

Soils Strand – Technician Option

New 16

Describe soil classification tests in the civil engineering industry

Level: 4 Credits: 10

Entry information: Open.

Special notes

- 1 Applicable Rules, standards, and codes
ISO/IEC 17025:2005 – *General Requirements for the Competence of Testing and Calibration Laboratories* (ISO/IEC 17025); Available at <http://www.iso.org/iso/store.htm>
NZS 4402:1986 - *Methods of testing soils for civil engineering purposes*;
Available at <http://www.standards.co.nz>.
- 2 Definitions
Samples may include but are not limited to – prepared materials and test materials.
Organisational requirements refers to instructions to staff on policy and procedures which are formally documented or generally accepted at the work site. This may include legislation; industry standards and methods; national and international standards and methods; customer/organisation developed methods, standard operating procedures, specifications, manuals, and manufacturer's information.
- 3 Performance must be demonstrated and assessed in accordance with organisational requirements for a minimum of four.
- 4 *Soil Classification tests* include but are not limited to – wet sieve (particle size), dry sieve (particle size), Liquid Limit cone, Liquid Limit casagrande Plastic limit, Linear shrinkage, moisture content, Pinhole dispersion, Allophane, pH, Emerson crumb test, Hydrometer (particle size), Pipette (particle size), Shrink/swell, Jar Slake.

Judgment statement

Verifier: The trainee has shown ability to meet the standard stated within this unit in accordance with company specifications, procedures and where appropriate manufacturer's instructions.

Assessor: Based on the evidence of the verifier and demonstrated skills and knowledge the candidate has met the criteria as specified within this unit including all range statements.

Focus: Throughout this area of assessment the candidate will need to consistently apply knowledge learned relating to: sound businesses practices, organisational business rules and legislative requirements relating to acts, codes and legislation listed above.

Element 1

Describe a soil classification test method.

Performance Criteria	Candidate	Verifier/Assessor
1.1 The principle of the test is described in terms of sample requirements, equipment, processes involved and results.	▪	
1.2 Critical factors of the test are described in accordance with organisational requirements.		
Range: may include but is not limited to – temperature, humidity, environment.		
1.3 Variables of the test are described and the options to minimise variability is described in accordance with organisational requirements.		
Range: may include but is not limited to – equipment, apparatus, reagents, sample, technique, calibration, environment.		
1.4 Quality assurance of the test is described in accordance with organisational requirements.		
Range: may include but is not limited to – test method, recording requirements.		

Element 2

Describe the application of soil classification test results.

Performance Criteria	Candidate	Verifier/Assessor
<p>2.1 The application of test results is described in terms of process implications.</p> <p>Range: may include but is not limited to – out of specification results, in specification results, reporting.</p> <p>2.2 Critical limits of test results are described in accordance with organisational requirements.</p> <p>Range: may include but is not limited to – uncertainty of measurement, suitability, limitations.</p> <p>2.3 Reporting requirements for non conforming test results are described in accordance with organisational requirements.</p> <p>Range: may include but is not limited to – equipment, apparatus, reagents, sample, technique, calibration, environment.</p>	▪	

The term for a given scenario could be used and scenarios provided

New 17

Perform soil classification tests in the civil engineering industry

Level: 4 Credits: 10

Entry information: Open.

Special notes

- 1 Applicable Rules, standards, and codes
ISO/IEC 17025:2005 – *General Requirements for the Competence of Testing and Calibration Laboratories* (ISO/IEC 17025); Available at <http://www.iso.org/iso/store.htm>
NZS 4402:1986 - *Methods of testing soils for civil engineering purposes*. Available at <http://www.standards.co.nz>.
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Samples may include but are not limited to – prepared materials and test materials such as standards and reagents.
Organisational requirements refers to instructions to staff on policy and procedures (including the application of legislation to work site situations) which are formally documented or generally accepted at the work site. This may include legislation; industry standards and methods; national and international standards and methods; standards and methods published in internationally recognised reputable texts; customer/organisation developed methods, standard operating procedures, specifications, manuals, and manufacturer's information.
- 3 Performance must be demonstrated and assessed in accordance with organisational requirements for a minimum of **four**.
- 4 *Soil Classification tests* include but are not limited to – wet sieve (particle size), dry sieve (particle size), Liquid Limit cone, Liquid limit casagrande Plastic limit, Linear shrinkage, moisture content, Pinhole dispersion, Allophane, pH, Emerson crumb test, Hydrometer (particle size), Pipette (particle size), Shrink/swell, Jar Slake .

Judgment statement

- Verifier: The trainee has shown ability to meet the standard stated within this unit in accordance with company specifications, procedures and where appropriate manufacturer's instructions.
- Assessor: Based on the evidence of the verifier and demonstrated skills and knowledge the candidate has met the criteria as specified within this unit including all range statements.
- Focus: Throughout this area of assessment the candidate will need to consistently apply knowledge learned relating to: sound businesses practices, organisational business rules and legislative requirements relating to acts, codes and legislation listed above.

