

Road Pavement Forum
May 2018

South Africa

COTO

Committee of Transport
Officials

Materials Tester & Laboratory Controller: Certification & Registration

SANRAL

SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LTD



Reg.No. 1998/009584/30

BUILDING SOUTH AFRICA
THROUGH BETTER ROADS

Sean Strydom

Overview

- **Materials Tester Certification**
- **Laboratory Controller Registration**

Qualification

- **Materials Tester - NQF 4**
- **Laboratory Controller – NQF 5**



Material Tester Certification



**Competence
Based**



Material Tester Certification

ISO 17024

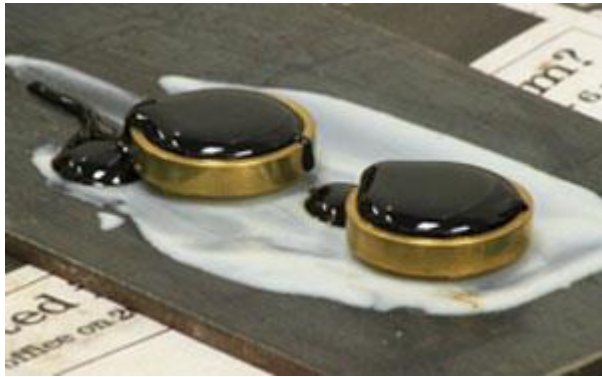
NLA-SA

Competence
Based

SABITA
sponsored
Curriculum

SANAS

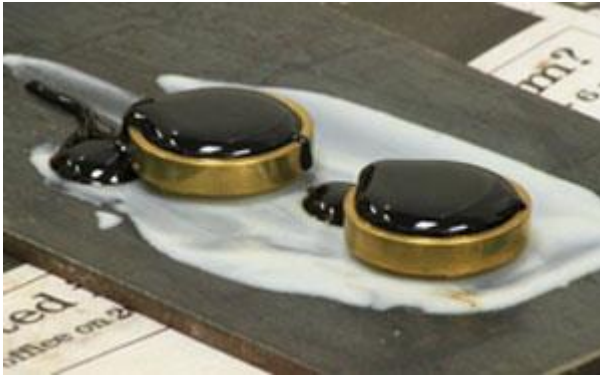
Material Tester Certification



Specialisations



Material Tester Certification



- Draw from storage and assemble testing apparatus for the relevant test,
- Check compliance of apparatus to specifications of test method,
- Execute laboratory and housekeeping activities,
- Organise samples, data information and documentation,
- Conduct sampling and field testing of bituminous binders,
- Extract a representative and sized test sample,
- Determine the properties of bituminous base binders,
- Determine the properties of modified bituminous binders,

Bitumen Tester

Ball penetration; texture depth; sampling of base bituminous binders, cut-backs and emulsions; sampling of modified bituminous binders; divide a sample using the riffler; by quartering; softening point; penetration; viscosity; sample and prepare modified binders samples & the elastic recovery of modified bituminous binder

Material Tester Certification

- Draw from storage and assemble testing apparatus for the relevant test,
- Check compliance of apparatus to specifications of test method,
- Execute laboratory and housekeeping activities,
- Organise samples, data information and documentation,
- Conduct sampling and field testing of fresh and hardened concrete,
- Extract a representative and sized test sample,
- Determine the properties of fresh and hardened concrete,



Concrete tester

Sample of fresh concrete; divide a sample using the riffler; by quartering; density of compacted freshly mixed concrete; compressive strength of hardened concrete, incl making and curing of specimen

Material Tester Certification

Asphalt Tester

- Draw from storage and assemble testing apparatus for the relevant test
- Check compliance of apparatus to specifications of test method
- Execute laboratory and housekeeping activities,
- Organise samples, data information and documentation,
- Conduct sampling and field testing of asphalt,
- Extract a representative and sized test sample,
- Determine the properties of asphalt

