

***martin***<sup>®</sup>

***Martin***<sup>®</sup> ***Typhoon Air Cannon***



***Operator's Manual***  
***M3813***

# Important

MARTIN ENGINEERING HEREBY DISCLAIMS ANY LIABILITY FOR: DAMAGE DUE TO CONTAMINATION OF THE MATERIAL; USER'S FAILURE TO INSPECT, MAINTAIN AND TAKE REASONABLE CARE OF THE EQUIPMENT; INJURIES OR DAMAGE RESULTING FROM USE OR APPLICATION OF THIS PRODUCT CONTRARY TO INSTRUCTIONS AND SPECIFICATIONS CONTAINED HEREIN. MARTIN ENGINEERING'S LIABILITY SHALL BE LIMITED TO REPAIR OR REPLACEMENT OF EQUIPMENT SHOWN TO BE DEFECTIVE.

Observe all safety rules given herein along with owner and Government standards and regulations. Know and understand lockout/tagout procedures as defined by American National Standards Institute (ANSI) z244.1-1982, *American National Standard for Personnel Protection - Lockout/Tagout of Energy Sources - Minimum Safety Requirements* and Occupational Safety and Health Administration (OSHA) Federal Register, Part IV, 29 CFR Part 1910, *Control of Hazardous Energy Source (Lockout/Tagout); Final Rule*.

The following symbols may be used in this manual:



**Danger:** Immediate hazards that will result in severe personal injury or death.



**Warning:** Hazards or unsafe practices that could result in personal injury.



**Caution:** Hazards or unsafe practices that could result in product or property damages.



**Important:** Instructions that must be followed to ensure proper installation/operation of equipment.



**Note:** General statements to assist the reader.

# Table of Contents

---

<b>Section</b>	<b>Page</b>
List of Figures .....	ii
Introduction .....	1
General .....	1
Operation .....	1
Air cannon materials .....	1
Safety .....	1
Model and serial numbers .....	2
Materials required .....	2
Required accessories .....	3
References .....	3
Before Installing Air Cannon .....	4
Installing Air Cannon .....	6
Installing mounting plate .....	6
Connecting air cannon to mounting plate .....	11
Installing restraining cable .....	11
Connecting air supply to air cannon .....	12
After Installing Air Cannon .....	17
Maintenance .....	19
Monthly inspection .....	19
Periodic maintenance .....	20
Air cannon valve assembly replacement .....	20
Troubleshooting .....	24
Part Numbers .....	26
Air cannons .....	26
Air cannon repair parts .....	26
Miscellaneous .....	26
Appendix A. Martin <sup>®</sup> Typhoon Air Cannon Specifications .....	A-1
Appendix B. Martin <sup>®</sup> Typhoon Air Cannon Labels .....	B-1

## List of Figures

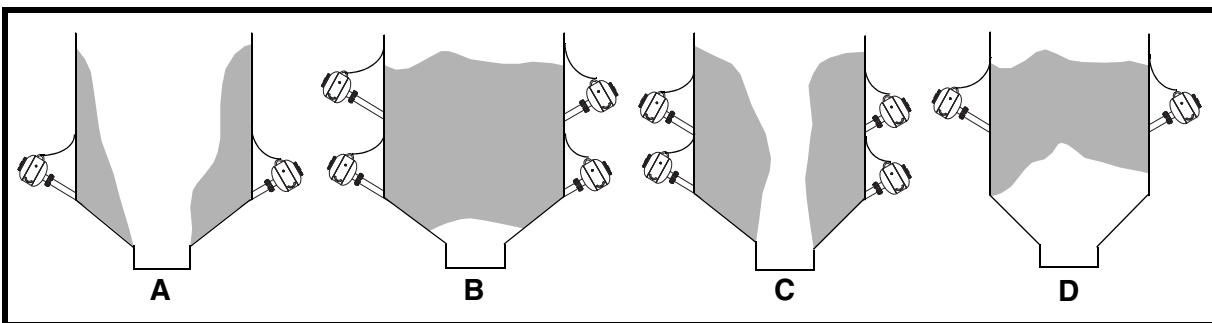
---

<b>Figure</b>	<b>Title</b>	<b>Page</b>
1	Restricted Material .....	1
2	Air Cannon Charging and Discharging .....	2
3	Serial and Model Number Plate .....	2
4	Air Cannon Accessories .....	4
5	Air Cannon Mounting Orientation .....	5
6	Installing 30-Degree Mounting Plate .....	7
7	Installing a Drop-Through 30-Degree Mounting Plate for Vessels with Liner	7
8	Mounting Nozzles/Pipes for High-Temperature Applications .....	8
9	Installing Martin <sup>®</sup> SMART <sup>™</sup> Series Jet Nozzle for High-Temperature Applications .....	9
10	Riser Duct with Fan Nozzles for High-Temperature Applications .....	9
11	Installing Stainless Steel Blow Pipe and Carbon Steel Blow Pipe for High-Temperature Applications .....	10
12	Cyclone with High-Temperature Blow Pipes .....	10
13	Flange Installation .....	11
14	Installing Restraining Cable .....	12
15	Solenoid Enclosure Piping .....	15
16	Martin <sup>®</sup> Typhoon Air Cannon Assembly Parts List .....	27
17	Martin <sup>®</sup> Typhoon Air Cannon Valve Assembly Parts List, P/N 38426-FD .	28
18	Air Cannon Air Fill Kit, P/N 37890-XX .....	29

# Introduction

## General

The Martin<sup>®</sup> Typhoon Air Cannons are pneumatic, bulk material-moving systems that quickly release compressed air into a storage vessel to restore flow to material that is clinging (A), bridging (B), rat-holing (C), or arching (D) (see Figure 1). This manual provides instructions for installing cannons on steel structures only. For installations on other structures, call Martin Engineering or a representative.



**Figure 1. Restricted Material**

## Operation

The Martin<sup>®</sup> Typhoon Air Cannon System consists of one or more air cannons mounted on a storage vessel. The air cannon charges when the tank is filled with plant compressed air or nitrogen between 40 psi (2.76 bar) and 120 psi (8.27 bar) (A, Figure 2) that is controlled by a 3-way normally open solenoid valve. Air fed through the valve assembly-mounted quick exhaust valve (QEV) passes through the piston and into the tank (B). When tank pressure equals line pressure, airflow is static and the cannon is ready to discharge (C). By activating the solenoid valve, the air supply is shut off and the air line between the QEV and solenoid is emptied. This allows the QEV to quickly release the pressure holding the piston. The piston is instantly forced back by the pressure stored in the tank which then exits through the discharge pipe, releasing the energized air pressure stored in the tank. This blast of air is directed through the discharge pipe and into the storage vessel (D).

## Air cannon materials

The air cannon tank is manufactured to American Society of Mechanical Engineers (ASME) Code Rules, Section VIII, Division 1. It is National Board registered, and is pressure vessel quality (PVQ). After the tank is welded, paint is applied inside the tank to prevent rust and corrosion. **Never weld tank.** Welding will melt paint and violate ASME coding.

## Safety

All safety rules defined in the above documents, and all owner/employer safety rules, must be strictly followed when installing and servicing this equipment.

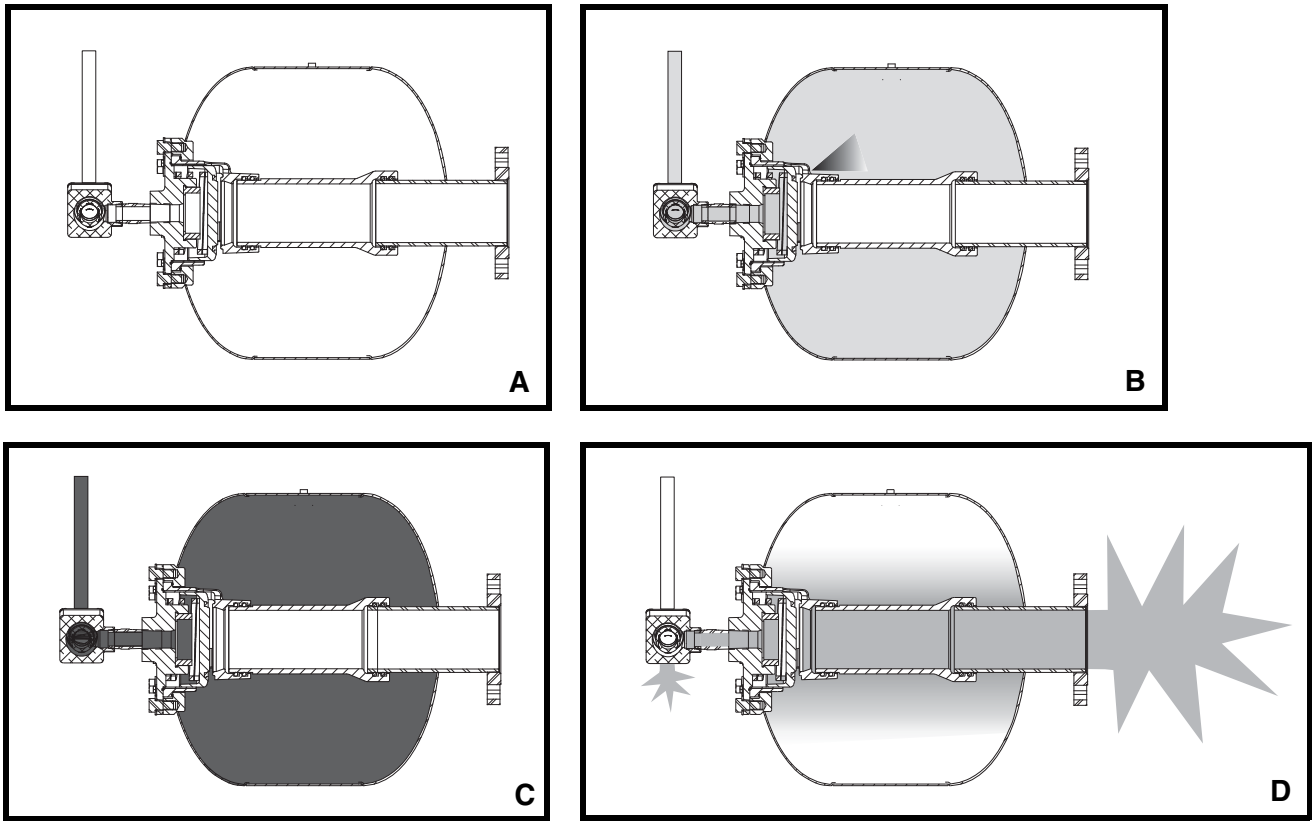


Figure 2. Air Cannon Charging and Discharging

**Model and serial numbers**

Each air cannon’s serial and model number is shown on a plate attached to the tank (see Figure 3). Serial and model numbers must be referenced when ordering parts from Martin Engineering or representative, and on all correspondence.



Figure 3. Serial and Model Number Plate

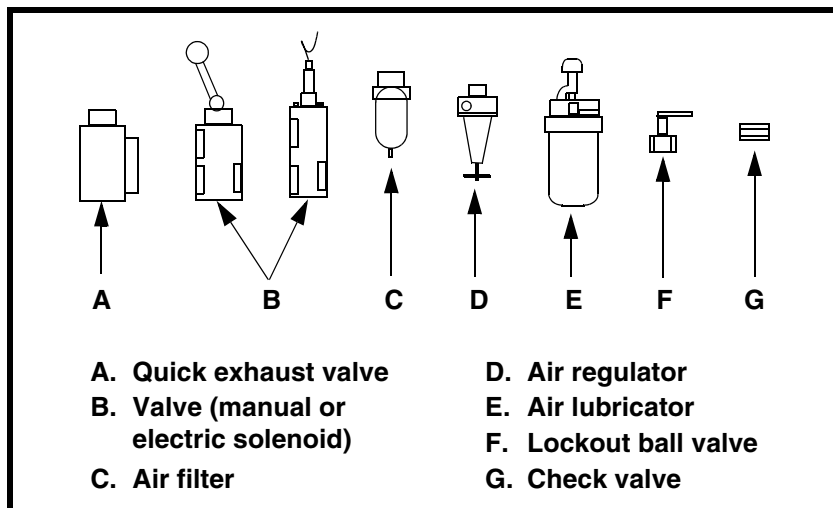
**Materials required**

Materials other than standard hand tools that are required to complete tasks are listed where applicable.

