

AIRSPADE®

PNEUMATIC SOIL EXCAVATION



AIRSPADE 2000
AIR EXCAVATION TOOL

EXCAVATION USING THE POWER OF COMPRESSED AIR

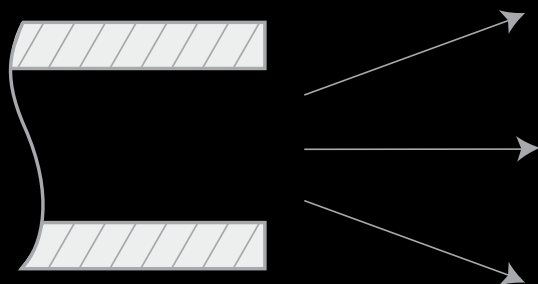
Soil is an unconsolidated assemblage of solid particles including clay, sand, and rock and sometimes organic matter. Voids between the particles are occupied by air and/or water. When compressed air is directed into soil at close range, air enters the voids where it expands, thereby fracturing the soil. Stronger, non-porous materials such as metal or plastic pipes, cables, or even tree roots are unaffected.



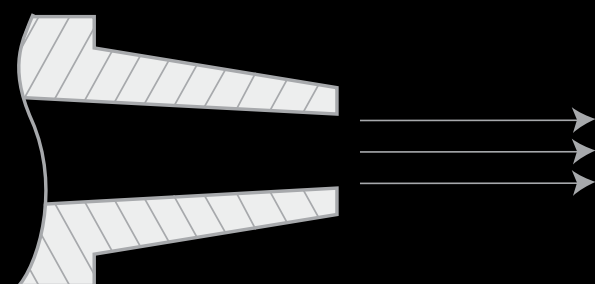
PATENTED SUPERSONIC NOZZLE

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

UNFOCUSED AIR FLOW FROM IMPROPERLY DESIGNED NOZZLE



FOCUSED AIR FLOW FROM AIRSPADE SUPERSONIC NOZZLE



Air exiting from an improperly designed nozzle diffuses outward rapidly to 3 to 4 times the area versus the focused air-jet from the patented AirSpade supersonic nozzle. With AirSpade, the result is faster, safer, more efficient soil excavation.



AirSpade 2000 Arbor/Landscape Kit shown above.

AirSpade® 2000 Arbor/Landscape Kit includes:

- AirSpade® 2000 handle with universal "Chicago style" coupling
- 4 ft barrel with dirt shield and 150 scfm nozzle
- 45 degree angled adapter
- 10 ft x 1" 1D lightweight air hose with universal "Chicago style" coupling
- Heavy duty locking storage case

AirSpade® 2000 Construction Kit includes:

- AirSpade® 2000 handle with universal "Chicago style" coupling
- 4 ft barrel with dirt shield and 150 scfm nozzle
- 3 ft extension and coupler
- 45 degree angled adapter
- 10 ft x 1" 1D lightweight air hose with universal "Chicago style" coupling
- Heavy duty locking storage case

AirSpade® 2000 Trench Rescue Kit includes:

- AirSpade® 2000 handle with universal "Chicago style" coupling
- 4 ft barrel with dirt shield and 150 scfm nozzle
- 45 degree angled adapter
- 10 ft x 1" 1D lightweight air hose with universal "Chicago style" coupling
- Additional 60 scfm nozzle
- Heavy duty locking storage case

THE INDUSTRY STANDARD

Today, thousands of AirSpades® are in use in arboriculture, utility, construction, and industrial applications worldwide. AirSpade is the tool of choice due to its fast, easy and non-destructive method of excavation.