Element 1		
Perform soil classification tests on civil engineering samples		
Performance Criteria	Candidate	Assessor
1.1 Samples and equipment are prepared in accordance with organisational requirements.	▪	
1.2 Tests are performed according to organisational requirements.		
1.3 Test results are within precision requirements.		
1.4 Test equipment is maintained and stored.		

Element 2		
Calculate and report results of soil classification tests on civil engineering samples.		
Performance Criteria	Candidate	Assessor
2.1 Results are recorded accurately and calculations performed according to organisational requirements.	▪	
Range: may include but is not limited to – sample size, sample description.		
2.2 Calculations are reported in accordance with organisational requirements.		
Range: may include but is not limited to – non-conformance, corrective action taken.		

New 18

Describe soil density and compaction tests in the civil engineering industry

Level: 4 Credits: 8

Entry information: Open.

Special notes

- 1 Applicable Rules, standards, and codes
ISO/IEC 17025:2005 – *General Requirements for the Competence of Testing and Calibration Laboratories* (ISO/IEC 17025); Available at <http://www.iso.org/iso/store.htm>
NZS 4402:1986 - *Methods of testing soils for civil engineering purposes*;
Available at <http://www.standards.co.nz>.
- 2 Definitions
Samples may include but are not limited to – prepared materials and test materials such as standards and reagents.
Organisational requirements refers to instructions to staff on policy and procedures which are formally documented or generally accepted at the work site. This may include legislation; industry standards and methods; national and international standards and methods; customer/organisation developed methods, standard operating procedures, specifications, manuals, and manufacturer's information.
- 3 Performance must be demonstrated and assessed in accordance with organisational requirements for a minimum of **two** tests.
- 4 *Soil density and compaction tests* include but are not limited to - NZ standard, NZ heavy, NZ vibrating hammer, Solid density fine, Solid density coarse, maximum density, minimum density.

Judgment statement

Verifier: The trainee has shown ability to meet the standard stated within this unit in accordance with company specifications, procedures and where appropriate manufacturer's instructions.

Assessor: Based on the evidence of the verifier and demonstrated skills and knowledge the candidate has met the criteria as specified within this unit including all range statements.

Focus: Throughout this area of assessment the candidate will need to consistently apply knowledge learned relating to: sound businesses practices, organisational business rules and legislative requirements relating to acts, codes and legislation listed above.

Element 1

Describe a soil density and compaction test method.

Performance Criteria	Candidate	Verifier/Assessor
1.1 The principle of the test is described in terms of sample requirements, equipment, processes involved and results.	▪	
1.2 Critical factors of the test are described in accordance with organisational requirements.		
Range: may include but is not limited to – temperature, humidity, environment.		
1.3 Variables of the test are described and the options to minimise variability is described in accordance with organisational requirements.		
Range: may include but is not limited to – equipment, apparatus, reagents, sample, technique, calibration, environment.		
1.4 Quality assurance of the test is described in accordance with organisational requirements.		
Range: may include but is not limited to – test method, recording requirements.		

Element 2

Describe the application of soil density and compaction test results.

Performance Criteria	Candidate	Verifier/Assessor
<p>2.1 The application of test results is described in terms of process implications.</p> <p>Range: may include but is not limited to – out of specification results, in specification results, reporting.</p> <p>2.2 Critical limits of test results are described in accordance with organisational requirements.</p> <p>Range: may include but is not limited to – uncertainty of measurement, suitability, limitations.</p> <p>2.3 Reporting requirements for non conforming test results are described in accordance with organisational requirements.</p> <p>Range: may include but is not limited to – equipment, apparatus, reagents, sample, technique, calibration, environment.</p>	<ul style="list-style-type: none">▪	

New 19

Perform soil density and compaction tests in the civil engineering industry

Level: 4 Credits: 12

Entry information: Open.

Special notes

- 1 Applicable Rules, standards, and codes
ISO/IEC 17025:2005 – *General Requirements for the Competence of Testing and Calibration Laboratories* (ISO/IEC 17025); Available at <http://www.iso.org/iso/store.htm>
NZS 4402:1986 - *Methods of testing soils for civil engineering purposes*
Available at <http://www.standards.co.nz>.
- 2 Definitions
Samples may include but are not limited to – prepared materials and test materials such as standards and reagents.
Organisational requirements refers to instructions to staff on policy and procedures (including the application of legislation to work site situations) which are formally documented or generally accepted at the work site. This may include legislation; industry standards and methods; national and international standards and methods; standards and methods published in internationally recognised reputable texts; customer/organisation developed methods, standard operating procedures, specifications, manuals, and manufacturer’s information.
- 3 Performance must be demonstrated and assessed in accordance with organisational requirements for a minimum of **two** tests.
- 4 *Soil density and compaction tests* include but are not limited to - NZ standard, NZ heavy, NZ vibrating hammer, Solid density fine, Solid density coarse, maximum density, minimum density.

Judgment statement

- Verifier: The trainee has shown ability to meet the standard stated within this unit in accordance with company specifications, procedures and where appropriate manufacturer’s instructions.
- Assessor: Based on the evidence of the verifier and demonstrated skills and knowledge the candidate has met the criteria as specified within this unit including all range statements.
- Focus: Throughout this area of assessment the candidate will need to consistently apply knowledge learned relating to: sound businesses practices, organisational business rules and legislative requirements relating to acts, codes and legislation listed above.