## Required accessories

This manual includes instructions for installing accessories required for air cannons to be fully operational (see Figure 4). The following accessories can be ordered from Martin Engineering and shipped separately from air cannons (see “Part Numbers”):

- Quick exhaust valve (A).
- Air control components: valve (B), air filter (C), air regulator (D), air lubricator (E), lockout ball valve (F), and check valve (G).



**Figure 4. Air Cannon Accessories**

## References

The following documents are referenced in this manual:

- American National Standards Institute (ANSI) z244.1-1982, *American National Standard for Personnel Protection - Lockout/Tagout of Energy Sources - Minimum Safety Requirements*, American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.
- Federal Register, Volume 54, Number 169, Part IV, 29 CFR Part 1910, *Control of Hazardous Energy Source (Lockout/Tagout); Final Rule*, Department of Labor, Occupational Safety and Health Administration (OSHA), 32nd Floor, Room 3244, 230 South Dearborn Street, Chicago, IL 60604.
- *The National Electrical Code (NEC) Handbook*, National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy MA 02269-9101.
- ICS 1-1988, *General Standards for Industrial Control and Systems*, and 250-1985, *Enclosures for Electrical Equipment (1000 Volts Maximum)*, National Electrical Manufacturers Association (NEMA), 2101 L Street N.W., Washington, D.C. 20037.
- *Section VIII, Rules for Construction of Pressure Vessels, Division 1*, American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, NY 10017.

## Before Installing Air Cannon

---

### **IMPORTANT**

The delivery service is responsible for damage occurring in transit. Martin Engineering CANNOT enter claims for damages. Contact your transportation agent for more information.

1. Inspect shipping container for damage. Report damage to delivery service immediately and fill out delivery service's claim form. Keep any damaged goods subject to examination.
2. Remove air cannon from shipping container. Equipment in container should include the following:
  - Air cannon, relief valve, and safety cable kit.
  - Air Blast Warning Label, P/N 31913.
  - Lockout Valve Warning Tag, P/N 35146.
3. If you ordered accessories from Martin Engineering, remove from shipping container. Equipment in container may include the following:
  - Quick exhaust valve.
  - Air control components: manual valve or electrical solenoid valve, air filter/regulator/lubricator, air supply line, lockout ball valve, and check valve.
4. If anything is missing, contact Martin Engineering or representative.

### **⚠ WARNING**

Before installing air cannon, lock out/tag out any equipment that is loading or unloading material from the storage vessel.

5. Turn off and lock out/tag out energy source to accessory equipment according to ANSI standards (see "References").

### **⚠ WARNING**

If equipment will be installed in an enclosed area, test gas level or dust content before using a cutting torch or welding. Using a cutting torch or welding in an area with gas or dust may cause an explosion.

6. If using a cutting torch or welding, test atmosphere for gas level or dust content.

### **⚠ CAUTION**

When blasting into closed storage vessel, exhaust vents must be considered to prevent internal vessel air pressure from increasing to point where it may damage vessel.



- When blasting into closed storage vessel, consider exhaust vents to prevent internal vessel air pressure from increasing to point where it may damage vessel.

**IMPORTANT**

Air cannon force output can vary depending on inlet pressure, discharge opening size, structure size, material in structure, and other factors. To determine maximum force output values for your application, call Martin Engineering.

- If you need to know air cannon maximum force output for your application, call Martin Engineering.

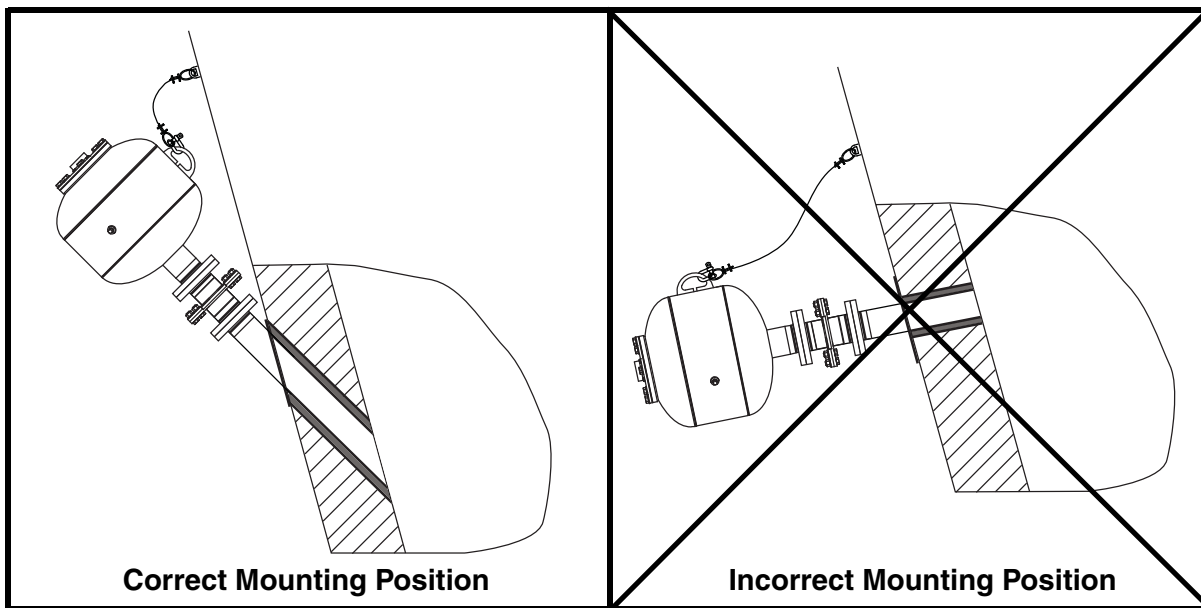


Figure 5. Air Cannon Mounting Orientation

**IMPORTANT**

Do not mount air cannon at a negative angle, see Figure 5. Dirt and dust can collect in air cannon causing rapid wear of air cannon's internal components.

**IMPORTANT**

Air cannons operated in extremely dirty and dusty environments must be lubricated to prevent premature wear of air cannon's internal components. Lubricate air cannon with Martin® Air Motor Oil, p/n 14766.

# Installing Air Cannon

---

## IMPORTANT

**Read entire section before beginning work.**

To install air cannon, follow the procedures in this section corresponding to the following steps:

1. Install mounting plate.
2. Connect air cannon to mounting plate.
3. Install restraining cable.
4. Connect air supply to air cannon. See “Installing manual valves and electrical solenoid valves” or “Installing solenoid enclosures,” as applicable.

A variety of mount plate and nozzle designs are available from Martin Engineering. This section will describe the installation of the most commonly used mount plates and nozzles. The correct mount plate or nozzle must be used for the given application. If you are not sure which mount plate or nozzle to use for your application, contact Martin Engineering or representative.

## NOTE

**NOTICE OF LIMITED LIABILITY: Due to possible presence of latent structural defects in the apparatus of the purchaser, Martin Engineering shall not be responsible for consequential damage to the purchaser’s equipment and/or apparatus resulting from the application of a Martin® Product. Martin Engineering shall not be liable for improper installation by the purchaser or other circumstances beyond the control of Martin Engineering. Liability is disclaimed for the structural soundness of apparatus or equipment not supplied by Martin Engineering. Liability shall be strictly limited to the replacement of the purchased product or refund of the purchase price. To secure the integrity of the installation, specify supervision by qualified personnel from Martin Engineering.**

### *Installing mounting plate*

Materials Required: Mounting plate or seal plate and support structure.

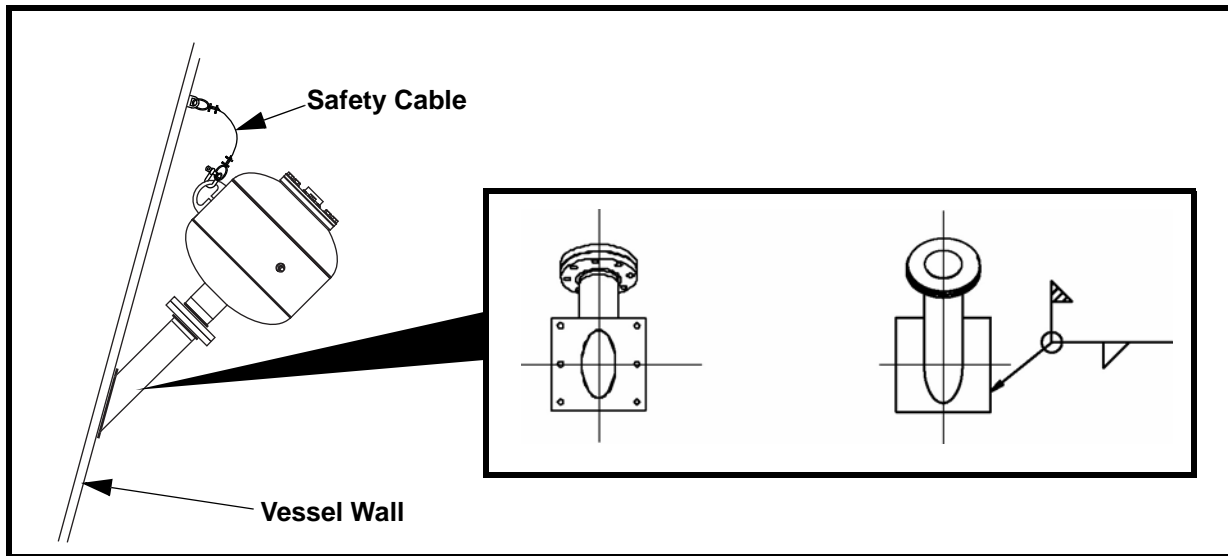
Material and field welds: If mild steel to mild steel use a 7018 or equivalent rod. If stainless steel to stainless steel, use 308 or equivalent welding rod. If stainless steel to mild steel, use 309 or equivalent welding rod.

## NOTE

**If you are unsure where to locate air cannon(s) on your storage vessel, contact Martin Engineering or your representative.**

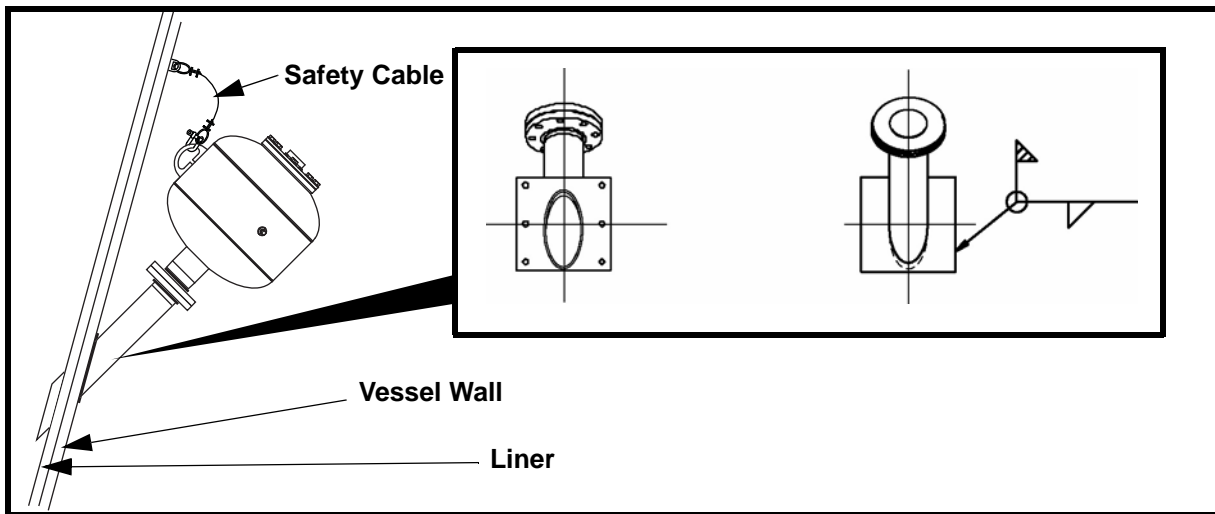
1. Mark location for each air cannon on storage vessel.