APPLICATIONS



Arboriculture / Horticulture

Since its earliest trials in 1998 at Gainsborough Farms, KY, the AirSpade has become the premier air tool for advanced tree care. Leading arborists worldwide have evaluated and found multiple uses for the AirSpade including:

- *Aeration • Locating roots for utility line installation • Radial trenching • Root collar excavation*
- *Root damage investigation • Locating roots for pruning • Soil compaction reduction • Vertical mulching*
- *Transplanting / bare rooting • Checking adequacy of root structure before pruning*



Utility / Construction

When dealing with sensitive pipes and cables that are often punctured or damaged by traditional backhoes, the AirSpade offers an easy, fast, and non-damaging way to locate and excavate the area around them. In addition, AirSpade can create new holes or trenches to lay pipe or cable, and can be used in many other industrial and utility applications, including:

- *Utility locating and repair • Keyholing • Potholing for line location*
- *Crack, joint, and valve box cleaning • Roadwork*



Trench Rescue

The December 2005 issue of Underground Focus Magazine reports, "Every year in the United States, trenching accidents account for more than 5,000 serious injuries and between 50 and 100 deaths." According to Lt. Dave Adler of the Addison, IL Fire Department, a leading teacher of trench rescue training and safety; "When a worker is buried in a cave-in, a critical time clock starts and AirSpade can be an effective tool for their rescue."



AirSpade with AirSpade® Vac

Conventional excavation of hazardous materials can be slow and harmful. AirSpade, used in conjunction with the AirSpade Vac, makes environmental site remediation easy, fast and non-damaging. Capabilities include:

- *Uncover buried waste containers without fear of puncture*
- *Excavate tight places inaccessible to conventional backhoes*
- *Remove material in carefully controlled layers*

FREQUENTLY ASKED TECHNICAL QUESTIONS

IN WHAT TYPE OF SOIL WILL AIRSPADE® WORK?

Because of the focused air-jet generated from the supersonic nozzle, AirSpade works in most soils, including compacted soils, and hard clays. In general, AirSpade will not cut through rock. However, shales may be broken apart by AirSpade if the jet is directed between the laminations of the rock. Similarly, AirSpade will not dislodge hard frozen soil which tends to behave like pavement or concrete.

WHAT SIZE AIRSPADE NOZZLE SHOULD I USE?

This depends on the desired rate of soil excavation which is in turn dependent upon the air delivered from the AirSpade nozzle. Rates are summarized in the table below:

Soil Excavation Rates

Nozzle Size (scfm)	Soil Excavation Rates (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

WHAT SIZE AIR HOSE DO I NEED FOR THE AIRSPADE?

Generally a 1" ID air supply hose is recommended for use with the AirSpade.

WILL HIGHER PRESSURE MAKE THE AIRSPADE WORK BETTER?

All AirSpade nozzles are developed to operate optimally at 90 psig. Supplying higher pressure to a supersonic nozzle that has been optimized for 90 psig actually defocuses the air jet, thus degrading performance while consuming more air. For example, doubling the air pressure to 180 psig increases the air jet force by only 10%.

WHAT SIZE AIR COMPRESSOR DO I NEED TO USE THE AIRSPADE PROPERLY?

Portable air compressors have model numbers that are normally sized by the approximate air delivery in standard cubic feet per minute (scfm) at a gauge delivery pressure of 100 pounds per square inch (psig). For example, a 185 compressor will deliver 185 scfm at 100 psig. All AirSpade nozzles are rated at 90 psig and are designated by their air delivery at this pressure. Five nozzles are available to cover the size range of most portable air compressors. To size an AirSpade nozzle to a compressor simply ensure the compressor size is larger than the nozzle size.

The below table lists the minimum portable air compressor size needed to properly run a given AirSpade nozzle.

Recommended Compressor Size

Nozzle Size (scfm)	Minimum Compressor Size (scfm @ 100 psig)
25	25
60	60
105	125
150	175
225	250

HOW SHOULD I DIG WITH THE AIRSPADE?

Each pass of the AirSpade dislodges material up to several inches deep in a medium to stiff soil. Unless the soil is highly compacted, dwelling on the same spot is unnecessary and tends to increase spray. Ideally, the AirSpade should be moved laterally at a rate of about 1 to 2 feet per second. When several inches of soil have been loosened, soil should be physically removed to expose a fresh working surface for the nozzle. Vacuum suction, as provided by the AirSpade Vac, is an excellent way to remove loosened soil.



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

PRODUCTS, PARTS & ACCESSORIES

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

AIRSPADE®
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CORPORATION

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