



Construction Materials Testing  
**ASPHALT, CONCRETE, SOILS**

**PROGRAM DETAIL MANUAL**

Please check NICET's web site ([www.nicet.org](http://www.nicet.org)) to make sure you have the most recent edition of this document.

Effective upon issuing a new edition of any program detail manual, all previous editions of that program detail manual become obsolete.

This manual may be freely copied in its entirety.

Field Code: 002  
Subfield Code: 7 Asphalt  
8 Concrete  
9 Soils

**Eighth Edition  
January 2016**

## IMPORTANT INFORMATION

The Institute occasionally makes changes in its certification programs that will significantly affect the currency of individual program detail manuals. These changes could include any or all of the following:

**KEEP YOUR  
MANUALS  
CURRENT**

- deletion, modification, or addition of work elements
- modification to the Examination Requirements Chart
- modification to crossover work element credit
- changes to the work experience requirement
- changes to the verification requirement

Such changes could affect the requirements for certification. Therefore, if this manual is more than a year old, NICET highly recommends that you check [www.nicet.org](http://www.nicet.org) (or, if you don't have access to the Internet, call NICET at 888-476-4238) to make sure that you have the current edition of the Program Detail Manual before applying for an examination. The date of publication of this manual is January 2016.

It is the responsibility of all applicants to make sure they are using a current manual.

This January 2016 edition of the Construction Materials Testing program detail manual contains the following minor updates from the December 2008 edition:

- Added "Concrete" to ACI Laboratory Testing Technician – Level I
- Added "Concrete" to ACI Laboratory Testing Technician – Level II

This eighth edition of the Construction Materials Testing program detail manual contains the substantive changes from the seventh edition. ACI retired the following certification programs on January 1, 2008:

- ACI Concrete Laboratory Testing Technician – Grade I
- ACI Concrete Laboratory Testing Technician – Grade II
- ACI Field Aggregate Testing Technician
- ACI Laboratory Aggregate Testing Technician

Whenever an exam requirement changes, individuals who are already certified and do not intend to upgrade their level of certification do not need to comply with any changes for the level(s) of certification they have already been awarded.

Individuals who wish to upgrade must satisfy any "new" exam or other certification requirements for the higher level once the deadline has been passed.

**Beginning October 1, 2002, all applicants testing in Asphalt, Concrete, or Soils were required to comply with the examination requirements found in this Eighth Edition program detail manual. (Candidates who had tested in Asphalt, Concrete, or Soils, prior to September 1, 2002, were offered a choice: to satisfy the certification requirements in the Eighth Edition program detail manual OR, before September 1, 2003, to satisfy the certification requirements in the Sixth Edition manual. After the September 1, 2003, deadline, all Construction Materials Testing applicants were required to satisfy the certification requirements in the Eighth Edition program detail manual.)**

# FIELD OF CONSTRUCTION MATERIALS TESTING

## SUBFIELDS OF ASPHALT, CONCRETE, SOILS

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## **GENERAL INFORMATION**

This Program Detail Manual contains the certification criteria for the Asphalt, Concrete, and Soils subfields of Construction Materials Testing.

This manual does not contain all of the policies and procedures for obtaining certification. For this, you must refer to the website ([www.nicet.org](http://www.nicet.org)).

**National Institute for Certification  
in Engineering Technologies (NICET)  
1420 King Street, Alexandria, Virginia 22314-2794  
1-888-476-4238 (staff response – 8:30am to 5pm Eastern Time)  
(voice mail system at all other times)  
1-703-548-1518 (local number)  
[www.nicet.org](http://www.nicet.org)**

## **PROGRAM DESCRIPTION**

This certification program, through its three subfields of Asphalt, Concrete and Soils, was designed for field and laboratory technicians engaged specifically in the testing and inspection of construction materials. Knowledge of engineering properties of construction materials used in buildings, roads, and related civil engineering projects and knowledge of testing specifications, standards, methods, and materials evaluation is required.

This program became operational in 1981. Development of the program was initiated in 1978 with guidance from the American Council of Independent Laboratories (ACIL) and technical assistance from interested testing laboratory managers.

This certification does not entitle the certificant to practice engineering. The practice of engineering is defined and regulated by state engineering licensing boards; unlawful practice of engineering is a violation of state laws. When not exempted by state law, the performance of work by the engineering technician/technologist which constitutes the practice of engineering must be under the direct supervision and control of a licensed professional engineer.

## **CERTIFICATION REQUIREMENTS**

Certification candidates must meet the following criteria:

- complete the written examination requirement
- work element verification by the immediate supervisor
- appropriate employment history
- technician recommendation by an acceptable recommender (required at Levels III and IV)

Simply passing the examination does not guarantee certification. All other components **MUST** be accepted and approved in order to achieve certification.

Level I is designed for entry-level technicians with very limited relevant work experience in the technical subfield. The Institute recommends that persons with eighteen or more months of relevant work experience set their initial certification goal at Level II. Certification at Levels II, III, and IV does not require prior certification at a lower level. The Examination Requirements Charts show how many elements must be passed to meet the exam requirement for Levels I, II, III, and IV.

## **WORK ELEMENT DESCRIPTION**

The typical job duties and associated responsibilities of Construction Materials Testing engineering technicians have been broken down into discrete elements which form the basis for an evaluation of the candidate's knowledge. Each work element is written in sufficient detail to permit candidates to make reasonable assumptions about the types of questions likely to be asked.

In addition, the supervisor verifying the experience of the candidate should be able to interpret the scope of the activities associated with each work element.

## **FIELD CODE AND WORK ELEMENT IDENTIFICATION NUMBERS**

In order for NICET to prepare individualized examinations for each applicant, identification numbers have been assigned to each technical field and to each work element. Each technical field is represented by a 3-digit number. The technical field code number for Construction Materials Testing is **002**.

The identification number assigned to each work element is 5 or 6 digits long. The first digit identifies the technical subfield within the field of Construction Materials Testing:

- (7) General work elements for Asphalt, Concrete, and Soils; Special work elements for Asphalt
- (8) Special work elements for Concrete
- (9) Special work elements for Soils

The second digit identifies the level (Levels I through IV) and the work element type (General or Special):

### **GENERAL WORK ELEMENTS**

- (1) Level I General
- (3) Level II General
- (5) Level III General
- (7) Level IV General

### **SPECIAL WORK ELEMENTS**

- (2) Level I Special
- (4) Level II Special
- (6) Level III Special
- (8) Level IV Special

The third, fourth and fifth digits identify the individual work element within each category.

A sample of this numbering system is illustrated below for work element number 002/73001:

Technical Field Code:	002	(Construction Materials Testing)
Subfield:	7	(Asphalt, Concrete, Soils)
Level/Type:	3	(Level II General)
Work Element Sequence:	001	
Work Element Number:	002/73001	(Field Code Number/ 5-Digit Work Element ID Number)

This eight-digit identification number is needed when using the application form to request a work element on an exam or to provide work element verification.

## **WORK ELEMENT SELECTION**

1. Refer to Examination Requirements Charts beginning on page 5.
2. Select the appropriate box for the level of certification desired.
3. Note the number/type of work elements required for certification, by category, as shown in the selected box.
4. Turn to the Work Element Listing section and carefully select work elements from the required categories, paying attention at each level to whether they are classified as **General** or **Special** work elements. When possible, select a few extra in each category so that failing one or more work elements leaves enough passed work elements to satisfy the examination requirements.
5. The maximum number of work elements for any single examination sitting is 34, due to time restrictions.
6. The Institute recommends that the maximum number of work elements (34) be selected for each examination. This provides the greatest opportunity for successful completion of the examination requirements with the least number of subsequent examinations. Recognize, however, that all elements selected on an exam application **will be scored**, even if no attempt is made to answer the questions. That is, a score of "0" will be assigned to the work element even if the questions are not answered and the work element will have one failure marked against it.
7. If the requirement for the desired level is more than 34, it is advisable to test first all lower-level work elements needed to achieve certification. Save the upper-level work elements for a subsequent examination.
8. Examination candidates should keep copies of their applications for their records.
9. It is not necessary to retest failed work elements if there are other work elements, in the appropriate categories, which can be selected. If you need to retest a failed work element, you must wait three months from the last time you failed it before you will be permitted to test that element again. In addition, you will be blocked from signing up for a work element a fourth time **if it has been previously failed four times within a two-year span**. For further information, read Policy #20, "Retesting of Failed Work Elements," available on our website ([www.nicet.org](http://www.nicet.org)).
10. If an adequate number of work elements has been selected to meet the desired certification requirement (with a few extra selected to provide a cushion), and there is room on the exam application to add more elements, it is appropriate to include work elements that will satisfy the examination requirement of the next level of certification or to include work elements from another field/subfield.

## **CROSSOVER WORK ELEMENTS**

NICET “Crossover” work elements are identified as identical or nearly identical in topic coverage and test questions to work elements in other selected fields/subfields. Almost all NICET certification programs have “generic” crossover work elements covering communication skills, mathematics, physical science and other basic areas of knowledge. Once a crossover work element is passed on an examination, it does not normally have to be taken again on any other examinations. Crossover credit for the passed elements will be assigned to an examinee’s record as follows:

- **First Time Testing in New Subfield:** When you test work elements in a new subfield (at least one element), any crossover credit from previously tested subfields will automatically be assigned to the new subfield. At the same time, any crossover credit from the new subfield will automatically be assigned to previously tested subfields. This assignment of crossover credit will occur every time a new subfield is tested.
- **Additional Testing in Previously Tested Subfield:** When you test new work elements or retest failed work elements from a previously-tested subfield, any crossover credit from the newly-passed work elements will automatically be assigned to all previously-tested subfields.
- No crossover credit will be assigned to a subfield until you **test at least one work element** from that subfield.
- Crossover credit will not be assigned to or from work elements if the certification is in Delinquent or Expired Status.
- The three-month waiting period policy, which applies to failed work elements, also applies to all work elements that have crossover credit to that work element (see Policy #20).
- The following documents can be ordered on the NICET website.
  - **Personal Crossover Evaluation** lists your “potential” crossover credit to a designated **untested** subfield.
  - **Crossover Listing** lists all current crossovers between three specified subfields.
  - **Official Personal Transcript** lists all work elements presently credited to the examinee’s testing record (including those passed on an exam and those achieved through crossover) for a designated subfield.

### **WARNING**

Revisions to certification programs can occasionally eliminate previous crossovers relationships or create new ones. Thus, crossover credit shown on the “Personal Crossover Evaluation” and on any “Crossover Listing” cannot be assumed to be permanent.

The Personal Crossover Evaluation is a “potential” list. Only when a new subfield is tested and the crossover credit is posted to the test record does it become permanent. The Official Personal Transcript shows the crossover credit actually awarded.