2. A standard carbon steel mount plate or nozzle can be used for internal vessel temperatures of less than 500°F.
  - a. If using 30-degree mounting plate (Figure 6), cut hole in storage vessel for each mounting plate using templates on last page of this manual. If templates are missing, contact Martin Engineering or representative. Place mounting plate over hole and field weld to vessel skin.



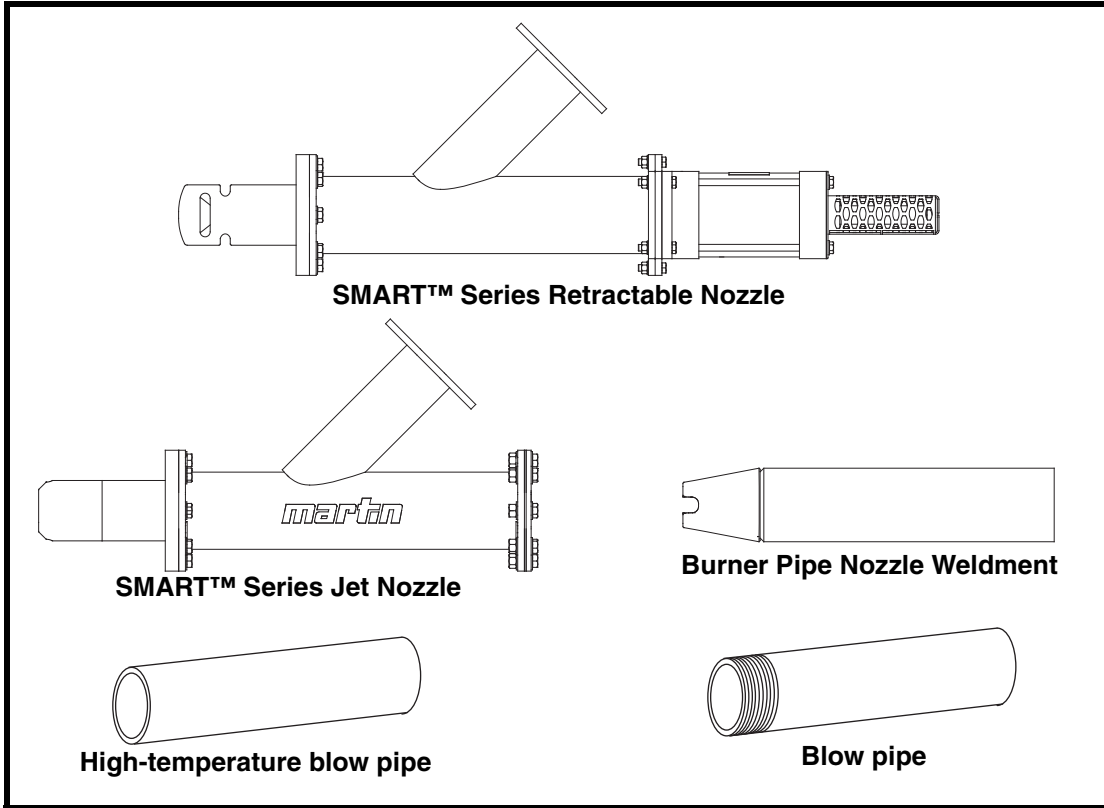
**Figure 6. Installing 30-Degree Mounting Plate**

- b. If mount plate is to be welded to vessel, bolt holes must be cut away or plug-welded in order to prevent air leakage upon discharge. If mount plate is to be bolted to vessel, gasket must be used to prevent air leakage upon discharge.
- c. If vessel has a liner (Figure 7), drop-through blow-pipe must be used. The blow pipe must be extended past liner so that liner is not damaged from air cannon blast.

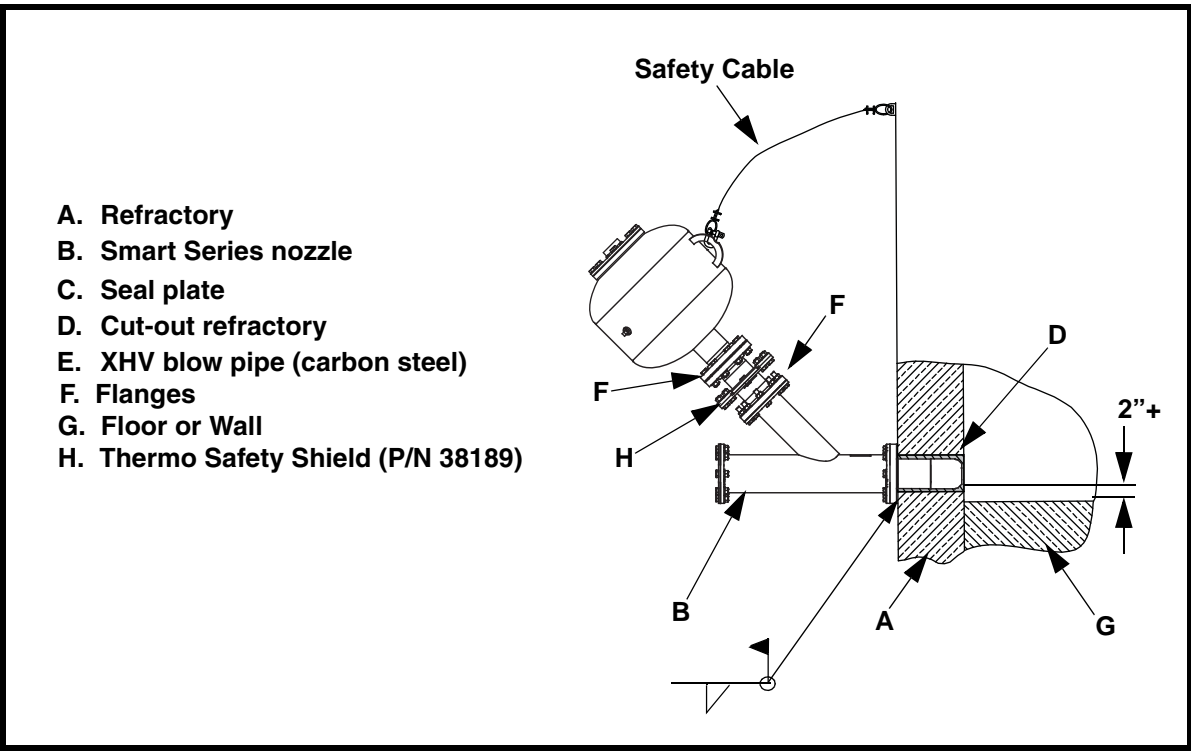


**Figure 7. Installing a Drop-Through 30-Degree Mounting Plate for Vessels with Liner**

d. Martin® SMART™ Series Nozzles and blow pipes (Fig. 8) should be used in applications where the internal vessel temperature exceeds 500°F.

