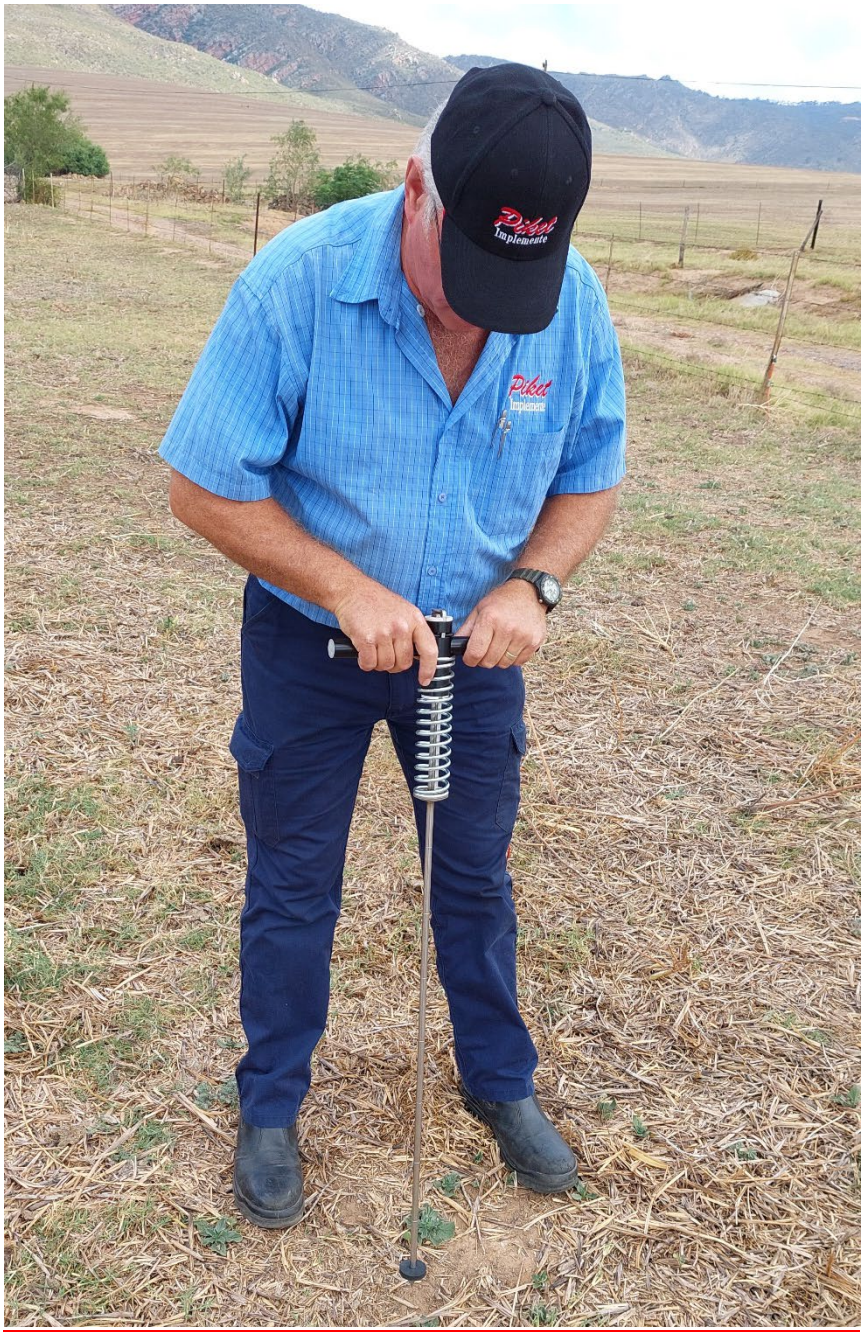
Piket Penetrometer

Soil Hardness Tester *Patent Appln. No. 2023/03021*



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Piket Penetrometer

The Piket Penetrometer is developed to measure soil hardness for agriculture purposes. Soil hardness has a direct impact on water infiltration and root development that is critical for farming. Literature suggests that the harder the soil is, the poorer the root development is. Below 200psi is considered good, and most crops can grow well up to 300psi. Above 300psi is considered poor conditions for root development.

Soil type and **moisture** affects the reading from the penetrometer, and it is important to take these factors into account when taking the reading.

The Piket Penetrometer can be used to:

Determine soil compaction layer, how deep the compaction occurs, the effect of animals before and after grazing, the effect of tilling, before and after and also if tilling addresses the compaction challenges.

When soil compacts, the natural cavities in the soil then disappear and the resistance required to penetrate through the soil increases. This penetration resistance is an important indication of whether the soil can still be rooted well. This is essential for the formation of a strong and healthy root system of trees or crops and indicates, as it were, how much effort a root has to do to grow further in the soil.

The air and oxygen content and the moisture supply capacity of the soil depend on this penetration resistance. Highly compacted soils can slow down or even block root growth and its functioning, so that trees and crops can even die completely due to the suffocation of the roots.

The penetrometer is an excellent tool to determine if the planter / seeder can plant in that condition and if the soil is deep enough and ideal for root development.

