

## **Soil Sampling and Doing Something Useful with It.**

It's so easy to over-water, it doesn't show except for the bills for water and electricity for the pumps!

Estimating the right amount of water needs a knowledge of the soil makeup, root depth and plant (turf) type.

The soil probes from TWL Irrigation will enable you to find the makeup and root depth.

### **Underhill Soil Probe**

#### **The perfect tool where deep soil sampling is required.**

- Designed to penetrate hard soil.
- Open side 12" barrel for deep soil penetration and easy inspection of soil structure 12" extension bar
- Tee handle and hand grips for ease of use
- Hardened steel leading edge for optimum results

### **Underhill Handy Compact Soil Sampler 3/4"**

#### **Designed for small core soil samples, fast, simple and accurate.**

Triple window tine for quick and easy viewing of soil strata near the turf surface

- Lightweight Stainless Steel construction
- Plug size: 3/4" x 9 3/4"
- Removable "T" handle with convenient metal storage container

#### **This is what to do with the sample you have taken.**

From the sample taken, measure the root depth.

Cut off the green bits and tease out the roots from the sample and put the rest into a jam jar. Add water, shake until all is loose. Put the jar down somewhere it won't be disturbed. Leave it for at least a day.

At the bottom, will be the layer of sand. Above that the silt and at the top, the clay. Above that, the water should be clear. Measure the height of each layer and work out its percentage of the total height.

Enter these percentages into the soil calculator (link below.)

<http://resources.hwb.wales.gov.uk/VTC/env-sci/module2/soils/soilwatr.htm>

Use this to determine the soil type

Download the **Runtime Calculator** from the TWL Irrigation website

<https://www.twl-irrigation.com/resources/application-notes/>

and select **“Runtime Calculator”** (This is an Excel Spreadsheet, so your browser might object, but it’s OK)

sorry it’s in inches and not metric!

1 inch = 25mm

GPM = American Gallons per Minute x 4 to get to litres

3.25 feet = 1 meter

1m<sup>2</sup> = 10.5 sq.ft.

Click on the **“PR Calculators”** tab and work out the precipitation rate  
You may find out this directly from your sprinkler catalogue.

PR CALCULATOR #1	
Nozzle GPM	8.000
Arc, Degrees 10-360	180
Head Spacing ft	65.00
Row Spacing ft	65.00
<b>Precipitation - Gross "/hour</b>	<b>0.36</b>

**Row**  
Enter row spacing 0.1-200 ft

Here’s an example

8GPM = 32 L/min

Head Spacing 65ft = 20m

Row Spacing 65ft = 20m

Result:

Gross PR/hour 0.36” = 9mm/hour

Now click back to the **“RunTimeCalc”** tab

ZONE RUN TIME CALCULATOR			(User Entries in Blue)	
<b>WEEKLY PEAK PLANT NEEDS</b>			<b>CYCLE &amp; SOAK CALCULATOR</b>	
Peak Summer ETo "/day	0.05		Select Soil Type	Sandy-Loam
Month of Peak Summer	Jul		Slope %	0
Plant Type	Shallow-rooted Annuals		Zone Application divided into	1
Turf Height of Cut (HOC) inches	6.0		Cycle Time (mins)	12
Root Depth Inches	6.0		Water Applied per sub-division ("	0.054
Sun or Shade	Sun, South Facing		Allowed Infiltration Rate "/hour	0.75
Deficit Watering, % of Etc	100		Soak Time (mins)	0
<b>Peak Plant Needs (ETc) "/week</b>	<b>0.38</b>			
<b>DELIVERY METHOD</b>		Gives:	<b>ZONE RUN TIME</b>	
Type of Head	Manual Entry PR & DU		<b>Minutes</b>	<b>Water Applied Inches</b>
Manual Entry Precip Rate "/hour	0.36	0.36	<b>12</b>	<b>0.05</b>
Manual Entry Distribution Uniformity %	78	78		
Plants Trimmed? Yes/no	Yes			
Heads Perpendicular? Yes/no	Yes			
Nozzles Matched? Yes/no	Yes			
Correct Spacing? Yes/no	Yes			
Pressure Regulating Nozzles? Yes/no	No			
<b>Effective Field Precipitation Rate</b>	<b>0.26</b>	<b>"/hour</b>	<b>WATERING EFFICIENCY</b>	
			Zone Total Area (sq.ft.)	300
			Gross Precipitation Rate "/hr	0.36
			Gallons per minute GPM	1.12
			Gallons per Week (peak usage)	97
			Deep Percolation per Week (Gals)	26
			<b>Zone Irrigation Efficiency %</b>	<b>73</b>
<b>WATERING CYCLES PER WEEK</b>				
Starts/day	1			
Allowed Watering Days/week	7			
worst Case No Water Interval (days)	0.5			
Days to Deplete Available Water	6.1			
<b>Cycles per Week</b>	<b>7</b>			

The **weekly peak plant needs** depends on how hot it is. In UK you are unlikely to be more than just over 1mm/day during a hot spell. 0.05" = 1.27mm/day.

Choose the plant type. Cool Season Grasses is what golf uses

Turf height of cut influences how much water turfgrass loses

Root depth, you can judge from the soil sampled. It affects how frequently you have to water. Deeper the roots, the longer the interval can be between watering cycles

How sunny is the area determines how fast it loses its available water.

The result is the **peak plant needs** in inches per week.

This is what you have to put back to keep everything in equilibrium.

Turning now to the **delivery method**.

Use manual entry PR and DU. Use the PR you got from the Precipitation Rate Calculator, earlier.

Distribution Uniformity is never 100% (alas), but 70-80% is quite common. There will always be drier spots. If unsure, use the Underhill Catch cans and the "CatchCan" tab in the calculator

The result is the **Effective Precipitation Rate**, inches per hour

**Watering cycles/week** is how many times a week you put on water.

‘Days to deplete available water’ depends on the root depth and soil type (set in the Cycle & Soak Calculator). It’s useful to know how long you can go before having to water before your crop gets damaged.

#### **Cycle & Soak Calculator**

This is where the soil type is entered. There won’t be as many choices as what the soil triangle will offer you, so choose the one nearest from the drop down box.

#### **Zone Runtime in minutes**

The result of all the previous entries is the amount of time to run the station for which you have calculated. Use this and you won’t over-water!

For further advice and questions call or email:

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