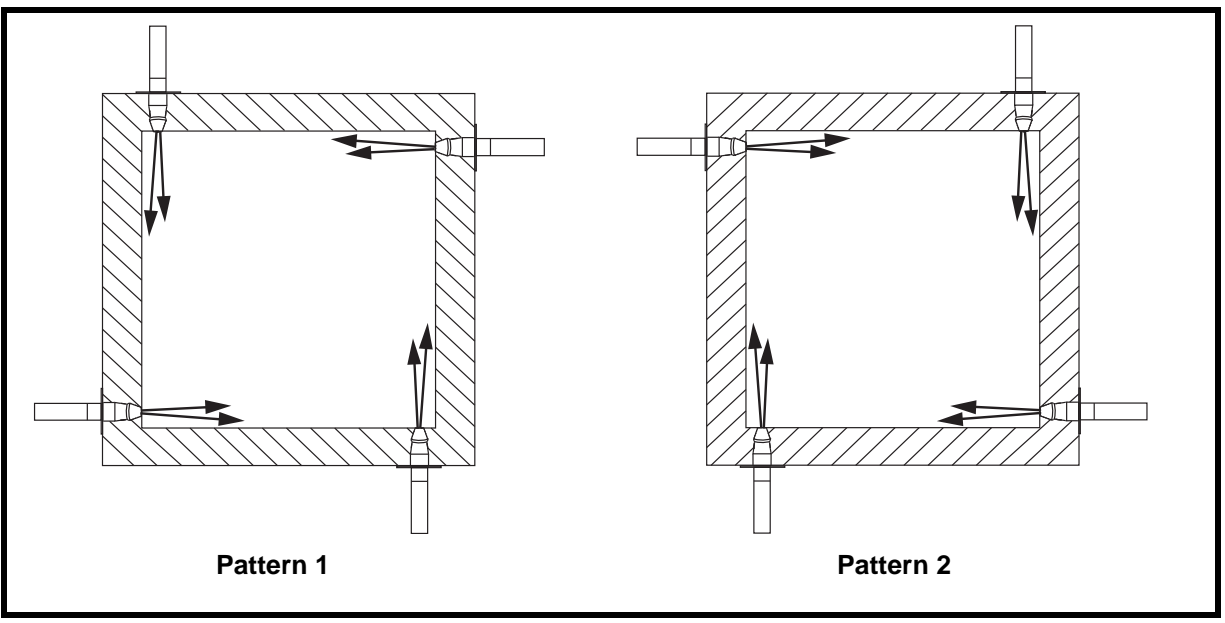


**Figure 8. Mounting Nozzles/Pipes for High-Temperature Applications**

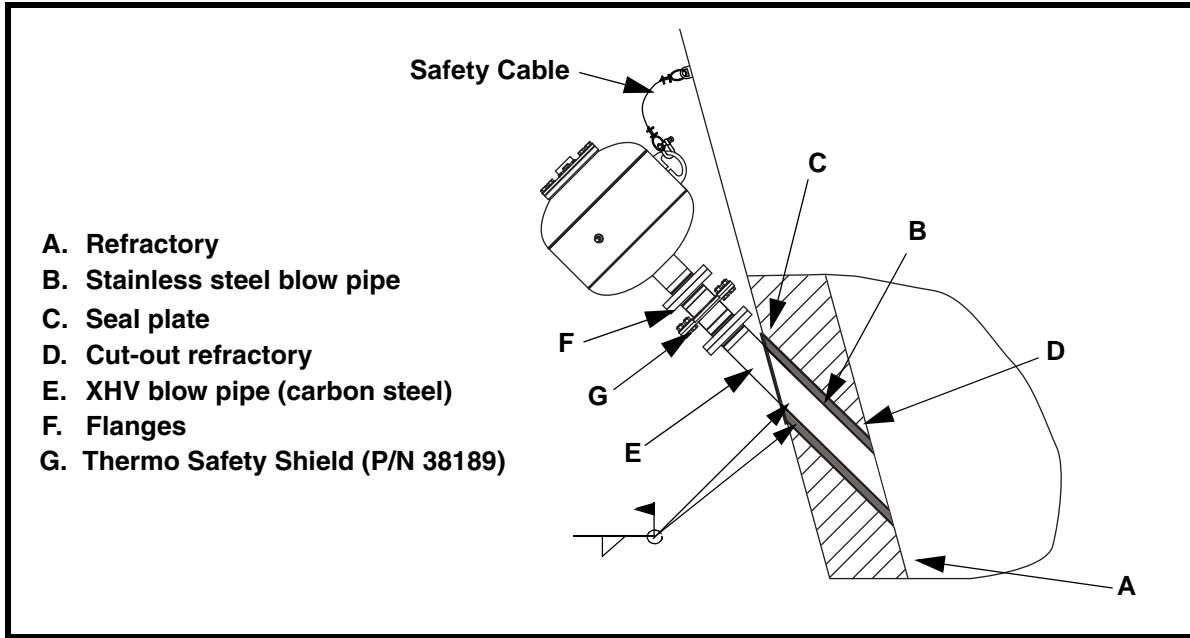


**Figure 9. Installing Martin<sup>®</sup> SMART<sup>™</sup> Series Jet Nozzle for High-Temperature Applications**

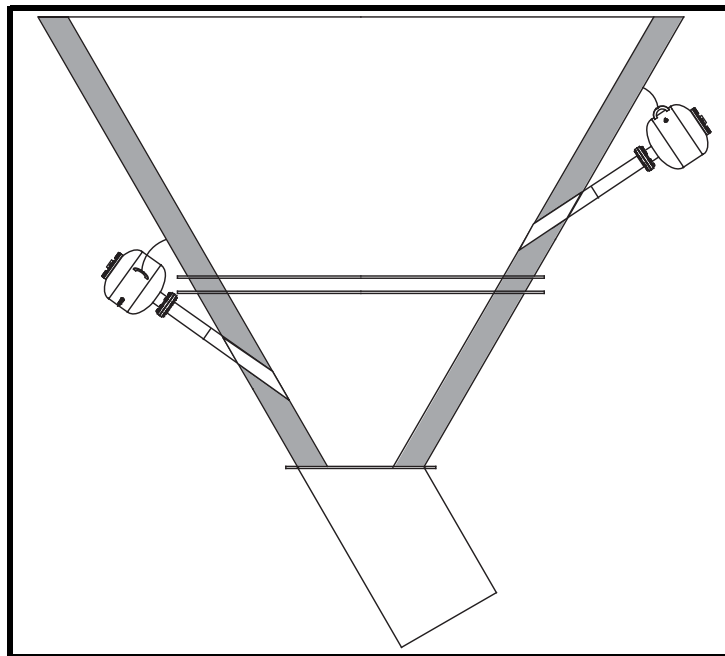
3. Plan view of nozzle placement for riser duct application. Alternate levels between Pattern 1 and Pattern 2 for maximum area coverage.



**Figure 10. Riser Duct with Fan Nozzles for High-Temperature Applications**



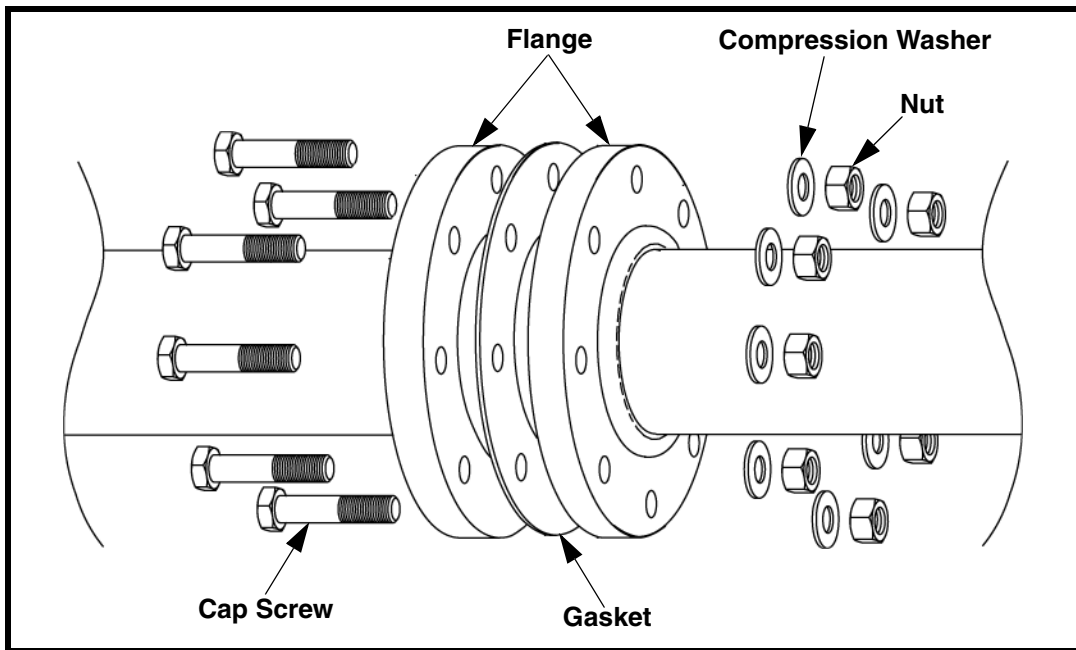
**Figure 11. Installing Stainless Steel Blow Pipe and Carbon Steel Blow Pipe for High-Temperature Applications**



**Figure 12. Cyclone with High-Temperature Blow Pipes**

**Connecting air cannon to mounting plate**

1. One flange will be connected to blow pipe and other will be connected to air cannon's discharge flange weldment.
  - a. For threaded end pipe, screw pipe flange onto pipe completely. If necessary, tack weld connection to prevent from becoming loose. DO NOT weld threaded connection completely.
  - b. For plain end pipe, place slip-on flange over end of pipe and fillet weld completely.



**Figure 13. Flange Installation**

2. Place a gasket between the flanges and assemble using cap screws, nuts and compression washers.

**Installing restraining cable**

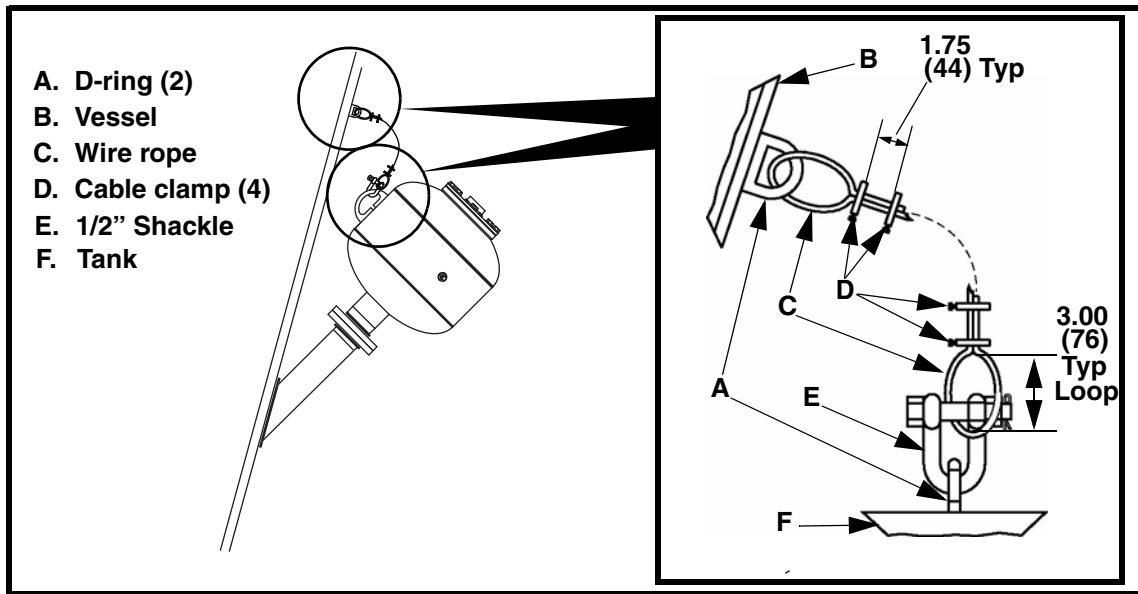
**⚠ WARNING**

Always install restraining cable to secure air cannon to storage vessel. Without restraining cable, air cannon could fall and cause injury.

Do not use restraining cable to mount air cannon to storage vessel wall. Purpose of restraining cable is to keep air cannon from falling should it come loose from vessel wall, not as primary means of securing air cannon to wall.

**⚠ CAUTION**

Do not use angle iron or support ring to secure air cannon rigidly to storage vessel. If restrained too rigidly, tank cannot flex and air cannon can fail.



**Figure 14. Installing Restraining Cable**

1. Weld D-ring (A, Figure 14) onto storage vessel (B) with 1/4-in. (6-mm) field weld.
2. Insert wire rope (C) through D-ring on storage vessel, making a 3-in. (76-mm) loop. If wire rope supplied with air cannon is not long enough, loop and clamp it to an additional cable and attach additional cable to air cannon.
3. Clamp wire rope with one cable clamp (D) as close to loop as possible. Place another cable clamp 1-3/4 in. (44 mm) from first clamp.
4. Leave at least 1 in. (25 mm) of wire rope on dead end.
5. Gradually tighten nuts alternately and evenly to 15 ft-lbs. Leave 2 to 3 in. (51 to 76 mm) slack in wire rope.
6. Use the U-bolt to connect the restraining cable to one of the D-rings on tank. Tighten U-bolt's pin with a wrench and insert cotter pin through the hole. Separate ends of cotter pin to ensure U-bolt's pin cannot back out.

***Connecting air supply to air cannon***

**IMPORTANT**

Read entire section before beginning work.

**CAUTION**

When pressure in the storage vessel is 4 psi (0.28 bar) or more, apply equal or greater pressure to the air cannon inlet. Absence of inlet pressure will allow material in the storage vessel to enter the air cannon and contaminate the valve assembly and tank.



**IMPORTANT**

**To prevent leaking, apply pipe sealant to all fittings. Air cannon will discharge randomly if leaks are present.**

1. Apply pipe sealant to all fittings.

**⚠ WARNING**

**Use ASME-approved relief valve only (supplied with air cannon).**

2. Install relief valve. Make sure other inspection ports are tightly plugged.

**⚠ WARNING**

**Make sure exhaust port on quick exhaust valve is pointed downward so that dirt cannot enter, and exhaust port is not directed at personnel. Martin Engineering recommends installing a 90° street elbow on quick exhaust valve exhaust port and on manual or electrical solenoid valve exhaust ports to prevent dirt from entering.**

3. If using optional 90° street elbow or quick exhaust valve, thread it into quick exhaust valve exhaust port.
4. Thread quick exhaust valve outlet port (with exhaust port pointed down) onto hex nipple and tighten.

**IMPORTANT**

**Manual valves or electrical solenoid valves distributed by Martin Engineering, which are made especially for this air cannon, are recommended. Substitute valves may not work as effectively.**

**Use any length pipe to connect air filter/regulator/lubricator to check valve. Use 1/2-in. pipe only. Locate manual valve or electrical solenoid valve within 15 ft (4-1/2 m) of air cannon.**

5. Choose location for manual 3-way valve or electrical solenoid valve.
6. Install bushing into quick exhaust valve inlet port.
7. Connect manual 3-way valve or electrical solenoid valve outlet port to bushing/quick exhaust valve inlet port with no more than 15 ft (4-1/2 m) of 1/2-in. pipe.
8. Install 90° street elbow for manual 3-way valve or electrical solenoid valve into valve exhaust port.

**NOTE**

**Look at arrow on side of FRL, check valve, and lockout ball valve to make sure flow is correct.**

9. Connect air filter/regulator/lubricator and manual 3-way valve or electrical solenoid inlet port with desired length 1/2-in. pipe.

**IMPORTANT**

**OSHA requires installation of a lockout ball valve (see “References”).**

10. Connect lockout ball valve to air filter/regulator/lubricator with desired length 1/2-in. pipe. Look at arrow on side of ball valve to make sure flow is correct.
11. Connect check valve to lockout ball valve with desired length 1/2-in. pipe. Look at symbol on side of check valve to make sure flow is correct.

**IMPORTANT**

**For electrical solenoid valve installations, design and wire electrical solenoid controls according to NEC Handbook. Electrical push buttons, timers, and programmable controllers are available through Martin Engineering.**

12. For electrical solenoid valve installations, if using electrical solenoid controller, install according to instructions provided with controller.

