Mascaro Infill and Cleat Depth Tester Procedure Manual

The new Mascaro Infill and Cleat Depth Tester (MICDT) is designed as a testing instrument that will measure infill depth on synthetic turf as well as cleat depth penetration on synthetic turf and natural grass or any other surface where cleats are being worn by athletes.

Measuring infill on synthetic turf is an important process to prolong the life and playability of the turf. It also ensures the playability of the surface reaches the optimum performance specifications.

Measuring cleat depth will determine how the athletes may perform on the area by measuring how the (athletes) cleats will penetrate the surface of the area being tested.

The unit uses Bluetooth technology and, by utilizing the free version of the SpecConnect App, you can record the readings in the app as you go. By subscribing to the paid version of SpecConnect, you can also GPS map the area you are testing.

For testing infill depth on synthetic turf, simply install the infill 1 inch or 2-inch depth foot, place the unit on the area to be tested, press down on the handle and the unit will display and record the infill depth in 100th of an inch increments.

For testing cleat depth, install the cleat depth foot, raise the center shaft up until it hits the stop, and drop the shaft. The unit will display and record the cleat depth reading in 100th of an inch increments.

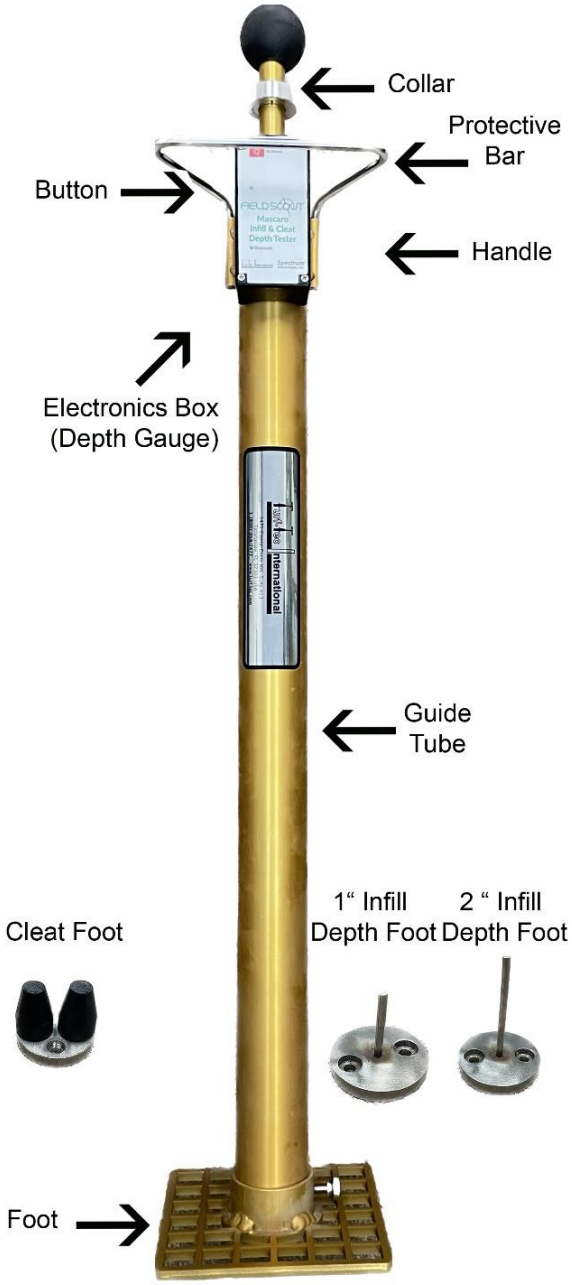
Finding uniformity in athletic field infill depth and cleat depth penetration will ensure a safe athletic field playing surface.

Mascaro Infill and Cleat Depth Tester - Overall height is 34 inches tall (86 cm) and can be used standing upright.