## EXAMINATION REQUIREMENTS CHART

### Subfield: Asphalt

You must pass the number of work elements shown in each box to complete the exam requirement for certification at that level.

#### Level I

Level I - General	-	3
Level I - Special	-	<u>6</u>
TOTAL		9

You must pass this many work elements to complete the **Level I** exam requirement.

#### Level II

Level I - General	-	4
Level I - Special	-	8
Level II - General	-	4
Level II - Special	-	<u>10</u>
TOTAL		26

You must pass this many work elements to complete the **Level II** exam requirement.

#### Level III

Level I - General	-	6
Level I - Special	-	8
Level II - General	-	7
Level II - Special	-	16
Level III - General	-	8
Level III - Special	-	<u>4</u>
TOTAL		49

You must pass this many work elements to complete the **Level III** exam requirement.

#### Level IV

Level I - General	-	6
Level I - Special	-	10
Level II - General	-	7
Level II - Special	-	22
Level III - General	-	10
Level III - Special	-	4
Level IV - General	-	6
Level IV - Special	-	<u>2</u>
TOTAL		67

You must pass this many work elements to complete the **Level IV** exam requirement.

#### GENERAL NOTES:

- (1) No more than 34 work elements can be scheduled for any single examination sitting.
- (2) Work elements passed which are in excess of the requirement for a particular type and level, but which are needed to meet the requirement at the next higher level are automatically applied to that higher level requirement.
- (3) Use the Personal Tally Worksheet in this manual to keep track of the number of work elements you have passed.
- (4) Read very carefully the two sections applicable to Level IV certification in this manual before seeking Level IV certification.

## EXAMINATION REQUIREMENTS CHART

### Subfield: Concrete

You must pass the number of work elements shown in each box to complete the exam requirement for certification at that level.

#### Level I

Level I - General	-	3
Level I - Special	-	<u>6</u>
TOTAL		9

You must pass this many work elements to complete the **Level I** exam requirement.

#### Level II

Level I - General	-	4
Level I - Special	-	8
Level II - General	-	4
Level II - Special	-	<u>10</u>
TOTAL		26

You must pass this many work elements to complete the **Level II** exam requirement.

#### Level III

Level I - General	-	6
Level I - Special	-	8
Level II - General	-	7
Level II - Special	-	18
Level III - General	-	8
Level III - Special	-	<u>5</u>
TOTAL		52

You must pass this many work elements to complete the **Level III** exam requirement.

#### Level IV

Level I - General	-	6
Level I - Special	-	10
Level II - General	-	7
Level II - Special	-	25
Level III - General	-	10
Level III - Special	-	5
Level IV - General	-	6
Level IV - Special	-	<u>2</u>
TOTAL		71

You must pass this many work elements to complete the **Level IV** exam requirement.

#### GENERAL NOTES:

- (1) No more than 34 work elements can be scheduled for any single examination sitting.
- (2) Work elements passed which are in excess of the requirement for a particular type and level, but which are needed to meet the requirement at the next higher level are automatically applied to that higher level requirement.
- (3) Use the Personal Tally Worksheet in this manual to keep track of the number of work elements you have passed.
- (4) Read very carefully the two sections applicable to Level IV certification in this manual before seeking Level IV certification.

## EXAMINATION REQUIREMENTS CHART

### Subfield: Soils

You must pass the number of work elements shown in each box to complete the exam requirement for certification at that level.

#### Level I

Level I - General	-	3
Level I - Special	-	<u>6</u>
TOTAL		9

You must pass this many work elements to complete the **Level I** exam requirement.

#### Level II

Level I - General	-	4
Level I - Special	-	8
Level II - General	-	4
Level II - Special	-	<u>10</u>
TOTAL		26

You must pass this many work elements to complete the **Level II** exam requirement.

#### Level III

Level I - General	-	6
Level I - Special	-	8
Level II - General	-	7
Level II - Special	-	16
Level III - General	-	8
Level III - Special	-	<u>3</u>
TOTAL		48

You must pass this many work elements to complete the **Level III** exam requirement.

#### Level IV

Level I - General	-	6
Level I - Special	-	10
Level II - General	-	7
Level II - Special	-	21
Level III - General	-	10
Level III - Special	-	3
Level IV - General	-	6
Level IV - Special	-	<u>2</u>
TOTAL		65

You must pass this many work elements to complete the **Level IV** exam requirement.

#### GENERAL NOTES:

- (1) No more than 34 work elements can be scheduled for any single examination sitting.
- (2) Work elements passed which are in excess of the requirement for a particular type and level, but which are needed to meet the requirement at the next higher level are automatically applied to that higher level requirement.
- (3) Use the Personal Tally Worksheet in this manual to keep track of the number of work elements you have passed.
- (4) Read very carefully the two sections applicable to Level IV certification in this manual before seeking Level IV certification.

## CREDIT FOR ACI CERTIFICATION

Technicians who have current technician certification from the American Concrete Institute in select specialty areas will be exempted from meeting the NICET written examination requirement (and possibly the verification requirement) for selected work elements. Details are provided below. To receive credit for these work elements, you must send to NICET a photocopy of the front and back of your current ACI wallet card. Candidates holding ACI certification should turn to the Personal Tally Worksheet in this manual and mark an “A” next to the work element numbers below from which they are exempted.

### ACI Concrete Field Testing Technician – Grade I

#### **You are exempt from testing and verifying:**

82001	Level I	Special	Sample Fresh Concrete
82002	Level I	Special	Slump Test
82015	Level I	Special	Temperature of Fresh Concrete
84002	Level II	Special	Air Content by Pressure Method/Concrete
84003	Level II	Special	Air Content by Gravimetric Method/Concrete
84004	Level II	Special	Air Content by Volumetric Method/Concrete
84010	Level II	Special	Field-Prepared Test Specimens/Concrete

### ACI Concrete Laboratory Testing Technician – Level I

#### **You are exempt from testing, but you must provide verification for the following:**

82004	Level I	Special	Cap Cylindrical Concrete Specimens
82006	Level I	Special	Sampling/Aggregates
82007	Level I	Special	Sieve Analysis/Aggregates
82008	Level I	Special	Materials Finer Than No. 200 Sieve
82011	Level I	Special	Total Moisture Content/Aggregates
84006	Level II	Special	Compressive Strength of Cylinders
84012	Level II	Special	Third-Point Flexural Strength
84033	Level II	Special	Aggregate Specific Gravity and Absorption
84035	Level II	Special	Organic Impurities in Concrete Sand

### ACI Concrete Laboratory Testing Technician – Level II

#### **You are exempt from testing, but you must provide verification for the following:**

84007	Level II	Special	Laboratory Prepared Test Specimens/Concrete
84011	Level II	Special	Drilled Cores and Sawed Beams/Concrete
84017	Level II	Special	Splitting Tensile Strength/Concrete
86005	Level III	Special	Concrete Mixes

### ACI Concrete Strength Testing Technician

#### **You are exempt from testing and verifying:**

82004	Level I	Special	Cap Cylindrical Concrete Specimens
84006	Level II	Special	Compressive Strength of Cylinders
84012	Level II	Special	Third-Point Flexural Strength

### ACI Aggregate Testing Technician – Level I

#### **You are exempt from testing and verifying:**

82006	Level I	Special	Sampling/Aggregates
82007	Level I	Special	Sieve Analysis/Aggregates
82008	Level I	Special	Materials Finer Than No. 200 Sieve
82011	Level I	Special	Total Moisture Content/Aggregates
84033	Level II	Special	Aggregate Specific Gravity and Absorption
84035	Level II	Special	Organic Impurities in Concrete Sand

### ACI Aggregate Testing Technician – Level II

#### **You are exempt from testing and verifying:**

82010	Level I	Special	Unit Weight/Aggregates
84032	Level II	Special	Aggregate Lightweight Pieces
84034*	Level II	Special	Aggregate Resistance to Abrasion
84036	Level II	Special	Clay Lumps and Friable Particles
84041*	Level II	Special	Sulfate Test for Aggregate Soundness
94014	Level II	Special	Plastic Fines by Sand Equivalent Test (Soils work element)

\* verification required

## **VERIFICATION OF WORK ELEMENTS**

Verification must be provided by the examinee's immediate supervisor as identified by the examinee in the employment history section of the NICET Test Application form. Verification of work elements is the acknowledgement that the verifier has personally observed the examinee repeatedly and correctly perform the task or utilize the knowledge required by the particular work element.

The verifier should read each work element description and then initial each work element. The verifier also completes and signs the statement of understanding that is part of the NICET Test Application form.

Lack of verification does not prevent testing a work element. However, work elements tested without verification are not counted for certification until acceptable verification is received and approved by the Institute.

If the examinee's immediate supervisor does NOT have technical expertise in the specialty area, or if the examinee has no supervisor, verification must be obtained from an individual who does have technical expertise in the specialty area AND has firsthand knowledge of the examinee's specific job skills. There is space on the application form (Section VII) for the verifier or examinee to explain how the verifier has been in a position to supervise, inspect and approve the work.

## **TECHNICIAN RECOMMENDATION FORM**

A valid Technician Recommendation form **MUST** be on file to award certification at Levels III and IV. It is valid for one year from the date shown next to the recommender's signature.

This form is available on NICET's website. It must be completed by a person who is familiar with the examinee's technical capabilities and background.

## **WORK EXPERIENCE REQUIREMENT**

Your work experience will not be evaluated until a written exam requirement has been met. Carefully consider your actual experience before testing in a technical area where you have limited or no experience — **meeting an exam requirement does not guarantee certification.**

- NICET certification is only awarded to persons performing engineering **technician** level work. This must be documented in the examinee's Employment History in the Test Application form.
- A preponderance of the work experience must be acquired while residing in the United States and its territories, employing U.S. standards and work practices.
- A significant proportion of the relevant work experience must be recent.
- The work history write-up must be complete, detailed, and specific. It must describe your specific job duties, responsibilities, work tasks, specific tests you perform, materials tested, assignments over the years, job title/position changes, and any other pertinent information. Lack of detail will delay certification.
- See also the Technician Profiles in this manual.

