

AIRSPADE®

PNEUMATIC SOIL EXCAVATION



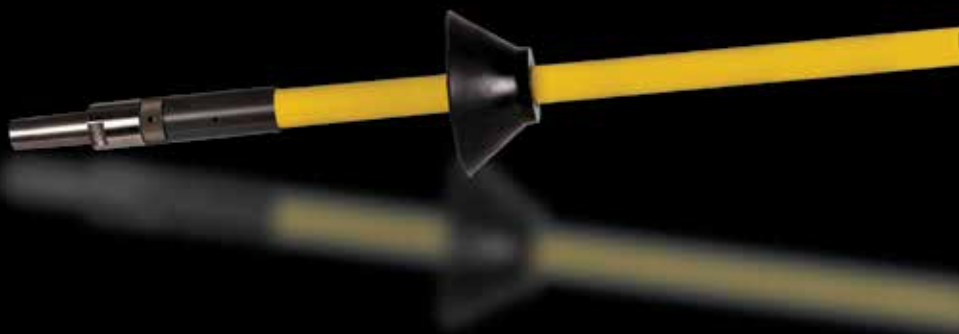
AIRSPADE 2000

OPERATOR'S MANUAL

TABLE OF CONTENTS

Technical Specifications	3
General Information	4
Safety Instructions	5
Assembly Instructions	6
Operating Instructions	7-9
Components & Accessories	10-12
Parts Disassembly and Reassembly	13
Products, Parts & Accessories List	14
Limited Warranty	15

AirSpade® is a registered trademark of Guardair Corporation.



Always wear eye and ear protection when operating air tools and related equipment.

AIRSPADE SERIES 2000

- **Overall Length** 60.5 inches (154 cm)
- **Weight** 7.1 pounds (3.2 kg)
- **Nozzle** Extra-hardened stainless steel
- **Nozzle Flow Rates**

25 scfm	(0.7m ³ /min)
60 scfm	(1.7m ³ /min)
105 scfm	(3.0m ³ /min)
150 scfm	(4.2m ³ /min)*
225 scfm	(6.4m ³ /min)
- **Operating Pressure** 90 psi (6.2 bar)
- **Barrel** Insulated fiberglass
- **Inlet** 3/4" FNPT

*Standard Model



AirSpade is covered by U.S. Patents 5,782,414, D408,830, and D435,207.

GUARDAIR CORPORATION'S AirSpade Series 2000 is a compressed air-powered tool used for excavation of a wide variety of soils. AirSpade Series 2000 consists of an ergonomic pistol grip style handle, an insulated fiberglass barrel, and a patented supersonic nozzle. Typically powered by a portable tow-behind air compressor, the AirSpade Series 2000 provides a safe, powerful and efficient method of uncovering underground electric lines, pipes, and tree roots without harm. Capable of excavation where a shovel or backhoe cannot be used, AirSpade can be equipped with multiple nozzle sizes and a variety of extension lengths for optimum job performance.

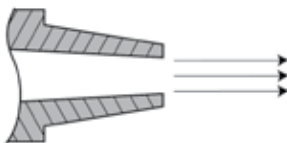
The heart of the AirSpade is the patented supersonic nozzle which produces a focused "laser-like" jet of air moving at approximately 1,200 mph (1,900 km/hr), or nearly twice the speed of sound. This supersonic air-jet penetrates voids in the soil and expands rapidly, therefore fracturing the soil. Unlike the hard cutting edges of shovels, picks, blades, or buckets, the air-jet is harmless to non-porous items such as tree roots, buried pipes, or cables. Excavating with AirSpade is much easier and many times faster than hand excavation.

The AirSpade supersonic air-jet outperforms "homemade tools" featuring a pipe nipple or a crimped orifice. Air flow from these tools expands to atmosphere in an unfocused, complex manner while the supersonic air jet delivers significantly more kinetic energy and more focused momentum. In practical terms the AirSpade does more work by moving more material, and harder material, in a shorter period of time.