Sampling of Previously Blended (ready mixed) Asphalt; sampling of Asphalt from completed layer; handle and maintain a nuclear density gauge; in-situ density of compacted asphaltic materials; divide a sample using the riffler; by quartering; produce asphalt briquettes; Marshall stability, flow and quotient; indirect tensile strength of asphalt; bulk density and void content of compacted asphalt; maximum void-less density of asphalt mixes and the quantity of binder absorbed by the aggregate; soluble binder content and particle size distribution



Material Tester Certification

- Draw from storage and assemble testing apparatus for the relevant test,
- Check compliance of apparatus to specifications of test method,
- Execute laboratory and housekeeping activities,
- Organise samples, data information and documentation,
- Conduct sampling of aggregates,
- Extract a representative and sized test sample,
- Determine particle distribution and particle shape of aggregates,
- Determine the density and strength of aggregates

Sampling from Stockpiles; from Conveyor Belts; divide a sample using the riffler; by quartering; particle size distribution; average least dimension; flakiness index; bulk density, apparent density and water absorption retained on the 5 mm sieve; passing the 5 mm sieve; bulk density of aggregates; aggregate crushing value (ACV) and 10 % FACT



Aggregate tester

Material Tester Certification

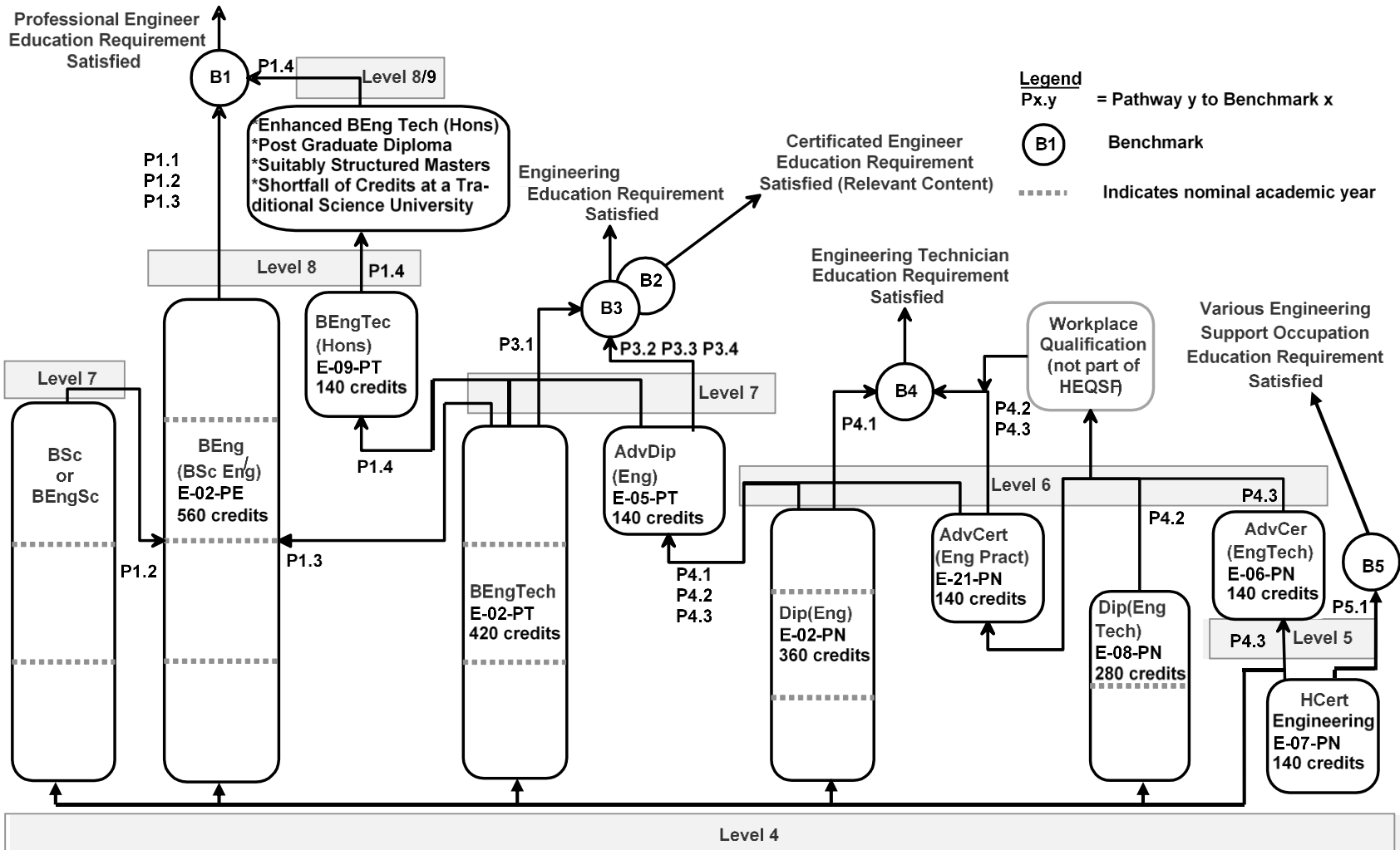
- Draw from storage and assemble testing apparatus for the relevant test,
- Check compliance of apparatus to specifications of test method,
- Execute laboratory and housekeeping activities,
- Organise samples, data information and documentation
- Conduct sampling of soils, gravels and crushed stone materials,
- Conduct field testing of compacted and uncompacted fill and pavement layers,
- Extract a representative and sized test sample,
- Determine particle size distribution and Atterberg Limits of soils, gravels and crushed stone materials,
- Determine the density of soils, gravels and crushed stone materials,
- Determine compaction and strength characteristics of untreated soils, gravels and crushed stone materials