**TECHNICIAN PROFILE FOR CERTIFICATION IN ASPHALT TESTING & INSPECTION ENGINEERING TECHNOLOGY**

	<b>Level I</b>	<b>Level II</b>	<b>Level III</b>	<b>Level IV</b>
<b>Education</b>	No formal education requirement. Program content at Level II and above assumes knowledge and skills based on work and/or educational experiences (college, self-study, correspondence courses, workshops, or field assignments, etc.) that develop knowledge equivalent to courses in construction or civil engineering technology or a closely related Associate Degree program coupled with internships.			
<b>Minimum Work Experience</b>	None to very limited work experience in bituminous materials testing, QA/QC, inspection or related activities	Minimum of two years, of which at least one year must involve bituminous materials testing & QA/QC activities. The balance may be in related activities or other related specialties such as construction inspection and or other materials testing activities.	Level II work experience plus three additional years. At least three of these years must involve bituminous materials testing & QA/QC as the primary activity. The balance may be in construction and/or other materials testing activities.	Level III work experience plus five additional years of bituminous materials testing & QA/QC experience involving a broad range of complexity and diversity.
<b>Level of Responsibility</b>	Under direct supervision	Under general supervision	Under little or no supervision. May supervise others.	Independent performance, delegated responsibilities, assign tasks and supervise personnel.
<b>Typical Activities</b>	Performs simple, repetitive, specific tasks, measurements and computations. Document findings.	Perform common laboratory and field acceptance tests. Prepare test reports.	Conduct common and specialized laboratory and field tests. Maintain records. Offer recommendations.	Manage projects, oversee specialized laboratory and field tests. Interact with project engineer/manager. Recommend corrective actions.
<b>Typical Job Titles</b>	Laboratory Technician I Field Technician I Trainee	Laboratory Technician II Field Technician II QC/QA Technician	Laboratory Technician III Field Technician III Senior QA/QC Technician	Chief Technician Lab/Field Chief QA/QC Technician

**TECHNICIAN PROFILE FOR CERTIFICATION IN CONCRETE TESTING & INSPECTION ENGINEERING TECHNOLOGY**

	<b>Level I</b>	<b>Level II</b>	<b>Level III</b>	<b>Level IV</b>
<b>Education</b>	No formal education requirement. Program content at Level II and above assumes knowledge and skills based on work and/or educational experiences (college, self-study, correspondence courses, workshops, or field assignments, etc.) that develop knowledge equivalent to courses in construction or civil engineering technology or a closely related Associate Degree program coupled with internships.			
<b>Minimum Work Experience</b>	None to very limited work experience in concrete testing, QA/QC, inspection or related activities	Minimum of two years, of which at least one year must involve concrete testing & QA/QC activities. The balance may be in related activities or other related specialties such as construction inspection and/or other materials testing activities.	Level II work experience plus three additional years. At least three of these years must involve concrete testing & QA/QC as the primary activity. The balance may be in construction and/or other materials testing activities.	Level III work experience plus five additional years of concrete testing & QA/QC experience involving a broad range of complexity and diversity.
<b>Level of Responsibility</b>	Under direct supervision	Under general supervision	Under little or no supervision. May supervise others.	Independent performance, delegated responsibilities, assign tasks and supervise personnel.
<b>Typical Activities</b>	Performs simple, repetitive, specific tasks, measurements and computations. Document findings.	Perform common laboratory and field acceptance tests. Prepare test reports.	Conduct common and specialized laboratory and field tests. Maintain records. Offer recommendations.	Manage projects, oversee specialized laboratory and field tests. Interact with project engineer/manager. Recommend corrective actions
<b>Typical Job Titles</b>	Laboratory Technician I Ins Field Technician I Trainee	Laboratory Technician II Field Technician II QC/QA Technician	Laboratory Technician III Field Technician III Senior QA/QC Technician	Chief Technician Lab/Field Chief QA/QC Technician

**TECHNICIAN PROFILE FOR CERTIFICATION IN SOILS TESTING & INSPECTION ENGINEERING TECHNOLOGY**

	<b>Level I</b>	<b>Level II</b>	<b>Level III</b>	<b>Level IV</b>
<b>Education</b>	No formal education requirement. Program content at Level II and above assumes knowledge and skills based on work and/or educational experiences (college, self-study, correspondence courses, workshops, or field assignments, etc.) that develop knowledge equivalent to courses in construction or civil engineering technology or a closely related Associate Degree program coupled with internships.			
<b>Minimum Work Experience</b>	None to very limited work experience in soils testing, QA/QC, inspection or related activities	Minimum of two years, of which at least one year must involve soils QA/QC activities. The balance may be in related activities or other related specialties such as construction inspection and/or other materials testing activities.	Level II work experience plus three additional years. At least three of these years must involve soils QA/QC as the primary activity. The balance may be in construction and/or other materials testing activities.	Level III work experience plus five additional years of soils QA/QC experience involving a broad range of complexity and diversity.
<b>Level of Responsibility</b>	Under direct supervision	Under general supervision	Under little or no supervision. May supervise others.	Independent performance, delegated responsibilities, assign tasks and supervise personnel.
<b>Typical Activities</b>	Performs simple, repetitive, specific tasks, measurements and computations. Document findings.	Perform common laboratory and field acceptance tests. Prepare test reports.	Conduct common and specialized laboratory and field tests. Maintain records. Offer recommendations.	Manage projects, oversee specialized laboratory and field tests. Interact with project engineer/manager. Recommend corrective actions.
<b>Typical Job Titles</b>	Laboratory Technician I Field Technician I Trainee	Laboratory Technician II Field Technician II QC/QA Technician	Laboratory Technician III Field Technician III Senior QA/QC Technician	Chief Technician Lab/Field Chief QA/QC Technician

## **LEVEL IV MAJOR PROJECT**

Ten years or more of employment in the certification area, by itself, is **not** sufficient for the granting of Level IV. An absolute requirement for certification at Level IV is senior-level involvement in a major project which is **directly related to the subfield in which Level IV certification is sought**. The major project selected must be completed, must be recent (within the past 3-4 years), and must have taken place well into your career in the certification area. A write-up submitted too early (for example, after only 5 or 6 years in the certification area) will not be reviewed.

**The project write-up should include such information as:**

- 1. type of service provided (specifically, testing and/or inspection);**
- 2. scope of project (project time period, amount of daily services performed);**
- 3. your supervisory responsibilities and/or on-site authority on the project; and**
- 4. the range of your experiences on the project as related to such various components as recordkeeping, testing, inspection, observation, mixture proportioning, quality control, etc. If all of these components cannot be documented for a single project, they may be accumulated via several narrowly-focused projects.**

**If your experience is very narrowly focused on most of your projects, you should describe several assignments which collectively can be used to meet the experience requirement.**

Your write-up must address the Level IV requirement that your level of responsibility demonstrates independent senior engineering technician work, including delegated responsibilities and duties for which engineering precedent exists. The pertinent work experience must be described in depth by you personally -- official job descriptions or testimonials from others will not be evaluated. Level IV write-up guidelines are available for download on NICET's website ([www.nicet.org](http://www.nicet.org)).

## **EARLY TESTING AND VERIFICATION OF LEVEL IV WORK ELEMENTS**

Although we permit testing of Level IV work elements prior to satisfying the work experience requirement, we reserve the right to question the validity of Level IV work elements passed by, and verified for, persons with little work experience. If, for example, a technician with a total of 3 years of experience passes Level IV work elements, we may require documentation of how this higher level knowledge was obtained without accumulating the requisite work experience. NICET may require specific work elements to be tested and passed again, at the candidate's expense, at the time of the Level IV certification decision.

In addition, we reserve the right to require reverification of work elements designated for meeting the Level IV examination requirement if the verifications were signed more than three years prior to the time of the Level IV certification decision.

## **PREPARATION FOR TESTING**

The NICET written examinations are designed by the individual who has performed the work elements associated with the program. Preparation for this examination should be minimal.

When appropriate, the work element description specifies the applicable standards or procedures. The standards and other references cited in the work element descriptions are permitted (and encouraged) at the test site.

## **TRAINING COURSES**

NICET does not endorse, certify, or accredit training programs. The Institute does, however, provide information on the certification procedures and objectives so that training courses can be developed specifically to help persons planning to take a NICET certification exam.

## **EXPIRATION OF CERTIFICATE**

The first certificate(s) awarded will have an expiration date of three years from the date of award. The certificate(s) will expire at the end of that three-year period unless renewed through recertification. A certificate that is not renewed at the end of three-year period will expire. A consequence of the certificate going into Expired Status will be deletion of all records, including test history.

Upgrading the certificate or adding a certificate in a different technical area does not change your 3-year expiration date.

## **RECERTIFICATION POLICY**

All certificants should read Policy #30, "Continuing Professional Development." At the end of each 3-year period, all certificants must demonstrate that they have accumulated sufficient Continuing Professional Development (CPD) points within the certification area(s) held to renew the certificate(s) for another 3 years. Once renewed, the certificate is valid for an additional three-year period. The recertification fee must be paid when submitting the recertification application form.

## WORK ELEMENT LISTING

### Asphalt, Concrete, Soils

#### LEVEL I - GENERAL WORK ELEMENTS

(Work at Level I Is Performed Under Direct Supervision)

**All General Work Elements are common to all three subfields of asphalt, concrete, and soils. Each General Work Element ID No. begins with the digit seven (7). All General Work Elements which are passed will automatically be posted to all three subfields.**

#### **ID No. Work Element Title and Description**

- 71001 SIMPLE PLANS AND SPECS  
Use simple plans and specifications to determine material types and characteristics; sampling locations, spacings, depths, elevations, slopes, distances; and testing requirements, etc.
- 71002<sup>^</sup> BASIC MATHEMATICS  
Solve mathematical problems requiring simple addition, subtraction, multiplication, division and raising numbers to exponential powers. Round to the correct number of significant figures, calculate percentages, read graphs, and use simple geometric definitions and formulas. (See general math textbooks.)
- 71003 STANDARD LAB EQUIPMENT  
Be familiar with commonly used equipment, devices, scales, ovens, moisture chambers, strain gauges, etc.
- 71005<sup>^</sup> BASIC COMMUNICATION SKILLS  
Use proper punctuation, vocabulary, spelling, and sentence structure. Follow written instructions. (See basic grammar references.)
- 71006<sup>^</sup> BASIC PHYSICAL SCIENCE  
Apply terms, definitions, and concepts from mechanics, electricity, heat and chemistry. (Solutions may involve simple formulas found in basic physics textbooks, but will not involve algebraic manipulation or trigonometry.)
- 71007 REAGENTS  
Know the reagents used for standard field and lab tests. Know limitations on use of reagents and how results are affected. (See basic chemistry handbooks, T105, T144, C114, D806)
- 71008 SAMPLE IDENTIFICATION  
Identify samples properly in accordance with standard practices. Note and record information on samples and on plans. Map or log the site from which samples were obtained and the types of tests required to produce the desired information. (T2, D75, ASTM Manual of Aggregate and Concrete Testing)
- 71009<sup>^</sup> BASIC METRIC UNITS AND CONVERSIONS  
Perform conversions to and from metric (SI) units. (R1, IEEE/ASTM SI 10)

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(<sup>^</sup>) Generic crossover credit exists in other fields/subfields for this work element. Read section on Crossover Work Elements in this manual.  
**GENERAL NOTE:** See "Selected General References" page in this manual for information on listed publications.

