

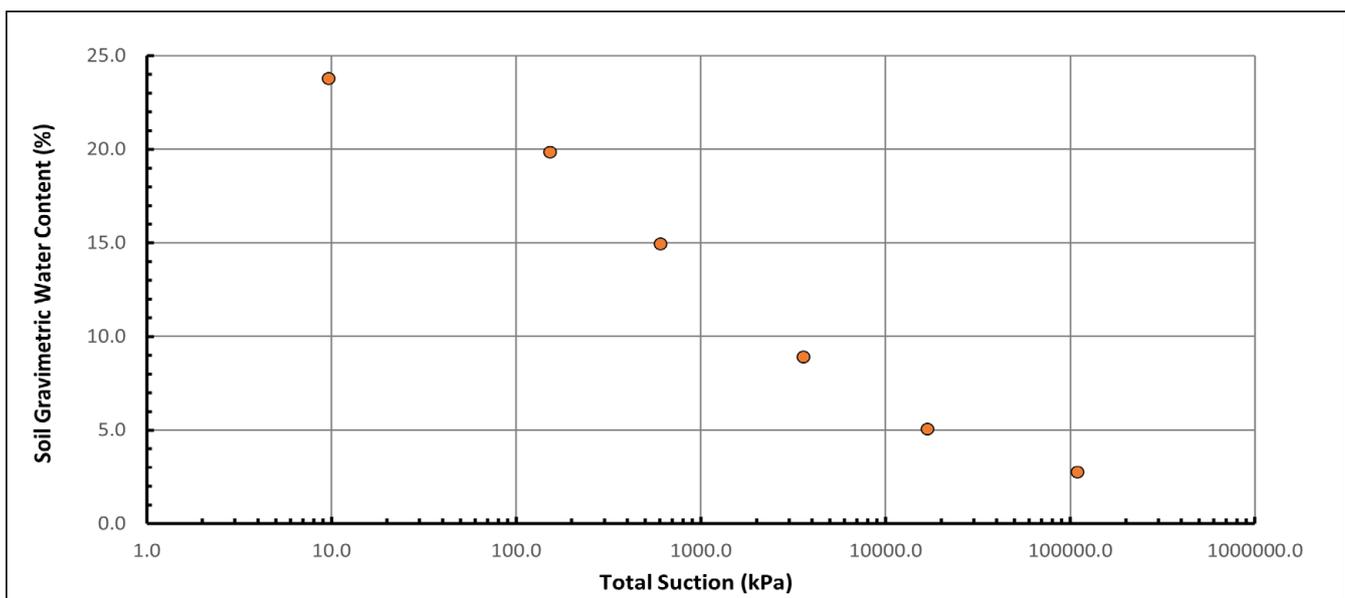
# /// Unsaturated Soil Testing

At Alliance we provide unsaturated soil mechanics testing in the specialist testing laboratory. Our soil and rock technical manager has solid knowledge and practice backgrounds in the theory, research and experiment in the unsaturated soil mechanics. With the state-of-art suction controlled triaxial equipment, we can provide unsaturated soil testing including the soil water characteristic curve (SWCC) tests, unsaturated consolidation tests and unsaturated drained triaxial tests.



## SWCC Tests (Soil Water Characteristic Curves Test)

The SWCC of a soil describes the relationship between its moisture conditions and the suction values existing in the soil. It is the most fundamental constitutive relationship in the unsaturated soil mechanism. Scientists and engineers are able to predict some of the most commonly used unsaturated soil properties using the SWCC, e.g., the unsaturated permeability, unsaturated shear strength, etc. At Alliance we use the axis-translation technique and the filter paper method ( ASTM D5298-16) to measure matric or total suctions in the soil.



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## Unsaturated Consolidation Tests & Unsaturated Drained Triaxial Tests

Using the high air entry porous disk (HAEPD) and the advanced air pressure/volume controller in the triaxial setup, the consolidation characteristics and the drained shear strength of a soil at a controlled suction value (i.e., a controlled unsaturated condition) can be determined. Furthermore, if a series of unsaturated consolidation tests are conducted at different saturation stages, the equilibrium void ratio obtained at each stage can be used to analysis the soil volume change properties upon drying and wetting, which have been used in unsaturated soil mathematical models such as Barcelona Basic Model or Unsaturated Cambridge Model.