MICDT-M - Mascaro Infill and Cleat Depth Tester

SET UP

Mascaro Infill and Cleat Depth Tester (MICDT) Parts Diagram

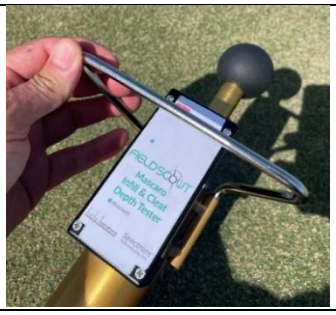


SET UP

The Mascaro Infill and Cleat Depth Tester (MICDT) requires 2 AA Batteries (included). They are installed inside the plastic housing. Remove the four screws holding the lid in place to access the battery holder.

Note: If the MICDT will not be used for an extended period of time (over one month), it is recommended that you remove the batteries.

Assembly Instructions

		
Install protective bar over electronics box	Insert evenly into both guide tubes	Press down firmly to secure into place
		
Install foot	Be sure the bottom of the foot is flush with bottom of the guide tube for accurate readings	Tighten thumb screw on base of unit. Reconfirm base is flush with the bottom of the tube for accurate readings
		
Install Infill Depth Foot 1” or 2” deep or the Cleat Depth Foot depending on the depth of your infill	Be sure to tighten screws properly so foot is tight against actuator shaft base	Place the units foot in a clean, flat steel plate, be sure ring is near the actuator shaft

Using the Mascaro Infill and Cleat Depth Tester (MICDT)

The Mascaro Infill and Cleat Depth Tester (MICDT) measures the depth the plunger depresses on a surface when it is released from a set height. The value of this depth is displayed on the LCD readout. The unit will also display the average of a series of measurements, and the number of measurements included in the average, on the LCD.

Activating/Deactivating the Display:

The unit is activated by briefly pressing the red Power Button located on the face of the unit.

The LCD will display the percent of battery life for 5 seconds and will then show zeros when it is ready to take a measurement. The MICDT will power off after 5 minutes of inactivity.

For Infill Depth - Taking a Reading:

1. Determine the infill depth foot you will be using. If the desired infill depth is between 0.0 – 1.0 inch, install the 1-inch-long depth foot. If the desired infill depth is between 1.0 – 2.0 inches deep, install the 2-inch-long depth foot.
2. Place unit on turf surface being measured and be sure the foot is on the surface of the infill for accurate readings. DO NOT push down on handle, just use it to stabilize the unit during testing.
3. If the display is blank, press the Power Button briefly and wait for the unit to turn on.
4. Connect the unit to the SpecConnect app as shown on Page # 11
5. Slightly lift up on the plunger shaft so that the collar is not touching the actuator shaft on the electronics box.
6. The display will now show the number of measurements that have been included in the average (or zero for the first reading).
7. Raise the shaft up slightly with the actuator shaft grip and then smoothly press down on the actuator shaft grip until the synthetic turf backing is reached. (Do not use excessive force)
8. **For the 1.0-inch foot** – Readings are displayed as shown.

   For the 2.0-inch foot = Add 1.0 inch to the reading as the digital readout scale is 0.000 to 1.000 inch and the infill depth foot has a 2.000-inch-long probe. (If reading is 500 infill depth is 1.500 or 1.5 inches deep)

9. On the first measurement, the value of the current measurement is displayed. For subsequent measurements, the LCD will display the current reading for 2 seconds and the average after 2 seconds.
10. To reset the average, press the Power Button briefly while the average value is being displayed. If the average is not reset, the next reading will be included in the average as well. The average will also be reset if the meter is powered off (manually or due to 5 minutes of inactivity).
11. Move to the next test area and repeat the process.

For optimal field conditions, you do not want to see more than a 10% difference in readings.

	
For testing infill with the Mascaro Infill and Cleat Depth Tester (MICDT), lift up the plunger shaft slightly so the collar is not touching the actuator shaft on the electronics box.	Smoothly press down on actuator shaft grip until the synthetic turf backing is reached and read the digital display.

Take note of any high or low areas and groom the field or add additional infill to even out the playing surface. Usually wear areas, like football field centers and soccer goal mouths, will have more displaced infill as compared to areas of the field that are less utilized.