## **LEVEL I - SPECIAL WORK ELEMENTS**

In the Special Work Element listing, an initial digit of 7 indicates the asphalt subfield, an initial digit of 8 indicates the concrete subfield, and an initial digit of 9 indicates the soils subfield. When a work element has more than 1 number listed, it means that it is a crossover work element. All crossover elements which are passed will be posted to all numbers indicated if the requirements printed on page 4 in this manual are followed.

### **\*\*\*\*\* CROSSOVER WORK ELEMENTS\*\*\*\*\***

#### **o AGGREGATES**

##### **72005, 82005, 92005**

###### **SURFACE MOISTURE/AGGREGATES**

Determine the surface moisture content of fine aggregate samples in the laboratory. (C70)

##### **72006, 82006, 92006**

###### **SAMPLING/AGGREGATES**

Know field sampling procedures and prepare sample for testing. (T2, T248, D75, C702, D3665)

##### **72007, 82007, 92007**

###### **SIEVE ANALYSIS/AGGREGATES**

Determine and record the particle size distribution of fine and coarse aggregate by sieving or screening. (T27, C136)

##### **72008, 82008, 92008**

###### **MATERIALS FINER THAN NO. 200 SIEVE**

Use wash tests to determine the amount finer than No. 200 sieve in an aggregate and perform sieve analyses of mineral fillers encountered in road and paving materials. (T11, C117, )

##### **72009, 82009, 92009**

###### **WIRE CLOTH SIEVES**

Use sieves for testing purposes. (M92, E11, )

##### **72010, 82010, 92010**

###### **UNIT WEIGHT/AGGREGATES**

Determine unit weight of and voids in a fine, coarse, or mixed aggregate sample. (T19, C29)

##### **72011, 82011, 92011**

###### **TOTAL MOISTURE CONTENT/AGGREGATES**

Determine the percentage of evaporative moisture in a sample of aggregate by drying. (T255, C566)

### **\*\*\*\*\*NON-CROSSOVER WORK ELEMENTS\*\*\*\*\***

#### **\*\*\*\*\* ASPHALT \*\*\*\*\***

#### **o MISCELLANEOUS**

##### **72001 SAMPLE BITUMINOUS MATERIALS**

Sample liquid, semisolid, or solid bituminous materials at the point of manufacture, supply terminal, or at the point of shipment delivery. (T40, T168, D140, D979)

##### **72013 BITUMINOUS MATERIALS TERMINOLOGY**

Know the standard definitions of bituminous materials and related terms as defined by ASTM. (D8)

**o BITUMINOUS MIXTURES**

- 72002 PARTICLE COATING  
Determine the degree of particle coating in a bituminous-aggregate mix on the basis of the percentage of coarse aggregate particles that are completely coated. (T195, D2489)
- 72003 TEST SPECIMENS BY MARSHALL METHOD  
Prepare test specimens of bituminous mixtures by means of the Marshall Method. (T245, D1559)
- 72004 TEST SPECIMENS BY KNEADING COMPACTOR  
Prepare test specimens of bituminous paving mixtures by means of a mechanical kneading compactor. (T247, D1561)
- 72012 SIEVE ANALYSIS OF EXTRACTED AGGREGATE  
Determine the particle size distribution of fine and coarse aggregates extracted from bituminous mixtures, using sieves with square openings. (T30)

**\*\*\*\*\* CONCRETE \*\*\*\*\***

**o CONCRETE MIXES**

- 82001 SAMPLE FRESH CONCRETE  
Know the procedures for obtaining representative samples of fresh concrete as delivered to a project site. (T141, C172)
- 82002 SLUMP TEST  
Determine slump of concrete in laboratory and in the field. (T119, C143)
- 82003 CONCRETE AND CONCRETE AGGREGATE TERMINOLOGY  
Understand standard definitions of terms relating to concrete and concrete aggregates as defined by ASTM. (C125)
- 82004 CAP CYLINDRICAL CONCRETE SPECIMENS  
Cap freshly molded concrete cylinders with neat cement and hardened cylinders and drilled concrete cores with high-strength gypsum plaster or sulfur mortar, using proper apparatus, materials and procedures. (T231, C617)
- 82013 TEXTURE DEPTH OF CONCRETE  
Measure texture depth of fresh or hardened Portland cement concrete by use of a tire tread depth gauge. (T261)
- 82014 ~~CONCRETE AGGREGATE SPECIFICATIONS~~ (Not available for testing)  
Interpret and apply standard specifications for concrete aggregates. (C33)
- 82015 TEMPERATURE OF FRESH CONCRETE  
Determine the temperature of freshly mixed portland cement concrete. Calibrate equipment. Report results. (C1064)

**\*\*\*\*\* SOILS \*\*\*\*\***

**o GENERAL**

- 92001 SOIL AND ROCK TERMINOLOGY  
Understand standard definitions of terms relating to soils and rocks. (D653)
- 92002 TEST SAMPLE (SOIL) PREPARATION  
Know the proper techniques for preparing soil samples for testing to include adequate sample size, splitting techniques, and moisture conditioning. (T87, T146, D421, D2217)
- 92003 WASH TEST FOR SOILS  
Use wash test to determine the amount finer than No. 200 sieve in a soil sample. (D1140)

**o SOIL STABILIZATION**

- 92004 SAMPLE HYDRATED LIME  
Know the proper techniques for sampling hydrated lime. (T218)

## **LEVEL II - GENERAL WORK ELEMENTS**

(Work at Level II Is Performed Under General Supervision)

**All General Work Elements are common to all three subfields of asphalt, concrete, and soils. Each General Work Element ID No. begins with the digit seven (7). All General Work Elements which are passed will automatically be posted to all three subfields.**

- 73001 STANDARD PLANS AND SPECS  
Use plans and specs of standard jobs to determine dimensions, types of materials, elevations, slopes, depths at which samples are required, locations, spacing of sample sites, etc.
- 73002 EQUIPMENT AND INSTRUMENTS  
Care for, clean, perform basic calibrations, and safeguard standard lab and field equipment and instruments.
- 73003 REVIEW OF TEST RESULTS  
Review test results to see if they are complete and contain all required information. Compare results with conclusions determined under similar circumstances in the same area and in working with the same or similar materials. Review procedures used and determine if results properly utilize data collected and provide an unbiased estimate of the condition being observed. Reconcile apparent divergences from standard results.
- 73005<sup>^</sup> INTERMEDIATE MATHEMATICS  
Perform mathematical calculations using basic algebra (fundamental laws, algebraic expressions), geometry, and the trigonometric functions of right triangles. (See basic textbooks on algebra and trigonometry.)
- 73006<sup>^</sup> BUSINESS COMMUNICATIONS  
Use the rules of syntax and style to write clear sentences and paragraphs in preparing routine correspondence and reports. Follow standard business communications procedures. (See basic grammar and writing handbooks.)
- 73007<sup>^</sup> INTERMEDIATE PHYSICAL SCIENCE  
Solve problems in mechanics, electricity, heat, and inorganic chemistry. (Solutions may involve algebra and trigonometry.)
- 73008 PROCESS TEST INFORMATION  
Compute, record, handle and file test information in accordance with a good standard procedure.
- 73009<sup>^</sup> BASIC INDIVIDUAL SAFETY  
Follow standard safety practices in performing job tasks. Recognize and call attention to improper safety practices at the work site. (OSHA)
- 73010 TOPOGRAPHIC MAPS AND SITE PLANS  
Use topographic maps and site plan drawings to describe locations of sample sites as well as to locate previous samples sites. Understand elevations, stationing, offsets, bearings, and grid coordinates.
- 73011<sup>^</sup> BASIC DRAFTING  
Recognize and describe standard manual drafting techniques. Describe the characteristics and proper usage of standard drafting equipment. (See basic technical drawing textbooks.)

## **LEVEL II - SPECIAL WORK ELEMENTS**

In the Special Work Element listing, an initial digit of 7 indicates the asphalt subfield, an initial digit of 8 indicates the concrete subfield, and an initial digit of 9 indicates the soils subfield. When a work element has more than 1 number listed, it means that it is a crossover work element. All crossover elements which are passed will be posted to all numbers indicated if the requirements printed on page 4 in this manual are followed.

### **\*\*\*\*\*CROSSOVER WORK ELEMENTS\*\*\*\*\***

#### **o AGGREGATES**

##### **74025, 84032**

###### **AGGREGATE LIGHTWEIGHT PIECES**

Determine the approximate percentage of lightweight pieces by means of sink-float gate separation in a heavy liquid. (T113, C123)

##### **74026, 84033, 94021**

###### **AGGREGATE SPECIFIC GRAVITY AND ABSORPTION**

Determine bulk specific gravity, apparent specific gravity and absorption of fine and coarse aggregates. (T84, T85, C127, C128)

##### **74027, 84034, 94022**

###### **AGGREGATE RESISTANCE TO ABRASION**

Determine the resistance to abrasion of large and small-size aggregates by the Los Angeles Method. (T96, C131, C535)

##### **74029, 84036, 94024**

###### **CLAY LUMPS AND FRIABLE PARTICLES**

Determine the quantity of clay lumps and friable particles in natural aggregates. (T112, C142)

##### **74031, 84038, 94026**

###### **AGGREGATE RESISTANCE TO FREEZING AND THAWING**

Test aggregates to determine their resistance to disintegration by freezing and thawing. (T103)

##### **74032, 84039, 94027**

###### **AGGREGATE ANGULARITY**

Determine the percent of face fractures in natural and crushed river gravel by approved methods which establish suitability for uses requiring specified bearing characteristics. (D1139, D3398)

##### **74034, 84041, 94029**

###### **SULFATE TEST FOR AGGREGATE SOUNDNESS**

Determine the weathering resistance of aggregates to disintegration by application of the sodium or magnesium sulfate test. (T104, C88)

##### **74035, 84042, 94030**

###### **AGGREGATE PRODUCTION OF PLASTIC FINES**

Determine the durability index of aggregates by the prescribed mechanical methods of degradation to indicate the relative resistance of an aggregate to produce detrimental claylike fines. (T210)

##### **84046, 94034**

###### **CALCIUM CHLORIDE**

Perform sampling and testing of calcium chloride for roads and structural applications. (T143, D345)

