TURF-TEC 6 and 12 INCH INFILTRATION RINGS INSTRUCTIONS (IN7-W & IN8-W)

Outline of Uses

The Turf-Tec Infiltration Rings was specifically designed to give infiltration readings directly on site. It can give you a reading on the rate of water percolation through grass, thatch, mat and soil as well as directly on bare soil.

Use a heavy jack under the back end of a truck to drive rings as an alternative to the sledge method

1. Position the Turf-Tec IN6-W driving plates over the IN7 or IN8 - 6 and 12 inch Infiltration rings so the center bar is in the center of the two plates as shown.

2. Center a suitable wood block across the Turf-Tec IN6-W Steel Driving Plates.

3. Center a jack on the driving plate or wood blocks. Place the top of the jack and the assembled items vertically under the previously positioned end of a truck body and apply force to the ring by means of the jack and truck reaction.

4. Also, tamp near the edges or near the center of the ring with the rubber mallet, as slight tamping and vibrations will reduce hang-ups and tilting of the ring.

5. Check the rings with the level, correcting the attitude of the rings to be vertical, as needed.

Reliability of testing and reducing variables

Saturated test (The most reliable test method)

The most reliable test method for measuring infiltration is called a saturated test. This method is performed by placing the Turf-Tec Infiltration Rings directly into the soil to be tested and filling the rings 2-3 times, allowing the water to infiltrate into the soil between fillings. Once the soil is saturated, you can perform the test.

Moisture Sensing (The quickest test method):

Another reliable method for testing infiltration is to use a Moisture Sensor. Moisture Sensor readings should be taken at one, two, three and four inch levels of the soil to be tested using a Turf-Tec Moisture Sensor and the readings should be recorded. The infiltration test can then be performed on that area. This method should be repeated for each test area. In addition, the next time the same area is to be tested for infiltration, be sure the Moisture Sensor readings are in the exact same range before testing. This will eliminate any variables and still produces a reliable test.

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Testing on irrigated areas:

Another way to insure a proper infiltration reading on irrigated areas is to use this instrument approximately one hour after irrigation. A visual indication of soil moisture should also be noted by using a Soil Profile Sampler. When using this method, be sure no rainfall has occurred within 48 hours of the test to remove this variable.

Correlating your readings

If the results from your Turf-Tec Infiltration Rings show that the soil readings are one inch of water absorbed per hour, this should be recorded. This reading should not be used as a conclusive result for all areas because each area tested most likely will have different variables like vegetative cover, soil organic matter content, soil physical properties, compaction, soil texture and other factors. The variables all affect infiltration rate.

Each infiltration reading should be duly recorded, so that comparisons can be made periodically. You will probably find wide differences in infiltration rates from area to area, especially when testing newly constructed areas or areas where the soil has been disturbed compared to areas where the soil has remained unchanged. The best way to insure infiltration results will be consistent, is to record the infiltration rate on each area so that you can compare any changes. Use this standard for each particular area only.

Monitoring Golf Greens

If readings on the Turf-Tec Infiltration Rings are less then one inch per hour, the area is considered to be in a very critical range. When the infiltration rate drops 10% or more, check your topdressing and management practices. Topdressing can sometimes drastically change infiltration rates, especially if even a slight change in the mixture occurs.

When infiltration decreases are detected, the formations of layers in the soil profile are beginning. However, layers can be corrected with aerification and proper topdressing if they are diagnosed with the Turf-Tec Infiltration Rings before they can cause a major problem.

Putting your readings to use - Turfgrass Areas

The results of your readings of the Infiltration rate can then be used to regulate the amount of water applied from each sprinkler zone. Irrigation can then be adjusted to apply only the amount of water that should be applied per hour.

To check irrigation rates, Turf-Tec precipitation / uniformity gauges can be purchased from Turf-Tec International and placed in the soil, and spaced every 1 1/2 to 3 feet between two sprinkler heads. The irrigation clock should be set for a 15 minute cycle and the amount of water in each rain gauge should be recorded. This will give you the actual amount of water applied.

Applying only the amount of water that the soil will absorb saves water lost by surface runoff and reduces fertilizer loss. It will help prevent waterlogged soils, which reduce oxygen levels in the soil. Excessive surface water will also reduce root systems and can also contribute to increased disease problems. Wet soils can become compacted more easily and in severe cases, harmful anaerobic conditions can be created.

