

83 GDS Helpsheet



*World Leaders in Computer Controlled Testing
Systems for Geotechnical Engineers and Geologists*

Hardware

Triaxial Testing Systems

Consolidation and Saturation

1. Introduction

If you consolidate your triaxial test specimens to the same effective stress state then all tests should be similar. This assumes however that any volume changes are identical and that you have the same voids ratio and degree of saturation in each test specimen.

If you use low back pressures however (i.e. less than 500kPa) and you do not saturate prior to consolidation (i.e. use saturation ramps and carry out B checks to make sure you have the same B values) then you might have an unsaturated soil. You are then comparing this with a saturated soil (at higher back pressures) and so you cannot expect to get similar results.

Here is a check list of "dos" and "don'ts".

1. Before carrying out strength or stiffness testing always saturate the test specimen. This will give you accurate volume change measurement and hence area correction for calculation of deviator stress.
2. Saturate gently by using low rates of saturation ramps (i.e. ramp cell pressure and back pressure at the same time and the same rate so that the apparent state of effective stress is maintained). If you saturate too fast "destruction" might occur caused by a lag between the pore pressure at the top drain and the pore pressure elsewhere in the test specimen causing effective stress variations and therefore strain gradients.
3. Verify you have satisfactory saturation by carrying out B checks.
4. Avoid back pressures below 500kPa because here the pore water is soft and varies in stiffness whereas above 500kPa water is constantly stiff and results are therefore more consistent.