Element 1		
Perform soil density and compaction tests on civil engineering samples		
Performance Criteria	Candidate	Assessor
1.1 Samples and equipment are prepared in accordance with organisational requirements.	▪	
1.2 Tests are performed according to organisational requirements.		
1.3 Test results are within precision requirements.		
1.4 Test equipment is maintained and stored.		

Element 2		
Calculate and report results of soil density and compaction tests on civil engineering samples.		
Performance Criteria	Candidate	Assessor
2.1 Results are recorded accurately and calculations performed according to organisational requirements.	▪	
Range: may include but is not limited to – sample size, sample description.		
2.2 Calculations are reported in accordance with organisational requirements.		
Range: may include but is not limited to – non-conformance, corrective action taken.		

New 20

Describe soil strength tests in the civil engineering industry

Level: 4 Credits: 8

Entry information: Open.

Special notes

- 1 Applicable Rules, standards, and codes
ISO/IEC 17025:2005 – *General Requirements for the Competence of Testing and Calibration Laboratories* (ISO/IEC 17025); Available at <http://www.iso.org/iso/store.htm>
NZS 4402:1986 - *Methods of testing soils for civil engineering purposes*;
Available at <http://www.standards.co.nz>.
- 2 Definitions
Samples may include but are not limited to – prepared materials and test materials such as standards and reagents.
Organisational requirements refers to instructions to staff on policy and procedures which are formally documented or generally accepted at the work site. This may include legislation; industry standards and methods; national and international standards and methods; customer/organisation developed methods, standard operating procedures, specifications, manuals, and manufacturer’s information.
- 3 Performance must be demonstrated and assessed in accordance with organisational requirements for a minimum of **two** tests.
- 4 *Soil strength tests* include but are not limited to - California Bearing Ratio (remoulded), California Bearing Ratio (undisturbed), Unconfined Compressive Strength (standard), Unconfined Compressive Strength (autographic), Laboratory Shear Vane, Point load.

Judgment statement

Verifier: The trainee has shown ability to meet the standard stated within this unit in accordance with company specifications, procedures and where appropriate manufacturer’s instructions.

Assessor: Based on the evidence of the verifier and demonstrated skills and knowledge the candidate has met the criteria as specified within this unit including all range statements.

Focus: Throughout this area of assessment the candidate will need to consistently apply knowledge learned relating to: sound businesses practices, organisational business rules and legislative requirements relating to acts, codes and legislation listed above.

Element 1

Describe a soil strength test method.

Performance Criteria	Candidate	Verifier/Assessor
1.1 The principle of the test is described in terms of sample requirements, equipment, processes involved and results.	■	
1.2 Critical factors of the test are described in accordance with organisational requirements.		
Range: may include but is not limited to – temperature, humidity, environment.		
1.3 Variables of the test are described and the options to minimise variability is described in accordance with organisational requirements.		
Range: may include but is not limited to – equipment, apparatus, reagents, sample, technique, calibration, environment.		
1.4 Quality assurance of the test is described in accordance with organisational requirements.		
Range: may include but is not limited to – test method, recording requirements.		

Element 2

Describe the application of soil strength test results.

Performance Criteria	Candidate	Verifier/Assessor
<p>2.1 The application of test results is described in terms of process implications.</p> <p>Range: may include but is not limited to – out of specification results, in specification results, reporting.</p> <p>2.2 Critical limits of test results are described in accordance with organisational requirements.</p> <p>Range: may include but is not limited to – uncertainty of measurement, suitability, limitations.</p> <p>2.3 Reporting requirements for non conforming test results are described in accordance with organisational requirements.</p> <p>Range: may include but is not limited to – equipment, apparatus, reagents, sample, technique, calibration, environment.</p>	<ul style="list-style-type: none">▪	

New 21

Perform soil strength tests in the civil engineering industry

Level: 4 Credits: 12

Entry information: Open.

Special notes

- 1 Applicable Rules, standards, and codes
ISO/IEC 17025:2005 – *General Requirements for the Competence of Testing and Calibration Laboratories* (ISO/IEC 17025); Available at <http://www.iso.org/iso/store.htm>
NZS 4402:1986 - *Methods of testing soils for civil engineering purposes*;
Available at <http://www.standards.co.nz>.
- 2 Definitions
Samples may include but are not limited to – prepared materials and test materials such as standards and reagents.
Organisational requirements refers to instructions to staff on policy and procedures (including the application of legislation to work site situations) which are formally documented or generally accepted at the work site. This may include legislation; industry standards and methods; national and international standards and methods; standards and methods published in internationally recognised reputable texts; customer/organisation developed methods, standard operating procedures, specifications, manuals, and manufacturer's information.
- 3 Performance must be demonstrated and assessed in accordance with organisational requirements for a minimum of **two** tests.
- 4 *Soil strength tests* include but are not limited to - California Bearing Ratio (remoulded), California Bearing Ratio (undisturbed), Unconfined Compressive Strength (standard), Unconfined Compressive Strength (autographic), Laboratory Shear Vane, Point load.

