

AIR-SPADE®

Air Excavation Tool



AIR-SPADE® is used by arborists and landscape professionals worldwide for:

- Root Collar Excavation
- Plant Aeration
- Vertical Mulching
- Soil Compaction Relief
- Disease diagnosis and treatment
- Transplanting
- Bare rooting
- Damage analysis
- Locating Roots in New Construction
- Root Pruning and Structure Analysis
- Running utilities through the root zone
- Radial trenching

Full Range of Spare parts & additions Available:

- 0.6m, 0.9m, 1.2m, 1.5m barrel extensions or Custom length barrel can be ordered
- Additional nozzles include; 15, 25, 60, 105, 150 & 225 scfm nozzles
- 45o Angled Adapter Arboricultural
- Scratch Proof Face Shield
- Spare Parts Kit
- Storage Case with lock
- AIR-SPADE® Handle
- 3m, 7.5m & 15m Lightweight Hose Lengths Available



FEATURED EQUIPMENT

Benefits of Air-Spade® Excavation:

- Digs faster and harder soils than competitive or home made wands
- Less worker fatigue/injuries than a pick or shovel
- Faster and safer than hand digging
- Saves expensive hourly labour costs
- Non-damaging to all kinds of buried utilities or plant roots
- Digs without making mud and does not create "contaminated" spoil like water
- Excavated soil is ideal for decompaction
- Modular design with parts that screw together without tools
- Interchangeable nozzles sized to match air compressors from 15 to 250 scfm
- Interchangeable extensions to 8ft and reducers to 2 ft
- Ergonomic handle with thermal shield and pressure gauge
- Safety "dead Man" trigger with guard
- Electrically insulating barrel
- Hardened wear resistant stainless steel nozzle
- 450 deg adaptor

Why Does the AIR-SPADE® out perform other air tools?

In head to head tests, the AIR-SPADE® dislodged harder clay soil and dug faster than other air digging tools. Compressed air exiting from a pipe nipple, orifice, or improperly designed nozzle expands outward rapidly to 3 to 4 times the area of the nozzle as opposed to the jet from the patented supersonic nozzle in the AIR-SPADE®.

Will higher pressure make the AIR-SPADE® work better?

Increasing the air pressure above 90 psi on a properly designed supersonic nozzle does not lead to a proportional gain in excavation capability. For example, doubling the nozzle pressure to 180 psi increases the air jet force by only 10% and the exit momentum flux (stress seen by the soil) by only 45%. Supplying higher pressure to a nozzle designed to work at 90 psi actually un-focuses the air jet degrading performance and consuming more air. The patented CEG Supersonic nozzle turns 90 psig compressed air into laser-like Mach 2 jet. Jet penetrates and fractures friable materials like soil but harmlessly goes around buried pipes, cables, fibre-optic lines and tree roots.

Fig 1.

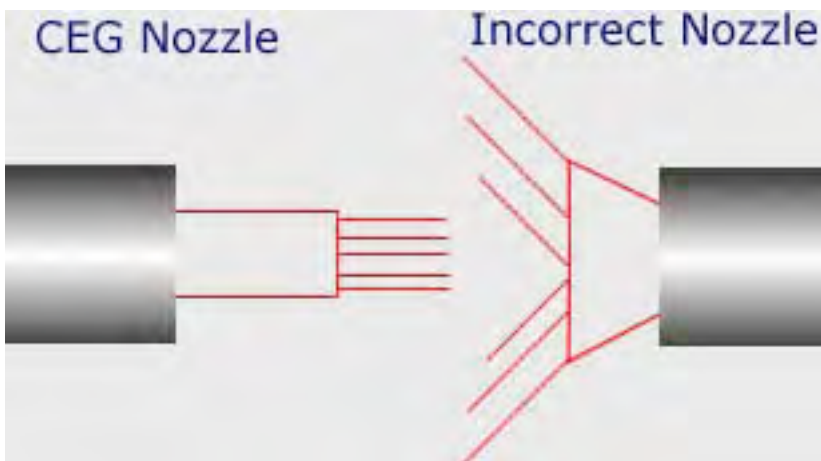


Fig 2

Fig 1: Jet from CEG nozzle focuses all of its energy and momentum onto a concentrated spot on the soil.

Fig 2: Air from pipe nipple, orifice, or improperly designed nozzle, expands, greatly reducing its effectiveness.

