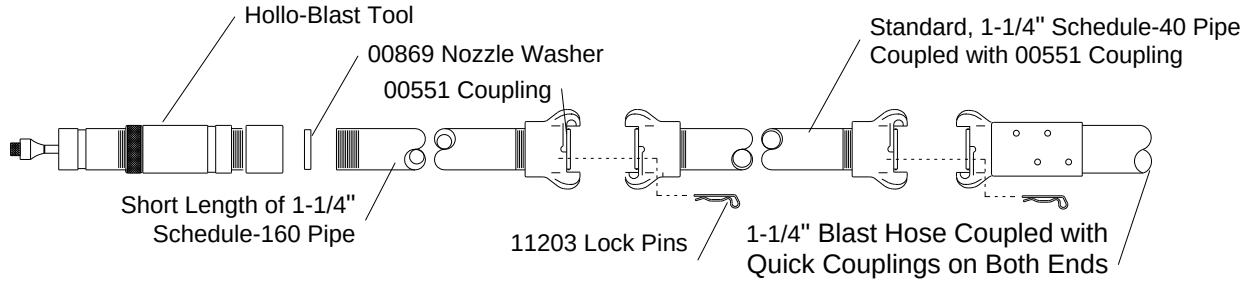

This is the basic setup. Alone it may be used to blast short lengths of pipe or cylinders.

Figure 3-A




This setup is suitable for blasting up to 25-ft. long lengths of 2” ID and larger diameter pipe.

Figure 3-B




This setup is suitable for blasting long lengths of 3-1/2" and larger diameter pipe.

Figure 3-C

### 2.5 Abrasive

**2.5.1** DO NOT USE abrasives containing more than one percent crystalline (free) silica. Obtain material safety data sheets (MSDS) 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 blast cleaning, 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:** These are the most aggressive, high volume abrasives in the blasting industry. 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 aggressive abrasive must be used, use boron carbide or composite deflection tips and boron sleeves. Boron tips may chip when using large, aggressive abrasive. Use composite tips 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.

1. Slide the front collar over the tip protection sleeve. Align the collar setscrew with the groove in the protection sleeve. Using the 3/16" hex key provided, tighten the setscrew to secure. Repeat the process to secure the rear collar to the tool holder.