Safety:

- The penetrometer has a sharp tip.
- Work in a well-lit space so you can see what you are doing.
- Only use the tool only for the job it was designed for.
- Keep the penetrometer pointed away from yourself and other people at all times to avoid causing injury. Do not walk or run with the point pointing towards you.
- Do not pass or throw the penetrometer to someone else.

- Keep your hands away from all moving parts. Do not try reach into any part of the equipment with your fingers. Do not press your finger(s) between the coils of the spring, especially when force is applied.
- Always make sure that no feet are in the way of the penetrometer when force is applied. Do not press the point on your shoe.
- Store the penetrometer appropriately. Do not let the penetrometer stand against the wall where it can fall over.
- Do not poke or point at someone with the penetrometer.
- Do not swallow the penetrometer or any components.
- Use both hands while using the penetrometer. Use your forearm and triceps muscles to press the penetrometer into the soil.
- Do not sit on, stand or lean against the penetrometer.

Product Description and technical specs

Penetrometer	PPT-01-1100
Measuring Range	Up to 700mm
Pressure Range	200-600 PSI
Stainless steel probe tip	13mm
Tip for loose soil	19mm (Loos soil tip is not included and is a additional extra)
Product Dimensions LxBxW	108 x 31 x 6
Weight	1.7kg

Initial Sample

Move the rubber slider to the bottom.

Press the penetrometer into the soil to the required force (PSI), do another 2-3 compaction tests but not moving the rubber slider to the bottom, **while applying same amount of pressure**. (*by doing 2-3 samples in close proximity of each other, it will give a good actual result by eliminating the possibility of a rock or root in the sub soil*) However, the opposite is also a reality that while pressing, and there is an air pocket, the reading needs to restart from the beginning.

When taking a reading, it is important to understand that one reading is a fraction of the entire field. So, it is important to take multiple readings. To get a good average, take multiple readings until an average start to show. And discard the abnormalities.

Base sample / Reference Sample

The Base or Reference Sample is used to compare the field sample with, and can be used to determine potential of soil and future action.

This sample should be in close proximity of the first reading and at the same time period (not days later), moisture in soil is similar, where soil is of a similar nature +/- 10 – 20 meters from the initial reading.

Pre-condition for a base sample is an area where there haven't been any animal traffic, machine movement, or tilling has been done to compare the initial sample to the base sample. (e.g. underneath the fence line)

The Base sample will indicate what the normal condition would be with no traffic, animal compaction or tillage effect.

Disclaimer

Patent Application number: 2023/03021

The product is provided "as is". We make no representation or warranty of any kind whatsoever to you or any other person relating in any way to the information, content, materials, products or other services included in or otherwise made available to you through any Piket implements (Pty) Ltd product and / or service, including, but not limited to direct, indirect, incidental, punitive, and consequential damages, unless otherwise specified in writing.

Although the penetrometer is manufactured, calibrated and tested to the best of our abilities, Piket Implements (Pty) Ltd does not accept any responsibility and / or liability for any losses incurred as a direct or indirect result of the use of this product. Piket Implements (Pty) Ltd does not take responsibility and / or liability for the quality of reading and / or accuracy of reading by the penetrometer.

Piket Penetrometer Data Recording sheet

Date:								
Location								
Soil Types	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand
	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay
	Loam/organic	Loam/organic	Loam/organic	Loam/organic	Loam/organic	Loam/organic	Loam/organic	Loam/organic
Dry		Dry	Dry	Dry	Dry	Dry	Dry	Dry
Moist		Moist	Moist	Moist	Moist	Moist	Moist	Moist
Wet		Wet	Wet	Wet	Wet	Wet	Wet	Wet
Depth of moist								
Down Force	200 PSI	Depth	Depth	Depth	Depth	Depth	Depth	Depth
	300 PSI	Depth	Depth	Depth	Depth	Depth	Depth	Depth
	400 PSI	Depth	Depth	Depth	Depth	Depth	Depth	Depth
	500 PSI	Depth	Depth	Depth	Depth	Depth	Depth	Depth
	600 PSI	Depth	Depth	Depth	Depth	Depth	Depth	Depth

Date:								
Location								
Soil Types	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand
	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay
	Loam/organic	Loam/organic	Loam/organic	Loam/organic	Loam/organic	Loam/organic	Loam/organic	Loam/organic
Dry		Dry	Dry	Dry	Dry	Dry	Dry	Dry
Moist		Moist	Moist	Moist	Moist	Moist	Moist	Moist
Wet		Wet	Wet	Wet	Wet	Wet	Wet	Wet
Depth of moist								
Down Force	200 PSI	Depth	Depth	Depth	Depth	Depth	Depth	Depth
	300 PSI	Depth	Depth	Depth	Depth	Depth	Depth	Depth
	400 PSI	Depth	Depth	Depth	Depth	Depth	Depth	Depth
	500 PSI	Depth	Depth	Depth	Depth	Depth	Depth	Depth
	600 PSI	Depth	Depth	Depth	Depth	Depth	Depth	Depth