For Cleat Depth - Taking a Reading:

1. Place the unit on the surface being measured.
2. Place the unit on the turf surface being measured and be sure the foot is on the surface of the infill for accurate readings. DO NOT push down on handle, just use it to stabilize the unit during testing.
3. If the display is blank, press the Power Button briefly and wait for the unit to turn on.
4. Lift up the plunger shaft until it hits the Stop (about four inches). The display will now show the number of measurements that have been included in the average (or zero for the first reading).
5. Release the Plunger so that it drops *smoothly.*
6. On the first measurement, the value of the current measurement is displayed. For subsequent measurements, the LCD will display the current reading for 2 seconds and the average after 2 seconds.
7. To reset the average, press the Power Button briefly while the average value is being displayed. If the average is not reset, the next reading will be included in the average as well. The average will also be reset if the meter is powered off (manually or due to 5 minutes of inactivity).
8. Move to the next test area and repeat the process.
9. For optimal field conditions, you do not want to see more than a 10% difference in readings.

	
Lift up the plunger shaft until it hits the Stop (about four inches)	Release *smoothly* to avoid affecting drop speed

Understanding readings in 100th of an inch

Note, often synthetic infill depth requirements are listed in millimeters and this tool measures in one hundredths of an inch. A simple conversion formula is as follows:

Formula: Multiply number on display x 25.4 – Millimeter
500 on display = .500 of an inch
.500 x 25.4 = 12.7 mm
(Remember with the cleat foot and the 1-inch infill depth foot, this is your reading)

With the **2-inch-deep infill depth foot**, you MUST add an inch to the reading:
500 on display = 1.500 of an inch of infill
1.500 x 25.4 = 38.1 mm

Note: Most human hair is one-thousandth of inch, or 0.001 inch so 10 human hairs = 1/100th of an inch. This would equate to a reading on the Mascaro Infill & Cleat Depth Tester of 001. For sports field infill we want less than a 10% variance in depth so a range between 0.00 and 0.20 inches or on the display a range of 200 is acceptable. If the field reads between 400 and 600 (1.4 inches and 1.6 inches, this would be an acceptable range).

For professional sports, a smaller range would be necessary in order to maintain a more accurate and consistent surface.

Understanding infill readings

Check with your synthetic turf manufacturer as to the infill depth requirements for your surface. Each manufacturer has different depth requirements from brand to brand and also different infill depth requirements for different types of surfaces produced by the same manufacturer. **Always look at the manufacturer recommendations.**

In general, 70% of the pile height should be covered with infill material and 30% of the pile should be visible above the infill material. If the pile (fiber) height is 2.00 inches, the infill material should be at the depth of 1.40 inches.

FieldScout Mobile App/ SpecConnect

The FieldScout Mobile App can be used to view measurement results directly on your mobile device and send the data directly to the SpecConnect web interface. Data can be viewed on a Smartphone in two formats:

Basic Grid Mode - Available with or without a SpecConnect subscription. The site is divided into a customizable 2-dimensional grid of 3 to 5 rows and 3 to 5 columns. Measurements are taken in each grid cell. Grid cells are color-coded showing firmness average (fig. 1).

Freeform Mode - Available with a SpecConnect subscription. Color-coded location icons are placed at every measurement point using the coordinates from the internal location of the app's mobile device (fig. 2).

The data from the Pro version of the app is sent instantaneously to SpecConnect. Data can be viewed in map form (fig. 3), exported to a spreadsheet, or viewed as a Trend Report (fig. 4). More details are available in the user's guide for the app.