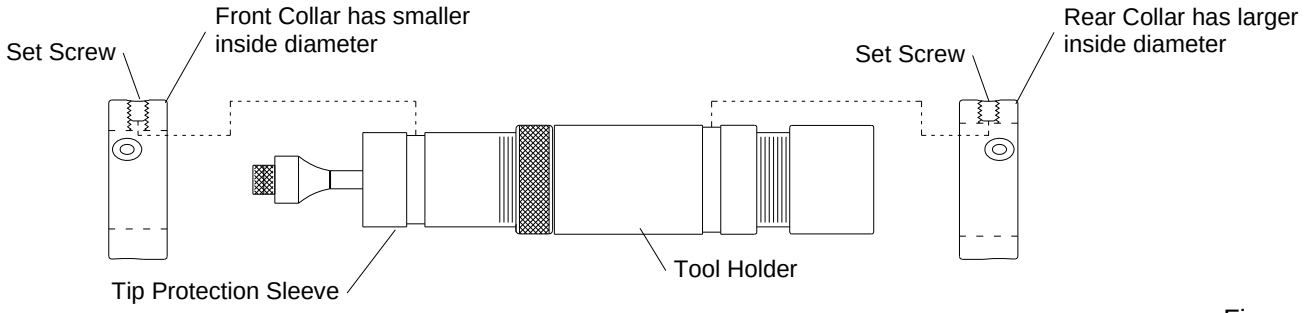



Figure 4-A

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

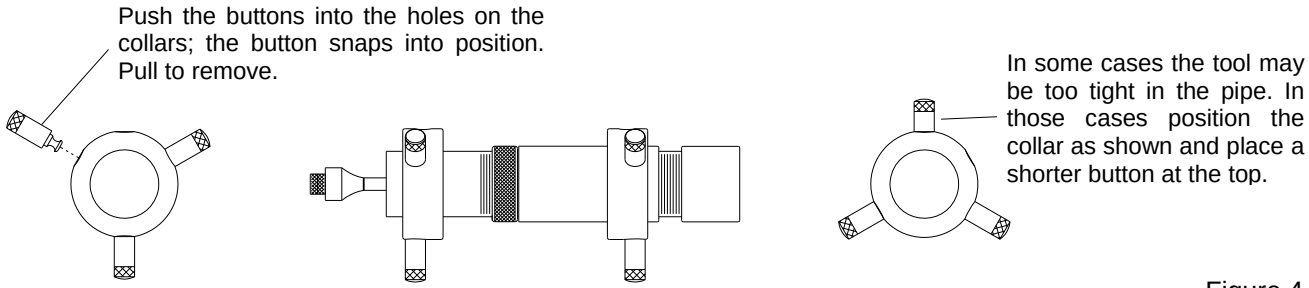
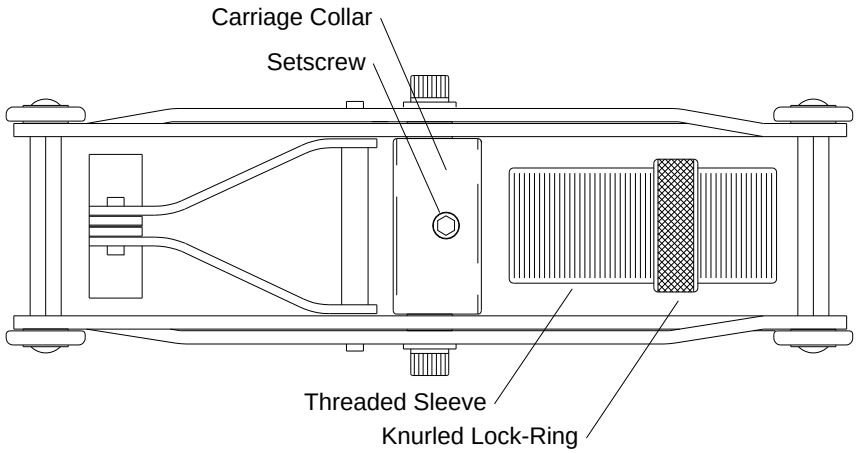



Figure 4-B

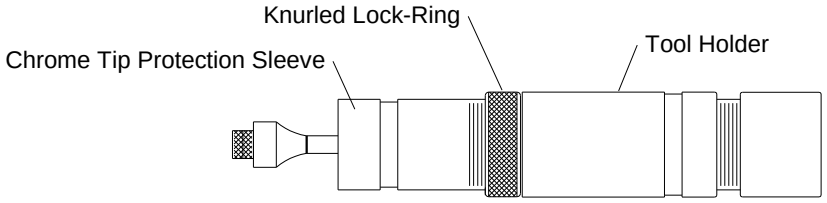
### 3.2 Adjustable Centering Carriage 5" to 12" Model HBC-2

**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.

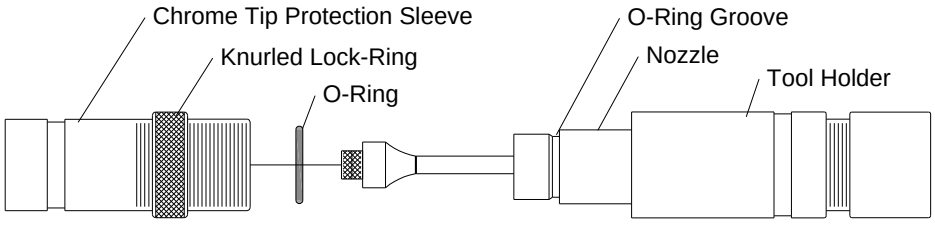
1. Using the 3/16" hex key provided, loosen the setscrew, and then remove the knurled lock-ring and threaded sleeve.