Judgment statement

Verifier: The trainee has shown ability to meet the standard stated within this unit in accordance with company specifications, procedures and where appropriate manufacturer's instructions.

Assessor: Based on the evidence of the verifier and demonstrated skills and knowledge the candidate has met the criteria as specified within this unit including all range statements.

Focus: Throughout this area of assessment the candidate will need to consistently apply knowledge learned relating to: sound businesses practices, organisational business rules and legislative requirements relating to acts, codes and legislation listed above.

Element 1		
Perform soil strength tests on civil engineering samples		
Performance Criteria	Candidate	Assessor
1.1 Samples and equipment are prepared in accordance with organisational requirements.	▪	
1.2 Tests are performed according to organisational requirements.		
1.3 Test results are within precision requirements.		
1.4 Test equipment is maintained and stored.		

Element 2		
Calculate and report results of soil strength tests on civil engineering samples.		
Performance Criteria	Candidate	Assessor
2.1 Results are recorded accurately and calculations performed according to organisational requirements.	▪	
Range: may include but is not limited to – sample size, sample description.		
2.2 Calculations are reported in accordance with organisational requirements.		
Range: may include but is not limited to – non-conformance, corrective action taken.		

New 22

Describe and complete soil sampling in the civil engineering industry

Level: 4 Credits: 10

Entry information: Open.

Special notes

- 1 Applicable Rules, standards, and codes
ISO/IEC 17025:2005 – *General Requirements for the Competence of Testing and Calibration Laboratories* (ISO/IEC 17025);
Available at <http://www.iso.org/iso/store.htm>
NZS 4402:1986 - *Methods of testing soils for civil engineering purposes*;
Available at <http://www.standards.co.nz>.
- 2 Definitions
Samples may include but are not limited to – prepared materials and test materials such as standards and reagents.
Organisational requirements refers to instructions to staff on policy and procedures (including the application of legislation to work site situations) which are formally documented or generally accepted at the work site. This may include legislation; industry standards and methods; national and international standards and methods; standards and methods published in internationally recognised reputable texts; customer/organisation developed methods, standard operating procedures, specifications, manuals, and manufacturer's information.
- 3 Performance must be demonstrated and assessed in accordance with organisational requirements.

Judgment statement

- Verifier: The trainee has shown ability to meet the standard stated within this unit in accordance with company specifications, procedures and where appropriate manufacturer's instructions.
- Assessor: Based on the evidence of the verifier and demonstrated skills and knowledge the candidate has met the criteria as specified within this unit including all range statements.
- Focus: Throughout this area of assessment the candidate will need to consistently apply knowledge learned relating to: sound businesses practices, organisational business rules and legislative requirements relating to acts, codes and legislation listed above.

Element 1

Describe requirements for soil sampling in the civil engineering industry.

Range: includes but is not limited to – Push tube sampling, augering, core sampling, test pits, block sampling.

Performance Criteria	Candidate	Assessor
1.1 The selection of sites is described in terms of material integrity.	▪	
1.2 The selection of samples is described in terms of homogeneous and representative sampling.		
1.3 The methods of sampling are described in terms of their use, limits and standards.		
1.4 The documentation requirements are described in accordance with test and organisational requirements.		

Element 2

Complete soil sampling in the civil engineering industry.

Range: may include but is not limited to – Push tube sampling, augering, core sampling, test pits, block sampling evidence is required for 2 sample methods.

Performance Criteria	Candidate	Assessor
2.1 Sampling is planned in accordance with soil test and company requirements.	▪	
Range: may include but is not limited to – transport, access to sample site, customer communication.		
2.2 Take samples in accordance with test and company requirements.		
2.3 Label samples and document observations in accordance with test and company requirements.		
2.4 Sample is transported to testing location in accordance with test and company requirements.		

Soils Strand – Senior Technician Option

New 23

Explain specialist soil tests in the civil engineering industry

Level: 5 Credits: 24

Entry information: tech describe unit.

Special notes

- 1 Applicable Rules, standards, and codes
ISO/IEC 17025:2005 – *General Requirements for the Competence of Testing and Calibration Laboratories* (ISO/IEC 17025);
Available at <http://www.iso.org/iso/store.htm>
NZS 4402:1986 - *Methods of testing soils for civil engineering purposes*;
Available at <http://www.standards.co.nz>.
- 2 Definitions
Samples may include but are not limited to – prepared materials and test materials such as standards and reagents.
Organisational requirements refers to instructions to staff on policy and procedures which are formally documented or generally accepted at the work site. This may include legislation; industry standards and methods; national and international standards and methods; customer/organisation developed methods, standard operating procedures, specifications, manuals, and manufacturer’s information.
- 3 Performance must be demonstrated and assessed in accordance with organisational requirements for a minimum of **three** tests.
- 4 Specialist soil tests include but are not limited to - Triaxial total, Triaxial effective, permeability Triaxial, Hoek Cell, Shear box, Ring shear, permeability constant head test, permeability falling head test, 1D consolidation, ‘hydraulic oedometer’,

Judgment statement

- Verifier: The trainee has shown ability to meet the standard stated within this unit in accordance with company specifications, procedures and where appropriate manufacturer’s instructions.
- Assessor: Based on the evidence of the verifier and demonstrated skills and knowledge the candidate has met the criteria as specified within this unit including all range statements.
- Focus: Throughout this area of assessment the candidate will need to consistently apply knowledge learned relating to: sound businesses practices, organisational business rules and legislative requirements relating to acts, codes and legislation listed above.