**⚠ WARNING**

**Do not exceed 125 psi (8.62 bar) maximum working pressure or pressure relief valve will open. Minimum recommended pressure for most applications is 80 psi (5.52 bar) but lower pressures can be used. Make sure air supply is filtered and regulated.**

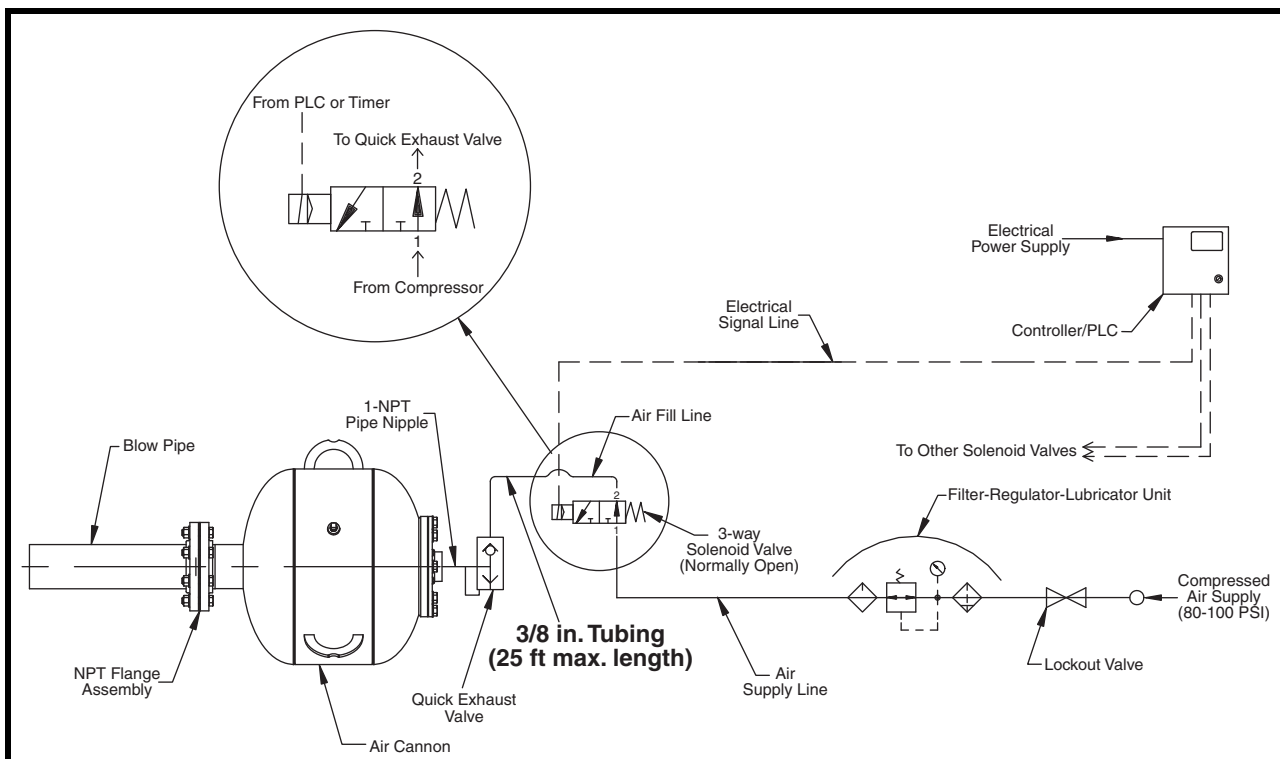
**NOTE**

**Pressure relief valves of up to 150 psi are available from Martin Engineering. Consult the Maximum Allowable Working Pressure (MAWP) on tank's name plate before substituting a different pressure relief valve. Never use a pressure relief valve with a set pressure that is higher than the MAWP of the tank.**

**⚠ WARNING**

**Pressure relief valve may relieve at any point between 90% and 100% of set pressure. Exceeding MAWP can cause tank to rupture.**

13. Connect air supply to check valve.
14. Anchor all pipes and wires to prohibit movement.
15. Operate air cannon as described under “After Installing Air Cannon.”



**Figure 15. Solenoid Enclosure Piping**

**IMPORTANT**

**Solenoid enclosures distributed by Martin Engineering, which are made especially for this air cannon, are recommended. Substitute enclosures may not work as effectively.**

**⚠ CAUTION**

**Do not use solenoid enclosure in explosive environment. Solenoid enclosure is not rated for hazardous locations.**

16. Refer to Figure 15 and follow steps 1 through 4 under “Installing manual valves and electrical solenoid valves.”
17. Choose location for solenoid enclosure and mount with bulkhead fittings pointing down.
18. Connect quick exhaust valve to solenoid enclosure as follows:
  - a. Install bushing on quick exhaust valve. Install a male adapter fitting on bushing and on solenoid enclosure.
  - b. Connect the two male adapter fittings with 3/8-in. stainless steel tubing.

**NOTE**

**Look at symbol on side of FRL, check valve, and lockout ball valve to make sure flow is correct.**

19. Connect air filter/regulator/lubricator to solenoid enclosure inlet line with desired length 1/2-in. pipe.

**IMPORTANT**

**OSHA requires installation of a lockout ball valve (see “References”).**

20. Connect lockout ball valve to air filter/regulator/lubricator with desired length 1/2-in. pipe.
21. Connect check valve to lockout ball valve with desired length 1/2-in. pipe.

**IMPORTANT**

**Connect all solenoid enclosures to a controller. Design and wire solenoid cabinet controls according to NEC Handbook. Electrical push buttons, timers, and programmable controllers are available through Martin Engineering.**

22. Drill conduit entrance hole in solenoid enclosure for wiring.
23. Connect conduit according to NEC Handbook standards.
24. Wire solenoid enclosure to a mechanical, programmable, or solid-state controller according to controller’s operating manual.
25. Connect air supply to check valve.
26. Anchor all pipes and wires to prohibit movement.
27. Operate air cannon as described under “After Installing Air Cannon.”

# After Installing Air Cannon

---

## IMPORTANT

Read entire section before beginning work.

1. Thoroughly wipe storage vessel wall clean next to vessel door/port. Place Air Blast Warning Label, P/N 31913, on vessel wall visible to anyone opening door/port. If more than one door or port exists on storage vessel, request additional labels from Martin Engineering or representative. Attach Lockout Valve Warning Tag, P/N 35146, to lockout valve with cable tie (supplied).
2. Purge air lines.

## IMPORTANT

Charge each air cannon individually during initial start-up to avoid significant pressure loss.

Relief valve is preset to open at 125 psi (8.62 bar).

## ⚠ WARNING

Do not exceed 125 psi (8.62 bar) maximum working pressure or pressure relief valve will open. Minimum recommended pressure for most applications is 80 psi (5.52 bar) but lower pressures can be used. Make sure air supply is filtered and regulated.

## NOTE

Pressure relief valves of up to 150 psi are available from Martin Engineering. Consult the Maximum Allowable Working Pressure (MAWP) on tank's name plate before substituting a different pressure relief valve. Never use a pressure relief valve with a set pressure that is higher than the MAWP of the tank.

## ⚠ WARNING

Pressure relief valve may relieve at any point between 90% and 100% of set pressure. Exceeding MAWP can cause tank to rupture.

3. Supply 80 to 125 psi (5.52 to 8.62 bar) filtered, regulated, and lubricated air to system.
4. For air cannons with manual valves, position manual valve lever so air is supplied to air cannon (inlet to outlet open).
5. If air cannon does not charge, see “Troubleshooting.”
6. Check system for air leaks. If leaking, see “Troubleshooting.”

**NOTE**

When air cannon blasts, a small amount of air will release from solenoid valve and quick exhaust valve.

**⚠ DANGER**

Do not open door/port or enter storage vessel when cannons are charged and operational. Flying debris from cannons' blast can kill you.

If air cannons are installed on open pit or on structure with no top, make sure area is clear before firing cannons. Flying debris from cannons' blast can kill you.

Air cannons are loud when firing. Use ear protection to avoid impairment or loss of hearing.

7. Blast air cannon as follows:
  - a. For air cannons with manual valves, move manual valve lever to opposite position (inlet to outlet closed, outlet to exhaust open).
  - b. For air cannons with electrical solenoid valves and external electrical controls, activate electrical solenoid valve by external control (electrical push button, timer, etc.) or by pushing button on electrical solenoid valve. (If wired correctly, this should send signal to solenoid valve closing inlet to outlet and opening outlet to exhaust.)
  - c. For air cannons with solenoid enclosure and controller, set up controller according to controller's operating manual. Use controller to activate solenoid cabinet.
8. Blast air cannon five times to ensure proper operation. Allow tank to fill after each blast.
9. If air cannon blasts properly, continue to operate air cannon as needed. If problems occur, see "Troubleshooting."
10. Keep air cannon charged with air at all times so unit is always ready for use, and so material cannot flow into air cannon.

## IMPORTANT

Read entire section before beginning work.

## DANGER

Turn off and lock out/tag out air supply and energy source before blasting air cannon to prevent air cannon from refilling.

Do not open door/port or enter storage vessel before turning off compressed air source, locking out controls, purging line pressure, and venting air from tank.

Shutting off lockout ball valve will purge all cannons connected to that valve and cause the air cannons to fire immediately. Do not shut off the valve until you make sure no one is in the structure or near its discharge. Flying debris from the cannons' blast can kill you.

Turn off and lock out/tag out energy source according to ANSI standards (see "References").

### *Monthly inspection*

1. Inspect all connections from air supply to tank for leaks and deterioration. If connections are leaking, seal all fittings with pipe sealant and tighten. Replace any deteriorating connections. Make sure hoses do not flex more than 1/4 in. (6 mm).
2. Make sure all pipes and wires are anchored to prohibit movement. Secure as needed.
3. Inspect quick exhaust valve, manual valve or electrical solenoid valve, check valve, lockout ball valve, and air filter/regulator/lubricator for proper operation. If not operating correctly, replace.
4. Wipe all warning labels clean. If labels are not readable, contact Martin Engineering or representative for replacements.

*Periodic maintenance*

1. Blast air cannon to remove air from tank, then pull ring on relief valve to make sure air stored in cannon has been released.
2. Perform monthly maintenance. See “Monthly inspection.”

**⚠ WARNING**

**Do not remove drain plug until air has been released from tank, or air cannon will discharge.**

3. After all air is released, remove drain plug. Allow all moisture to drain from tank.
4. After all moisture is removed, apply pipe sealant to drain plug. Install drain plug on tank.

**⚠ CAUTION**

**Do not weld tank. Paint in tank will melt and welding will violate ASME code. If tank is damaged or leaking, do not use air cannon until tank is replaced or repaired by Martin Engineering.**

5. Inspect air cannon mounting area for rust and loose screws, welds, and bolts. Replace, tighten, or weld as necessary.
6. Inspect tank, valve assembly, piston, and discharge nozzle for damage. Replace or return to Martin Engineering for repair as necessary.
7. Inspect restraining cable for wear. Replace if worn.
8. Inspect quick exhaust valve for loose screws or dirt. Tighten and clean as necessary. Inspect rubber diaphragm in quick exhaust valve. If worn, replace. (Repair kit available from Martin Engineering or representative.)
9. On units with electrical controls, inspect wires and connections. Repair or replace wires to NEC Handbook standards as necessary.

