

**Level III Content Outline****Engineering Technician**

The candidates for NICET certification at Level III in Construction Materials Testing – Concrete should have the knowledge, experience and skills needed to work without direct supervision, under the guidance of a registered professional engineer. They are familiar with concrete mix and cement types; design concrete mixes; perform analysis and complex concrete mix testing (for example concrete shrinkage test); determine mix properties; develop sampling programs; evaluate concrete mix production and placement; perform concrete inspections and nondestructive testing; identify concrete plants types; perform proficiency sample tests and prepare for lab assessments; trouble shoot problem areas; supervise and train Levels I and II technicians, reviewing their testing procedures and practices; maintain equipment maintenance and calibration records; and prepare reports.

3.1 Sampling of Concrete Mixes and Components

(Questions related to these tasks make up 1-8% of the exam.)

3.1.1 Manage sampling program. 29, 30, 54

3.2 Concrete Mix Testing

(Questions related to these tasks make up 4-15% of the exam.)

3.2.1 Perform aggregate sulfate resistance (ASR) tests. 26, 27

3.2.2 Evaluate floor flatness and levelness results. 59

3.2.3 Perform water-soluble chloride ion content tests. 25, 49

3.2.4 Perform length change of concrete tests. 9, 15, 35

3.2.5 Perform mortar flow tests. 52, 57

3.2.6 Perform maturity mix trials. 22

3.2.7 Perform freeze thaw tests. 18, 36

3.2.8 Perform tests on roller-compacted concrete (RCC). 24

3.2.9 Perform rapid chloride ion permeability tests. 60

3.3 Concrete Mix Design

(Questions related to these tasks make up 10-20% of the exam.)

3.3.1 Determine theoretical proportions of concrete. 16

3.3.2 Determine theoretical proportions of grout. 33

3.3.3 Determine theoretical proportions of mortar. 33

3.3.4 Verify performance of concrete mix design. 12, 13, 20, 38, 49, 56

3.3.5 Identify types of concrete aggregate. 2, 6, 14

3.3.6 Identify types of cement. 51, 53

3.3.7 Identify types of pozzolans. 39, 40, 63

3.3.8 Identify types of concrete mixes. 41, 42, 55

3.3.9 Identify types of chemical admixtures. 21, 63

3.4 Concrete Mix Production and Placement

(Questions related to these tasks make up 15-25% of the exam.)

3.4.1 Identify batch plant types and components. 5, 61

3.4.2 Consult with Level I and II concrete technicians about site issues. 1, 4, 5, 10, 11, 29, 32, 50, 63

3.5 Concrete Inspections

(Questions related to these tasks make up 10-20% of the exam.)

3.5.1 Perform concrete post-tensioning inspections. 41, 63

3.5.2 Perform concrete pre-stress inspections. 63

3.5.3 Perform concrete precast inspections. 48, 63

3.5.4 Perform structural masonry inspections. 46, 62, 64



3.6 Concrete Nondestructive Testing

(Questions related to these tasks make up 1-8% of the exam.)

- 3.6.1 Perform ground penetrating radar tests.
- 3.6.2 Perform pulse echo tests. 17
- 3.6.3 Verify thermal tube placement. 37
- 3.6.4 Perform cross hole sonic logging (CSL) tests. 18, 58
- 3.6.5 Monitor mass concrete temperatures. 41, 43

3.7 Quality System Implementation

(Questions related to these tasks make up 10-20% of the exam.)

- 3.7.1 Train Level I and II technicians. 8, 29, 41, 44
- 3.7.2 Maintain training records. 23, 31
- 3.7.3 Maintain equipment records. 23
- 3.7.4 Maintain calibration records. 23, 31
- 3.7.5 Perform proficiency sample testing. 23, 31
- 3.7.6 Prepare for lab assessments. 23, 31

3.8 Reporting and Supervision

(Questions related to these tasks make up 10-20% of the exam.)

- 3.8.1 Evaluate concrete mixes and component test results. 3, 5
- 3.8.2 Review concrete mix and component sampling methods. 5
- 3.8.3 Review concrete mix testing procedures. 5, 34
- 3.8.4 Review aggregate testing procedures. 2, 5, 7, 19
- 3.8.5 Maintain concrete quality control charts. 23, 45
- 3.8.6 Produce preliminary reports. 28, 30, 47, 50, 54, 60

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footnote number is linked to a reference on the Selected General References listing