Government Gazette
Staatskoerant

REPUBLIC OF SOUTH AFRICA
REPUBLIEK VAN SUID AFRIKA

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Contents

government printing

Department:
Government Printing Works
REPUBLIC OF SOUTH AFRICA

HIGH ALERT: SCAM WARNING!!!

TO ALL SUPPLIERS AND SERVICE PROVIDERS OF THE GOVERNMENT PRINTING WORKS

It has come to the attention of the *GOVERNMENT PRINTING WORKS* that there are certain unscrupulous companies and individuals who are defrauding unsuspecting businesses disguised as representatives of the *Government Printing Works* (*GPW*).

The scam involves the fraudsters using the letterhead of *GPW* to send out fake tender bids to companies and requests to supply equipment and goods.

Although the contact person's name on the letter may be of an existing official, the contact details on the letter are not the same as the *Government Printing Works*'. When searching on the Internet for the address of the company that has sent the fake tender document, the address does not exist.

The banking details are in a private name and not company name. Government will never ask you to deposit any funds for any business transaction. *GPW* has alerted the relevant law enforcement authorities to investigate this scam to protect legitimate businesses as well as the name of the organisation.

Example of e-mails these fraudsters are using:

PROCUREMENT@GPW-GOV.ORG

Should you suspect that you are a victim of a scam, you must urgently contact the police and inform the *GPW*.

GPW has an official email with the domain as **@gpw.gov.za**

Government e-mails DO NOT have org in their e-mail addresses. All of these fraudsters also use the same or very similar telephone numbers. Although such number with an area code 012 looks like a landline, it is not fixed to any property.

GPW will never send you an e-mail asking you to supply equipment and goods without a purchase/order number. *GPW* does not procure goods for another level of Government. The organisation will not be liable for actions that result in companies or individuals being resultant victims of such a scam.

Government Printing Works gives businesses the opportunity to supply goods and services through RFQ / Tendering process. In order to be eligible to bid to provide goods and services, suppliers must be registered on the National Treasury's Central Supplier Database (CSD). To be registered, they must meet all current legislative requirements (e.g. have a valid tax clearance certificate and be in good standing with the South African Revenue Services - SARS).

The tender process is managed through the Supply Chain Management (SCM) system of the department. SCM is highly regulated to minimise the risk of fraud, and to meet objectives which include value for money, open and effective competition, equitability, accountability, fair dealing, transparency and an ethical approach. Relevant legislation, regulations, policies, guidelines and instructions can be found on the tender's website.

Fake Tenders

National Treasury's CSD has launched the Government Order Scam campaign to combat fraudulent requests for quotes (RFQs). Such fraudulent requests have resulted in innocent companies losing money. We work hard at preventing and fighting fraud, but criminal activity is always a risk.

How tender scams work

There are many types of tender scams. Here are some of the more frequent scenarios:

Fraudsters use what appears to be government department stationery with fictitious logos and contact details to send a fake RFQ to a company to invite it to urgently supply goods. Shortly after the company has submitted its quote, it receives notification that it has won the tender. The company delivers the goods to someone who poses as an official or at a fake site. The Department has no idea of this transaction made in its name. The company is then never paid and suffers a loss.

OR

Fraudsters use what appears to be government department stationery with fictitious logos and contact details to send a fake RFQ to Company A to invite it to urgently supply goods. Typically, the tender specification is so unique that only Company B (a fictitious company created by the fraudster) can supply the goods in question.

Shortly after Company A has submitted its quote it receives notification that it has won the tender. Company A orders the goods and pays a deposit to the fictitious Company B. Once Company B receives the money, it disappears. Company A's money is stolen in the process.

Protect yourself from being scammed

- If you are registered on the supplier databases and you receive a request to tender or quote that seems to be from a government department, contact the department to confirm that the request is legitimate. Do not use the contact details on the tender document as these might be fraudulent.

- Compare tender details with those that appear in the Tender Bulletin, available online at **www.gpwonline.co.za**

- Make sure you familiarise yourself with how government procures goods and services. Visit the tender website for more information on how to tender.

- If you are uncomfortable about the request received, consider visiting the government department and/or the place of delivery and/or the service provider from whom you will be sourcing the goods.

