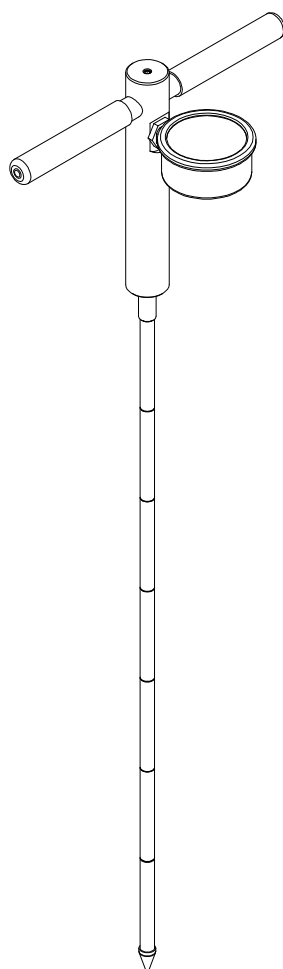
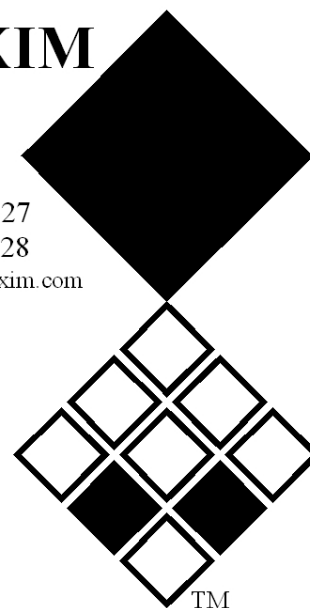


User Manual and Parts Book

Penetrometer

REDEXIM

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ATTENTION:
IT IS OF THE UTMOST IMPORTANCE TO READ THIS USER MANUAL
CAREFULLY PRIOR TO USING THE PENETROMETER IN ORDER TO USE THE
MACHINE SAFELY AND TO OBTAIN THE BEST RESULTS.

Operating Instructions

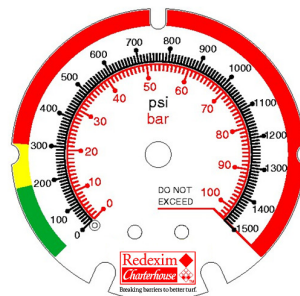
***Congratulations on purchasing your Redexim Penetrometer!
You now have in your possession the perfect scientific instrument for measuring
compaction levels in your soil at all depths down to 600mm (24in).***

Description

The Penetrometer consists of a removable tapered cone tip, a measuring rod with depth marks at 75mm (3in) intervals, a machined precision-bore pressure chamber, and a 0-104 bar (0-1500 psi) pressure gauge.

We have used stainless steel and high-grade anodized aluminium alloy to construct this instrument for maximum durability and corrosion resistance.

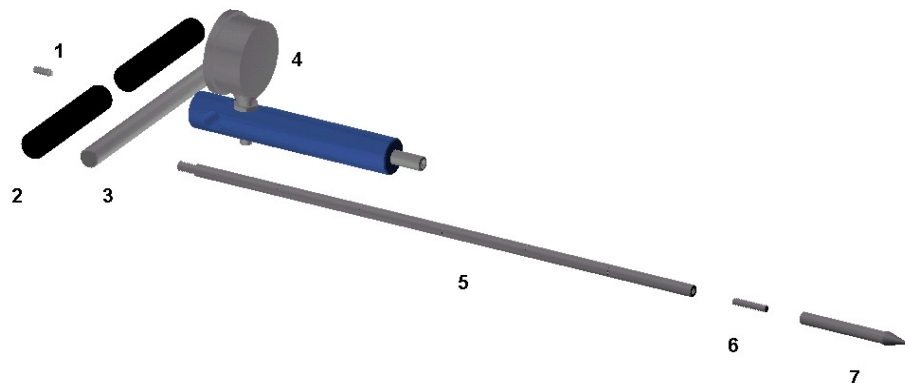
By pushing the Penetrometer pointed tip into the soil, pressure is applied via the measuring rod to the hydraulic piston within the pressure chamber. This gives you accurate pressure readings on the gauge in Bar and psi.



ASSEMBLING THE PENETROMETER

Please assemble your new Penetrometer as follows.