Element 1

Explain a specialist soil test method.

Performance Criteria	Candidate	Verifier/Assessor
1.1 The principle of the test is explained in terms of sample requirements, equipment, processes involved and results.	▪	
1.2 Critical factors of the test are explained in accordance with organisational requirements.		
Range: may include but is not limited to – temperature, humidity, environment.		
1.3 Variables of the test are explained and the options to minimise variability is described in accordance with organisational requirements.		
Range: may include but is not limited to – equipment, apparatus, reagents, sample, technique, calibration, environment.		
1.4 Quality assurance of the test is explained in accordance with organisational requirements.		
Range: may include but is not limited to – test method, recording requirements.		

Element 2

Explain the application of specialist soil test results.

Performance Criteria	Candidate	Verifier/Assessor
<p>2.1 The application of test results is explained in terms of process implications.</p> <p>Range: may include but is not limited to – out of specification results, in specification results, reporting.</p> <p>2.2 Critical limits of test results are explained in accordance with organisational requirements.</p> <p>Range: may include but is not limited to – uncertainty of measurement, suitability, limitations.</p> <p>2.3 Reporting requirements for non conforming test results are described in accordance with organisational requirements.</p> <p>Range: may include but is not limited to – equipment, apparatus, reagents, sample, technique, calibration, environment.</p>	▪	

New 24

Evaluate and troubleshoot soil specialist tests in the civil engineering industry

Level: 5 Credits: 18

Entry information: Open.

Special notes

- 1 Applicable Rules, standards, and codes
ISO/IEC 17025:2005 – *General Requirements for the Competence of Testing and Calibration Laboratories* (ISO/IEC 17025); Available at <http://www.iso.org/iso/store.htm>
NZS 4402:1986 - *Methods of testing soils for civil engineering purposes*;
Available at <http://www.standards.co.nz>.
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- 3 Performance must be demonstrated and assessed in accordance with organisational requirements for a minimum of **three** tests.
- 4 Specialist soil tests include but are not limited to - Triaxial total, Triaxial effective, permeability Triaxial, Hoek Cell, Shear box, Ring shear, permeability constant head test, permeability falling head test, 1D consolidation, 'hydraulic oedometer',

Judgment statement

Verifier: The trainee has shown ability to meet the standard stated within this unit in accordance with company specifications, procedures and where appropriate manufacturer's instructions.

Assessor: Based on the evidence of the verifier and demonstrated skills and knowledge the candidate has met the criteria as specified within this unit including all range statements.

Focus: Throughout this area of assessment the candidate will need to consistently apply knowledge learned relating to: sound businesses practices, organisational business rules and legislative requirements relating to acts, codes and legislation listed above.

Element 1

Evaluate results of specialist soil tests on civil engineering materials.

Performance Criteria	Candidate	Assessor
2.1 Results are interpreted in accordance with organisational requirements. Range: may include but is not limited to – non-conformance, corrective action taken.		

Element 2

Troubleshoot abnormal specialist soil test situations and results.

Performance Criteria	Candidate	Assessor
2.1 Troubleshooting abnormal specialist test situations identifies the nature of the problem, uses effective problem solving techniques and reaches a valid solution in accordance with organisational requirements. 2.2 Troubleshooting abnormal specialist test results identifies the nature of the problem, uses effective problem solving techniques and reaches a valid solution in accordance with organisational requirements.	<ul style="list-style-type: none"> ▪ 	

New 25

Explain soil classification tests in the civil engineering industry

Level: 5 Credits: 20

Entry information: Technician level describe unit.

Special notes

- 1 Applicable Rules, standards, and codes
ISO 9001:2008, *Quality Management Systems (QMS) Requirements* (ISO 9001);
ISO/IEC 17025:2005 – *General Requirements for the Competence of Testing and Calibration Laboratories* (ISO/IEC 17025);
NZS 4402:1986 - *Methods of testing soils for civil engineering purposes*;
Available at <http://www.standards.co.nz>.
- 2 Definitions
Samples may include but are not limited to – prepared materials and test materials such as standards and reagents.
Organisational requirements refers to instructions to staff on policy and procedures which are formally documented or generally accepted at the work site. This may include legislation; industry standards and methods; national and international standards and methods; customer/organisation developed methods, standard operating procedures, specifications, manuals, and manufacturer's information.
- 3 Performance must be demonstrated and assessed in accordance with organisational requirements for a minimum of four.
- 4 *Soil Classification tests* include but are not limited to – wet sieve (particle size), dry sieve (particle size), Liquid Limit cone, Liquid Limit casagrande Plastic limit, Linear shrinkage, moisture content, Pinhole dispersion, Allophane, pH, Emerson crumb test, Hydrometer (particle size), Pipette (particle size), Shrink/swell, Jar Slake.