- In the unlikely event that you are asked for a deposit to make a bid, contact the SCM unit of the department in question to ask whether this is in fact correct.

Any incidents of corruption, fraud, theft and misuse of government property in the *Government Printing Works* can be reported to:

Supply Chain Management: Ms. Anna Marie Du Toit, Tel. (012) 748 6292.
Email: **Annamarie.DuToit@gpw.gov.za**

Marketing and Stakeholder Relations: Ms Bonakele Mbhele, at Tel. (012) 748 6193.
Email: **Bonakele.Mbhele@gpw.gov.za**

Security Services: Mr Daniel Legoabe, at tel. (012) 748 6176.
Email: **Daniel.Legoabe@gpw.gov.za**

Closing times for **ORDINARY WEEKLY** *GOVERNMENT GAZETTE* 2024

*The closing time is **15:00** sharp on the following days:*

- **28 December 2023,** Thursday for the issue of Friday **05 January 2024**
- **05 January,** Friday for the issue of Friday **12 January 2024**
- **12 January,** Friday for the issue of Friday **19 January 2024**
- **19 January,** Friday for the issue of Friday **26 January 2024**
- **26 January,** Friday for the issue of Friday **02 February 2024**
- **02 February,** Friday for the issue of Friday **09 February 2024**
- **09 February,** Friday for the issue of Friday **16 February 2024**
- **16 February,** Friday for the issue of Friday **23 February 2024**
- **23 February,** Friday for the issue of Friday **01 March 2024**
- **01 March,** Friday for the issue of Friday **08 March 2024**
- **08 March,** Friday for the issue of Friday **15 March 2024**
- **14 March,** Thursday for the issue of Friday **22 March 2024**
- **20 March,** Wednesday for the issue of Thursday **28 March 2024**
- **27 March,** Wednesday for the issue of Friday **05 April 2024**
- **05 April,** Friday for the issue of Friday **12 April 2024**
- **12 April,** Friday for the issue of Friday **19 April 2024**
- **19 April,** Friday for the issue of Friday **26 April 2024**
- **25 April,** Thursday for the issue of Friday **03 May 2024**
- **03 May,** Friday for the issue of Friday **10 May 2024**
- **10 May,** Friday for the issue of Friday **17 May 2024**
- **17 May,** Friday for the issue of Friday **24 May 2024**
- **24 May,** Friday for the issue of Friday **31 May 2024**
- **31 May ,** Friday for the issue of Friday **07 June 2024**
- **07 June,** Friday for the issue of Friday **14 June 2024**
- **13 June,** Thursday for the issue of Friday **21 June 2024**
- **21 June,** Friday for the issue of Friday **28 June 2024**
- **28 June,** Friday for the issue of Friday **05 July 2024**
- **05 July,** Friday for the issue of Friday **12 July 2024**
- **12 July,** Friday for the issue of Friday **19 July 2024**
- **19 July,** Friday for the issue of Friday **26 July 2024**
- **26 July,** Friday for the issue of Friday **02 August 2024**
- **01 August,** Thursday for the issue of Thursday **08 August 2024**
- **08 August,** Thursday for the issue of Friday **16 August 2024**
- **16 August,** Friday for the issue of Friday **23 August 2024**
- **23 August,** Friday for the issue of Friday **30 August 2024**
- **30 August,** Friday for the issue of Friday **06 September 2024**
- **06 September,** Friday for the issue of Friday **13 September 2024**
- **13 September,** Friday for the issue of Friday **20 September 2024**
- **19 September,** Thursday for the issue of Friday **27 September 2024**
- **27 September,** Friday for the issue of Friday **04 October 2024**
- **04 October,** Friday for the issue of Friday **11 October 2024**
- **11 October,** Friday for the issue of Friday **18 October 2024**
- **18 October,** Friday for the issue of Friday **25 October 2024**
- **25 October,** Friday for the issue of Friday **01 November 2024**
- **01 November,** Friday for the issue of Friday **08 November 2024**
- **08 November,** Friday for the issue of Friday **15 November 2024**
- **15 November,** Friday for the issue of Friday **22 November 2024**
- **22 November,** Friday for the issue of Friday **29 November 2024**
- **29 November,** Friday for the issue of Friday **06 December 2024**
- **06 December,** Friday for the issue of Friday **13 December 2024**
- **12 December,** Thursday for the issue of Friday **20 December 2024**
- **18 December,** Wednesday for the issue of Friday **27 December 2024**