AIRSPADE PATENTED SUPERSONIC NOZZLE

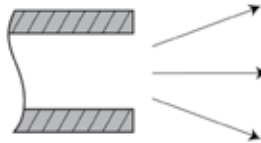
AirSpade's patented supersonic nozzle turns compressed air into a high-speed, laser-like jet moving at twice the speed of sound – 1,200 mph. All of the energy and momentum of air moving at approximately Mach 2 is focused into the soil, dislodging it in a fraction of a second. (Fig.A) The result is faster, safer, and more efficient soil excavation.

(Fig.A)



**FOCUSED AIR FLOW FROM
AirSpade SUPERSONIC NOZZLE**

(Fig.B)



**UNFOCUSED AIR FLOW FROM
IMPROPERLY DESIGNED NOZZLE**

Air exiting from an improperly designed nozzle diffuses outward 3 to 4 times wider than the air-jet from the patented AirSpade supersonic nozzle. (Fig.B).

ALWAYS

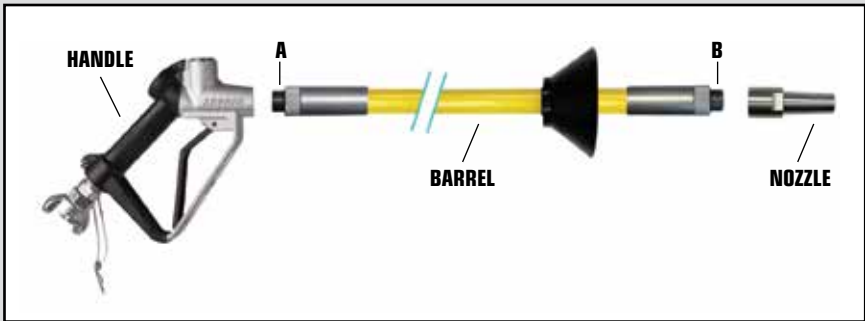
- Wear appropriate protective work clothing and equipment. Cut and puncture resistant gloves, approved safety glasses with side shields and/or face protection, and protective earplugs or earmuffs should be worn while operating the AirSpade. Eye protection should comply with ANSI Z87.1-2015. Ear protection should provide a NRR of at least 20 dB.
- Wear approved respiratory protection when working in extremely dusty conditions.
- Wear approved, electrically insulated footwear and gloves if working near underground electrical lines.
- Ensure that all personnel near the area being excavated are aware that AirSpade is being used and that they wear appropriate personal protection as indicated.
- Protect surfaces that could be chipped, or damaged by dislodged soil or rock particles adjacent to the excavation work area by using suitable drop cloths, screens, or other means.
- Check the AirSpade for loose or damaged parts prior to use. Tighten, repair, and/or replace as necessary.
- Inspect hoses for leakage, kinking, abrasion, corrosion, or any other signs of wear or damage. Worn or damaged hose assemblies should be replaced immediately.
- Check that the air compressor is delivering the specified pressure to operate the AirSpade.
- Anticipate that the AirSpade tool will push upwards when using the 45 degree adapter. Brace against the upwards force by holding the tool in accordance with the operating instructions. See page 13.



- Operate the AirSpade until the operating and safety instructions are read and fully understood.
- Make any modifications to the AirSpade.
- Tie, tape, or otherwise lock or fasten the trigger in the "ON" position.
- Point, or aim the AirSpade at any person during operation.
- Allow hands, feet, or any body parts near the AirSpade nozzle tip during operation.
- Use the AirSpade as a pry bar.



- Read and follow the directions below to properly assemble the AirSpade.
- Apply a small amount of commercial grade anti-seize compound on the barrel threads (A & B) to prevent galling. Screw the nozzle into the barrel by turning clockwise. Hand-tighten only.
- Screw the barrel into the handle by turning clockwise. Hand-tighten only.



User assumes full responsibility to read and understand these instructions prior to operation. Failure to adhere to these instructions can result in personal injury. User should also have operating knowledge of the air compressor to which the tool is attached.