Sampling of soils, gravels and crushed stone of treated pavement layers; of untreated road pavement layers; and from stockpiles; handle and maintain a nuclear density gauge; in-situ density; divide a sample using the riffler; by quartering; particle size distribution; hydrometer; two-point liquid limit, plastic limit, plasticity index and linear shrinkage; soil-mortar %, coarse sand ratio, GM & FM; handling sieves; moisture content; maximum dry density & optimum moisture content; California Bearing Ratio; unconfined compressive strength; indirect tensile strength

Soils, gravel and Base Course Materials Tester



Civil Laboratory Technical Controller Registration



New Engineering Qualifications

NQF Level 10

PhD

NQF Level 9

M Eng

NQF Level 8

B Eng

B Eng Tech Hons

NQF Level 7

B Eng Tech

Adv Dip

NQF Level 6

Dip Eng

Dip Eng Tech

Adv Cert

NQF Level 5

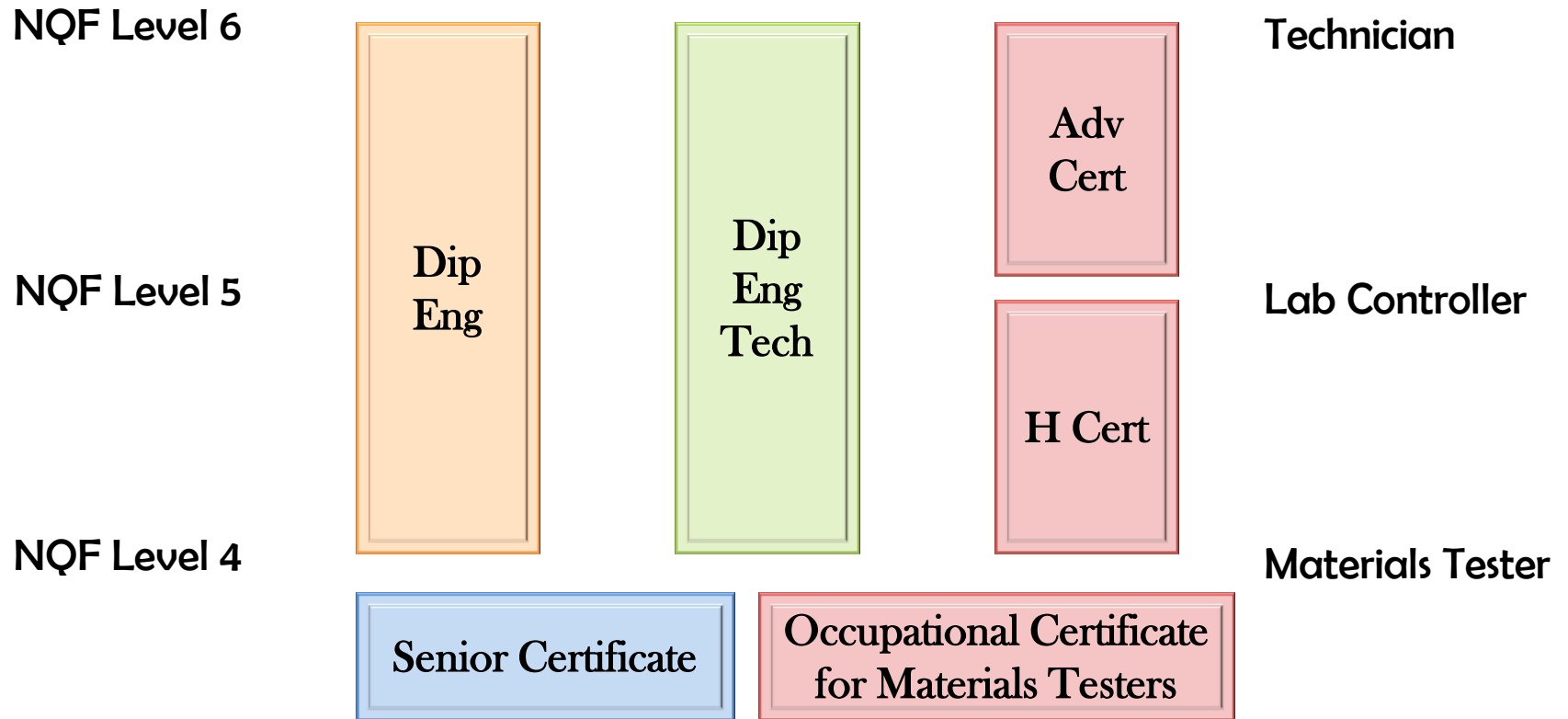
H Cert

NQF Level 4

Senior Certificate

Occupational Certificate for Materials Testers

Materials Testers to Materials Technicians



Civil Laboratory Technical Controller Registration

The screenshot shows the ECSA website with a blue and white color scheme. At the top, there is a navigation bar with links for Home, About ECSA, Council Sign-In, Engenius, Latest News, Register, Regulation, Tenders, ECSA Documents, and FAQ. Below this, there are three news articles, each with the ECSA logo and a brief description. The bottom section of the page is a grid of 12 menu items, each with a dark blue header and a list of sub-links.

Home - ECSA x
Secure | https://www.ecsa.co.za/default.aspx
Council Sign-in Contact Us

ECSA