**\*\*\*\*\*NON-CROSSOVER WORK ELEMENTS\*\*\*\*\***

**\*\*\*\*\* ASPHALT \*\*\*\*\***

**o LIQUID BITUMINOUS MATERIALS**

- 74001 SOFTENING POINT OF BITUMEN  
Determine the softening point of asphalt and tar. (T53, D36)
- 74002 SPOT TEST/ASPHALTIC MATERIALS  
Participate in testing of asphaltic materials by performing spot test procedures to determine acceptability on the basis of “xylene equivalent.” (T102)
- 74003 DUCTILITY TEST/BITUMINOUS MATERIALS  
Determine the ductility of bituminous materials. (T51, D113)
- 74004 SOLUBILITY TEST/BITUMINOUS MATERIALS  
Determine the degree of solubility of bituminous road materials (such as road tars and petroleum asphalts) in organic solvents. (T44, D2042)
- 74005 TESTING EMULSIFIED ASPHALT  
Perform the series of tests specified for emulsified asphalt. (T59, D244)
- 74006 PERCENT ASH FROM PETROLEUM PRODUCTS  
Determine percent of ash in asphalt and tars. (T111, D482)
- 74007 SPECIFIC GRAVITY OF ASPHALT-TYPE MATERIALS  
Determine the specific gravity of asphaltic materials by the hydrometer, glass pycnometer, or displacement methods. (T227, T228, T229, D70, D71, D1298)
- 74009 FLASH POINT TEST  
Determine the flash points of fuel oils, lube oils, suspensions of solids, and liquids that tend to form a surface film by use of the Pensky-Martens Closed Tester, of cutback asphalts by use of the Tag Open Cup apparatus, and asphalt cements by the Cleveland Open Cup apparatus. (T48, T73, T79, D92, D93, D3143)
- 74010 DISTILLATION OF BITUMINOUS AND PETROLEUM PRODUCTS  
Distill cutback asphaltic products, petroleum products, and creosote. Dehydrate oil-type preservatives. (T55, T62, T78, T83, T115, D20, D86, D95, D246, D370, D402)
- 74011 PENETRATION OF BITUMINOUS MATERIALS  
Determine the penetration of asphalt and other bituminous semisolid and solid materials by use of the penetration test. (T49, D5)
- 74012 THIN FILM OVEN TEST  
Determine the effect of heat and air on asphalt materials by use of the thin film oven test and on a moving film of asphalt. (T179, T240, D1754, D2872)
- 74013 COATING AND STRIPPING OF BITUMEN-AGGREGATE MIXTURES  
Determine the retention of a bituminous film by an aggregate in the presence of water by use of a standard test applicable to cutback, emulsified and semisolid asphalts. (T182)
- 74020 FLOAT TEST  
Perform the float test for bituminous materials. (T50, D139)
- 74021 LOSS ON HEATING OF OIL AND ASPHALTIC COMPOUNDS  
Determine the loss in weight of oil and asphaltic compounds when heated as prescribed. (T47, D6)
- 74022 RECOVERY OF ASPHALT FROM SOLUTION BY ABSON METHOD  
Recover asphalt from solution by the Abson method. (T170, D1856)
- 74024 SPECIFIC GRAVITY/BITUMINOUS MATERIALS  
Determine the specific gravity of semisolid and solid bituminous materials. (D3289)

**o BITUMINOUS MIXTURES**

- 74008 SPECIFIC GRAVITY/BITUMINOUS MIXTURES  
Determine the specific gravity on bituminous paving mixtures and compacted bituminous mixtures using saturated surface-dry specimens. (T166, T209, D2041, D2726)
- 74014 PERCENT VOLATILES/BITUMINOUS MIXTURES  
Determine the percent of moisture or volatile distillates in bituminous paving mixtures. (T110, D1461)
- 74015 EXTRACTION OF BITUMEN  
Extract asphalt from bituminous paving mixtures with trichloroethylene, trichloroethane, or benzene. (T164, T170, D1856, D2172, )
- 74016 COMPRESSIVE STRENGTH/BITUMINOUS MIXTURES  
Determine unconfined compression strength of compacted bituminous mixtures of the hotmixed, hotlaid type used in pavement surfaces and base courses. (T167, D1074)
- 74017 DENSITY BY NUCLEAR METHODS/BITUMINOUS MIXTURES  
Determine the nuclear density measurement of in-place bituminous concrete. (D2950)
- 74018 EFFECT OF WATER ON COHESION/BITUMINOUS MIXTURES  
Determine the effect of water on cohesion of compacted bituminous mixtures. (T165, D1075)
- 74019 DEGREE OF COMPACTION/BITUMINOUS-AGGREGATE MIXTURES  
Determine the degree of pavement compaction of a bituminous-aggregate mixture as related to standard specimens composed of the same materials and with the tolerances of the job mix formula. (T230)
- 74023 PERMEABILITY/BITUMINOUS MIXTURES  
Determine the permeability of bituminous mixtures. (D3637)
- 74036 THEORETICAL MAXIMUM SPECIFIC GRAVITY/BITUMINOUS MIXTURES  
Know the procedure for testing paving mixtures to determine the theoretical maximum specific gravity (Rice Method). (D2041)

**\*\*\*\*\* CONCRETE \*\*\*\*\***

**o CONCRETE MIXES**

- 84002 AIR CONTENT BY PRESSURE METHOD/CONCRETE  
Determine the air content of freshly mixed concrete from observation of the change in volume of concrete with a change in pressure. (T152, C231)
- 84003 AIR CONTENT BY GRAVIMETRIC METHOD/CONCRETE  
Determine the weight per cubic foot of freshly mixed concrete and calculate the yield, cement content, and air content of concrete. (T121, C138)
- 84004 AIR CONTENT BY VOLUMETRIC METHOD/CONCRETE  
By the Volumetric Method, determine the air content of freshly mixed concrete containing any type of aggregate, whether it be dense, cellular or lightweight. (T196, C173)
- 84005 COMPRESSIVE STRENGTH OF BROKEN BEAM PORTIONS  
Determine compressive strength of concrete, using portions of beams broken in flexure for test specimens. (T140, C116)
- 84006 COMPRESSIVE STRENGTH OF CYLINDERS  
Determine compressive strength of cylindrical concrete specimens such as molded cylinders and drilled cores. (T22, C39)
- 84007 LABORATORY PREPARED TEST SPECIMENS/CONCRETE  
Perform procedures for making and curing test specimens of concrete in the laboratory. (T126, C192)
- 84008 READY MIXED CONCRETE  
Know specifications for manufacture and delivery of ready mixed concrete, including plant inspection. (C94)
- 84009 LENGTH CHANGE OF DRILLED OR SAWED SPECIMENS/CONCRETE  
Determine length changes of drilled or sawed specimens of cement mortar and concrete. (C341)

- 84010 FIELD-PREPARED TEST SPECIMENS/CONCRETE  
Know the procedures for making and curing concrete compressive and flexural strength test specimens in the field. (T23, C31)
- 84011 DRILLED CORES AND SAWED BEAMS/CONCRETE  
Obtain, prepare, and test: (1) cores drilled from concrete for length, compressive, or splitting tensile strength determination; (2) beams sawed from concrete for flexural strength determination. (T24, C42)
- 84012 THIRD-POINT FLEXURAL STRENGTH  
Determine the flexural strength of concrete by use of third-point loading. (T97, C78)
- 84013 CENTER-POINT FLEXURAL STRENGTH  
Determine the flexural strength of concrete by use of center-point loading. (T177, C293)
- 84014 TIME SET OF CONCRETE  
Determine the time of setting of concrete by testing mortar sieved from the concrete mixture. (T197, C403)
- 84015 UNIT WEIGHT/STRUCTURAL LIGHTWEIGHT CONCRETE  
Determine the unit weight of freshly mixed structural lightweight concrete. (C567)
- 84016 SPECIFIC GRAVITY, ABSORPTION AND VOIDS/HARDENED CONCRETE  
Determine specific gravity, absorption and voids in hardened concrete. (C642)
- 84017 SPLITTING TENSILE STRENGTH/CONCRETE  
Determine the splitting tensile strength of cylindrical concrete specimens. (T198, C496)
- 84018 AIR CONTENT BY CHACE INDICATOR/CONCRETE  
Determine the air content of freshly mixed concrete using the Chace Indicator. (T199)
- 84020 CEMENT CONTENT OF HARDENED CONCRETE  
Determine the cement content of hardened portland cement concrete. (T178)
- 84021 REINFORCING STEEL BOND/CONCRETE  
Perform test to compare concrete on the basis of the bond developed with reinforcing steel. (T159, C234)
- 84022 BLEEDING OF CONCRETE  
Determine the relative quantity of mixing water that will bleed from a sample of freshly mixed concrete. (T158, C232).
- 84026 TEST SPECIMENS/HARDENED INSULATING CONCRETE  
Secure, prepare, and test specimens of hardened, lightweight insulating concrete having an oven-dry weight not exceeding 50 pcf. (C513)
- 84027 COMPRESSIVE STRENGTH/INSULATING CONCRETE  
Prepare specimens and determine the compressive strength of lightweight insulating concrete having an oven-dry unit weight not exceeding 50 pcf. (C495)
- 84029 NONDESTRUCTIVE TESTING/HARDENED CONCRETE  
Perform nondestructive testing of hardened concrete. (C597, C803, C805)
- o CONCRETE INSPECTION**
- 84028 FORMWORK AND SHORING/CONCRETE  
Know the requirements for formwork and shoring for concrete. (ACI 301 and 318)
- 84030 PLACEMENT OF REINFORCING STEEL/CONCRETE  
Know the requirements for placement of reinforcing steel for reinforced concrete. (ACI 301 and 318)
- 84031 PLACEMENT AND CURING OF CONCRETE  
Know the requirements for placement, consolidation, and curing of concrete. (ACI 301 and 318)

**o CEMENT**

- 84047 COMPRESSIVE STRENGTH/CEMENT  
Determine the compressive strength of hydraulic cement mortars using 2inch cube specimens. (T106, C109)
- 84048 NORMAL CONSISTENCY AND TIME OF SET  
Determine the normal consistency and time of setting of hydraulic cement using the Vicat Needle apparatus. (T129, T131, C187, C191)
- 84049 FALSE SET  
Determine the false set of Portland cement by the mortar method and the paste method. (T185, T186, C359, C451)

**o MASONRY**

- 84043 BRICK  
Sample and test brick for modulus of rupture, compressive strength, absorption, saturation coefficient, effect of freezing and thawing, initial rate of absorption, efflorescence, measurement of size, and measurement of warpage. (T32, C67)
- 84050 MASONRY BLOCK UNITS  
Sample and test block units for compressive strength, absorption, and dimensions. (C140)
- 84051 MASONRY MORTAR  
Sample and test mortars for composition and plastic and hardened properties. (C270, C780)
- 84052 GROUT  
Perform field and lab sampling and testing of grout used in masonry construction. (C1019)

