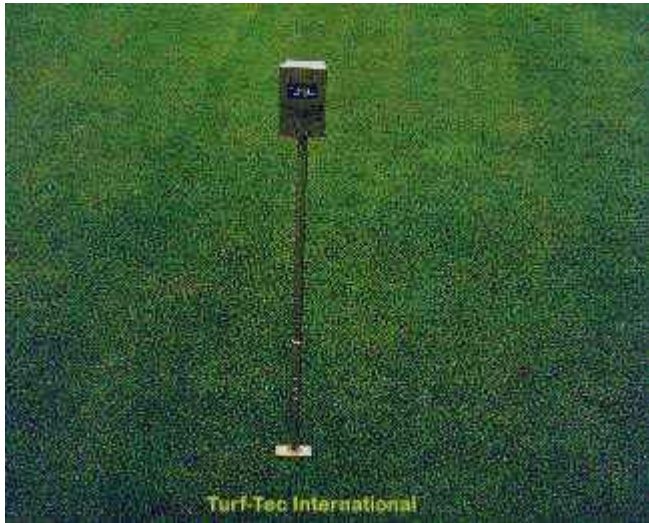


Turf-Tec pH Meter



Test soil pH in the mat, thatch and above and below the root zone. pH can be checked, 0" to 4" inch level right on the turfgrass area.

Simply insert probe to desired depth, allow to stand for 60 seconds, and read pH scale display window.

Specially designed probe depth control and stand.

For all turfgrass areas.

Now you can test soil reaction at different levels in the soil profile.

Check Soil pH on:	Specifications:
<ul style="list-style-type: none"> • Golf greens, fairways, golf tees. • Seed beds. • Sports fields. • New construction. • Lawns. • Playgrounds. • Locate layers. • Check fertigation performance. 	<ul style="list-style-type: none"> • Easy to use. • Read out 3.5 to 9.0. • Accurate to +/- 1.0 pH Point • Readings within one minute. • Durable and reliable. • Adjustable foot from 1-4 inches deep. • Overall height 48 inches tall. • Weather proof non-corrosive metal.

Completely self contained, no chemicals, batteries, or attachments needed. pH meter, wires and probe are protected inside water-resistant instrument.

For testing soil reaction. Monitoring pH is the key to successful turfgrass management.

Determine when soil is acid or alkaline and at what level in the soil profile these changes occur.



Turf-Tec pH Meter Instructions

pH Probe Re-Calibration

Cleaning pH Meter Probe

Note: Moisture Sensor probe may need cleaning before use.

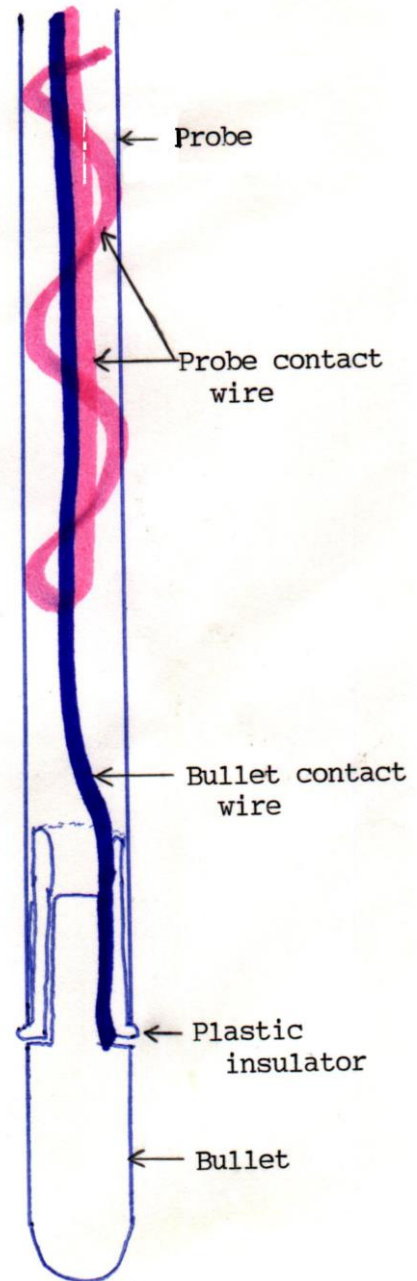
The pH meter probe is susceptible to attracting particles during times of non-use. Before using meter, use the abrasive pad that is included to buff clean the probe and bullet to a bright shine. (The bullet material will not become as bright as the probe shaft.)