**⚠ WARNING**

**Turn off and lock out/tag out air supply and energy source before blasting air cannon to prevent air cannon from refilling. Failure to do so could result in injury to personnel and damage to equipment.**

**Do not open door/port or enter storage vessel before turning off compressed air source, locking out controls, purging line pressure, and venting air from tank.**

**⚠ DANGER**

**Shutting off lockout ball valve will purge all cannons connected to that valve and cause the air cannons to fire immediately. Do not shut off the valve until you make sure no one is in the structure or near its discharge. Flying debris from the cannons’ blast can kill you.**

*Air cannon valve assembly replacement*

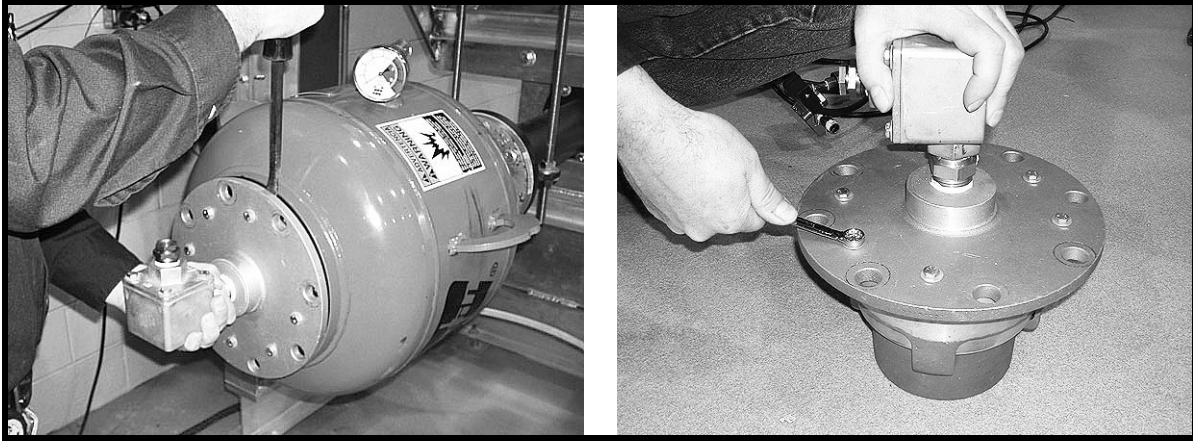




1. De-energize the air cannon; completely drain all compressed air energy from tank.
2. Close safety slide gate if equipped with one. If your air cannon has an open discharge port, make sure you are safely isolated from free-flowing material or hazards inside the discharge area.



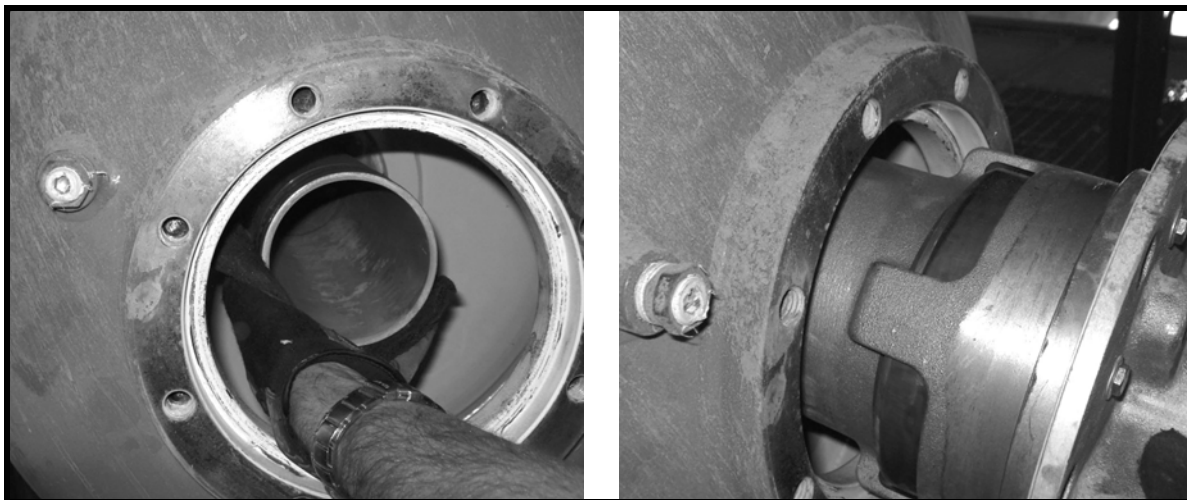
3. Disconnect air line.
4. Remove the 8 bolts on the valve assembly.



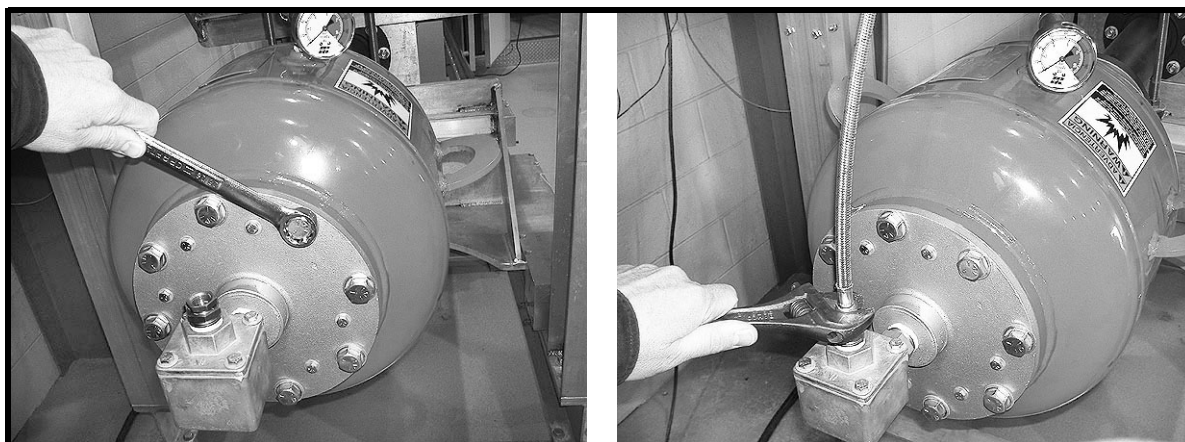
5. Remove valve from tank. A small pry bar can help if O-rings are dry.
6. With the valve assembly removed, the rebuild can be done in the maintenance shop (see list of rebuild kits in “Part Numbers”).



7. When replacing the valve assembly on the tank, a small amount of grease will secure the O-ring. Make sure O-ring stays secure during the reassembly.
8. Place a small amount of grease on the discharge tube O-rings.
9. Inspect interior of air cannon. Make sure discharge tube has a clean and smooth surface for air-tight O-ring seal.



10. Inspect interior of air cannon. Make sure discharge tube has a clean and smooth surface for air-tight O-ring seal.
11. Mate the valve assembly back onto discharge tube, making sure not to pinch O-ring.



12. Install the 8 cap screws and compression washers.
13. After the valve assembly is bolted to tank, re-connect air lines. Ensure there are no leaks or loose connections.
14. If present, pin the Martin<sup>®</sup> Thermo Safety Shield back to open position.
15. Slowly pressurize air cannon. Check for leaks from any pinched O-rings.
16. When air cannon is pressurized and ready for operation, test fire the cannon.
17. The Martin<sup>®</sup> Typhoon Air Cannon is now ready for operation.

**NOTE**

Watch air gauge when air cannon is fired. Needle should drop to “zero” instantly. Exhaust ports should be pointing down so that no dirt can fall into exhaust valve.

# Troubleshooting

If the air cannon will not charge or discharge, or if the electrical solenoid valve will not operate, find the possible cause(s) in the appropriate chart below and follow the steps in the “Solution” column.

<b>Problem: Air Cannon Will Not Charge</b>	
<b>Cause</b>	<b>Solution</b>
Shut-off valve not turned on.	Turn on valve.
Quick exhaust valve installed improperly.	Make sure air supply line is connected to correct ports.
Quick exhaust valve dirty or damaged.	Clean or replace quick exhaust valve or valve piston.
Tank inspection plug(s) loose.	Tighten plug(s).
Tank punctured or cracked.	Replace tank.
Restriction in air supply line.	Remove restriction and check air filter/regulator/lubricator.
Electrical solenoid valve is not #125, 3-way normally-opened valve.	Replace valve.
Compressor source.	Make sure compressor is on and air line has pressure.
Ball valves open.	Check that ball valves are fully open to each cannon.
Filter/Regulator.	Factory-set at zero. Rotate clockwise to increase. Check plumbing air flow direction (indicated with an arrow).
Solenoid plumbing.	Check connections. Port 1 = inlet; Port 2 = outlet; Port 3 = exhaust.
Tank plugs missing.	Check to see whether any NPT ports on tank have been left open.

<b>Problem: Air Cannon Will Not Discharge</b>	
<b>Cause</b>	<b>Solution</b>
Quick exhaust valve improperly installed.	Make sure air supply line is connected to correct ports.
Quick exhaust valve dirty or damaged.	Clean or replace quick exhaust valve or valve piston.
Quick exhaust valve exhaust port blocked.	Open exhaust port to atmosphere.
Electrical solenoid valve is not #125, 3-way normally-opened valve.	Replace valve.
Manual or solenoid valve not installed properly.	Check all connections from tank to air supply. Make sure pipes are 1/2-in. NPT.
Supply line too large diameter.	Replace with 3/8-in. tubing for solenoid cabinet installation, and 1/2-in. pipe for all others.
Solenoid valve located too far away from quick exhaust valve.	Move to within 25 ft (7.62 m) on 3/8-in. tubing application, and 15 ft (4.57 m) on 1/2-in. tubing application.
Valve full of foreign matter.	Disassemble and clean out.

<b>Problem: Air Cannon Will Not Discharge</b>	
<b>Cause</b>	<b>Solution</b>
Solenoid plumbing.	Make sure plumbing is correct. Check for leaks. Check plumbing direction.
Solenoid electrical.	Make sure wiring is connected. Check that voltage is correct. Check for signal.
Tank pressure.	Check air gauge.
Blocked discharge—cannon makes “sputtering” sound when discharging; air gauge drops slowly or does not go all the way to zero.	Remove blockage.
Operating pressure is low.	Check that operating pressure is at 80–100 psi.
Control signal too short.	Make sure that solenoid stays on long enough for correct operation (1 second).
Air gauge not working correctly.	Be sure that air gauge drops to “0” psi in less than ½ second.

<b>Problem: Electrical Solenoid Valve Will Not Operate</b>	
<b>Cause</b>	<b>Solution</b>
Defective solenoid valve. (Check the valve by connecting to another output. Low resistance across coil indicates good valve.)	Remove piping from exhaust port of solenoid. If this causes solenoid to operate properly, use larger piping or remove restriction. Replace valve.
Broken lead to solenoid valve.	Replace wire to NEC Handbook Standards.
Defective timer.	Replace timer.

## **Part Numbers**

---

This section provides product names and corresponding part numbers for Martin<sup>®</sup> Typhoon Air Cannons and related equipment. Please reference part numbers when ordering parts. Part numbers for accessory equipment not listed here are available from Martin Engineering or representative.