BEFORE OPERATION

- Match the air compressor size to the AirSpade nozzle on the tool. To properly size the air compressor, make sure the air compressor flow rate is equal to, or greater than, the nozzle flow rate.
- Check the air compressor for sufficient fuel and oil levels.
- Make sure the air compressor is secure from accidental motion.
- Close the air supply valve on the air compressor.

- Make sure all air supply hose connections are secure and safety clips are installed.

- Use air supply hose with a pressure rating equal to, or greater than, 150 psig.

- Use air supply hose of an appropriate diameter and length. (See Table)

Maximum Recommended Air Supply Hose Length (Feet)			
Nozzle Flow (scfm)	3/4" ID	1" ID	1 1/4" ID
25	4,750	≤5,000	≤5,000
60	900	3,460	≤5,000
105	240	1,110	3,350
150	110	520	1,730
225	40	220	880

STARTING

- Start the air compressor according to the manufacturer's instructions.
- The air compressor should build pressure until 100 – 120 psig is shown on the air compressor pressure gauge.
- Make sure that the AirSpade is turned off. Point the nozzle away from all personnel or loose objects that could become airborne. Open the air supply valve on the air compressor.
- Securely hold the AirSpade. Point the nozzle up and away from all personnel and any loose objects, and depress the trigger. Read the air compressor pressure gauge and the pressure gauge on the tool. During operation the air pressure gauge on the tool should read between 80 and 100 psig (5.5 and 6.9 bar). If not, adjust the output pressure of the air compressor.

EXCAVATION PROCEDURES

- For most excavations the best performance is achieved by holding the AirSpade nozzle at approximately a 45 degree angle from horizontal and about 1 inch away from the surface to be excavated.
- Depending on the soil type, the AirSpade should be directed above the surface to be excavated at a rate of approximately 1 to 2 feet per second (0.3 to 0.6 meters per second).
- Except in very hard and compacted clays, dwelling on the same spot tends to reduce the rate at which material is excavated and can increase the amount of material blown away from the excavation site.
- Watering the work area ahead of time can often be helpful. Watering reduces airborne dust if the soil is extremely dry. It also reduces the soil strength making digging easier.
- For small diameter holes, position the AirSpade barrel perpendicular to the ground with the nozzle close to the surface. Depress the trigger, and slowly thrust the tool into the soil. When resistance is met, slowly withdraw the AirSpade and then reinsert. This procedure allows loose soil at the bottom of the hole to exit upwards. Reinsert the nozzle and repeat the above procedure until the desired depth of hole is reached.
- When boring a small diameter hole, or when plunging the AirSpade into loose soil, the tendency to expose the operator to blown back material is increased. The adjustable dirt shield should be positioned close to the ground to deflect airborne material away from the operator.
- For large diameter holes, position the AirSpade at an angle between 30° and 45° from the horizontal. Depress the trigger and move the AirSpade back and forth across the footprint of the excavation to loosen the soil to a depth of several inches. Each layer of loose soil should then be removed with a shovel or vacuum. Repeat the procedure until the desired depth is reached.
- For shallow, wide excavations, position the AirSpade at an angle between 30° and 45° from the horizontal. Depress the trigger, move the nozzle from side to side the desired width, and blow the loosened soil ahead of the nozzle. Continue until the excavation is completed to the required length.

- For deeper excavations or trenches loosen the soil in layers of several inches. Remove the soil with a shovel or vacuum. Repeat the procedure until the desired depth is reached.
- Excavation rates will vary depending upon soil composition, soil compaction, and the air delivered from the AirSpade nozzle. **(See Table)**
- Use a portable (collapsible) barrier or fence constructed from plywood, or canvas cloth, to keep dislodged soil confined to the working area.

Soil Excavation Rates	
Nozzle Flow (scfm)	Soil Excavation Rate (cubic ft / min)
25	0.4 to 0.9
60	0.7 to 1.1
105	0.9 to 1.5
150	1.2 to 1.8
225	1.7 to 2.3

SHUT DOWN

- Turn off the air compressor air supply valve.
- Shut down the air compressor.
- Securely hold the AirSpade. Point the nozzle up and away from all personnel and any loose objects, and depress the trigger. Continue to depress the trigger until all compressed air from the tool and hose is fully expelled and the air pressure gauge on the AirSpade reads "0".
- It is now safe to disconnect the air supply hose. Store the AirSpade as desired.