A 3-M brand abrasive pad can also be used to buff clean the probe and bullet to a bright shine. (The bullet material will not become as bright as the probe shaft.) **DO NOT USE SAND PAPER.**

Re-Calibration

Note if readings is 7.0 and will not move or if needle is reading sporadic or jumping, follow this procedure.

- 1) Extend the probe out of the foot portion of meter or remove foot entirely.
- 2) Take a pair of pliers and gently grasp the bullet portion of the probe. (The bullet portion is at the end of the probe just beyond the plastic insulator.)
- 3) Gently turn the bullet a half turn. (This will allow the probe contact wire inside the probe to gently scrape against the inside of the probe wall and insure proper contact similar to using the abrasive pad on the outside of the probe as mentioned above.)
- 4) **Be sure bullet is not pulled away from plastic insulator.**
- 5) Test again. A test may be made with a paper towel moistened with 1/2 vinegar, 1/2 water solution. This should give a pH reading of 5.0 or less.
- 6) If readings are still sporadic, repeat steps # 2 through # 5.



Instructions

Before each use, lightly shine the metal probe of the Turf-Tec pH Meter to remove any oxides that may have formed with the special pad provided.

Wipe away from the tip. DO NOT SHINE THE BULLET AT THE END OF PROBE when buffing bullet and probe!

Wipe with clean tissue or cloth.

Operating Instructions

ADJUSTING THE DEPTH OF THE TURF-TEC pH METER

1. Push pin in with thumb and turn outer tube slightly to one side.
2. Slide tube to desired depth. (Each hole is one inch increments).
3. Lock into place.
4. If soil is not moist, thoroughly wet the soil down to the depth to be tested with a glass full of irrigation water. (Be sure to use irrigation water as water from another source will change readings.)
5. Insert tines and probe slowly into turf. If resistance is met, DO NOT FORCE. Either move to a new location or make a hole for the probe with a suitable tool.
6. Allow 60 seconds for probe to register information on the meter.
7. Read meter and record. NOTE: Be sure to wipe probe after each use with pad to re-neutralize pH.
8. ** Use only hand pressure to insert into ground.

TESTING SUGGESTIONS

- Do not leave probe in the soil any longer than necessary.
- Probe should be clean and dry before storing.
- Keep probe away from metal objects.
- Use this instrument only in soil. DO NOT PLACE PROBE IN WATER.

TESTING SAMPLES

If you wish to make more accurate pH readings than field tests show, you can follow this procedure.

1. Take soil samples with a soil probe at desired depths and place them in a clean paper or plastic bag.
2. Mark locations of where samples were taken.
3. In the lab, mix the soil from each bag separately on a clean surface.
4. Remove all stones, roots and other debris that may be present.
5. Next, crumble the soil into small particles.
6. Use a half liter (approximately one pint) from the sample and mix with a half liter of distilled water in a clean glass or plastic container.
7. Thoroughly mix and compact.
8. Drain off excess water and make reading with probe.

SOIL ACIDITY AND ALKALINITY

In order to understand how acid and alkaline conditions affect grass growth one must first understand the scale used to express varying degrees of soil acidity or alkalinity.

A scale, known as the pH scale is used to indicate these differences.

The pH scale denotes the negative logarithm of concentrations of the hydrogen ion in grams per liter. This scale, developed by Sorenson*, permits the expression of both acidity and alkalinity in units that can be directly measured.