### ***Air cannons***

#### **Martin<sup>®</sup> Typhoon Air Cannon Assembly:**

**Martin<sup>®</sup> Typhoon Air Cannon 35 L:** P/N 38005-35FD

**Martin<sup>®</sup> Typhoon Air Cannon 70 L:** P/N 38005-70FD

**Martin<sup>®</sup> Typhoon Air Cannon 150 L:** P/N 38005-150FD

### ***Air cannon repair parts***

**Martin<sup>®</sup> Typhoon Air Cannon Valve Assembly:** P/N 38071-FD

**Pressure Relief Valve:** P/N 21680

**Air Pressure Gauge:** P/N 34842

**Safety Cable Kit:** P/N 32271

**Main Piston Rebuild Kit:** P/N 38426-FD

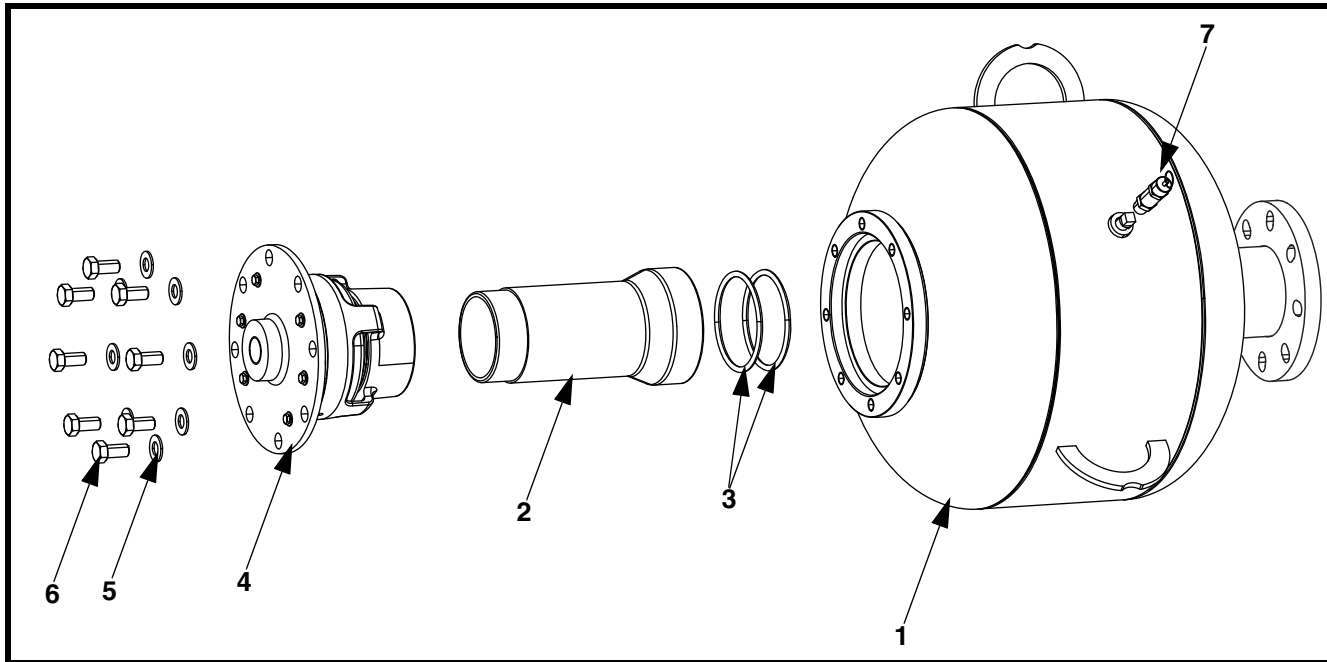
**Quick Exhaust Valve (QEV):** P/N 35669

**Quick Exhaust Valve (QEV) Rebuild Kit:** P/N 36060

### ***Miscellaneous***

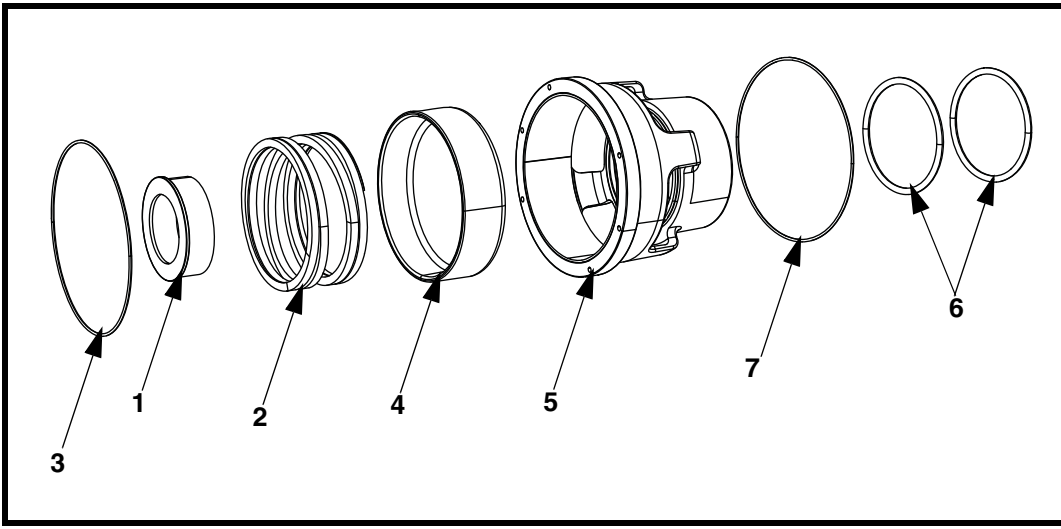
**Air Motor Oil:** P/N 14766

Contact Martin Engineering for information on other repair parts.



**Figure 16. Martin® Typhoon Air Cannon Assembly Parts List**

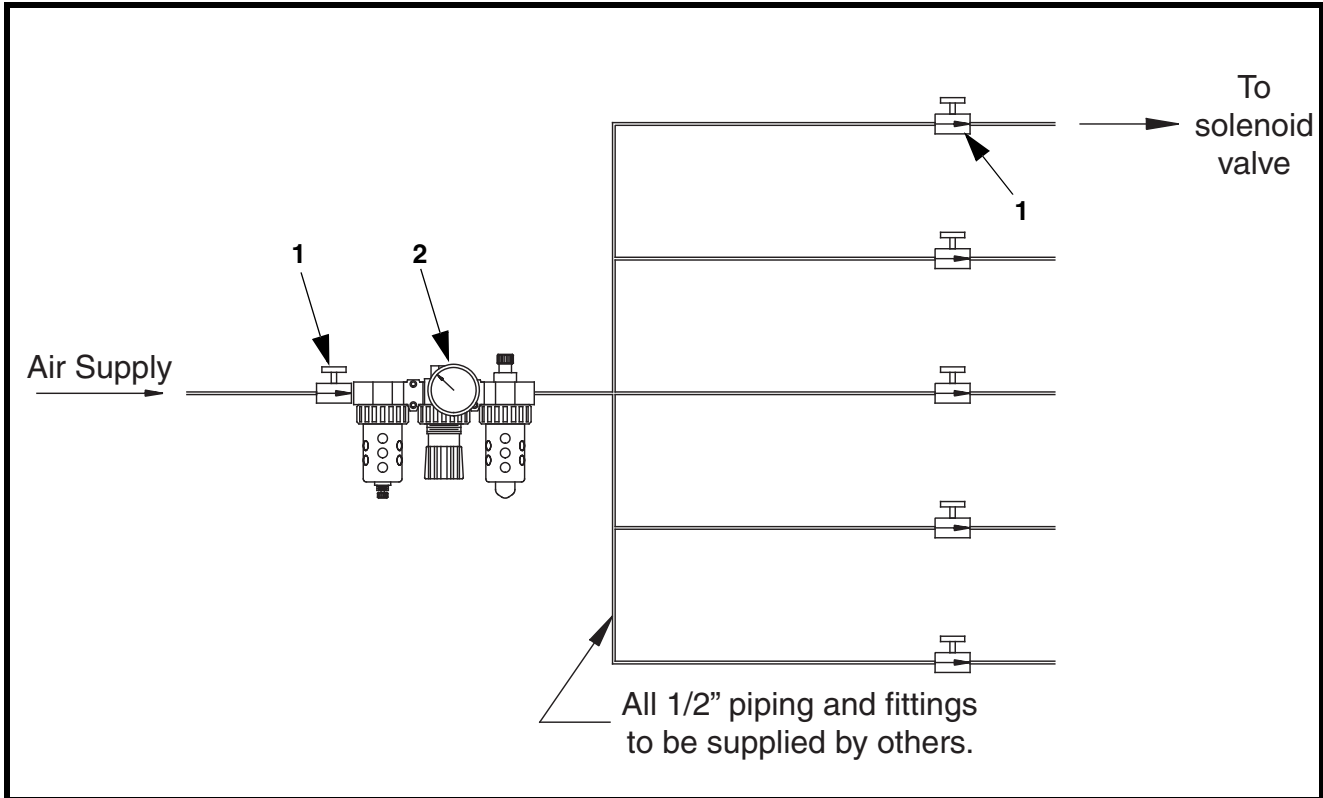
Item	Description	Part No.	Qty
1	Tank (35 Liter)	38181-35	1
	Tank (70 Liter)	38181-70	
	Tank (150 Liter)	38181-150	
2	Aluminum Pipe Coupling	38602	1
3	O-ring #425, 4.50 ID x .275 CS	20771-S	2
4	Valve Cap Assembly	38071-FD	1
5	Washer Compression 5/8	11752	8
6	Screw, HHC 5/8-11NC x 1-1/4 ZP	15798	8
7	Valve Safety 1/2-NPT Brass	21680	1



**Figure 17. Martin® Typhoon Air Cannon Valve Assembly Parts List, P/N 38426-FD**

<b>Item</b>	<b>Description</b>	<b>Qty</b>
1	Urethane Bumper	1
2	Spring, Compression	1
3	O-ring #166, 6.737 ID x .094 CS	1
4	Piston	1
5	Basket	1
6	O-ring #425, 4.500 ID x .275 CS	2
7	O-ring #169, 7.487 ID x .103 CS	1





**Figure 18. Air Cannon Air Fill Kit, P/N 37890-XX\***

Item	Description	Part No.	Qty
1	Valve Ball Lockout/Shutoff 1/2 NPT	32284-01	Table I
2	FRL 1/2 NPT	14760	1

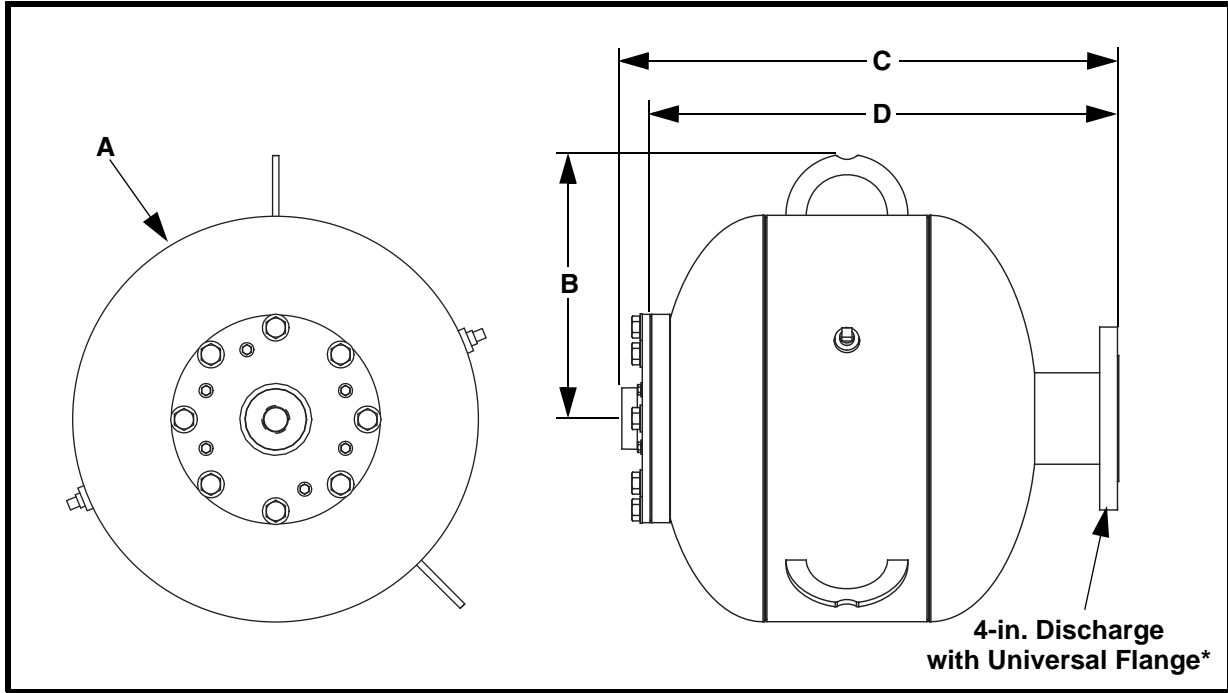
\*XX indicates the number of air cannons on the system

**Table I. Air Cannon Air Fill Kit Quantities**

P/N	Qty Item 1
37890-01	1
37890-02	3
37890-03	4
37890-04	5
37890-05	6
37890-06	7
37890-07	8
37890-08	9
37890-09	10
37890-10	11



**Appendix A**  
**Martin® Typhoon Air Cannon Specifications**



\*Fits ANSI and DIN bolt patterns.