Figure 1. Grid Mode

Figure 2. Freeform Mode

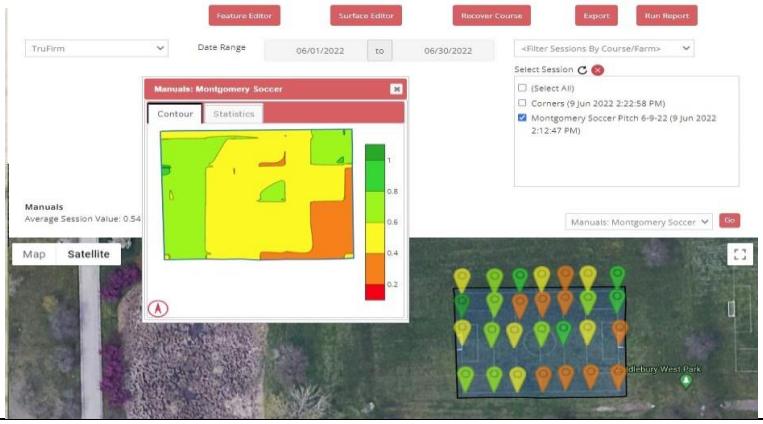


Fig. 3. 2-D Mapped Readings and Contour Plot in SpecConnect

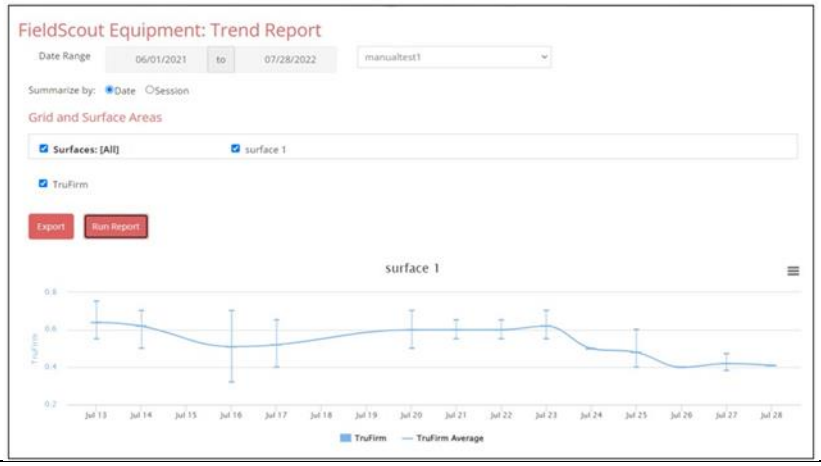
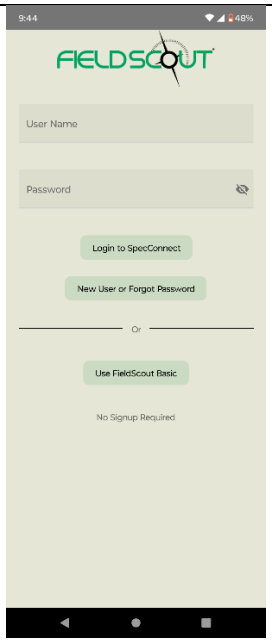
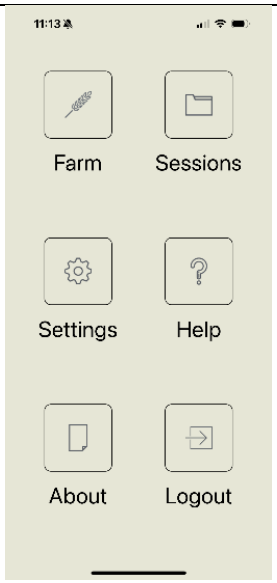
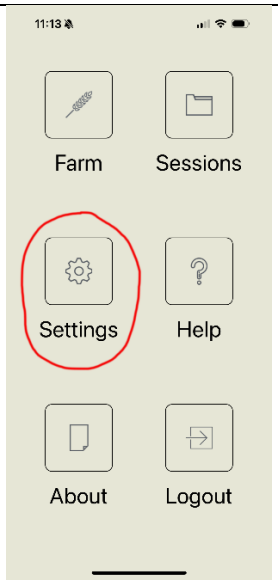
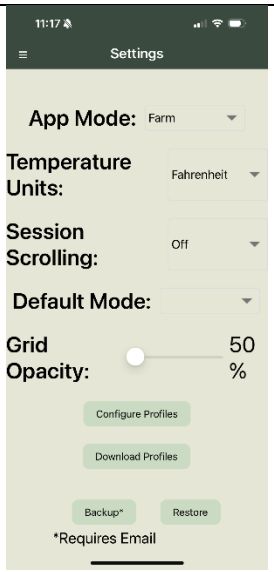