How to get the most out of the Turf-Tec Infiltration Rings on Turfgrass areas

Areas can be tested before and after certain management practices have been used. These include aerification, Verti-cutting, topdressing along with all the other practices that can change the water infiltration rate.

Monitoring Drain fields

The Turf-Tec Infiltration Rings can be used to install drain fields. The double ring is much more accurate then just using a single ring or an excavated cavity to test for infiltration. However please check with your local ordinances to see if an ASTM Infiltration test is required, if one is, you may need to use the Turf-Tec 12 and 24 Inch Infiltration Rings.

Environmental testing

The Turf-Tec Infiltration Rings can be used to perform various types of environmental tests. It can be used for testing fuel tank containment areas and spill clean up times. The Turf-Tec Infiltration Rings can also be used for measuring urban runoff. It has also been successfully used for storm water soil evaluations, forestry soil assessments and for groundwater recharge areas.

Monitoring test pits

When monitoring test pits, be sure you use the saturated method of testing and repeat the tests in several areas. In addition, if testing in the bottom of test pits be sure the soil has not been disturbed by the digging equipment. This is usually accomplished by excavating to within 2 to 4 inches of your desired testing depth by machine and then removing the last portion by hand digging by with a flat shovel before taking your readings. This will insure you are taking readings on undisturbed soils. If the soil is disturbed, you can re-tamp the area and confirm consistency in compaction with a Penetrometer before testing infiltration.

Features

- Sturdy welded construction
- Double ring for accuracy
- Rings are welded in position for optimum reliability
- Vinyl handle grips for ease of insertion and removal
- Galvanized steel for many years of life

Particular Specifications - Reason for the double ring

The Turf-Tec Infiltration Rings is equipped with a double ring. During use, both rings are filled up with water but only the inner ring is measured. The reason for this is that you may notice that during operation, one ring may infiltrate much faster than the other ring one because there will be lateral movement of water around the cutter blade. This action will also create a seal for the inner ring and give a much more accurate indication of the actual rate of infiltration.

Accuracy of testing the soil on the area in question

This tool is designed to test soil infiltration right on the area that is in question. It differs from lab results because it is representative of all the conditions that naturally occur on that area. The Turf-Tec Infiltration Rings accounts for the vegetative cover, soil organic matter content, soil physical properties, compaction, soil texture and other factors. The variables all come into consideration when using this tool to determine infiltration.

Checking infiltration at lower depths in the soil profile

If the Infiltration rate needs to be determined at lower levels in the soil profile, a post hole digger can be used to remove the turf, thatch and mat. The Turf-Tec Infiltration Rings can then be lowered into the hole and the rate of infiltration can be determined at that level. Maximum depth of the Turf-Tec Infiltration Rings is approximately two feet. If readings are needed at lower levels a backhoe can be used for excavation.

INFILTRATION RINGS
MONITORING RECORD

We suggest recording your results along with these certain variables on this page:

* MAKE A COPY OF THIS PAGE FOR EACH AREA TO BE TESTED.

PLACE: _____ DATE: _____

TIME: _____ EXACT LOCATION: _____

FORMER RAINFALL / IRRIGATION INFORMATION:

PENETROMETER (COMPACTION) READINGS: ( ) %

MOISTURE SENSOR READINGS AT DIFFERENT LEVELS

MOISTURE AT 1" INCH LEVEL : ( ) %
MOISTURE AT 2" INCH LEVEL : ( ) %
MOISTURE AT 3" INCH LEVEL : ( ) %
MOISTURE AT 4" INCH LEVEL : ( ) %

INFILTRATION RATE ACTUAL		INFILTRATION RATE CALCULATED
1 MINUTE : ( ) INCHES	X 60 =	( ) INCHES PER HOUR
5 MINUTES : ( ) INCHES	X 12 =	( ) INCHES PER HOUR
15 MINUTES : ( ) INCHES	X 4 =	( ) INCHES PER HOUR
30 MINUTES : ( ) INCHES	X 2 =	( ) INCHES PER HOUR
60 MINUTES : ( ) INCHES	X 1 =	( ) INCHES PER HOUR

A free Excel spreadsheet that will auto calculate this page can be downloaded at www.turf-tec.com

INFILTRATION RINGS
MONITORING RECORD
(SAMPLE PAGE)

We suggest recording your results along with these certain variables on this page:

PLACE: **Drainage Project # 4** DATE: **7/31/07**

TIME: **6:30 am** EXACT LOCATION: **Northwest corner of property**

FORMER RAINFALL / IRRIGATION INFORMATION
No rainfall, past 48 hours 1/4 inch irrigation, 28 hours ago.