MAINTENANCE

- As with any professional grade tool, the AirSpade requires regular care to ensure proper operation. Prior to each use, inspect the tool for any loose or visibly damaged parts. Tighten or replace worn parts as required. Brush off dirt or other foreign material from around the trigger and valve stem areas. Periodically apply light oil or lubricant (e.g. WD40) to the exposed valve stem to ensure smooth operation.

NOZZLE

- The AirSpade nozzle can be unscrewed from the barrel by turning counter-clockwise. In the event of a tighter than normal connection, flats are provided on the nozzle for wrench application. Before re-installing the nozzle, remove any dirt or foreign material from the threads and o-ring, and apply a small amount of commercial grade anti-seize compound on the threads to prevent galling. Screw the nozzle into the barrel by turning clockwise. Hand-tighten only.

BARREL

- The fiberglass barrel can be unscrewed from the handle by turning counter-clockwise. In the event of a tighter than normal connection, a spanner wrench may be used on the barrel if necessary. Before re-installing the barrel into the handle, remove any dirt or foreign material from the threads and o-ring, and apply a small amount of anti-seize compound on the threads to prevent galling. Screw the barrel into the handle by turning clockwise. Hand-tighten only.

EXTENSIONS

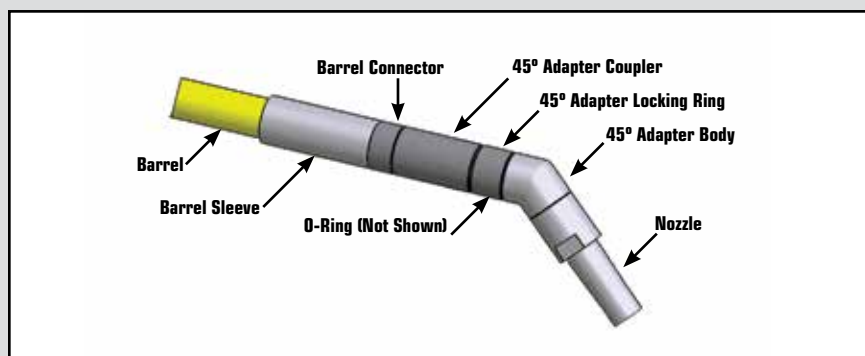
- Extensions provide the ability to extend the reach of the AirSpade into deeper holes or trenches. To install an extension, first remove the nozzle. Apply a small amount of anti-seize compound on the threads of the barrel, then attach the extension to the barrel by screwing it into the barrel. Turn clockwise and hand-tighten only. Apply a small amount of anti-seize compound on the threads of the extension, then screw on the nozzle. Hand-tighten only.



45° ADAPTER



- The 45° adapter enables the AirSpade to operate in tight locations where obstructions do not allow the use of a straight barrel. It can be installed by hand with no tools required. Remove the existing nozzle from the barrel. Ensure the 45° adapter locking ring is shouldered against the 45° adapter body and the 45° adapter coupler is snug against the o-ring. Clean the threads and the o-rings on the barrel and on the 45° adapter assembly and apply anti-seize compound to the threads of both. Screw the 45° adapter assembly onto the barrel via the coupler. Hand-tighten only. Screw the nozzle onto the other end of the 45° adapter. Hand-tighten only. To lock the adapter into position, shoulder the locking ring against the coupler. Do not thread 45° adapter into AirSpade handle.



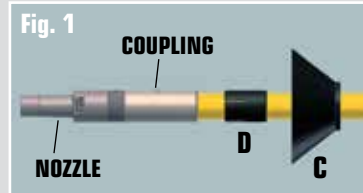
CAUTION: When using the 45° adapter, compressed air exiting the nozzle will force the tip of the tool away from the direction the nozzle is aimed. To prevent this from occurring, the operator should place the free hand at least midway down the barrel. Grip the barrel tightly to brace the tool against the force produced by the exiting compressed air.