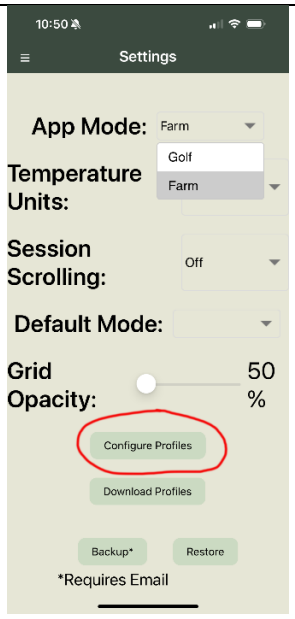
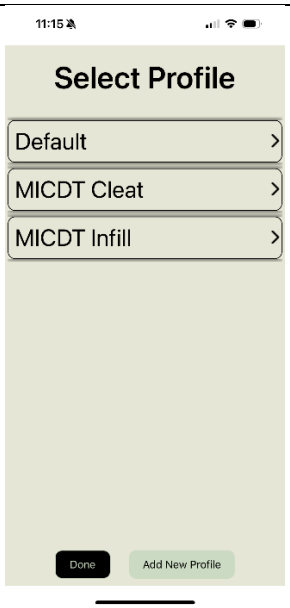
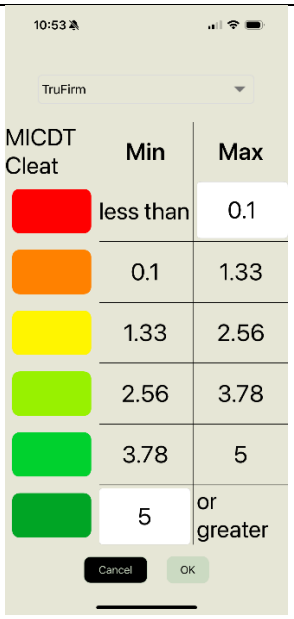
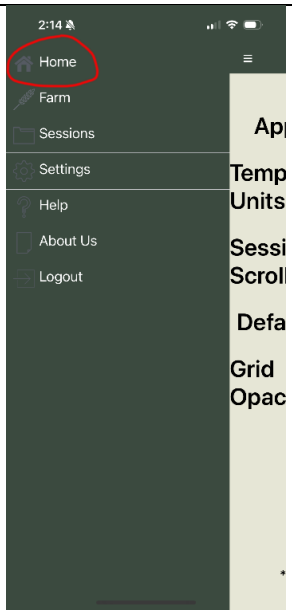
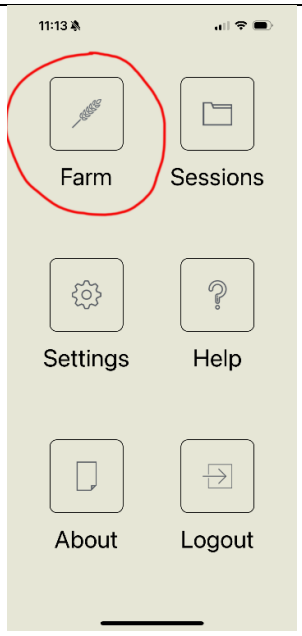
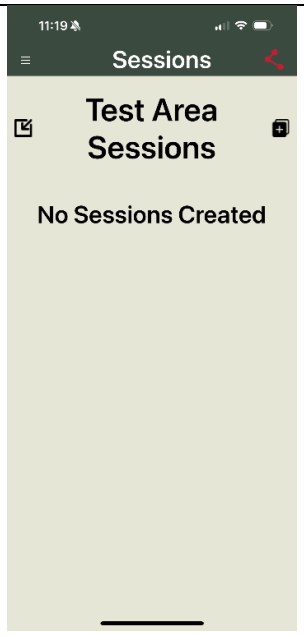
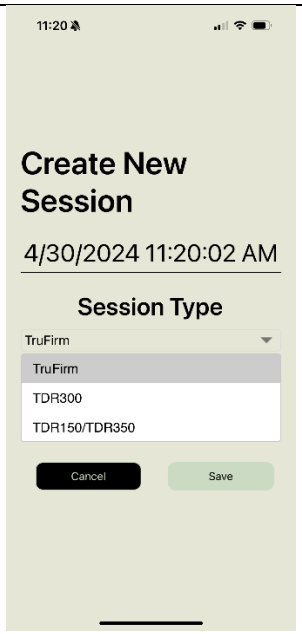
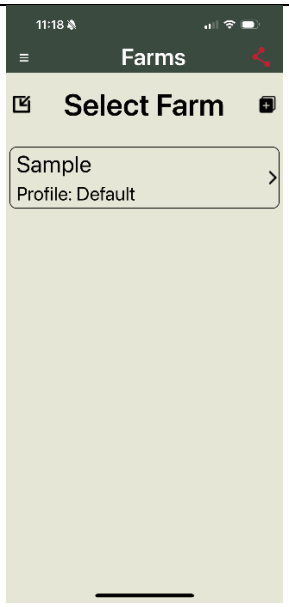
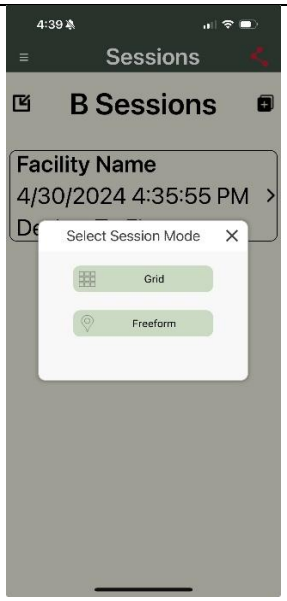