(See diagram)



1. Pick up the Pressure gauge and chamber assembly (Item 4 on diagram).
2. Slide the handle bar (Item 3) through the drilled orifice above the pressure gauge on the pressure chamber.
3. Tighten the handle by screwing the hexagon socket set screw (Item 1) into the top of the pressure chamber with the wrench supplied until the handbar is tight and cannot move sideways (do not over tighten Item 1).
4. Slide the handle bar grips onto either side of the handlebar.
5. Screw the measuring rod (Item 5) into the pressure chamber by hand until tight.
6. Screw the pointed tip into the measuring rod by hand until tight.

Your Penetrometer is now assembled and ready for immediate use.

CARE AND HANDLING

The Penetrometer should be handled with respect and care. If looked after properly, it will operate for many years without problem.

CAUTION

Never push the Penetrometer gauge needle over the 104 bar (1500psi) reading on the gauge, as it will result in damage to the instrument!

SAFETY

The tapered tip is very sharp and should be removed when not in use.

CHECKING THE GAUGE FOR ACCURACY

Should you doubt the accuracy of the gauge at any time, you can check the reading on your bathroom scales.

1. Place a small wooden block between the Penetrometer tip and the platform of the bathroom scales.
2. Push the compaction meter downwards until the scale reads 20kgs (93 pounds).
3. The Penetrometer gauge should now read 20 bar (600 psi).

WHAT IS COMPACTION?

Soil is comprised of mineral or organic soil particles with spaces in between called “pore space”. This space contains varying amounts of air and water depending on soil type and conditions. The ratio of particle to pore space would ideally be 50:50 in natural un-compacted friable soils.

However in soils which are supporting sports turf the reality is very different! The modern demands of continuous play and the regular use of machinery, often in wet and highly unfavourable conditions, is very destructive to soil structure and results in the condition described as “compaction”.

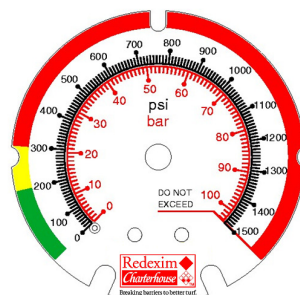
Compaction starts at the surface and builds progressively throughout the soil profile often to considerable depths preventing water penetration and the movement and up-take of all essential elements. As the soil particles pack closer and closer together pore space is eliminated and the soil is devoid of air and water, thus denying grass plants the “essentials of life”.

USA research has demonstrated that soils compacted to levels measuring over 300 psi can seriously inhibit root development. However, it is not unusual to find compaction levels of 600-800 PSI in sports turf including golf greens.

USING THE PENETROMETER

To use the Penetrometer, the operator should stand with his/her feet at approximately shoulder width apart and with his/her hands placed on the handle bar grips.

By pushing down on the bar slowly and evenly, the operator can observe soil compaction rates at all levels by reading the measurement scale on the pressure gauge in either Bar or psi.



For quick reference and ease of use the gauge is marked with coloured bands in green, yellow and red.

1. The green zone 0 – 200 psi (14 Bar) indicates acceptable un-compacted levels.
2. The yellow zone 200 – 300 psi (21 Bar) indicates suspect levels of compaction for most healthy plant growth.
3. The red zone 300 psi plus (21 Bar plus) indicates unacceptable compaction levels for good root growth and development.