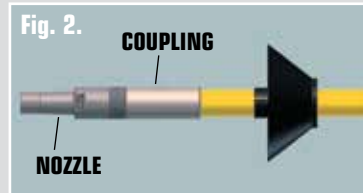
SLIDING DIRT SHIELD



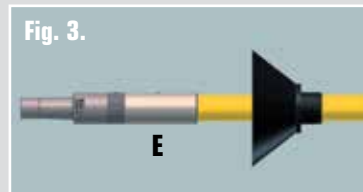
- The sliding dirt shield is made up of two components: the locking sleeve (A) and rubber deflector (B). One end of the locking sleeve has 4 slots; the other end is solid.
- To install, slide the rubber deflector over the nozzle and coupling into position (C) on the barrel. Separate the locking sleeve and clamp over the barrel in position (D). Make sure the slots are closest to the nozzle. (Fig.1)



- Slide the rubber deflector so that it is positioned over the solid end of the locking sleeve. The locking sleeve and rubber deflector assembly can now slide freely up and down the barrel shaft. (Fig.2)



- To lock the sliding dirt shield in position, slide the assembly to the desired position on the barrel. Then firmly push the rubber deflector over the slotted end of the locking sleeve. (Fig.3)



TOOLS NEEDED

- 1/2" square drive
- PTFE thread sealant tape
- Pick or flathead screwdriver
- 15/16", 6-point socket

Parts List

Parts List	
A	Handle Assembly
B	Gauge
C	Gauge Seal
D	Valve Cap
E	Spring
F	Valve Seal
G	Valve Stem

**INSTRUCTIONS****REPLACING PRESSURE GAUGE**

- Step 1:** Remove gauge seal with pick or small flathead screwdriver.
- Step 2:** Remove pressure gauge with 15/16" socket and discard.
- Step 3:** Apply thread sealant tape to threads of new pressure gauge — do not block air inlet of the pressure gauge.
- Step 4:** Thread new pressure gauge into handle and tighten with 15/16" socket. Do not over tighten.
- Step 5:** Insert new gauge seal.

REPLACING VALVE COMPONENTS

- Step 1:** Remove valve cap with 1/2" square drive.
- Step 2:** Remove and discard the spring, valve seal, and valve stem.
- Step 3:** Clean and inspect valve stem and bronze bushing.
- Step 4:** Apply lubrication (included) to the new valve stem and insert into the handle.
- Step 5:** Insert the new seal with the black seal face facing downwards.
- Step 6:** Insert the new spring.
- Step 7:** Apply thread sealant tape to the threads of the existing valve cap.
- Step 8:** Use 1/2" square drive to thread valve cap into the handle. Firmly tighten.