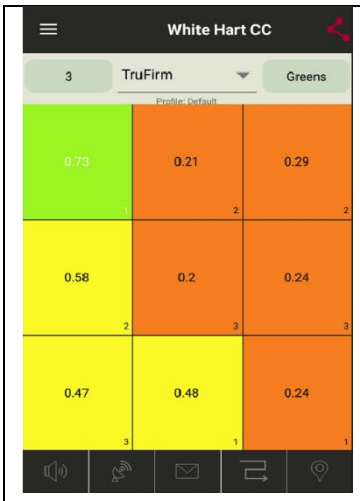
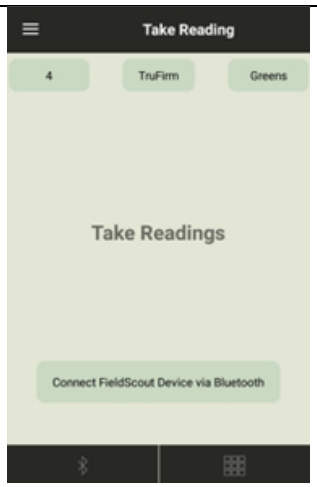
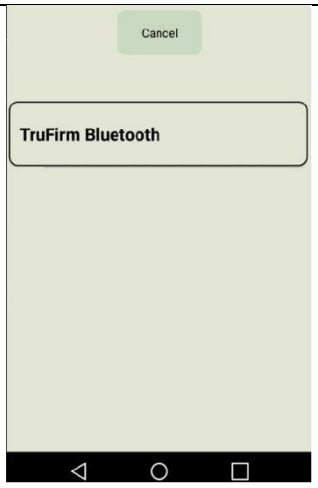
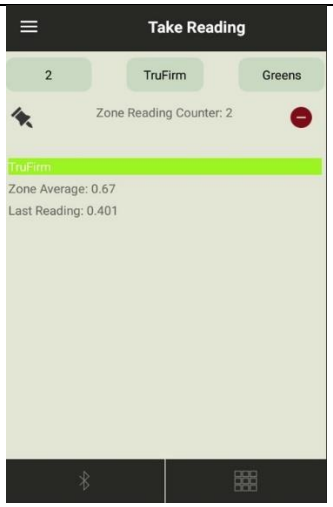
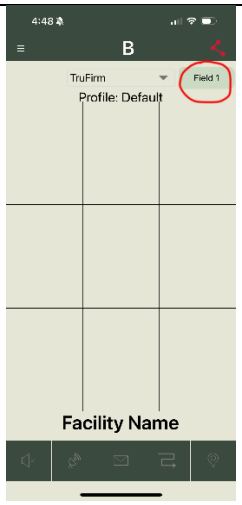
Fig. 4. Trend Report

FieldScout Mobile App: Setup and Use

FieldScout		
Install the FieldScout SpecConnect app on your device from the Play Store or App Store	After Installing the app, it asks if you are testing a Golf Course or Agriculture / Other Area. Choose Agriculture / Other Area	Choose to Login to SpecConnect if you have the paid version with your username and password or choose Basic if you are using the free version