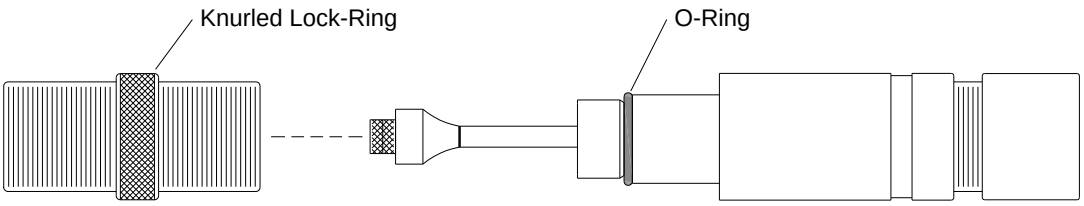

2. Loosen the knurled lock-ring on the chrome, tip protection sleeve.



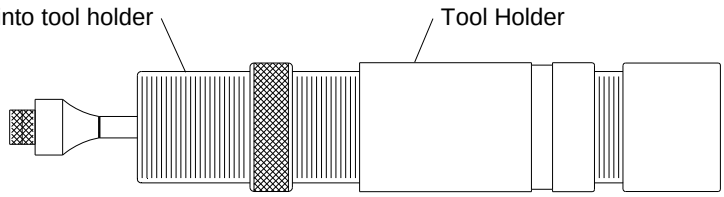

3. Remove chrome, tip protection sleeve from tool holder assembly. It may be necessary to hold the nozzle as the chrome sleeve is removed, to prevent the nozzle and deflection tip assembly from coming out of the tool holder. Note: The o-ring may slide off the nozzle, if so retrieve it from inside the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



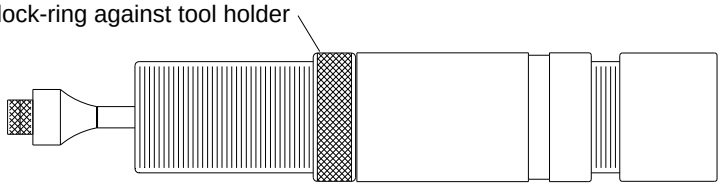
4. Position the knurled lock-ring at about the middle of the threaded sleeve.
5. Make sure the o-ring is in place in the nozzle o-ring groove.



