

Specification of Competency Standards
for the Testing, Inspection and Certification Industry
Unit of Competency

Functional Area - Testing Operations

Title	Perform advanced physical and mechanical tests on soil and rock
Code	105834L5
Range	This unit of competency (UoC) covers the abilities to carry out physical and mechanical tests independently and critically evaluate the compressibility properties and shear strength of soil and rock materials by analysing test data in testing laboratories.
Level	5
Credit	8 (For Reference Only)
Competency	<p>Performance Requirements</p> <ol style="list-style-type: none"> 1. Possess knowledge of advanced physical and mechanical tests applicable to soil and rock <ul style="list-style-type: none"> • Describe the physical and mechanical properties of soil and rock, e.g. compressibility properties, shear strength of jointed rock. • Employ the principles and concepts underpinning the test methods for advanced physical and mechanical tests of soil and rock, e.g. compressibility and strength tests for soil, strength and deformation test, lift-off test for rock anchor. • Determine the specification requirements of soil and rock testing. • Determine the testing and environmental conditions under specified requirements of soil and rock testing, e.g. laboratory temperature, pressure and force system. • Assess the sampling requirements (e.g. selection of samples, minimum sample size/ mass) and describe the sample preparation and handling procedures for soil and rock testing. • Explain the principles and operation of equipment used for advanced physical and mechanical tests on soil and rock. • Specify the calibration requirement of testing equipment. 2. Perform advanced physical and mechanical tests on soil and rock <ul style="list-style-type: none"> • Select and apply appropriate test methods/standards and testing equipment for physical and mechanical tests on soil and rock. • Set up, optimise and monitor the performance of testing equipment. • Prepare and treat the sample under test by applying appropriate conditions, e.g. drained or undrained condition for triaxial compression test, disturbed or undisturbed, saturated or unsaturated. • Carry out physical and mechanical tests, such as oedometer, triaxial compression test, shear strength of jointed rock, on selected soil and rock sample independently according to test methods/standards. • Maintain the testing and environmental conditions under specified requirements of the test. • Carry out required calibration checks on testing equipment and conduct validation checks on test data. • Record and analyse test data for reporting. • Evaluate critically the compliance of test results for the soil and rock sample. 3. Exhibit professionalism <ul style="list-style-type: none"> • Ensure integrity and confidentiality of test data by observing the code of conduct of the laboratory. • Ensure safe work practices and use appropriate personal protective equipment.
Assessment Criteria	The integrated outcome requirements of this UoC are the abilities to:

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	<ul style="list-style-type: none">• carry out advanced physical and mechanical tests on selected soil and rock sample independently by applying appropriate testing equipment and test conditions according to the requirements of test methods/standards and test specifications,• analyse accurate test data by verifying equipment calibration status and checking the validity of test data within the acceptable range specified in test methods/standards,• critically evaluate the compliance of test results against relevant specification requirements.
Remark	