		
Open the FieldScout Mobile App.	Click Settings	In Settings, under App Mode – Choose “Farm”
		
Click Configure Profile	Add new profile & create “MICDT Cleat” and “MICDT Infill”. You can also set your colors and depth ranges here. *	*This screen will appear after you create the profile name. Choose TruFirm and range for cleat depth and infill depth you are looking for testing. Click OK

		
Choose Hamburger Menu and click Home	Click on Farm	Add a Sports field by clicking on the “+” or select a sports field if you have one listed
		
Select session type as Trufirm and Save	Select the session your created	Start Testing - Click on Session you created and choose freeform or grid.

		
Grid is for the free app. In Basic Mode, the Grid screen appears. Tap on a grid cell where measurements will be added. The app will display the Take Readings screen	Freeform is for the paid SpecConnect App and shows the GPS locations. Enter your username and password to send measurements to the cloud account.	Connect to the Mascaro Infill Cleat Depth Tester by ensuring the unit is turned on and then select ”Connect FieldScout Device to Bluetooth”
		
Select TruFirm Bluetooth	Begin taking readings.	You can add additional Fields in Grid by Clicking on upper right button

- If using the Free or Basic App, click on the square you want to test in. If using the paid SpecConnect App, the GPS points will automatically appear in the screen as you test.

Note: Although the device appears in the app, it may not appear on the phone's list of Bluetooth devices.

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 the 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.

Spectrum Technologies, Inc.
"To Measure Is To Know"

CE

www.specmeters.com

Supplier's Declaration of Conformity 47 CFR § 2.1077 Compliance Information

In accordance with European Parliament and Council Decision No. 768/2008/EC Annex III we, Spectrum Technologies, Inc., a corporation validly organized and existing under the laws of the United States of America, having its principal place of business at 3600 Thayer Court, Aurora IL 60504 USA **declare under our sole responsibility that the below named Product:** FieldScout TruFirm Turf Firmness Meter **Model Name (Product Number):** TruFirm 6490S **Object of the Declaration:**

FieldScout TruFirm Turf Firmness Meter providing a means for determining the firmness of turf used in sport playing surfaces. Specifications:

- Battery powered device (2 x AA batteries)
- Bluetooth communications
- LCD Display
- Durable powder coated aluminum frame **to which this declaration relates conforms with the relevant requirements of the Harmonized Legislations mentioned below. Specifically, but not limited to, the following harmonized standards and/or normative documents:**

Harmonization Legislation:

2014/53/EU Radio Equipment Directive
2011/65/EU Restriction of Hazardous Substances Directive

Article 3.1(a) Safety of Information Technology Equipment

EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013 (as applied to internal Bluetooth module Silicon Labs BLE113-A-M256K)

Article 3.1(b) Electromagnetic Compatibility

EN 61000-6-1:2007 Immunity for residential, commercial, and light-industrial environments EN 61000-6-3:2007 /A1:2011 Emission standard for residential, commercial, and light-industrial environments
EN 55022:2010 /AC:2011 Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
EN 301 489-1 V2.1.1 EMC standard for radio equipment and services; Part 1 (as applied to internal Bluetooth module Silicon Labs BLE113-A-M256K)

EN 301 489-1 V1.9.2; 2011 EMC standard for radio equipment and services; Part 1: Common technical requirements
EN 301 489-3 V1.6.1; 2013 EMC standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices
EN 301 489-17 v3.1.1 EMC standard for radio equipment and services; Part 17 (as applied to internal Bluetooth module Silicon Labs BLE113-A-M256K)

Article 3.2 Spectrum Efficiency

EN 300 328 V2.1.1; 2016-11 Wideband Data Transmission Systems; 2.4 GHz Band; Emissions, EMC
(as applied to internal Bluetooth module Silicon Labs BGM113-A-M256K)
EN 300 440 V1.6.1 2010-08 Short Range Devises 1-40 GHz; Emissions; EMC

Article 3.3 Other Requirements

EN 63000:2018 Technical documents on for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Sam Kelly
Electronics Engineer