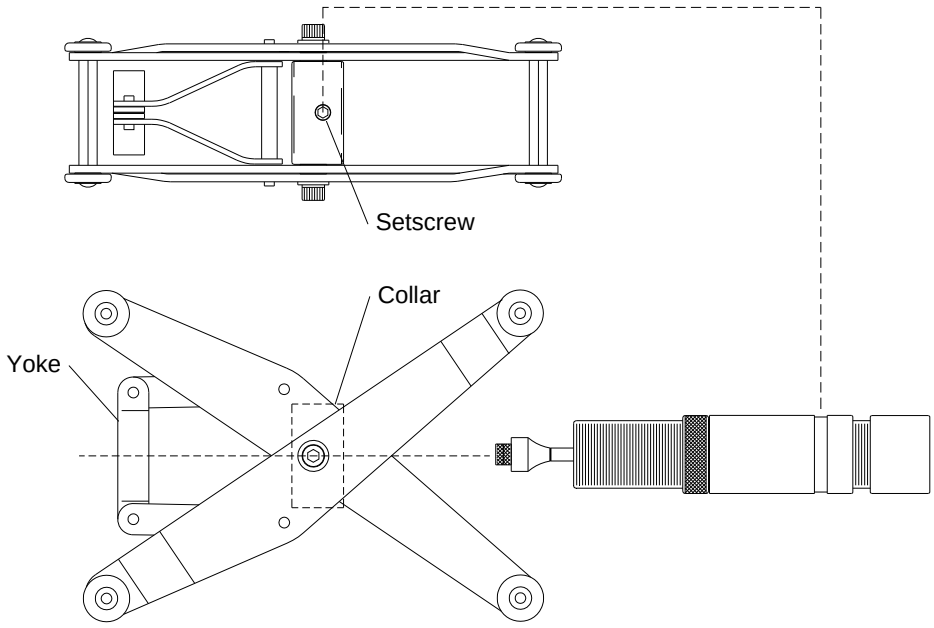

6. Screw the threaded sleeve into the tool holder until it is tight (fully seated).



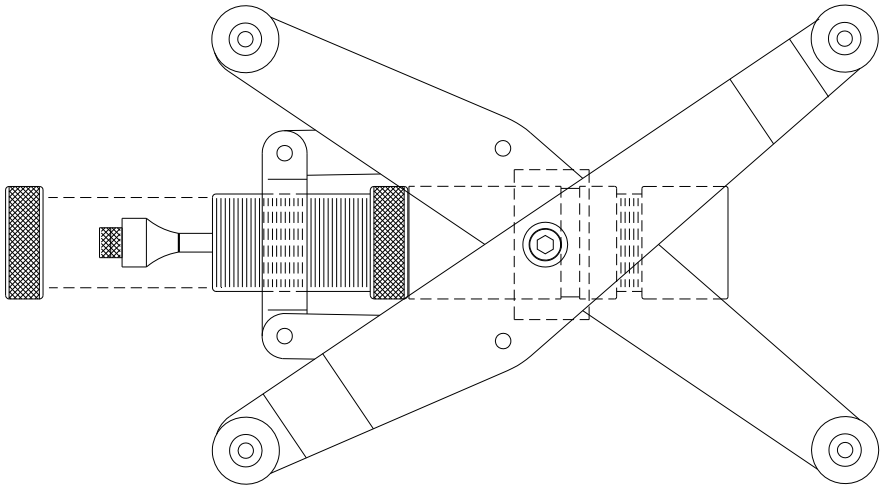

7. Screw the lock-ring tightly against the tool holder to lock the threaded sleeve.



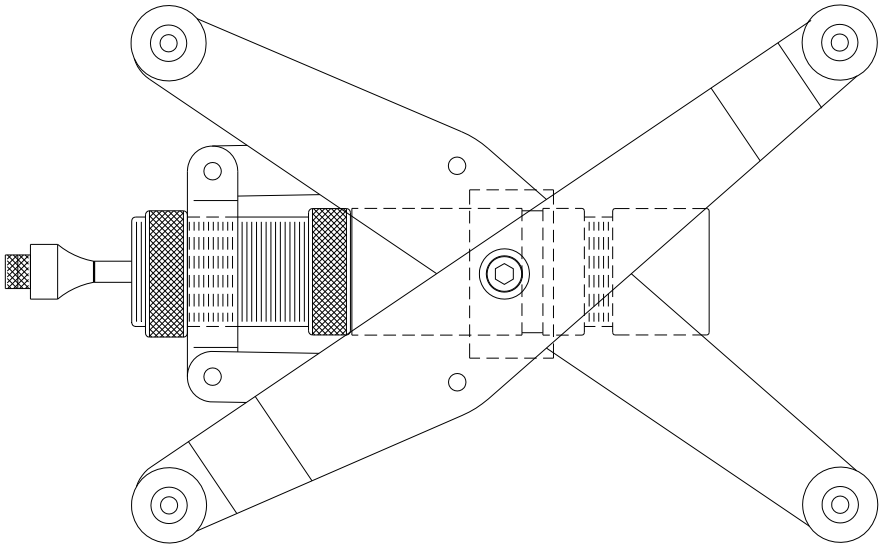
8. From the rear of the carriage, insert the reassembled tool through the carriage collar and yoke as shown in Step 9. Align the groove in the tool holder with collar setscrew, and tighten the setscrew to secure.




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



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



## 4.0 Set-Up and Operation

**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 lowers production.

**4.6** While the tool is at the entrance of the pipe, determine the best abrasive flow and how fast the tool should be moved to obtain the desired degree of blasting.

**4.7** Stop blasting and push the tool through the pipe. Start blasting and pull the lance backward; otherwise abrasive could build-up inside the pipe and slow production. Spent abrasive will be blown 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