**o MISCELLANEOUS**

- 84019 CHLORIDE ION CONTENT  
Determine the total chloride ion content of aggregates, portland cement, mortar or concrete and determine the resistance to the penetration of chloride ion of concrete, special concrete treatments or concrete overlays. (T259, T260)
- 84023 CONCRETE PIPE  
Determine the physical and chemical properties of culvert pipe, sewer pipe and drain tile. (C76, C412)
- 84024 QUALITY MIXING WATER  
Evaluate the quality of water to be used in concrete as prescribed by AASHTO. (T26)
- 84025 COATED DOWEL BARS  
Test the qualification of the organic coating of corrosion resistant dowel bars to withstand the effects of weathering, deicing chemicals, and the abrading and loading stresses experienced in field joints. (M254, T253)
- 84035 ORGANIC IMPURITIES IN CONCRETE SAND  
Know the test procedure to determine the presence of injurious organic compounds in concrete sand. (T21, C40)
- 84040 ALKALI REACTIVITY OF AGGREGATES  
Determine the alkali reactivity of aggregates. (C227, C289)
- 84044 PREFORMED EXPANSION JOINT FILLER  
Perform a series of tests to determine absorption, brittleness, distortion, expansion in boiling water, recovery, compression, extrusion, boiling in hydrochloric acid, weathering, and weight per cubic foot of preformed expansion joint filler for concrete. (T42, D1752)
- 84045 CONCRETE JOINT SEALERS  
Perform a series of tests to determine pour point, safe heating temperature, cone penetration, flow, and bond at low temperatures for all types of concrete joint sealers. (T187, D1191)

**\*\*\*\*\* SOILS \*\*\*\*\***

**o GENERAL**

- 94001 SOILS CLASSIFICATION  
Classify soils in accordance with the Unified Soil Classification System and the AASHTO Soil Classification System. (M145, D2487, D3282)
- 94002 PARTICLE-SIZE ANALYSIS OF SOILS  
Determine the quantitative distribution of particle sizes in a soil sample. (T88, D422)

- 94003 **LIQUID AND PLASTIC LIMITS**  
Determine the liquid and plastic limits of soils and derive the Plasticity Index from the data obtained. (T89, T90, D4318)
- 94004 **SHRINKAGE FACTOR**  
Determine the following soil constants: shrinkage limit, shrinkage ratio, volumetric shrinkage, and linear shrinkage. (T92, D427)
- 94005 **SPECIFIC GRAVITY/SOILS**  
Determine the specific gravity of a soil sample by means of a pycnometer. (T100, D854)
- 94006 **MOISTURE-DENSITY RELATIONS/SOILS**  
Determine the relation between moisture content and density of soils by use of the Standard Proctor and Modified Proctor tests. (T99, T180, T224, D698, D1557)
- 94007 **FIELD DENSITY BY SAND CONE METHOD**  
Determine the in-place moisture content and dry density of soils using the Sand Cone Method. (T191, D1556)
- 94008 **FIELD DENSITY BY RUBBER BALLOON METHOD**  
Determine the in-place moisture content and dry density of soils using the Rubber Balloon Method. (T205, D2167)
- 94009 **FIELD DENSITY BY DRIVE CYLINDER METHOD**  
Determine the in-place moisture content and dry density of soils using the Drive Cylinder Method. (T204, D2937)
- 94010 **NUCLEAR METHODS**  
Determine the density and moisture content of soil and soil-aggregate in-place using nuclear equipment. Be familiar with safety precautions and all applicable government regulations. (D2922, D3017)
- 94014 **PLASTIC FINES BY SAND EQUIVALENT TEST**  
Determine the relative proportions of fine dust or claylike materials in soils or graded aggregates by the Sand Equivalent test. (T176, D2419)
- 94015 **RESISTANCE R-VALUE AND EXPANSION PRESSURE/COMPACTED SOILS**  
Test treated and untreated laboratory compacted soils or aggregates with the stabilometer and expansion pressure devices to obtain results indicative of performance when placed in the base, subbase, or subgrade of a road subjected to traffic. (T190, D2844)
- 94019 **SOILS AND ROCKS**  
Perform soil and rock investigation and sampling for engineering purposes. (R13, D420)

#### **o SOIL STABILIZATION**

- 94011 **MOISTURE-DENSITY RELATIONS OF SOIL-CEMENT MIXTURES**  
Determine the relationship between the moisture content and the density of soil-cement mixtures when compacted before cement hydration. (T134, D558)
- 94012 **COMPACTED SOIL-CEMENT MIXTURES**  
Determine the soil-cement loss, moisture changes, and volume changes produced by repeated wetting and drying or freezing and thawing of hardened soil-cement specimens. (T135, T136, D559, D560)
- 94013 **CEMENT CONTENT OF SOIL-CEMENT AND CEMENT-TREATED AGGREGATE**  
Determine by chemical analysis the cement content of hardened soil-cement, and the cement content in cement-treated aggregate by the method of titration. (T144, T211, D806)
- 94016 **HYDRATED LIME**  
Determine the chemical limits of Type I hydrated lime and the particle size requirements of Types I and II hydrated lime. (T219)
- 94017 **STRENGTH OF SOIL-LIME MIXTURES**  
Determine the unconfined compressive strength of soil-lime stabilization mixtures. (T220)
- 94018 **LIME CONTENT OF LIME-TREATED MIXTURES**  
Determine the percentage of lime in soils or aggregates which have been treated with hydrated lime. (T232, D3155)

### **LEVEL III - GENERAL WORK ELEMENTS**

**All General Work Elements are common to all three subfields of asphalt, concrete, and soils. Each General Work Element ID No. begins with the digit seven (7). All General Work Elements which are passed will automatically be posted to all three subfields.**

- 75001 **COMPLEX PLANS AND SPECIFICATIONS**  
Utilize complex plans and specs to assure compliance with all requirements for sampling and testing; to plan activities for sampling and testing; and to record work accomplished with sample locations clearly noted.
- 75002 **FIELD TESTING**  
Evaluate sampling methods and methods used to protect and preserve samples to determine their validity for the purposes required. Request additional or modified methods if appropriate and apply correction factors if applicable. Recommend discarding samples or results if improper methods used have rendered sampling or testing results inapplicable for purposes required.
- 75006 **ACCURACY OF SCALES**  
If scales are controlled by a designated authority, inspect certificates and seals to assure that weight accuracy is maintained. If no designated authority exists, check scales with certified weights, require any necessary adjustments and seal adjusting mechanisms to assure continuing maintenance of accuracy standards.
- 75007 **OSHA AND OTHER SAFETY REQUIREMENTS**  
Understand what is needed to comply with OSHA, organizational, state and local safety requirements. Recognize violations and report violations to project engineer. (OSHA)
- 75008 **GOVERNMENTAL TEST PROCEDURES AND STANDARDS**  
Know the agencies which establish and publish testing and sampling procedures for materials. Know which agencies' procedures apply to work being performed and how to obtain pertinent manuals and other publications. Know which procedures and standards are used as primary guides and which are used as supplemental guides. Use appropriate test procedures and standards to accomplish assigned duties.
- 75009 **AERIAL PHOTOGRAPHY**  
Use single aerial photos to determine accessibility of sampling sites and approximate distances. Sketch approximate project boundaries and alignments on air photos as guides to layout of projected work.
- 75010 **SAMPLING SITES**  
Use maps and charts to locate and determine accessibility of sampling sites for proposed projects.
- 75011 **BASIC STATISTICS**  
Apply basic statistical concepts related to probability, frequency distributions such as histograms, central tendency measures such as mean and mode, and dispersion measures such as standard deviation. (See elementary statistics textbooks.)
- 75012 **BASIC FIELD MEASUREMENTS**  
Apply transit-tape surveying to basic planimetric surveys.
- 75013<sup>^</sup> **FIRST AID PROCEDURES**  
Understand the basic rules and procedures of first aid. (See general handbooks on first aid.)
- 75014 **TEST RESULTS**  
Review test results to see if they contain all required information and an unbiased estimate of the information desired. Compare results with conclusions determined under similar circumstances in the same area, working with the same or similar materials. Review procedures used to determine if the results properly utilize data collected. Reconcile apparent divergences from expected results.
- 75015 **DISPUTE AND CONFLICT MANAGEMENT**  
Review, gather information, and assist in the preparation of presentations of disputes related to claims, arbitrations, litigation and mediations.
- 75016 **INORGANIC CHEMISTRY**  
Read and interpret the periodic table of the elements. Write and recognize formulas for simple compounds and balance chemical equations. Determine the quantities of materials needed for a given chemical reaction and prepare solutions by weight, volume, or molarity. Recognize acids, bases, and salts, use the Ph scale. Recognize and operate simple laboratory equipment. (See Periodic Table of the Elements.)
- 75017<sup>^</sup> **TECHNICAL PRESENTATION AND REPORTS**  
Organize and deliver oral presentations and prepare technical reports and correspondence.  
**NOTE: If you have already passed 75003 or 77003, you will not be given credit for this work element.**

## LEVEL III - SPECIAL WORK ELEMENTS

In the Special Work Element listing, an initial digit of 7 indicates the asphalt subfield, an initial digit of 8 indicates the concrete subfield, and an initial digit of 9 indicates the soils subfield. When a work element has more than 1 number listed, it means that it is a crossover work element. All crossover elements which are passed will be posted to all numbers indicated if the requirements printed on page 4 in this manual are followed.

### \*\*\*\*\*CROSSOVER WORK ELEMENTS\*\*\*\*\*

#### o AGGREGATES

##### 76007. 86008

##### CALIBRATE AGGREGATE PLANTS

Assure compliance with specs covering materials produced by a plant, quarry or equivalent production process by verifying accuracy of automatic controls on quantities, weights, or other characteristics of final products. Refer to manufacturers' specs or to published standards as necessary. Test batches or samples on random basis to assure quality control. (D290)

### \*\*\*\*\*NON-CROSSOVER WORK ELEMENTS\*\*\*\*\*

#### \*\*\*\*\* ASPHALT \*\*\*\*\*

#### o LIQUID BITUMINOUS MATERIALS

##### 76004 VISCOSITY TESTS

Know the basic principles of the Absolute, Kinematic, and Saybolt methods of determining the viscosity of asphalts, petroleum or tar products and participate in the required laboratory tests. (T72, T201, T202, D88, D2170, D2171)

#### o BITUMINOUS MIXTURES

##### 76001 BITUMINOUS MIXING PLANT INSPECTION

Assure compliance with specs covering materials produced by a plant by verifying accuracy of automatic controls on quantities, weights, or other characteristics of final products. Refer to specs or to published standards as necessary. Test samples on random basis to assure quality control. (T172, D290)

##### 76002 HVEEM APPARATUS

Determine the resistance to deformation and cohesion of bituminous mixtures by use of the Hveem apparatus. (T246, D1560)

##### 76003 BITUMINOUS MIXES

Design (for approval by an engineer) bituminous mixes that economically and efficiently use available materials and meet specs.