Home | About ECSA | Council Sign-In | Engenius | Latest News | Register | Regulation | Tenders | ECSA Documents | FAQ |

ECSA **ECSA Portal Invites**
We are having challenges with people registering and not redeeming invites, and feel we need to address this on the website and portal.
Read More...

ECSA **Stakeholder Update on ECSA Operations**
The Engineering Council of South Africa (ECSA) had embarked on a transformation journey to enhance its service offerings to all registered persons. This transformation included migrating to an online system.
Read More...

ECSA **ECSA signs an Agreement to increase overseas marketability for Registered Engineers**
Engineering Council of South Africa (ECSA) earlier this month signed a five-year Agreement for the Mutual Recognition of Engineers with Engineers Australia (EA)
Read More...

Register Why Register ? Registration Categories Registration Process Apply for Registration Who is Registered ? Registration Enquiry Registration Documents Re-Registration	Continuing Professional Development Rules on CPD CPD Online Login CPD Activities CPD Forms CPD - FAQ Annual Fees Update Details	Education & Accreditation About Accreditation Policies and Standards Accredited Programmes International Recognition Evaluation of Qualifications Education and Accreditation Documents	Engineering in South Africa What is Engineering? History Engineering in action Public Safety Case Studies IDoEW
Professional Development Engineering Competence	ECSA Stakeholders Voluntary Associations	Regulation of Engineering Practice Legislation	External Links SASEE

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Civil Laboratory Technical Controller Registration

