Department of Sustainanable Natural Resources

SOIL SURVEY STANDARD TEST METHOD

AVAILABLE WATER CAPACITY

ABBREVIATED NAME	AWC
TEST NUMBER	P18
TEST METHOD TYPE	B
VERSION NUMBER	2

SCOPE

Available Water Capacity (AWC) is the amount of water available to plants from the time the soil stops draining water to the time the soil becomes too dry to prevent permanent wilting. This procedure determines the soil water content at Permanent Wilting Point (PWP) and Field Capacity (FC) and calculates AWC as the difference between PWP and FC.

PRINCIPLE

The water retentivity of a soil relates the amount of water retained in a soil to the energy state (potential) of that water. The water in the soil is equilibrated with imposed pressure to simulate the conditions for PWP and FC. The water content for each state is determined and AWC is calculated by subtracting PWP from FC.

SPECIAL APPARATUS
- Pressure plate apparatus.
- 50 mL burette.

PROCEDURE

1. Place the sample-retainer rings on the porous plate. Using a teaspoon or small scoop, take a random, grab sample of soil <2 mm diameter, and dump the whole sample into the ring taking care to avoid particle size segregation. Level the soil. Carry out duplicate samples.

2. Add distilled water to the surface of the porous plate until it reaches halfway up the outside of the rings. Cover the plate and allow to stand overnight, adding more water as required to maintain the level.

3. When the soils are saturated, carefully transfer the plate to the pressure chamber and connect the outlet tube. Connect the outflow tube from the pressure chamber to the bottom of 50 mL burette. Apply the appropriate pressure. (See Table 1.)

4. When equilibrium has been reached (minimum 24 hrs) as shown by no change in volume in the draining burette, close the burette tap and release the pressure in the chamber. Transfer the soil from each ring to a weighing tin and determine the moisture content according to the Soil Moisture Content (P1A/1).

5. Repeat the procedure for other required pressures.

Table 1. Comparison of pressure and pF

kPa	Bar	Atm	pF	Description
10	0.10	0.099	2.0	Field Capacity
20	0.20	0.197	2.31	
35	0.35	0.346	2.55	
60	0.60	0.592	2.79	
100	1.00	0.987	3.01	
200	2.00	1.974	3.31	
500	5.0	4.936	3.71	
1000	10.00	9.872	4.01	
1500	15.00	14.807	4.20	Permanent Wilting Point

CALCULATIONS

Moisture characteristic

Plot a graph of pF against moisture content (%).

Available soil water capacity

$$AWC\,(\%) = FC - PWP$$

Where:
FC   =   Field capacity (%)
PWP   =   Permanent wilting point (%)

REPORTING THE RESULTS

Report field capacity, permanent wilting point and available water content (%) (on an oven-dry basis) to one decimal place.

REFERENCES

Abbott, TS (ed) 1985, *Soil Testing Service: Methods and Interpretation.* NSW Department of Agriculture.

McIntyre, DS 1974, in Loveday, J (ed) *Methods of Analysis for Irrigated Soils.* Commonwealth Agricultural Bureaux Technical Commmunication No 54, Farnham Royal, England.