PRODUCTS, PARTS & ACCESSORIES LIST

Part #	Description
HT114	AIRSPADE 2000 105 CFM CONSTRUCTION KIT
HT106	AIRSPADE 2000 150 CFM CONSTRUCTION KIT
HT102	AIRSPADE 2000 225 CFM CONSTRUCTION KIT
HT142	AIRSPADE 2000 105 CFM ARBOR/LANDSCAPE KIT
HT107	AIRSPADE 2000 150 CFM ARBOR/LANDSCAPE KIT
HT109	AIRSPADE 2000 225 CFM ARBOR/LANDSCAPE KIT
HT108	AIRSPADE 2000 TRENCH RESCUE KIT
HT134	AIRSPADE 2000 60 CFM WITH 4 FT BARREL
HT139	AIRSPADE 2000 105 CFM WITH 4 FT BARREL
HT116	AIRSPADE 2000 150 CFM WITH 3 FT BARREL
HT130	AIRSPADE 2000 150 CFM WITH 4 FT BARREL
HT138	AIRSPADE 2000 225 CFM WITH 4 FT BARREL
HT126	25 CFM NOZZLE
HT125	60 CFM NOZZLE
HT156	105 CFM NOZZLE
HT123	150 CFM NOZZLE
HT127	225 CFM NOZZLE
HT119	45 DEGREE ANGLED ADAPTER
HT131	AIRSPADE 3 FT BARREL WITH DIRT SHIELD
HT118	AIRSPADE 4 FT BARREL WITH DIRT SHIELD
HT121	AIRSPADE 3 FT EXTENSION WITH COUPLER
HT154	AIRSPADE 4 FT EXTENSION WITH COUPLER
HT120	AIRSPADE 5 FT EXTENSION WITH COUPLER
HT180	AUXILIARY HANDLE ASSEMBLY
HT117	AIRSPADE 2000 HANDLE ASSEMBLY
HT150	AIRSPADE 2000 HANDLE REPAIR KIT - PRE 2010 MODELS
HT150-1	AIRSPADE 2000 HANDLE REPAIR KIT - 2010 to 2020 MODELS
HT150-2	AIRSPADE 2000 HANDLE REPAIR KIT - CURRENT MODELS
HT57	10 FT x 1" ID LIGHTWEIGHT AIR SUPPLY HOSE
HT111	25 FT x 1" ID LIGHTWEIGHT AIR SUPPLY HOSE
HT112	50 FT x 1" ID LIGHTWEIGHT AIR SUPPLY HOSE
HT113	50 FT x 1" ID STANDARD AIR SUPPLY HOSE
HT132	STORAGE CASE
HT136	FACE SHIELD & HEADGEAR

Limited Warranty

AirSpade Series 2000 is warranted by GUARDAIR CORPORATION (GUARDAIR) against defects in material and workmanship for a period of one year. Defective units will be replaced or repaired at the option of GUARDAIR. The warranty period begins at the date of shipment of the tool from GUARDAIR or from GUARDAIR'S authorized distributor.

This warranty shall not be in effect if the tool is subject to misuse, negligence, or accident, or if it is configured, or used in any manner inconsistent with the directions set forth in this operator's manual. Wear and tear from normal use is not covered under this warranty.

Any and all claims for warranty consideration must be coordinated through GUARDAIR. Do not return the unit or parts without prior authorization. Upon obtaining authorization, returned units or parts must be postage prepaid.

The purchaser's recovery for damages resulting from any and all causes whatsoever, including, but not limited to, breach of contract, breach of warranty, negligence or strict product liability will be limited to the replacement of the components of the tool with respect to which losses or damages are claimed, provided that GUARDAIR has been notified of any alleged defect within the warranty period.

IN NO EVENT SHALL GUARDAIR CORPORATION BE LIABLE TO THE PURCHASER OR ANY USER OF THE AIRSPADE, OR TO ANY OTHER PERSON OR ENTITY, FOR INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES INCLUDING THE COST OF PROVIDING SUBSTITUTE EQUIPMENT DURING PERIODS OF MALFUNCTION OR NONUSE AND DAMAGES FOR DELAY. THE WARRANTIES AND REMEDIES SET FORTH ABOVE ARE THE SOLE AND EXCLUSIVE WARRANTIES AND REMEDIES AVAILABLE. GUARDAIR CORPORATION SPECIFICALLY DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ALL OTHER WARRANTIES, WHETHER EXPRESS, IMPLIED OR STATUTORY.

GUARDAIR[®]
C O R P O R A T I O N

AIRVAC®

The Perfect Companion for AirSpade®

AirVac and AirSpade 2000 – the ideal combination to safely uncover sensitive tree roots and underground objects without harm.

Powered by a 185 cfm tow-behind compressor, AirVac is the mobile alternative to large, expensive vacuum trucks. Effectively vacuums up to 2 cubic ft/min of spoils including dirt, sand, gravel, small rocks, and muck.

- **Heavy-duty, all aluminum construction with 82 gallon tank**
- **24" x 16" dump door**
- **Removable, venturi vacuum engine assembly**
- **15" diameter pneumatic tires**
- **4" ID x 15 ft heavy-duty, lightweight vacuum hose**
- **4" ID x 4 ft clear plastic vacuum wand**



AIRSPADE®
PNEUMATIC SOIL EXCAVATION

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