Home - ECSA

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Professional Development Engineering Competence	ECSA Stakeholders Voluntary Associations	Regulation of Engineering Practice Legislation	External Links SASEE



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ECSA Documents - ECSA x

Secure | <https://www.ecsa.co.za/EcsaDocuments/sitepages/ecsa%20documents.aspx>

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 - New Registration
 - Professional Engineering Technologists
 - Legacy Registration
 - New Registration
 - Professional Engineering Technicians
 - Legacy Registration
 - New Registration
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 - International Registers and Mutual Recognition Agreements
 - Specified Categories
 - Lift Inspectors
 - Lifting Machinery Inspectors
 - Registered Medical Equipment Maintainer
 - Fire Protection Systems Inspector
- Professional Practice
- Accreditation
- Qualifications Evaluation
- Standards Development

2. General

- Policy Document on the Statutory Regulation of the Built Environment Professions. June 1999
- Engineering Profession Act, No 46 of 2000
- Council for the Built Environment Act, 2000(Act 43 of 2000)



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Civil Laboratory Technical Controller Registration

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Secure | <https://www.ecsa.co.za/EcsaDocuments/sitepages/ecsa%20documents.aspx#SpecCat>

Council Sign-in Contact Us

- R-02-SC Competency Standard for Registration in a Specified Category
- R-03-SC Processing of Applications for Registration as a Specified Category Candidate and SC Practitioner
- R-04-SC Training and Mentoring Guide for Specified Categories
- R-08-SC Guide to the Competency Standards for Registration in a Specified Category
- R-11-SC Process for training engineering graduates toward specified category registration
- E-07-SC Higher Certificate in Engineering for Specified Categories
- E-17-SC Criteria and Processes for the Recognition of Educational Qualifications for Specified Categories

3.7.1 Lift Inspectors

- Policy Statement R2/1F: Acceptable Engineering Work for Registration as a Registered Lift Inspector
- Application Form: Lift Inspector
- Re-Registration: Lift Inspector

3.7.2 Lifting Machinery Inspectors

- Policy Statement R2/1J: Acceptable Engineering Work for Registration as a Registered Lifting Machinery Inspector (RLMI) and Candidate Lifting Machinery Inspector (CLMI)
- Lifting Machinery Inspector Practitioner Application Form
- Application Form: Lifting Machinery Inspector - Additional Equipment Types
- Re-Registration: Lifting Machinery Inspector
- R-05-LMI-SC Sub Discipline-specific Training Requirements for Candidate Lifting Machinery Inspectors
- Lifting Machinery Inspector Candidate Application Form

3.7.3 Medical Equipment Maintainer

- Policy Statement R2/1H: Acceptable Engineering Work for Registration as a Medical Equipment Maintainer and Candidate Medical Equipment Maintainer
- Application Form: Medical Equipment Maintainer

3.7.4 Fire Protection Systems Inspector

- Policy Statement R2/1N: Acceptable Engineering Work for Registration as a Fire Protection Systems Inspector and Candidate Fire Protection Systems Inspector
- Application Form: Fire Protection Systems Inspector

3.7.5 Fire Protection Systems Practitioners

- Application Form: Fire Protection Systems Practitioner
- R-05-FPSP: Sub Discipline-specific Training Requirements for Candidate Fire Protection System Practitioners

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3.7.6 Civil Laboratory Technical Controller

- R-05-CLTC-SC Sub Discipline-Specific Training Guideline for Civil Laboratory Controller

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4. Professional Practice

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Form No.: APP-CLTC-SC		
Effective Date: 1 April 2018		
Rev no: 0		

Office Use
Ref.:

NB: Please consult the enclosed information sheet (Sheet A) before completing this Application.

1. General Information:


Surname:		Title and First Names:			PHOTOGRAPH (Passport-type. Please paste - do not staple) Alternatively, insert electronically in JPEG or similar format
Date of Birth:		Identity No: Or Passport No: Country (passport):			
*Race Group: Please tick the applicable block	Indian	Black	*Gender: (Please tick the applicable block)	Male	Country of normal residence:
	Coloured	White		Female	
Home Address:		Postal Address:		Name & Address of present Employer:	
Tel. No. (Home):		Title of Position held:		Tel. No. (Employer):	
Tel. No. (Work): (include area codes)				Fax No.: (include area codes)	
Cell No.:				E-mail:	
E-mail:					

*Completion of this section is necessary in order to accurately reflect equity statistics in terms of Government Policy.