**5.1.1** Carbide parts in the Hollo-Blast 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.

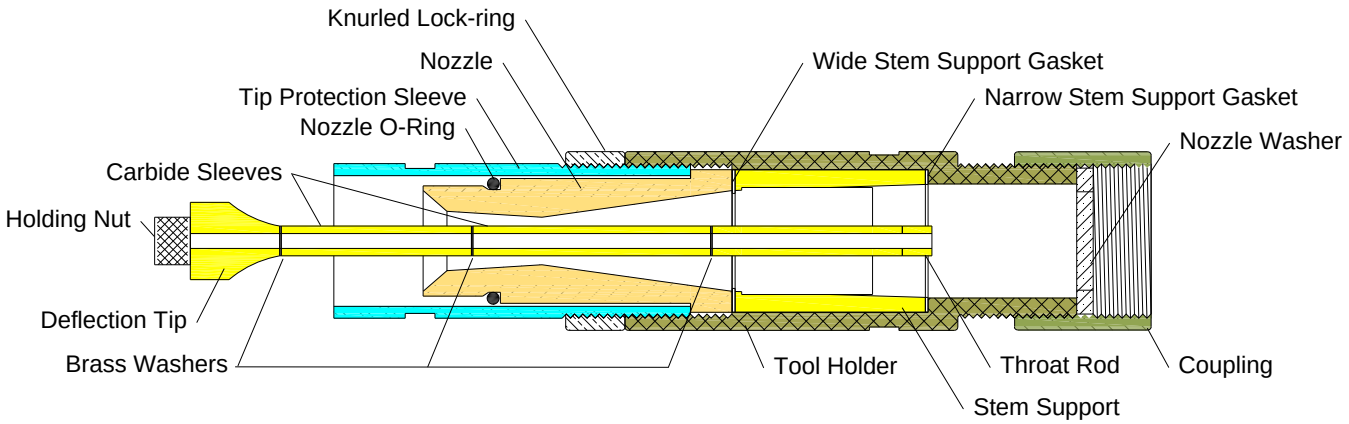



Figure 5

**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 for wear. Replace the when it is worn 1/16". 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 the any part of the straight section of the outside diameter is worn away.
- Make sure all 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 atop it.

**5.3.2** Place the o-ring on the nozzle. Lubricate the o-ring with silicon 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.

**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 lengths; 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 6 (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 less nozzle | 01077 |
| Hollo-Blast with 5/8" orifice nozzle | 08446 |
| Hollo-Blast with boron tip and sleeves | |
| Hollo-Blast, boron with 1/2" orifice nozzle | 21190 |
| Hollo-Blast, boron less nozzle | 21191 |

### 6.2 Hollo-Blast

| Item | Description | Stock No. |
|---|---|---|
| 1. | Nozzle (includes o-ring, item 15) | |
| | Model HBN-8, with 1/2" orifice, | 01406 |
| | Model HBN-10, with 5/8" orifice | 01407 |
| 2. | Tool holder | 01079 |
| 3. | Deflection tip | |
| | Tungsten carbide, standard | 01078 |
| | Boron, optional | |
| | for 40 and finer aggressive abrasive | 20968 |
| | Composite, optional | |
| | for 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 | |
| | equal lengths, 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 |