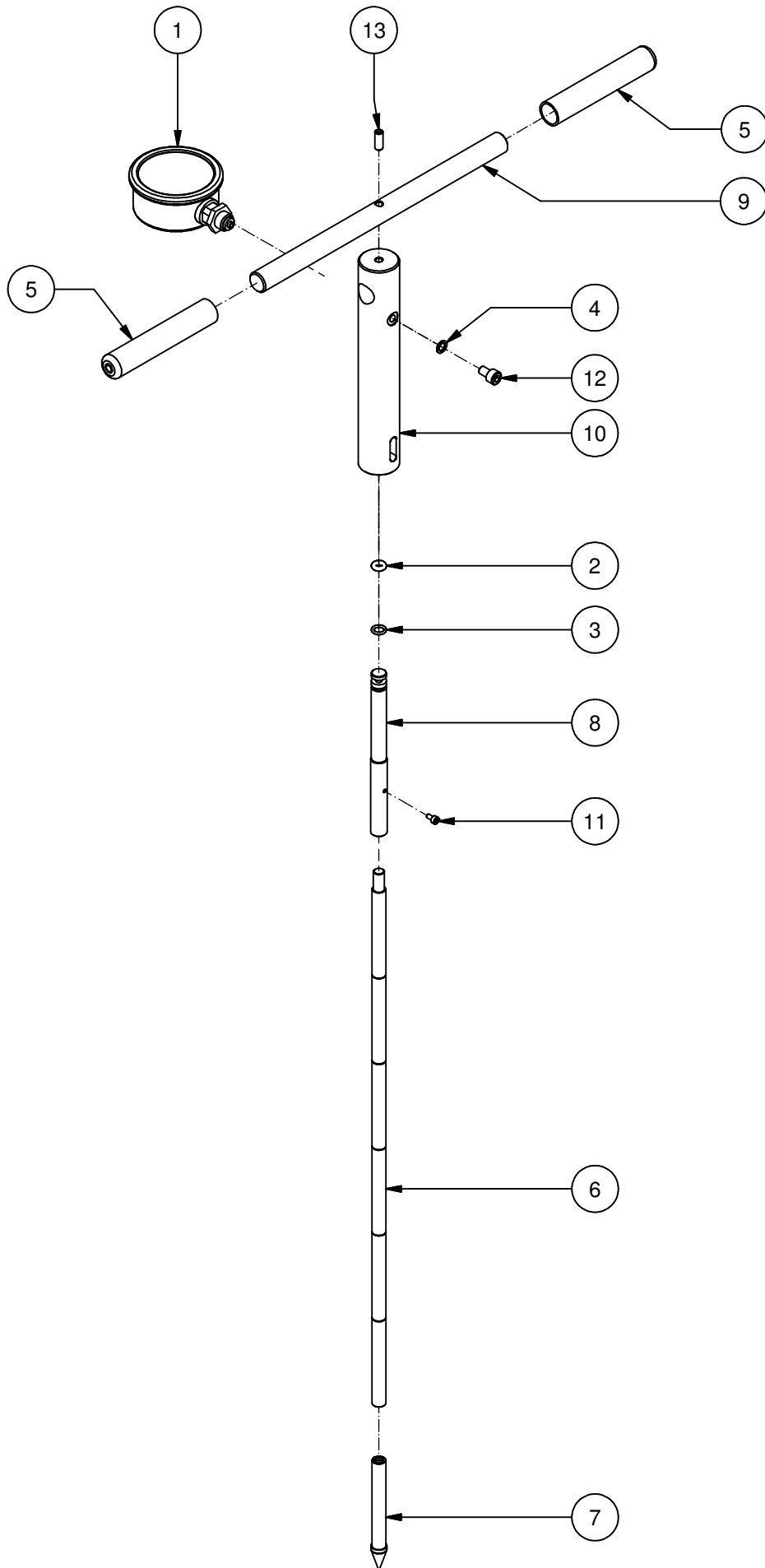
When testing grass turf surfaces for compaction it is important to take as many readings as possible paying particular attention to high or dry spots and areas of hard wear such as walk on or walk off areas on golf greens or goal mouths etc.

TECHNIQUE

E.g. 1 On a football or rugby pitches begin at a corner and work your way across the pitch in a “W” shape testing at regular intervals as you go and noting the readings and depth on a pad and their location on a drawing as below.

You should also pay particular attention to the goal mouths and centre area.

E.g. 2 On golf greens (500m²) work around the green in a circular direction testing at regular intervals and gradually moving in towards the centre of the green. Pay particular attention to high spots and areas of heavy wear.



Redexim-Charterhouse Penetrometer Pag 1 Code 0932

	PART #	DESCRIPTION	REMARKS	QUA
1	536.310.680	Manometer 0 -100 Bar		1
2	766.050.030	Rubber ring		1
3	766.080.020	Rubber ring		1
4	874.130.132	Copper ring		1
5	446.021.020	Rubber sleeve		2
6	472.104.860	Middle bar		1
7	472.120.980	Lower bar		1
8	472.121.420	Top bar		1
9	472.162.500	Handgrip		1
10	472.301.810	Base element		1
11	814.030.060	Bolt DIN 912 - M3 x 6		1
12	814.060.100	Bolt DIN 912 - M6 x 10		1
13	818.060.160	Hex. Socket Set Screw DIN 916 - M6 x 16		1
14	818.080.350	Hex. Socket Set Screw DIN 916 - M6 x 35		1