LIST OF TARIFF RATES

FOR PUBLICATION OF NOTICES

COMMENCEMENT: 1 APRIL 2018

NATIONAL AND PROVINCIAL

Notice sizes for National, Provincial & Tender gazettes 1/4, 2/4, 3/4, 4/4 per page. Notices submitted will be charged at R1008.80 per full page, pro-rated based on the above categories.

Pricing for National, Provincial - Variable Priced Notices		
Notice Type	**Page Space**	**New Price (R)**
Ordinary National, Provincial	1/4 - Quarter Page	252.20
Ordinary National, Provincial	2/4 - Half Page	504.40
Ordinary National, Provincial	3/4 - Three Quarter Page	756.60
Ordinary National, Provincial	4/4 - Full Page	1008.80

EXTRA-ORDINARY

All Extra-ordinary National and Provincial gazette notices are non-standard notices and attract a variable price based on the number of pages submitted.

The pricing structure for National and Provincial notices which are submitted as **Extra ordinary submissions** will be charged at R**3026.32** per page.

GOVERNMENT PRINTING WORKS - BUSINESS RULES

The **Government Printing Works** (**GPW**) has established rules for submitting notices in line with its electronic notice processing system, which requires the use of electronic *Adobe* Forms. Please ensure that you adhere to these guidelines when completing and submitting your notice submission.

Closing Times for Acceptance of Notices

1. The *Government Gazette* and *Government Tender Bulletin* are weekly publications that are published on Fridays and the closing time for the acceptance of notices is strictly applied according to the scheduled time for each gazette.

2. Please refer to the Submission Notice Deadline schedule in the table below. This schedule is also published online on the Government Printing works website www.gpwonline.co.za

   All re-submissions will be subject to the standard cut-off times.
   All notices received after the closing time will be rejected.

Government Gazette Type	Publication Frequency	Publication Date	Submission Deadline	Cancellations Deadline
National Gazette	Weekly	Friday	Friday 15h00 for next Friday	Tuesday, 15h00 - 3 working days prior to publication
Regulation Gazette	Weekly	Friday	Friday 15h00 for next Friday	Tuesday, 15h00 - 3 working days prior to publication
Petrol Price Gazette	Monthly	Tuesday before 1st Wednesday of the month	One day before publication	1 working day prior to publication
Road Carrier Permits	Weekly	Friday	Thursday 15h00 for next Friday	3 working days prior to publication
Unclaimed Monies (Justice, Labour or Lawyers)	January / September 2 per year	Last Friday	One week before publication	3 working days prior to publication
Parliament (Acts, White Paper, Green Paper)	As required	Any day of the week	None	3 working days prior to publication
Manuals	Bi- Monthly	2nd and last Thursday of the month	One week before publication	3 working days prior to publication
State of Budget (National Treasury)	Monthly	30th or last Friday of the month	One week before publication	3 working days prior to publication
Extraordinary Gazettes	As required	Any day of the week	*Before 10h00 on publication date*	*Before 10h00 on publication date*
Legal Gazettes A, B and C	Weekly	Friday	One week before publication	Tuesday, 15h00 - 3 working days prior to publication
Tender Bulletin	Weekly	Friday	Friday 15h00 for next Friday	Tuesday, 15h00 - 3 working days prior to publication
Gauteng	Weekly	Wednesday	Two weeks before publication	3 days **after** submission deadline
Eastern Cape	Weekly	Monday	One week before publication	3 working days prior to publication
Northern Cape	Weekly	Monday	One week before publication	3 working days prior to publication
North West	Weekly	Tuesday	One week before publication	3 working days prior to publication
KwaZulu-Natal	Weekly	Thursday	One week before publication	3 working days prior to publication
Limpopo	Weekly	Friday	One week before publication	3 working days prior to publication
Mpumalanga	Weekly	Friday	One week before publication	3 working days prior to publication