NB: Kindly initial this page in the presence of a Commissioner of Oaths / Justice of Peace.	
Applicant:	Commissioner of Oaths/ Justice of Peace:

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2. Qualifications: (All qualifications at tertiary level) (List of subjects to be provided on Form R-03-AR-SC)					
Educational Institution	Qualification	Attendance from	to	Date of final examination	Office Use

3. Did you complete a Learnership: Yes No

Training: _____ Date from: _____ Date to: _____

4. Previous/Current Registration or Application Details with ECSA: (eg. Professional Engineering Technician)

Type	Category	Number	Date
Previous Registration:			
Current Registration:			
Previous Registration:			

5. Membership of Engineering Institutes Recognised in terms of the Act (See list; (Membership of Engineering Institutes or Associations not recognised may also be included. If more space is needed, please supply information separately.)

Institute / Institution	Membership grade and date accepted	Number of years	Office held

6. Application Fee: (See item 6 of the Information Sheet)

My Application fee of R _____ (cheque) is enclosed herewith.

7. Referees: (At least one ECSA registered person)

(1)	(2)	(3)
E-mail:	E-mail:	E-mail:
Tel no:	Tel no:	Tel no:


NB: Kindly initial this page in the presence of a Commissioner of Oaths / Justice of Peace.

Applicant: Commissioner of Oaths/
Justice of Peace:

Application fee: R _____	Office Use Only	(Council's stamp)
Received by: _____	Date: _____	

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Engineering Report (ER)	Form R-03-ER-SC
<p>Use this form to report in about 100 words per criterion under Outcomes 1 to 11 below on a recent <u>engineering task</u>, part of a project or complete project to which the <u>applicant have</u> made a significant contribution. The report may cover conceptualization, design and analysis, specification, tendering and adjudication, manufacturing, project and construction management, commissioning, maintenance, measurement and testing or planning at a specifically-defined level. Please also provide <u>a sample relevant calculations</u>, drawings, etc. as an addendum which is limited to two A4 pages.</p> <p>Use Appendix A of the Discipline Specific Training Guide R-05-CLTC-SC to assist in the interpretation of the criteria</p>	
Name of Applicant:	
Detail of Equipment Applicable and/or Work Responsibility: (<30 words)	
Date of Work Done:	
Engineering brief and objective: (< 30 words)	
Environment: Industry; Laboratory; Theory; Simulation, etc. in <15 words)	
Short Summary: (State engineering/ management problems; solutions in < 30 words)	
Budget: (<10 words)	
<p>Specifically-defined engineering problems have the following characteristics:</p> <p>a) can be solved mainly by specific practical engineering knowledge, underpinned by related theory; <i>and one or more of:</i></p> <p>b) are largely defined but may require feedback;</p> <p>c) are discrete, specifically focused tasks within engineering systems;</p> <p>d) are routine, frequently encountered and in familiar specified and sustainable context; <i>and one or more of:</i></p> <p>e) can be solved by standardised or prescribed ways;</p> <p>f) are encompassed by specific standards, codes, legislation and documented procedures; requires authorisation to work outside limits;</p> <p>g) information is concrete specific and largely complete, but requires checking and possible supplementation;</p> <p>h) involve specific issues but few of these imposing conflicting constraints and a specific range of interested and affected parties; <i>and one or both of:</i></p> <p>i) requires practical judgement in specific practice area in evaluating solutions, considering interfaces to other</p>	