Judgment statement

Verifier: The trainee has shown ability to meet the standard stated within this unit in accordance with company specifications, procedures and where appropriate manufacturer's instructions.

Assessor: Based on the evidence of the verifier and demonstrated skills and knowledge the candidate has met the criteria as specified within this unit including all range statements.

Focus: Throughout this area of assessment the candidate will need to consistently apply knowledge learned relating to: sound businesses practices, organisational business rules and legislative requirements relating to acts, codes and legislation listed above.

Element 1

Describe a soil classification test method.

Performance Criteria	Candidate	Verifier/Assessor
1.1 The principle of the test is explained in terms of sample requirements, equipment, processes involved and results.	▪	
1.2 Critical factors of the test are explained in accordance with organisational requirements.		
Range: may include but is not limited to – temperature, humidity, environment.		
1.3 Variables of the test are explained and the options to minimise variability is described in accordance with organisational requirements.		
Range: may include but is not limited to – equipment, apparatus, reagents, sample, technique, calibration, environment.		
1.4 Quality assurance of the test is explained in accordance with organisational requirements.		
Range: may include but is not limited to – test method, recording requirements..		

Element 2

Explain the application of soil classification test results.

Performance Criteria	Candidate	Verifier/Assessor
<p>2.1 The application of test results is explained in terms of process implications.</p> <p>Range: may include but is not limited to – out of specification results, in specification results, reporting.</p> <p>2.2 Critical limits of test results are explained in accordance with organisational requirements.</p> <p>Range: may include but is not limited to – uncertainty of measurement, suitability, limitations.</p> <p>2.3 Reporting requirements for non conforming test results are explained in accordance with organisational requirements.</p> <p>Range: may include but is not limited to – equipment, apparatus, reagents, sample, technique, calibration, environment.</p>	<ul style="list-style-type: none">▪	

New 26

Evaluate and troubleshoot soil classification tests in the civil engineering industry

Level: 5 Credits: 5

Entry information: Technician level complete tests unit

Special notes

- 1 Applicable Rules, standards, and codes
ISO 9001:2008, *Quality Management Systems (QMS) Requirements* (ISO 9001);
ISO/IEC 17025:2005 – *General Requirements for the Competence of Testing and Calibration Laboratories* (ISO/IEC 17025);
NZS 4402.1:1986, *Preliminary and General Methods of testing soils for civil engineering purposes* (NZS 4402), available at <http://www.standards.co.nz>.
- 2 Definitions
Samples may include but are not limited to – prepared materials and test materials such as standards and reagents.
Organisational requirements refers to instructions to staff on policy and procedures (including the application of legislation to work site situations) which are formally documented or generally accepted at the work site. This may include legislation; industry standards and methods; national and international standards and methods; standards and methods published in internationally recognised reputable texts; customer/organisation developed methods, standard operating procedures, specifications, manuals, and manufacturer’s information.
- 3 Performance must be demonstrated and assessed in accordance with organisational requirements for a minimum of **four**.
- 4 *Soil Classification tests* include but are not limited to – wet sieve (particle size), dry sieve (particle size), Liquid Limit cone, Liquid limit casagrande Plastic limit, Linear shrinkage, moisture content, Pinhole dispersion, Allophane, pH, Emerson crumb test, Hydrometer (particle size), Pipette (particle size), Shrink/swell, Jar Slake .

Judgment statement

- Verifier: The trainee has shown ability to meet the standard stated within this unit in accordance with company specifications, procedures and where appropriate manufacturer’s instructions.
- Assessor: Based on the evidence of the verifier and demonstrated skills and knowledge the candidate has met the criteria as specified within this unit including all range statements.
- Focus: Throughout this area of assessment the candidate will need to consistently apply knowledge learned relating to: sound businesses practices, organisational business rules and legislative requirements relating to acts, codes and legislation listed above.

Element 1

Evaluate results of soil classification tests on civil engineering materials.

Performance Criteria

1.1 Results are interpreted in accordance with organisational requirements.

Range: may include but is not limited to – non-conformance, corrective action taken.

Element 2

Troubleshoot abnormal soil classification test situations and results.

Performance Criteria

2.1 Troubleshooting abnormal soil classification test situations identifies the nature of the problem, uses effective problem solving techniques and reaches a valid solution in accordance with organisational requirements.

2.2 Troubleshooting abnormal soil classification test results identifies the nature of the problem, uses effective problem solving techniques and reaches a valid solution in accordance with organisational requirements.

Candidate

▪

Assessor

New 27

Explain soil density and compaction tests in the civil engineering industry

Level: 5 Credits: 12

Entry information: Technician level describe unit.

Special notes

- 1 Applicable Rules, standards, and codes
ISO/IEC 17025:2005 – *General Requirements for the Competence of Testing and Calibration Laboratories* (ISO/IEC 17025); Available at <http://www.iso.org/iso/store.htm>
NZS 4402:1986 - *Methods of testing soils for civil engineering purposes*;
Available at <http://www.standards.co.nz>
- 2 Definitions
Samples may include but are not limited to – prepared materials and test materials such as standards and reagents.
Organisational requirements refers to instructions to staff on policy and procedures which are formally documented or generally accepted at the work site. This may include legislation; industry standards and methods; national and international standards and methods; customer/organisation developed methods, standard operating procedures, specifications, manuals, and manufacturer's information.
- 3 Performance must be demonstrated and assessed in accordance with organisational requirements for a minimum of **two** tests.
- 4 *Soil density and compaction tests* include but are not limited to - NZ standard, NZ heavy, NZ vibrating hammer, Solid density fine, Solid density coarse, maximum density, minimum density.