##### 76006 MARSHALL APPARATUS

Determine stability and resistance to plastic flow of bituminous mixtures containing asphalt cement, asphalt cutback or tar by use of the Marshall apparatus. (T245, D1559)

#### \*\*\*\*\* CONCRETE \*\*\*\*\*

##### 86002 AIR-ENTRAINING ADMIXTURES

Test materials proposed for use as air-entraining admixtures to be added to concrete mixtures. (T157, C233)

##### 86003 MODULUS OF ELASTICITY/CONCRETE

Determine modulus of elasticity and Poisson's ratio of molded concrete cylinders and drilled cores. (C469)

##### 86004 FREEZE-THAW TEST/CONCRETE

Evaluate the ability of cement containing an air-entraining agent to produce frost-resistant concrete by use of the Freeze-Thaw test. (T161, T188, C666)

##### 86005 CONCRETE MIXES

Design (for approval of an engineer) portland cement concrete mixes that economically and efficiently use available materials and meet requirements for anticipated loads and conditions. (ACI211)

##### 86010 AUTOCLAVE TEST

Determine probable delayed expansion of cement by the use of the autoclave test on a neat cement specimen. (T107, C151)

**o CONCRETE INSPECTION**

- 86006 PRECAST/PRESTRESSED CONCRETE PLANT INSPECTION  
Perform in-plant inspection, including all appropriate tests of precast or prestressed concrete structural members for compliance with applicable specs. (Prestressed Concrete Institute Structural QC Manual #116)
- 86007 POST-TENSIONING CONCRETE INSPECTION  
Inspect post-tensioned concrete (materials, forms, tensioning). (Prestressed Concrete Institute Structural QC Manual #116)

**o AGGREGATES**

- 86001 ORGANIC IMPURITIES IN FINE AGGREGATE  
Determine the effect on mortar strength of organic impurities. (T71, C87)
- 86009 PETROGRAPHIC ANALYSIS/AGGREGATES  
Perform petrographic analyses of rock samples through thin section microscopy, chemical tests, and other methods to determine composition of rock and suitability for use under designated conditions. (C295).

**\*\*\*\*\* SOILS \*\*\*\*\***

**o LABORATORY TESTING**

- 96001 CBR OF LAB COMPACTED SOILS  
Determine the bearing ratio of soil when compacted and tested in the laboratory by comparing the penetration load of the soil to that of a standard material. (T193, D1883)
- 96004 TRIAXIAL TESTING  
Determine the strength parameters of soils by triaxial compression testing. (D2850)

**o FIELD (IN-PLACE) TESTING**

- 96002 PLATE BEARING TESTS  
Determine the load deflection and residual deflection of subgrade soils and flexible pavement components by application of repetitive and non-repetitive plate load tests. (T221, T222, T235, D1194, D1195, D1196)
- 96003 PILE LOAD TEST  
Determine the response of a pile or pile group to a static compressive load applied axially to a pile or piles within a group. (D1143)

## LEVEL IV - GENERAL WORK ELEMENTS

**NOTE: Certification at Level IV requires that the candidate must have occupied a senior position of responsibility throughout the duration of one major construction materials testing and inspection project (field and/or laboratory/office assignment) for each subfield certification sought. There are no exceptions to this requirement.**

**All General Work Elements are common to all three subfields of asphalt, concrete, and soils. Each General Work Element ID No. begins with the digit seven (7). All General Work Elements which are passed will automatically be posted to all three subfields.**

- 77001 TECHNICAL LIBRARIES  
Perform research in technical libraries to determine accomplishments of other agencies with regard to physical properties of materials, testing methods, acceptable standards, etc. Extract pertinent information and use in conjunction with assigned projects and recommend necessary rechecks to substantiate.
- 77002 TESTING PROGRAM COORDINATION  
Coordinate a program of testing and/or research in the field or lab to assure effective performance of all related tasks. Maintain records on manhours, equipment, and material costs for each phase. Assure compliance of sampling and testing procedures with standards. Receive, review and collate results and summarize and compare results to determine accuracy. Prepare a report of entire program with findings and recommendations to designated authority.
- 77004 APPLIED STATISTICS  
Apply basic statistical concepts to the sampling and evaluation of materials or component batches. Utilize established standards or develop limits of acceptance which consider the practical variability of sampling procedures. (ASTM E105, E122, E141)
- 77005 PROJECT COORDINATION  
Assure accurate and complete performance of complex testing or research by coordinating operations within the unit and among all units, agencies, consultants and municipalities engaged on the project. Demonstrate tact while maintaining schedules and while demanding effective work and results from subordinates and cooperating units. Assure compliance with requirements of EEO, OSHA and other programs, and document costs of consultants' services. Disseminate appropriate information to ensure each member of the team knows what is expected. Handle grievances and complaints and refer matters beyond delegated authority to proper supervisor.
- 77006 LABORATORY TESTING SUPERVISION  
Be responsible for planning, supervising personnel, testing, reporting and overall operation of laboratory performing material testing such as physical (steel and concrete) testing, soil laboratory, asphalt laboratory, bituminous laboratory, etc. Work to be performed under the general supervision of an engineer.
- 77007 SHOP/FIELD INSPECTION SUPERVISION  
Be responsible for planning, supervising personnel, coordinating inspection with contractor or fabricator, inspection, reporting, and overall operation of inspection of construction or fabrication shop. Work to be performed under the general supervision of an engineer.
- 77008 TESTING MACHINE VERIFICATION  
By means of standard calibrating devices, know the procedures for the verification of testing machines that are designed to measure loads. (T67, E4)
- 77009 GEOLOGY  
Describe major categories of rocks and soils. Read and interpret geological and soil maps. Recognize geological structures and related terminology. Apply geological and basic hydraulic principles to stream flow properties and patterns, and to flow and level of groundwater. Recognize and describe the conditions which lead to rock and soil movements. Apply the law of superposition and principles of rock layer correlation.

## LEVEL IV - SPECIAL WORK ELEMENTS

In the Special Work Element listing, an initial digit of 7 indicates the asphalt subfield, an initial digit of 8 indicates the concrete subfield, and an initial digit of 9 indicates the soils subfield. When a work element has more than 1 number listed, it means that it is a crossover work element. All crossover elements which are passed will be posted to all numbers indicated if the requirements printed on page 4 in this manual are followed.

### \*\*\*\*\*CROSSOVER WORK ELEMENTS\*\*\*\*\*

#### o AGGREGATES

78002, 88002, 98002

SUPERVISE SAMPLING AND TESTING/AGGREGATES

Responsible for planning, supervising personnel, sampling, testing, reporting, and overall operation of aggregate testing. (T2, T96, T248, C131, C702, D75, D3665)

### \*\*\*\*\*NON-CROSSOVER WORK ELEMENTS\*\*\*\*\*

#### \*\*\*\*\* ASPHALT \*\*\*\*\*

#### o BITUMINOUS MIXTURES

78001 SUPERVISE LABORATORY/BITUMINOUS MIXTURES

Responsible for selecting, maintaining, and calibrating test equipment. Select appropriate tests to be performed. Supervise sampling, testing, and reporting for a bituminous mixtures field or plant laboratory. Be responsible for all operations under the supervision of an engineer.

#### \*\*\*\*\* CONCRETE \*\*\*\*\*

#### o CONCRETE MIXTURES AND COMPONENTS

88001 SUPERVISE LAB/CONCRETE

Responsible for selecting, maintaining, and calibrating test equipment. Select appropriate tests to be performed. Supervise sampling, testing, and reporting for a field concrete laboratory or precast/prestressed concrete plant. Be responsible for all operations under the supervision of an engineer.

#### \*\*\*\*\* SOILS \*\*\*\*\*

#### o SOIL LABORATORY

98001 SUPERVISE LAB/SOILS

Be responsible for selecting, maintaining, and calibrating test equipment. Select appropriate test to be performed. Supervise sampling, testing, and reporting for a field soil laboratory. Be responsible for all operations under the supervision of an engineer.

**PERSONAL TALLY WORKSHEET**

Passed Work Elements in Construction Materials Testing

**GENERAL NOTES:**

1. Put a checkmark next to the appropriate work element number when you receive a passing score on your Examination Score Report.
2. Put an "A" next to the appropriate work element number if you have been awarded credit for your current ACI certification (see page 8 in this manual).
3. Note that the crossover work elements are listed separately on the right side of this page. Once you pass a work element that is indicated as a crossover, check off the number of the one you passed, and put a "C" next to the other(s) in the row.

**Levels I and II General Work Elements**

<u>Level I</u>		<u>Level II</u>	
<input type="checkbox"/> 71001	<input type="checkbox"/> 71006	<input type="checkbox"/> 73001	<input type="checkbox"/> 73007
<input type="checkbox"/> 71002	<input type="checkbox"/> 71007	<input type="checkbox"/> 73002	<input type="checkbox"/> 73008
<input type="checkbox"/> 71003	<input type="checkbox"/> 71008	<input type="checkbox"/> 73003	<input type="checkbox"/> 73009
<input type="checkbox"/> 71004*	<input type="checkbox"/> 71009	<input type="checkbox"/> 73004*	<input type="checkbox"/> 73010
<input type="checkbox"/> 71005		<input type="checkbox"/> 73005	<input type="checkbox"/> 73011
		<input type="checkbox"/> 73006	

**Level I Special Work Elements**

**Work Elements with No Crossover Credit**

<u>Asphalt</u>	<u>Concrete</u>	<u>Soils</u>
<input type="checkbox"/> 72001	<input type="checkbox"/> 82001	<input type="checkbox"/> 92001
<input type="checkbox"/> 72002	<input type="checkbox"/> 82002	<input type="checkbox"/> 92002
<input type="checkbox"/> 72003	<input type="checkbox"/> 82003	<input type="checkbox"/> 92003
<input type="checkbox"/> 72004	<input type="checkbox"/> 82004	<input type="checkbox"/> 92004
<input type="checkbox"/> 72012	<input type="checkbox"/> 82013	
<input type="checkbox"/> 72013	<input type="checkbox"/> 82014*	
	<input type="checkbox"/> 82015	

**Crossover Work Elements**

(Check off all in row once one is passed)

<input type="checkbox"/> 72005	<input type="checkbox"/> 82005	<input type="checkbox"/> 92005
<input type="checkbox"/> 72006	<input type="checkbox"/> 82006	<input type="checkbox"/> 92006
<input type="checkbox"/> 72007	<input type="checkbox"/> 82007	<input type="checkbox"/> 92007
<input type="checkbox"/> 72008	<input type="checkbox"/> 82008	<input type="checkbox"/> 92008
<input type="checkbox"/> 72009	<input type="checkbox"/> 82009	<input type="checkbox"/> 92009
<input type="checkbox"/> 72010	<input type="checkbox"/> 82010	<input type="checkbox"/> 92010
<input type="checkbox"/> 72011	<input type="checkbox"/> 82011	<input type="checkbox"/> 92011