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<p>role-players;</p> <p>j) have consequences which are locally important but within a specified category (wider impact <u>are</u> dealt with by others).</p> <p>Specifically-defined engineering activities have several of the following characteristics:</p> <p>a) Scope of specific practice area is defined by specific techniques applied; change by adopting new specific techniques into current practice;</p> <p>b) Practice area is located within a wider, complex context, with specifically-defined working relationships with other parties and disciplines;</p> <p>c) Work involves specific familiar resources, including people, money, equipment, materials, technologies;</p> <p>d) Require resolution of interactions manifested between specific technical factors with limited impact on wider issues;</p> <p>e) Are constrained by operational context, defined work package, time, finance, infrastructure, resources, facilities, standards and codes, applicable laws;</p> <p>f) Have risks and consequences that are locally important but are generally not far reaching.</p>

Outcomes and Criteria	
Outcome 1: Define, investigate and analyse specifically-defined engineering problems encountered in the applicant's work:	
1.1 State how you understood the activity as agreed to with the client (or your supervisor).	
1.2 Describe how you analysed and clarified information, drawings, codes, procedures, etc.	
Outcome 2: Design, develop, plan or practise solutions to specifically-defined engineering problems (tasks) encountered in the applicant's work:	
2.1 Describe how you developed and analysed alternative approaches to do the work. Impacts and sustainability checked. (Calculations attached)	
2.2 State what the final solution to perform the work was, client or the applicant's supervisor in agreement.	
Outcome 3: Comprehend and apply knowledge embodied in established specific engineering practices and knowledge specific to the field in which the applicant practice:	
3.1 State what Higher Certificate level engineering standard procedures and systems you used to execute the work, and how Higher Certificate level theory was applied to understand and/or verify these procedures.	
3.2 Give your own Higher Certificate level theoretical calculations and/or reasoning on why the application of this theory is considered to be correct (Actual examples attached).	
Outcome 4: Manage part or all of one or more specifically-defined engineering activities embodied in the applicant's work:	
4.1 State how you managed yourself, priorities, processes and resources in doing the work (e.g. bar chart).	
4.2 Describe your role and contribution in the work team.	
Outcome 5: Communicate clearly with others in the course of the applicant's engineering activities	

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Sub-Discipline-Specific Requirements Report (SDSRR)	Form: R-05-SDSRR-CLTC
Use this form to report in about 100 words per statement under Requirements 1 to 6 below on <u>the applicant's</u> personal knowledge about the requirements.	
Surname and Initials:	
DISCIPLINE-SPECIFIC COMPETENCE REQUIREMENTS:	
There is a critical need in the industry to identify people who are able to conduct the essential operations associated with analysis and issuing of Civil Laboratory Test Results. This will lead to competence in the field of work and thereby add value to the industry and improve the economy of the country. It will also lead to a balanced society in that learners will understand how the work they do fits into the greater engineering industry.	
Requirement 1: Communicate at work:	
1.1 State how you maintained and adapted your oral communication as required to promote effective interaction in a work context.	
1.2 State how you accessed information from standing instructions, visual information and a range of other workplace texts and how you responded appropriately within the context.	
1.3 State how you complied written communication that was clear and unambiguous and at an appropriate level for designated target audiences.	
Requirement 2: Use mathematics and statistics in real life situations:	
2.1 Describe how you used mathematical functions correctly to solve routine workplace problems and tasks.	
2.2 Describe how you interrogated findings on life related problems in terms of their cause and solution.	
2.3 State how you effectively and accurately applied mathematical techniques in real life situations.	
Requirement 3: Interpolate Materials Properties from Test Result:	
3.1 Describe how you established the requirement for retest of certain properties' tests. (Actual examples attached)	
3.2 State how you validate results before you sign and issue test results results.	
3.3 Give your estimation of Materials Properties' values based on related test results. (Actual examples attached)	
Requirement 4: Take responsibility for the Implementation of Quality Assurance for a Test Result:	
4.1 Describe how you made sure your inspections comply with laboratory best practice requirements.	