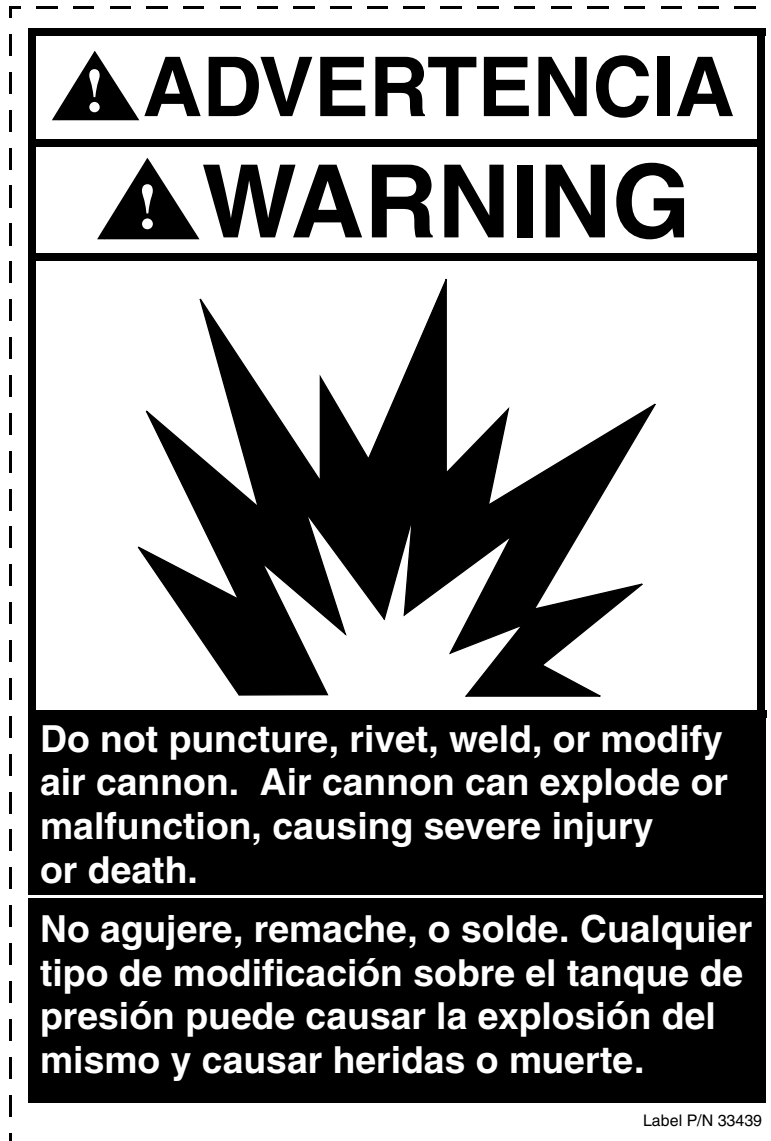
**Martin® Typhoon Air Cannon**

Dimensions--in. (mm)				
P/N	A	B	C	D
38005-35FD	16.00 (406)	10.95 (278)	22.44 (570)	21.00 (533)
38005-70FD	20.00 (508)	12.95 (329)	24.44 (621)	23.00 (584)
38005-150FD	24.00 (610)	14.95 (380)	32.19 (818)	30.75 (781)

**Air Cannon Air Volume in Cubic Feet (Liters) Free Air**

Air Pressure psi (bar)	38005-35FD ft <sup>3</sup> (L)	38005-70FD ft <sup>3</sup> (L)	38005-150FD ft <sup>3</sup> (L)
0	1.2 (35)	2.4 (70)	5.3 (150)
40 (2.8)	4.6 (130)	9.2 (260)	19.7 (558)
50 (3.4)	5.4 (153)	10.8 (308)	23.3 (660)
60 (4.1)	6.2 (176)	12.5 (355)	26.9 (762)
70 (4.8)	7.1 (201)	14.2 (403)	30.5 (864)
80 (5.5)	7.9 (224)	15.9 (450)	34.1 (966)
90 (6.2)	8.8 (249)	17.6 (498)	37.8 (1020)
100 (6.9)	9.6 (272)	19.2 (546)	41.4 (1172)
110 (7.6)	10.4 (294)	20.9 (593)	45.0 (1274)
120 (8.3)	11.3 (320)	22.6 (641)	48.6 (1376)

**Appendix B**  
**Martin<sup>®</sup> Typhoon Air Cannon Labels**



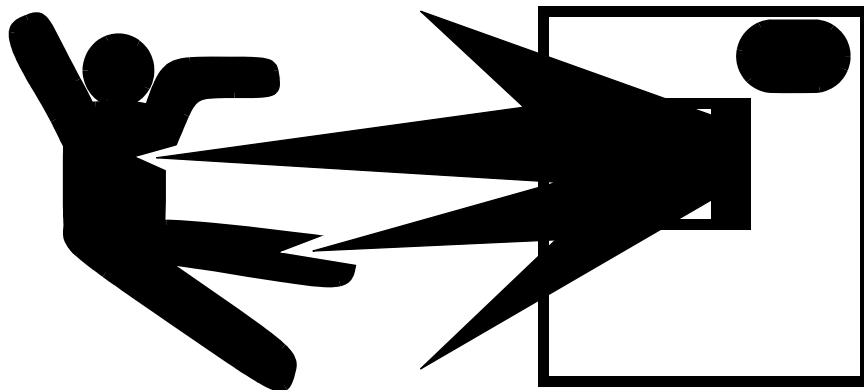
**Air Cannon Warning Label, P/N 33439**



**Martin® Serial/Model Number Label, P/N 21313**

**! ADVERTENCIA**

**! WARNING**



**Air cannon(s) are mounted on this structure.**

**DO NOT OPEN this door until you:**

- 1. Lock out/tag out all power.**
- 2. Purge line pressure.**
- 3. Vent air from all cannons.**

**Opening this door while cannons are operational can kill you.**

**Detonador(es) neumaticos son montados en esta estructura.**

**NO ABRA la puerta sin haber:**

- 1. Bloquee/rotule todas fuentes de energía.**
- 2. Purga la presión de línea.**
- 3. Ventile el aire de los detonadores.**

**Abrir esta puerta mientras los cañones están operando puede ser mortal!**

Label P/N 31913

**Air Blast Warning Label, P/N 31913**

○

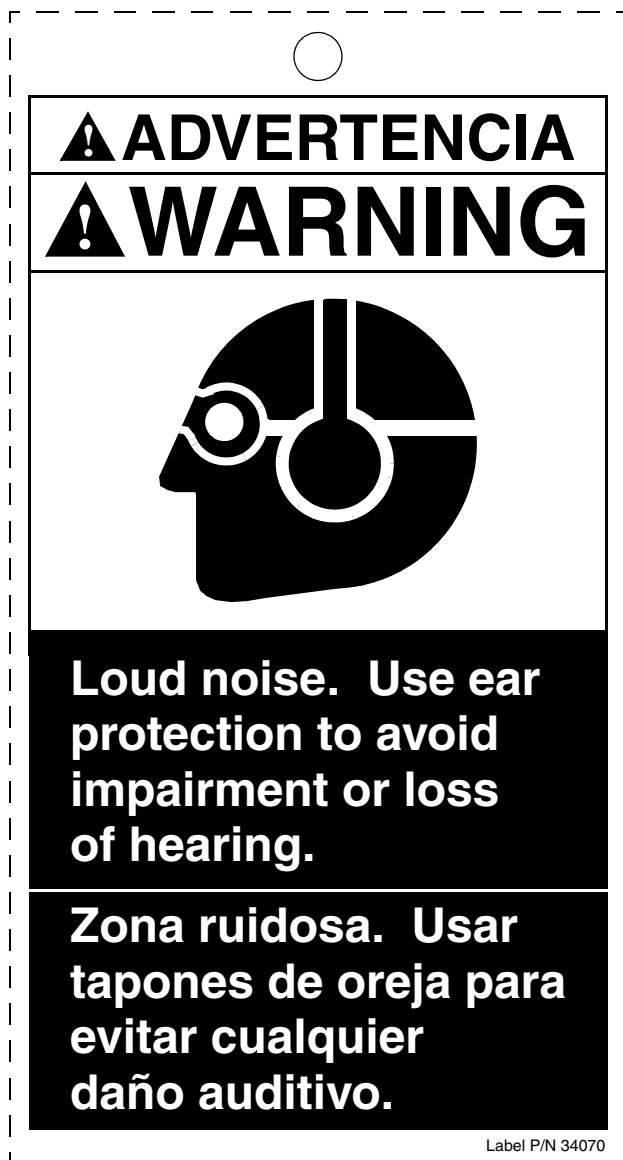
<b>⚠ ADVERTENCIA</b>
<b>⚠ WARNING</b>

<b>Shutting off the lockout ball valve will cause the air cannons on this structure to fire immediately. DO NOT shut off the valve until you make sure no one is in the structure or near its discharge. Flying debris from the cannons' blast can kill you!</b>
<b>Cerrar la válvula de cierre estilo bola causará que los cañones de aire en la tolva disparen inmediatamente. Antes de cerrar la válvula, asegúrese que nadie este dentro de la tolva o cerca de la descarga de la tolva. Escombros volantes pueden causar heridas serias o muerte.</b>

Label P/N 35146

Lockout Valve Warning Tag, P/N 35146



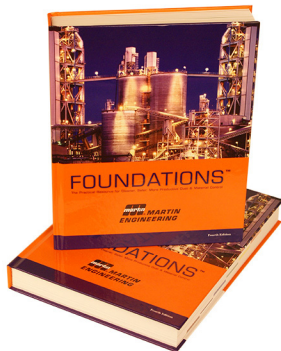


**Loud Noise Warning Tag, P/N 34070**

## Notes

*Any product, process, or technology described here may be the subject of intellectual property rights reserved by Martin Engineering Company. Trademarks or service marks designated with the ® symbol are registered with the U.S. Patent and Trademark Office and may be proprietary in one or more countries or regions. Other trademarks and service marks belonging to Martin Engineering Company in the United States and/or other countries or regions may be designated with the “TM” and “SM” symbols. Brands, trademarks, and names of other parties, who may or may not be affiliated with, connected to, or endorsed by Martin Engineering Company, are identified wherever possible. Additional information regarding Martin Engineering Company’s intellectual property can be obtained at [www.martin-eng.com/trademarks](http://www.martin-eng.com/trademarks).*

# Problem Solved™ GUARANTEED!



*For nearly 20 years, Martin Engineering's Foundations™ Books have taught industry personnel to operate and maintain clean and safe belt conveyors. The Foundations™ Book, fourth edition, focuses on improving belt conveyors by controlling fugitive material. "The Practical Resource for Total Dust and Material Control," is a 576-page hard cover volume that provides information of value to industries where the efficient handling of bulk materials is a key to productivity and profitability.*

*Expanding upon the book, our Foundations™ Training Program addresses the design and development of more productive belt conveyors, and is offered in three customizable seminars. Attendees gain a better understanding of conveyor safety and performance, helping to justify upgrade investments and increase profitability.*



**Martin Engineering Australia Pty Ltd.**  
20 Ern Harley Dr - Burleigh Heads, QLD, 4220 - Australia  
1300 627 364  
[www.martin-eng.com.au](http://www.martin-eng.com.au)