Judgment statement

- Verifier: The trainee has shown ability to meet the standard stated within this unit in accordance with company specifications, procedures and where appropriate manufacturer's instructions.
- Assessor: Based on the evidence of the verifier and demonstrated skills and knowledge the candidate has met the criteria as specified within this unit including all range statements.
- Focus: Throughout this area of assessment the candidate will need to consistently apply knowledge learned relating to: sound businesses practices, organisational business rules and legislative requirements relating to acts, codes and legislation listed above.

Element 1

Explain a soil density and compaction test method.

Performance Criteria	Candidate	Verifier/Assessor
1.1 The principle of the test is explained in terms of sample requirements, equipment, processes involved and results.	■	
1.2 Critical factors of the test are describe in accordance with organisational requirements.		
Range: may include but is not limited to – temperature, humidity, environment.		
1.3 Variables of the test are explained and the options to minimise variability is described in accordance with organisational requirements.		
Range: may include but is not limited to – equipment, apparatus, reagents, sample, technique, calibration, environment.		
1.4 Quality assurance of the test is explained in accordance with organisational requirements.		
Range: may include but is not limited to – test method, recording requirements.		

Element 2

Explain the application of soil density and compaction test results.

Performance Criteria	Candidate	Verifier/Assessor
<p>2.1 The application of test results is explained in terms of process implications.</p> <p>Range: may include but is not limited to – out of specification results, in specification results, reporting.</p> <p>2.2 Critical limits of test results are explained in accordance with organisational requirements.</p> <p>Range: may include but is not limited to – uncertainty of measurement, suitability, limitations.</p> <p>2.3 Reporting requirements for non conforming test results are described in accordance with organisational requirements.</p> <p>Range: may include but is not limited to – equipment, apparatus, reagents, sample, technique, calibration, environment.</p>	▪	

New 28

Evaluate and troubleshoot soil density and compaction tests in the civil engineering industry

Level: 5 Credits: 6

Entry information: Technician perform unit.

Special notes

- 1 Applicable Rules, standards, and codes
ISO/IEC 17025:2005 – *General Requirements for the Competence of Testing and Calibration Laboratories* (ISO/IEC 17025); Available at <http://www.iso.org/iso/store.htm>
NZS 4402:1986 - *Methods of testing soils for civil engineering purposes*; Available at <http://www.standards.co.nz>.
- 2 Definitions
Samples may include but are not limited to – prepared materials and test materials such as standards and reagents.
Organisational requirements refers to instructions to staff on policy and procedures (including the application of legislation to work site situations) which are formally documented or generally accepted at the work site. This may include legislation; industry standards and methods; national and international standards and methods; standards and methods published in internationally recognised reputable texts; customer/organisation developed methods, standard operating procedures, specifications, manuals, and manufacturer’s information.
- 3 Performance must be demonstrated and assessed in accordance with organisational requirements for a minimum of **two** tests.
- 4 *Soil density and compaction tests* include but are not limited to - NZ standard, NZ heavy, NZ vibrating hammer, Solid density fine, Solid density coarse, maximum density, minimum density.

Judgment statement

- Verifier: The trainee has shown ability to meet the standard stated within this unit in accordance with company specifications, procedures and where appropriate manufacturer’s instructions.
- Assessor: Based on the evidence of the verifier and demonstrated skills and knowledge the candidate has met the criteria as specified within this unit including all range statements.
- Focus: Throughout this area of assessment the candidate will need to consistently apply knowledge learned relating to: sound businesses practices, organisational business rules and legislative requirements relating to acts, codes and legislation listed above.

Element 1

Evaluate results of soil density and compaction tests on civil engineering materials.

Performance Criteria	Candidate	Assessor
1.1 Results are interpreted in accordance with organisational requirements. Range: may include but is not limited to – non-conformance, corrective action taken.		

Element 2

Troubleshoot abnormal soil density and compaction test situations and results.

Performance Criteria	Candidate	Assessor
2.1 Troubleshooting abnormal soil density and compaction test situations identifies the nature of the problem, uses effective problem solving techniques and reaches a valid solution in accordance with organisational requirements. 3.2 Troubleshooting abnormal soil density and compaction test results identifies the nature of the problem, uses effective problem solving techniques and reaches a valid solution in accordance with organisational requirements.	<ul style="list-style-type: none"> ▪ 	

New 29

Explain soil strength tests in the civil engineering industry

Level: 5 Credits: 12

Entry information: Technician level describe unit.