PENETROMETER (COMPACTION) READINGS: (55) %

MOISTURE SENSOR READINGS AT DIFFERENT LEVELS

MOISTURE AT 1" INCH LEVEL : (35) %
MOISTURE AT 2" INCH LEVEL : (50) %
MOISTURE AT 3" INCH LEVEL : (60) %
MOISTURE AT 4" INCH LEVEL : (80) %

	INFILTRATION RATE ACTUAL		INFILTRATION RATE CALCULATED
1 MINUTE :	( ) INCHES	X 60 =	( ) INCHES PER HOUR
5 MINUTES :	( ) INCHES	X 12 =	( ) INCHES PER HOUR
15 MINUTES :	(1) INCHES	X 4 =	(4) INCHES PER HOUR
30 MINUTES :	(2) INCHES	X 2 =	(4) INCHES PER HOUR
60 MINUTES :	(4) INCHES	X 1 =	(4) INCHES PER HOUR

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Turf-Tec 6 and 12 inch Infiltration Rings
Operating Instructions

1. **You will need** a stop watch; ruler and water supply before testing can begin. (A IN6-W Driving plate and bottle jack or board and dead blow hammer should be used in hard soils.) Also a Moisture Sensor and a Penetrometer reading should be taken if you are comparing infiltration rates over a period of time.
2. Before checking infiltration rate, check the soil moisture at the one, two, three and four inch levels and record on the monitoring chart. Also a Penetrometer reading should be taken and recorded to determine the percentage of compaction at each test location.
3. Place the double ring cutting blades on the area to be tested. (Silicone spray may be applied to the cutter edges to allow easier and cleaner removal of tool.)
4. Push down on handle while slightly turning instrument back and forth until the rings are approximately two inches into the soil. **(Do not move the instrument side to side or twist too much because the soil will be disturbed. Also on turf areas excessive twisting can cause the grass roots to shear.)**
5. If harder soils are being tested, you can use the **IN6-W Infiltration Test Ring Driving Plate** or a board and dead blow hammer to insert the rings into the soil. Be sure to use care as to not damage or bend the rings with excessive force.
6. If you are using the **IN6-W Infiltration Test Ring Driving Plate**, a pickup truck bumper can be placed over the ring with the driving plate and a bottle jack can be used to apply downward pressure on the plate and rings insuring an even insertion into the soil.
7. Once inserted to a depth of two inches deep, fill both the outer and inner ring with clean water until they slightly overflow. (This is accomplished easiest by filling the inner ring first and allowing it to spill over and fill the outer ring.)
8. Insert the ruler into the center ring until the top of the ruler is at the top of the water column. (The ruler may have to be cut down shorter and then inserted into the soil until the top of the ruler is just below the water level.)
9. When the water level has reached the top of the ruler in the inner ring, start the timer immediately.
10. After fifteen minutes, note the amount of water in the center ring on the ruler. Record this number on the monitoring record.
11. Multiply the inches that have infiltrated into the soil by 4 to give you the infiltration rate in one hour. Also record this information on the monitoring chart.
12. To remove the instrument from the soil, use the hand grips to lift the instrument straight out of the soil. The handles may also require a slight turning while lifting the tool out of the ground. Extract the tool slowly in order not to disturb the soil surface.
13. It is best to get several readings on an area to get the average infiltration rate.
14. If the infiltration rate is slow, a one hour test may be desired. If the Infiltration rate is fast (as with new sand construction), a five minute test may be sufficient.
15. After using your Turf-Tec Infiltration rings, wash the rings, dry them and spray with **silicone spray.** (This will help the infiltration rings to remove a clean plug.)

To see more tips on infiltration, visit our website at WWW.TURF-TEC.COM

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