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4.2 State how you understood the relevance of OHS and SANS requirements should be met in the laboratory.	
4.3 Describe how you identified unsafe working conditions and how you took corrective actions.	
4.4 State how you limited access to the workplace to involved personnel only.	
4.5 Describe how you linked test results to established QA procedures and test methods. (Actual examples attached)	
Requirement 5: Produce and maintain administrative reports:	
5.1 Describe how you generate, store and retrieve reports.	
5.2 Describe how you have used different paths for obtaining information for schedules.	
5.3 State how you implemented corrective action to improve quality of work conducted in the laboratory.	
5.4 State how you used administrative reports in providing administrative and financial control of the laboratory.	
Requirement 6: Manage Laboratory output:	
6.1 State how you prioritised tasks to meet testing timeframes and specific requirements.	
6.2 State how you used an analyses of work requirements to compare with relevant business plans and microenvironment.	
6.3 State how you identified potential risks that may affect laboratory performance and what appropriate actions you took.	No entry required. Assessment will be done against evidence submitted in item 7.2 of the Engineering Report (Form R-03-ER-SC).
6.4 List the legislation that may impact on your work environment.	No entry required. Assessment will be done against evidence submitted in item 7.1 of the Engineering Report (Form R-03-ER-SC).
6.5 Describe how you ordered and procured laboratory requirements in advance of being required.	

Signature of Applicant: _____ Date: _____

Signature of Mentor / Supervisor: _____

Name of Mentor/Supervisor printed: _____ Tel. No.: _____

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Engineering Competence

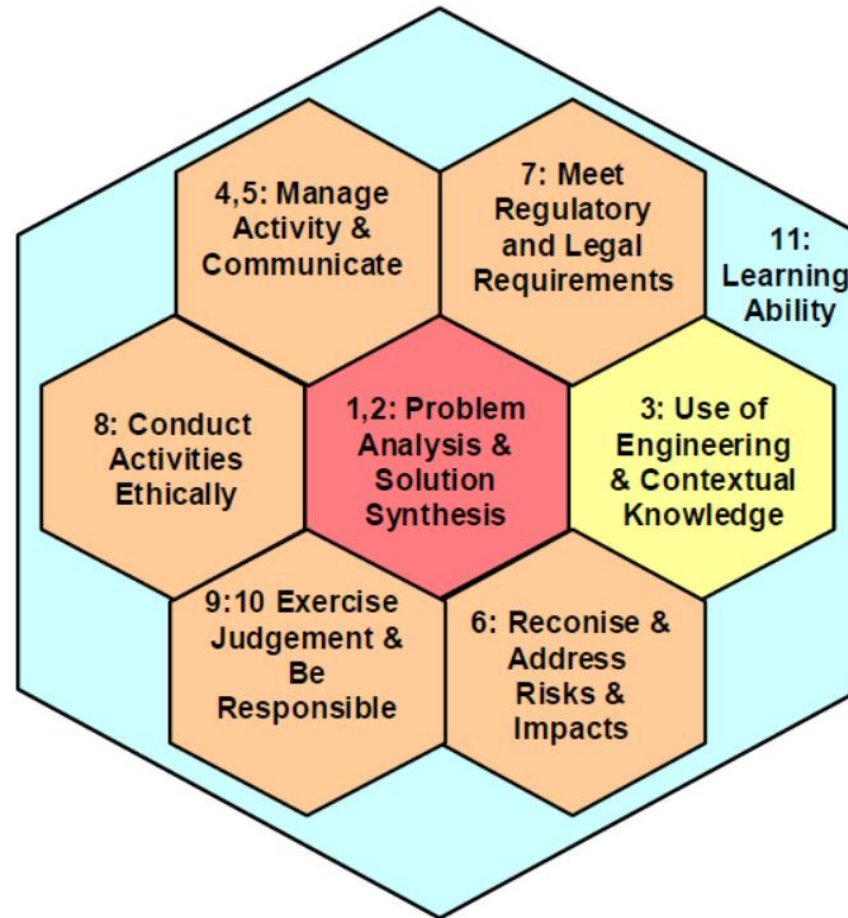


Figure 3: Visualising the interconnectedness of the outcomes that are evidence of engineering competence.

Sub-Discipline-Specific Requirements

1	Communicate at Work
2	Use mathematics and statistics in real life situations
3	Interpolate Materials Properties from Test Result
4	Take responsibility for the Implementation of Quality Assurance for a Test Result
5	Produce and maintain administrative reports
6	Manage Laboratory Output

Progress made



Progress made



Thank you