GOVERNMENT PRINTING WORKS - BUSINESS RULES

Government Gazette Type	Publication Frequency	Publication Date	Submission Deadline	Cancellations Deadline
Gauteng Liquor License Gazette	Monthly	Wednesday before the First Friday of the month	Two weeks before publication	3 working days **after** submission deadline
Northern Cape Liquor License Gazette	Monthly	First Friday of the month	Two weeks before publication	3 working days **after** submission deadline
National Liquor License Gazette	Monthly	First Friday of the month	Two weeks before publication	3 working days **after** submission deadline
Mpumalanga Liquor License Gazette	Bi-Monthly	Second & Fourth Friday	One week before publication	3 working days prior to publication

Extraordinary Gazettes

3. *Extraordinary Gazettes* can have only one publication date. If multiple publications of an *Extraordinary Gazette* are required, a separate Z95/Z95Prov *Adobe* Forms for each publication date must be submitted.

Notice Submission Process

4. Download the latest *Adobe* form, for the relevant notice to be placed, from the **Government Printing Works** website www.gpwonline.co.za.

5. The *Adobe* form needs to be completed electronically using *Adobe Acrobat* / *Acrobat Reader*. Only electronically completed *Adobe* forms will be accepted. No printed, handwritten and/or scanned *Adobe* forms will be accepted.

6. The completed electronic *Adobe* form has to be submitted via email to submit.egazette@gpw.gov.za. The form needs to be submitted in its original electronic *Adobe* format to enable the system to extract the completed information from the form for placement in the publication.

7. Every notice submitted **must** be accompanied by an official **GPW** quotation. This must be obtained from the *eGazette* Contact Centre.

8. Each notice submission should be sent as a single email. The email **must** contain **all documentation relating to a particular notice submission**.

8.1. Each of the following documents must be attached to the email as a separate attachment:

8.1.1. An electronically completed *Adobe* form, specific to the type of notice that is to be placed.

8.1.1.1. For National *Government Gazette* or *Provincial Gazette* notices, the notices must be accompanied by an electronic Z95 or Z95Prov *Adobe* form

8.1.1.2. The notice content (body copy) **MUST** be a separate attachment.

8.1.2. A copy of the official **Government Printing Works** quotation you received for your notice. *(Please see Quotation section below for further details)*

8.1.3. A valid and legible Proof of Payment / Purchase Order: **Government Printing Works** account customer must include a copy of their Purchase Order**. Non-Government Printing Works** account customer needs to submit the proof of payment for the notice

8.1.4. Where separate notice content is applicable (Z95, Z95 Prov and TForm 3, it should **also** be attached as a separate attachment. *(Please see the Copy Section below, for the specifications)*.

8.1.5. Any additional notice information if applicable.

GOVERNMENT PRINTING WORKS - BUSINESS RULES

9. The electronic *Adobe* form will be taken as the primary source for the notice information to be published. Instructions that are on the email body or covering letter that contradicts the notice form content will not be considered. The information submitted on the electronic *Adobe* form will be published as-is.

10. To avoid duplicated publication of the same notice and double billing, Please submit your notice **ONLY ONCE.**

11. Notices brought to **GPW** by "walk-in" customers on electronic media can only be submitted in *Adobe* electronic form format. All "walk-in" customers with notices that are not on electronic *Adobe* forms will be routed to the Contact Centre where they will be assisted to complete the forms in the required format.

12. Should a customer submit a bulk submission of hard copy notices delivered by a messenger on behalf of any organisation e.g. newspaper publisher, the messenger will be referred back to the sender as the submission does not adhere to the submission rules.

Quotations

13. Quotations are valid until the next tariff change.

    13.1. ***Take note:*** **GPW**'s annual tariff increase takes place on ***1 April*** therefore any quotations issued, accepted and submitted for publication up to ***31 March*** will keep the old tariff. For notices to be published from 1 April, a quotation must be obtained from **GPW** with the new tariffs. Where a tariff increase is implemented during the year, **GPW** endeavours to provide customers with 30 days' notice of such changes.

14. Each quotation has a unique number.

15. Form Content notices must be emailed to the *eGazette* Contact Centre for a quotation.

    15.1. The *Adobe* form supplied is uploaded by the Contact Centre Agent and the system automatically calculates the cost of your notice based on the layout/format of the content supplied.