In simpler terms, the pH scale indicates how acid or alkaline a soil may be. The pH scale is totally unlike measurements that normally are accustomed to, such as a ruler or thermometer. In fact, the pH scale increases in the following manner:

A pH reading of seven is neither acid nor alkaline. A pH of 6, however, is 10 times more acid than 7. A pH of 5 is 100 times more acid than 7. A pH of 4 is 1000 times more acid than 7.

Do not make the assumption that the difference between 7 and in only three points, the difference is actually 1000 times more.

The following table will give you the average scale used in Turfgrass Management.

pH SCALE OF SOIL REACTION

<u>pH Readings</u>	<u>Alkalinity and Acidity</u>
10.0 1000	(One thousand times more alkaline)
9.5 500	(Five hundred times more alkaline)
9.0 100	(One hundred times more alkaline)
8.5 50	(Fifty times more alkaline)
8.0 10	(Ten times more alkaline)
*7.5 5	(Five times more alkaline)
*7.0 0	(Neutral)
*6.5 5	(Five times more acid)
6.0 10	(Ten times more acid)
5.5 50	(Fifty times more acid)
5.0 100	(One hundred times more acid)
4.5 500	(Five hundred times more acid)
4.0 1000	(One thousand times more acid)
3.5 5000	(Five thousand times more acid)
3.0 10000	(Ten thousand times more acid)

* Grasses grow best at a pH reading of between 6.5 and 7.5

Any pH reading higher or lower than this range. can have a profound effect on low leaf growth and root growth take place. Soil reaction (pH) has a definite effect on nutrient availability.

Micro-organisms cannot reproduce beneficially when soils are too acid or alkaline. Minor elements such as aluminum and iron will not be released for plant use.

Intensive use turfgrass areas, however, require special attention for a number of reasons. Thatch, for instance, being constantly washed by frequent irrigation practices can become very acid, and most turfgrass areas fall under this category. Acidic fertilizer also lowers the pH of thatch and soil. At a low pH condition, microorganism activity is restricted and slows down and may even stop the normal decomposition of thatch and organic matter.

Soil compaction also affects pH, because anaerobic soils become very acid.

Soil pH plays an important part on various turfgrass diseases, and research has demonstrated that acid conditions encourage certain fungi, which adversely effect grass plants.

LIMITED WARRANTY OF TURF-TEC INTERNATIONAL PRODUCTS

Turfgrass Products Corporation - dba - Turf-Tec International ("Seller") warrants to the final purchaser, that all Turf-Tec International tools will be free from defects in material or workmanship for a period of one year from date of purchase. SELLER'S SOLE OBLIGATION AND YOUR EXCLUSIVE REMEDY under this Limited Warranty and, to the extent permitted by law, any warranty or condition implied by law, shall be the repair or replacement of parts, without charge, which are defective in material or workmanship and which have not been misused, carelessly handled, or improperly repaired by persons other than Turf-Tec International. To make a claim under this Limited Warranty, you must return the complete tool, transportation prepaid, to Turf-Tec International after contacting Turf-Tec International and receiving a return authorization number. Please include a dated proof of purchase with your tool.

ANY IMPLIED WARRANTIES SHALL BE LIMITED IN DURATION TO ONE YEAR FROM DATE OF PURCHASE. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING BUT NOT LIMITED TO LIABILITY FOR LOSS OF PROFITS) ARISING FROM THE SALE OR USE OF THIS PRODUCT.

Hold Harmless Agreement

The seller shall protect, defend, indemnify and hold the purchaser and their respective assigns and their attorneys, accountants, employees, officers and directors harmless from and against all losses, costs, liabilities, claims, damages and expenses of every kind and character, as incurred, resulting from or relating to or arising out of the inaccuracy of results, injury of user, injury of sports participant, turfgrass loss, warranty, covenant or any agreement made by the seller in this agreement.