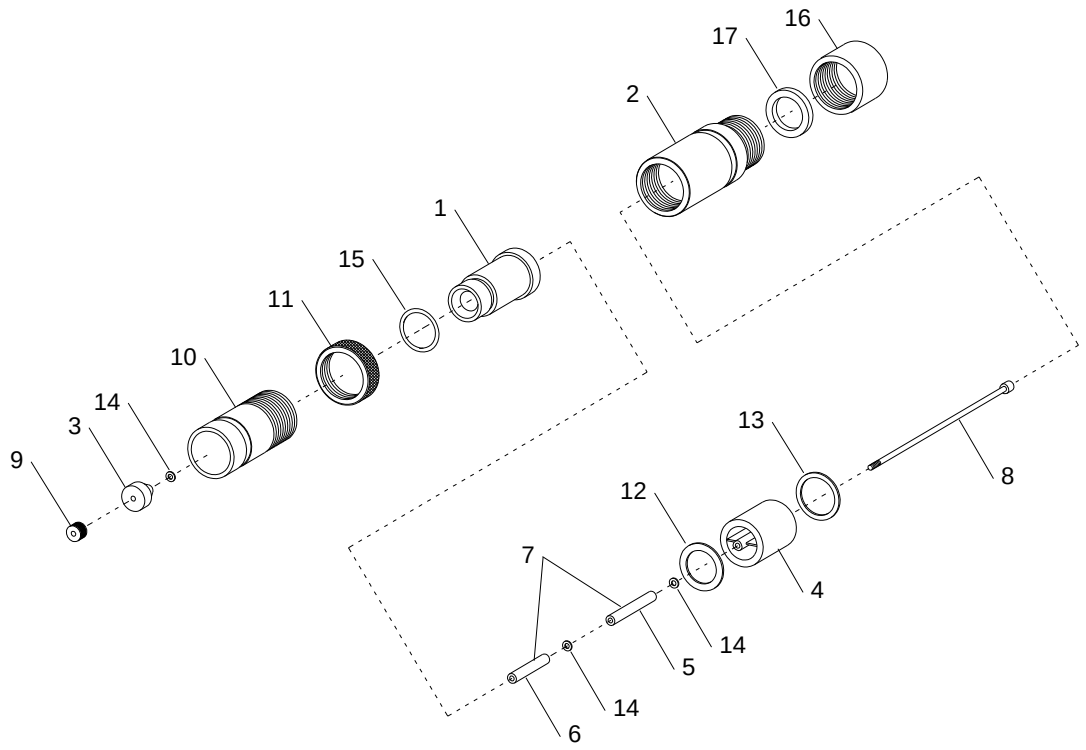



Figure 6

### 6.3 HBC-1 Centering Device
**For 3" to 5" ID Pipe, Refer to Figure 7**

| 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. | Set of 6, 5/16" buttons for 3-1/2" pipe | 01154 |
| 5. | Set of 6, 9/16" buttons for 4" pipe | 01155 |
| 6. | Set of 6, 13/16" buttons for 4-1/2" pipe | 01156 |
| 7. | Set of 6, 1-1/16" buttons for 5" pipe | 01157 |
| 8. | Screw, set, 3/8-NC cup point | 03271 |
| 9. | Key, 3/16" hex | 01139 |

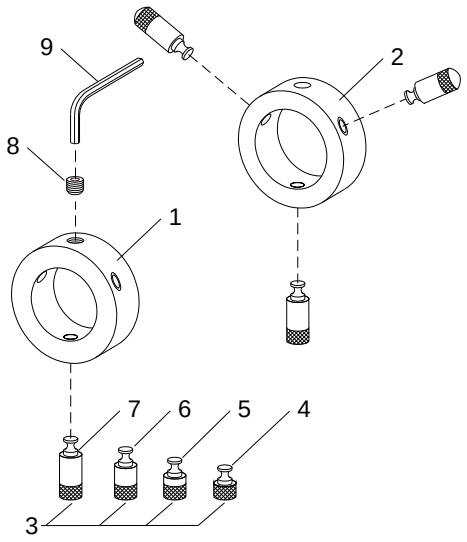



Figure 7

### 6.4 HBC-2 Adjustable Carriage
**For 5" to 12" ID Pipe, Refer to Figure 8**

| Item | Description | Stock No. |
|---|---|---|
| (-) | HBC-2 adjustable carriage, complete | 01131 |
| 1. | Tip protection sleeve, threaded | 01091 |
| 2. | Lock-nut, knurled | 01092 |
| 3. | Wheel bushing (1) with washers (2) | 01133 |
| 4. | Wheel, each | 01153 |
| 5. | Screw, 1/4-NC button head | 03124 |
| 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. | Screw, set, 3/8-NC cup point | 03271 |
| 12. | Key, 3/16" hex | 01139 |

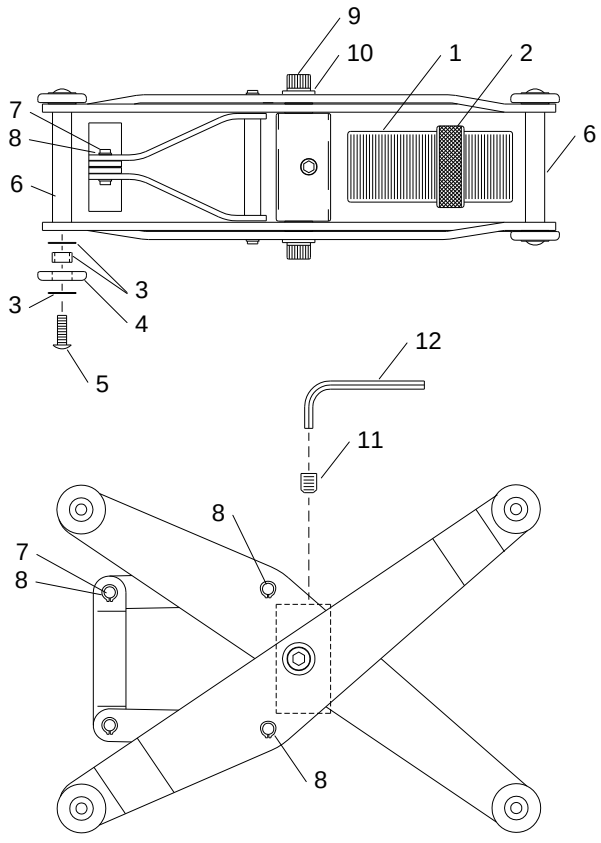



Figure 8