FEATURED EQUIPMENT

In what types of soil will an AIR-SPADE® work?

Because of its unique, focused air-jet, the AIR-SPADE® works in most soils, even hard clays. Cohesive soils can be classified and described by unconfined compressive strength as shown below. Tests have shown the AIR-SPADE® to be effective in compacted soils with unconfined compressive strengths well above the values listed below for hard clay. Watering the work area ahead of time can be helpful sometimes. Watering reduces airborne dust if the soil is extremely dry. It also reduces the soil's strength making the digging easier. Combined use of the AIR-SPADE® with a low pressure water jet is effective even with extreme cases of highly compacted or sun-baked soils.

The AIR-SPADE® in general will not cut through rock, since its unconfined compressive strength is much greater than for soil. Shales, however, may be broken apart by the AIR-SPADE® if the jet is directed between the laminations of the rock.

Type	Unconfined Compressive Strength tsf	Description Cohesive soils including:
A	>= 1.5 stiff	Clay, silty clay, sandy clay, clay loam, caliche, hardpan, and sometimes silty clay loam and sandy clay loam.
B	<1.5 and >0.5 med	Granular cohesive soils like angular gravel, silt, silt loam, sandy loam, and sometimes silty clay loam and sandy clay loam.
C	<= 0.5 soft /v.soft	Granular soils such as gravel, sand, loamy sand, submerged soil, or soil from which water is freely seeping

What size nozzle should I use?

Nozzles are available that use from 15 to 225 cfm of compressed air. The amount of soil that can be dislodged in a given amount of time is roughly proportional to the amount of air used. The 150 cfm nozzle is the most commonly used size for arboricultural and industrial applications. It has good productivity and is designed to run from the most common size of portable air compressor, a 175 to 185 cfm unit

Pressure Loss (psi) for 50 feet of common air hose						Excavation Rates (m3 / min) Recommended Compressor Size					
FLOW 9CFM						Nozzle Air Flow (CFM)		Nozzle (cfm)		Flow rating (cfm) @100psi	
Hose ID	25	60	105	150	255	15	Soil Type A	Soil Type C	15	15	
3/4 "	0.3	1.6	5.6	12.3	25.0	15	0.15	0.06	25	25-30	
1"	0.1	0.4	1.3	2.8	5.5	25	0.27	0.12	60	60-70	
1 1/4"	0.0	0.1	0.4	0.8	2.0	60	0.33	0.21	105	125	
						105	0.45	0.27	150	175-185	
						150	0.54	0.36	225	250	
						225	0.70	0.51			

FEATURED EQUIPMENT

How should I dig with the AIR-SPADE®?

The AIR-SPADE® will dislodge up to several centimeters deep in a medium to stiff soil in one pass. High-speed movies show that an air-jet penetrates and dislodges the soil in a fraction of a second. Unless the soil is highly compacted, dwelling on the same spot is unnecessary and tends to increase spray. The AIR-SPADE® can be moved over the soil surface at a rate of about 20-30cm per second. When several centimeters of soil have been loosened, the soil should be removed to expose a fresh working face for the air jet. Vacuum suction, as provided by our AIR-VAC and SAFEX® units, is an excellent companion to the AIR-SPADE® since it is likewise non-damaging.

What size of air hose do I need to use the AIR-SPADE® properly?

Compressed air flowing through a hose experiences a drop in pressure from friction and constrictions. Friction loss is proportional to the length of the hose. The amount of air, its pressure, the hose inner diameter and its smoothness also determine the loss. The table below shows the pressure loss for 50 feet of common air hose with couplings as a function of size and nozzle flow, cfm, for air at a pressure of 90 psi. Generally, a 1-inch air hose is recommended for use with the AIRSPADE®.

How much will it Cost ?

Arbor Kit complete includes: AIR-SPADE® Series 2000 tool *

* includes handle, 150 cfm / 90 psi nozzle, and 4 foot barrel.

AIR-SPADE® Series 2000 tool + Storage Case with lock: \$3,800.00*

*Prices are subject to exchange rate fluctuations

AIR-SPADE® - Excavation Tool



Contact us now to discuss this invaluable addition to your working tools.

Treelogic Pty Ltd

Unit 4 21 Eugene Terrace

Ringwood Victoria 3134

Phone 03 9870 8177

ABN: 18400541757

**DO THE WORK FASTER -
GET BETTER RESULTS !**

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