Special notes

- 1 Applicable Rules, standards, and codes
ISO/IEC 17025:2005 – *General Requirements for the Competence of Testing and Calibration Laboratories* (ISO/IEC 17025); Available at <http://www.iso.org/iso/store.htm>
NZS 4402:1986 - *Methods of testing soils for civil engineering purposes*;
Available at <http://www.standards.co.nz>.
- 2 Definitions
Samples may include but are not limited to – prepared materials and test materials such as standards and reagents.
Organisational requirements refers to instructions to staff on policy and procedures which are formally documented or generally accepted at the work site. This may include legislation; industry standards and methods; national and international standards and methods; customer/organisation developed methods, standard operating procedures, specifications, manuals, and manufacturer’s information.
- 3 Performance must be demonstrated and assessed in accordance with organisational requirements for a minimum of **two** tests.
- 4 *Soil strength tests* include but are not limited to - California Bearing Ratio (remoulded), California Bearing Ratio (undisturbed), Unconfined Compressive Strength (standard), Unconfined Compressive Strength (autographic), Laboratory Shear Vane, Point load.

Judgment statement

Verifier: The trainee has shown ability to meet the standard stated within this unit in accordance with company specifications, procedures and where appropriate manufacturer’s instructions.

Assessor: Based on the evidence of the verifier and demonstrated skills and knowledge the candidate has met the criteria as specified within this unit including all range statements.

Focus: Throughout this area of assessment the candidate will need to consistently apply knowledge learned relating to: sound businesses practices, organisational business rules and legislative requirements relating to acts, codes and legislation listed above.

Element 1

Explain a soil strength test method.

Performance Criteria	Candidate	Verifier/Assessor
1.1 The principle of the test is explained in terms of sample requirements, equipment, processes involved and results.	■	
1.2 Critical factors of the test are explained in accordance with organisational requirements.		
Range: may include but is not limited to – temperature, humidity, environment.		
1.3 Variables of the test are explained and the options to minimise variability is explained in accordance with organisational requirements.		
Range: may include but is not limited to – equipment, apparatus, reagents, sample, technique, calibration, environment.		
1.4 Quality assurance of the test is explained in accordance with organisational requirements.		
Range: may include but is not limited to – test method, recording requirements.		

Element 2

Explain the application of soil strength test results.

Performance Criteria	Candidate	Verifier/Assessor
<p>2.1 The application of test results is explained in terms of process implications.</p> <p>Range: may include but is not limited to – out of specification results, in specification results, reporting.</p> <p>2.2 Critical limits of test results are explained in accordance with organisational requirements.</p> <p>Range: may include but is not limited to – uncertainty of measurement, suitability, limitations.</p> <p>2.3 Reporting requirements for non conforming test results are explained in accordance with organisational requirements.</p> <p>Range: may include but is not limited to – equipment, apparatus, reagents, sample, technique, calibration, environment.</p>	▪	

New 30

Evaluate and troubleshoot soil strength tests in the civil engineering industry

Level: 5 Credits: 6

Entry information: Level 4 density unit.

Special notes

- 1 Applicable Rules, standards, and codes
ISO/IEC 17025:2005 – *General Requirements for the Competence of Testing and Calibration Laboratories* (ISO/IEC 17025); Available at <http://www.iso.org/iso/store.htm>
NZS 4402:1986 - *Methods of testing soils for civil engineering purposes*; Available at <http://www.standards.co.nz>.
- 2 Definitions
Samples may include but are not limited to – prepared materials and test materials such as standards and reagents.
Organisational requirements refers to instructions to staff on policy and procedures (including the application of legislation to work site situations) which are formally documented or generally accepted at the work site. This may include legislation; industry standards and methods; national and international standards and methods; standards and methods published in internationally recognised reputable texts; customer/organisation developed methods, standard operating procedures, specifications, manuals, and manufacturer’s information.
- 3 Performance must be demonstrated and assessed in accordance with organisational requirements for a minimum of **two** tests.
- 4 *Soil strength tests* include but are not limited to - - CBR - California Bearing Ratio - remoulded, California Bearing Ratio – undisturbed, Unconfined Compressive Strength - standard, Unconfined Compressive Strength – autographic, Laboratory Shear Vane, Point load,

Judgment statement

- Verifier: The trainee has shown ability to meet the standard stated within this unit in accordance with company specifications, procedures and where appropriate manufacturer’s instructions.
- Assessor: Based on the evidence of the verifier and demonstrated skills and knowledge the candidate has met the criteria as specified within this unit including all range statements.
- Focus: Throughout this area of assessment the candidate will need to consistently apply knowledge learned relating to: sound businesses practices, organisational business rules and legislative requirements relating to acts, codes and legislation listed above.

Element 1

Evaluate results of soil strength tests on civil engineering materials.

Performance Criteria

1.1 Results are interpreted in accordance with organisational requirements.

Range: may include but is not limited to – non-conformance, corrective action taken.

Element 2

Troubleshoot abnormal soil strength test situations and results.

Performance Criteria

2.1 Troubleshooting abnormal soil strength test situations identifies the nature of the problem, uses effective problem solving techniques and reaches a valid solution in accordance with organisational requirements.

2.2 Troubleshooting abnormal soil strength test results identifies the nature of the problem, uses effective problem solving techniques and reaches a valid solution in accordance with organisational requirements.

Candidate

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Assessor