**Level II Special Work Elements**

**Work Elements with No Crossover Credit**

<u>Asphalt</u>			<u>Concrete</u>			<u>Soils</u>	
<input type="checkbox"/> 74001	<input type="checkbox"/> 74014	<input type="checkbox"/> 84002	<input type="checkbox"/> 84016	<input type="checkbox"/> 84030	<input type="checkbox"/> 94001	<input type="checkbox"/> 94011	
<input type="checkbox"/> 74002	<input type="checkbox"/> 74015	<input type="checkbox"/> 84003	<input type="checkbox"/> 84017	<input type="checkbox"/> 84031	<input type="checkbox"/> 94002	<input type="checkbox"/> 94012	
<input type="checkbox"/> 74003	<input type="checkbox"/> 74016	<input type="checkbox"/> 84004	<input type="checkbox"/> 84018	<input type="checkbox"/> 84035	<input type="checkbox"/> 94003	<input type="checkbox"/> 94013	
<input type="checkbox"/> 74004	<input type="checkbox"/> 74017	<input type="checkbox"/> 84005	<input type="checkbox"/> 84019	<input type="checkbox"/> 84037*	<input type="checkbox"/> 94004	<input type="checkbox"/> 94014	
<input type="checkbox"/> 74005	<input type="checkbox"/> 74018	<input type="checkbox"/> 84006	<input type="checkbox"/> 84020	<input type="checkbox"/> 84040	<input type="checkbox"/> 94005	<input type="checkbox"/> 94015	
<input type="checkbox"/> 74006	<input type="checkbox"/> 74019	<input type="checkbox"/> 84007	<input type="checkbox"/> 84021	<input type="checkbox"/> 84043	<input type="checkbox"/> 94006	<input type="checkbox"/> 94016	
<input type="checkbox"/> 74007	<input type="checkbox"/> 74020	<input type="checkbox"/> 84008	<input type="checkbox"/> 84022	<input type="checkbox"/> 84044	<input type="checkbox"/> 94007	<input type="checkbox"/> 94017	
<input type="checkbox"/> 74008	<input type="checkbox"/> 74021	<input type="checkbox"/> 84009	<input type="checkbox"/> 84023	<input type="checkbox"/> 84045	<input type="checkbox"/> 94008	<input type="checkbox"/> 94018	
<input type="checkbox"/> 74009	<input type="checkbox"/> 74022	<input type="checkbox"/> 84010	<input type="checkbox"/> 84024	<input type="checkbox"/> 84047	<input type="checkbox"/> 94009	<input type="checkbox"/> 94019	
<input type="checkbox"/> 74010	<input type="checkbox"/> 74023	<input type="checkbox"/> 84011	<input type="checkbox"/> 84025	<input type="checkbox"/> 84048	<input type="checkbox"/> 94010		
<input type="checkbox"/> 74011	<input type="checkbox"/> 74024	<input type="checkbox"/> 84012	<input type="checkbox"/> 84026	<input type="checkbox"/> 84049			
<input type="checkbox"/> 74012	<input type="checkbox"/> 74036	<input type="checkbox"/> 84013	<input type="checkbox"/> 84027	<input type="checkbox"/> 84050			
<input type="checkbox"/> 74013		<input type="checkbox"/> 84014	<input type="checkbox"/> 84028	<input type="checkbox"/> 84051			
		<input type="checkbox"/> 84015	<input type="checkbox"/> 84029	<input type="checkbox"/> 84052			

**Crossover Work Elements**

(Check off all in row once one is passed)

<input type="checkbox"/> 74025	<input type="checkbox"/> 84032	none
<input type="checkbox"/> 74026	<input type="checkbox"/> 84033	<input type="checkbox"/> 94021
<input type="checkbox"/> 74027	<input type="checkbox"/> 84034	<input type="checkbox"/> 94022
<input type="checkbox"/> 74029	<input type="checkbox"/> 84036	<input type="checkbox"/> 94024
<input type="checkbox"/> 74031	<input type="checkbox"/> 84038	<input type="checkbox"/> 94026
<input type="checkbox"/> 74032	<input type="checkbox"/> 84039	<input type="checkbox"/> 94027
<input type="checkbox"/> 74034	<input type="checkbox"/> 84041	<input type="checkbox"/> 94029
<input type="checkbox"/> 74035	<input type="checkbox"/> 84042	<input type="checkbox"/> 94030
none	<input type="checkbox"/> 84046	<input type="checkbox"/> 94034

\*Deleted work elements – past credit retained

**Levels III and IV General Work Elements**

<u>Level III</u>		<u>Level IV</u>
<u>__75001</u>	<u>__75010</u>	<u>__77001</u>
<u>__75002</u>	<u>__75011</u>	<u>__77002</u>
<u>__75003*</u>	<u>__75012</u>	<u>__77003*</u>
<u>__75004*</u>	<u>__75013</u>	<u>__77004</u>
<u>__75005*</u>	<u>__75014</u>	<u>__77005</u>
<u>__75006</u>	<u>__75015</u>	<u>__77006</u>
<u>__75007</u>	<u>__75016</u>	<u>__77007</u>
<u>__75008</u>	<u>__75017</u>	<u>__77008</u>
<u>__75009</u>		<u>__77009</u>

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**Level III Special Work Elements**

**Work Elements with No Crossover Credit**

<u>Asphalt</u>	<u>Concrete</u>	<u>Soils</u>
<u>__76001</u>	<u>__86001</u>	<u>__96001</u>
<u>__76002</u>	<u>__86002</u>	<u>__96002</u>
<u>__76003</u>	<u>__86003</u>	<u>__96003</u>
<u>__76004</u>	<u>__86004</u>	<u>__96004</u>
<u>__76006</u>	<u>__86005</u>	
	<u>__86006</u>	
	<u>__86007</u>	
	<u>__86009</u>	
	<u>__86010</u>	

**Crossover Work Elements**

(Check off both once one is passed)

\_\_76007    \_\_86008

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**Level IV Special Work Elements**

**Work Elements with No Crossover Credit**

<u>Asphalt</u>	<u>Concrete</u>	<u>Soils</u>
<u>__78001</u>	<u>__88001</u>	<u>__98001</u>

**Crossover Work Elements**

(Check off both once one is passed)

\_\_78002    \_\_88002    \_\_98002

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\*Deleted work elements -- past credit retained.

## **SELECTED GENERAL REFERENCES**

**The following publications are cited in the Work Element descriptions. Candidates may bring these publications to the test center:**

Annual Book of ASTM Standards. ASTM International. West Conshohocken, PA.

Construction Industry - OSHA Safety and Health Standards Digest. Government Printing Office. Washington, D.C.

IEEE/ASTM SI 10. Standard for Use of the International System of Units (SI); the Modern Metric System. Institute of Electrical and Electronics Engineers, Inc. NY, New York. (www.ieee.org; phone: 800-678-IEEE (4333)).

Standard Specifications for Transportation Materials and Methods of Sampling and Testing. American Association of State Highway and Transportation Officials. Washington, D.C. (phone: 1-888-227-4860 fax: 202-624-5469).

Structural QC Manual (Manual 116). Pre-stressed Concrete Institute. Chicago, IL (www.pci.org; phone: 312-786-0300).

Basic textbooks on general math, algebra, trigonometry, elementary statistics, chemistry (including access to the Periodic Table of the Elements), basic technical drawing

General handbooks or textbooks on basic grammar and writing

General handbooks or textbooks on first aid

**The following publications were recommended by the committee who developed and/or updated the program. Candidates may bring these publications to the test center:**

Liu, C. and Evett, J., Soil Properties: Testing, Measurement, and Evaluation. Prentice Hall. Englewood Cliffs, NJ.

ACI Manual of Concrete Inspection (SP-2). American Concrete Institute. Farmington Hills, MI.

ACI Manual of Concrete Practice. American Concrete Institute. Farmington Hills, MI.

The Asphalt Handbook (MS-4). The Asphalt Institute. Lexington, KY.

Design and Control of Concrete Mixes. Portland Cement Association. Skokie, IL.

Fundamentals of Quality Precast. National Precast Concrete Association. Indianapolis, IN.

Hot-Mix Asphalt Paving Handbook 2000 and CD-ROM. National Asphalt Pavement Association. Lanham, MD.

Hot-Mix Asphalt Materials, Mixture Design, and Construction. National Asphalt Pavement Association. Lanham, MD.

Standard First Aid and Personal Safety. American Red Cross. Washington, D.C.

General handbooks or textbooks on surveying and physical science

General handbooks or textbooks on construction materials testing, civil engineering, and civil engineering technology.

### **Other Resources**

American Society of Civil Engineers. Reston, VA. (www.asce.org; phone: 800-548-2723; fax: 703-295-6222)

The Asphalt Institute. Publication Department. Lexington, KY. (www.asphaltinstitute.org; phone: 859-288-4960)

National Asphalt Pavement Association. Lanham, MD. (napa@hotmix.org; phone: 888-468-6499; fax: 301-731-4621)

Portland Cement Association. Publications Department. Skokie, IL. (www.portcement.org; phone: 847-966-6200)

#### **WARNING**

On its website, NICET maintains a complete listing of references that are allowed in the paper-and-pencil testing centers. Please view the document “Reference Material Allowed in NICET Paper and Pencil Test Centers” at [www.nicet.org/candidates/allowable\\_reference\\_material.pdf](http://www.nicet.org/candidates/allowable_reference_material.pdf).

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- o NICET does not stock these publications. You must contact the publisher directly for purchasing information.**
  - o This listing is not intended to be complete or representative.**
  - o We suggest in all cases that the most current edition of the publication be used.**

## SAMPLE SCORE REPORT

Exam No. 99999  
Examinee: JOHN EXAMINE

Test Date: 06/17/95  
Report Date: 07/11/95

Work Element Number and Title	Score (%)	Pass/Fail
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### CONSTRUCTION MATERIALS TESTING

2075001 Complex Plans and Specifications	70.75	P
2075002 Field Testing	80.00	P
2075007 OSHA and Other Safety Requirements	35.00	F*
2075008 Governmental Test Procedures and Standards	65.00	P
2075013 First Aid Procedures	80.00	P
2076001 Bituminous Mixing Plant Inspection	100.00	P
2076003 Bituminous Mixes	90.00	P
2076007 Calibrate Aggregate Plants	50.00	F**
2086004 Freeze-Thaw Test/Concrete	45.00	F***

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Asterisks (\*,\*\*,\*\*\*,\*\*\*\*) indicate the number of times a work element has been failed. Additional information can be found on our website: <http://www.nicet.org/about/policies.cfm#policy20>.

**JOHN EXAMINE**  
**1420 King Street**  
**Alexandria, Virginia 22314-2715**