    15.2. It is critical that these *Adobe* Forms are completed correctly and adhere to the guidelines as stipulated by **GPW**.

16. **APPLICABLE ONLY TO GPW ACCOUNT HOLDERS**:

    16.1. **GPW** Account Customers must provide a valid **GPW** account number to obtain a quotation.

    16.2. Accounts for **GPW** account customers **must** be active with sufficient credit to transact with **GPW** to submit notices.

        16.2.1. If you are unsure about or need to resolve the status of your account, please contact the **GPW** Finance Department prior to submitting your notices. (If the account status is not resolved prior to submission of your notice, the notice will be failed during the process).

17. **APPLICABLE ONLY TO CASH CUSTOMERS:**

    17.1. Cash customers doing **bulk payments** must use a **single email address** in order to use the **same proof of payment** for submitting multiple notices.

18. The responsibility lies with you, the customer, to ensure that the payment made for your notice(s) to be published is sufficient to cover the cost of the notice(s).

19. Each quotation will be associated with one proof of payment / purchase order / cash receipt.

    19.1. This means that **the quotation number can only be used once to make a payment.**

GOVERNMENT PRINTING WORKS - BUSINESS RULES

Copy (Separate Notice Content Document)

20. Where the copy is part of a separate attachment document for Z95, Z95Prov and TForm03

20.1. Copy of notices must be supplied in a separate document and may not constitute part of any covering letter, purchase order, proof of payment or other attached documents.

The content document should contain only one notice. (You may include the different translations of the same notice in the same document).

20.2. The notice should be set on an A4 page, with margins and fonts set as follows:

Page size = A4 Portrait with page margins: Top = 40mm, LH/RH = 16mm, Bottom = 40mm; Use font size: Arial or Helvetica 10pt with 11pt line spacing;

Page size = A4 Landscape with page margins: Top = 16mm, LH/RH = 40mm, Bottom = 16mm; Use font size: Arial or Helvetica 10pt with 11pt line spacing;

Cancellations

21. Cancellation of notice submissions are accepted by **GPW** according to the deadlines stated in the table above in point 2. Non-compliance to these deadlines will result in your request being failed. Please pay special attention to the different deadlines for each gazette. Please note that any notices cancelled after the cancellation deadline will be published and charged at full cost.

22. Requests for cancellation must be sent by the original sender of the notice and must accompanied by the relevant notice reference number (N-) in the email body.

Amendments to notices

23. With effect from 01 October 2015, **GPW** will not longer accept amendments to notices. The cancellation process will need to be followed according to the deadline and a new notice submitted thereafter for the next available publication date.

Rejections

24. All notices not meeting the submission rules will be rejected to the customer to be corrected and resubmitted. Assistance will be available through the Contact Centre should help be required when completing the forms. (012-748 6200 or email info.egazette@gpw.gov.za). Reasons for rejections include the following:

24.1. Incorrectly completed forms and notices submitted in the wrong format, will be rejected.

24.2. Any notice submissions not on the correct *Adobe* electronic form, will be rejected.

24.3. Any notice submissions not accompanied by the proof of payment / purchase order will be rejected and the notice will not be processed.

24.4. Any submissions or re-submissions that miss the submission cut-off times will be rejected to the customer. The Notice needs to be re-submitted with a new publication date.

GOVERNMENT PRINTING WORKS - BUSINESS RULES

Approval of notices

25. Any notices other than legal notices are subject to the approval of the Government Printer, who may refuse acceptance or further publication of any notice.

26. No amendments will be accepted in respect to separate notice content that was sent with a Z95 or Z95Prov notice submissions. The copy of notice in layout format (previously known as proof-out) is only provided where requested, for Advertiser to see the notice in final Gazette layout. Should they find that the information submitted was incorrect, they should request for a notice cancellation and resubmit the corrected notice, subject to standard submission deadlines. The cancellation is also subject to the stages in the publishing process, i.e. If cancellation is received when production (printing process) has commenced, then the notice cannot be cancelled.

Government Printer Indemnified Against Liability

27. The Government Printer will assume no liability in respect of—

27.1. any delay in the publication of a notice or publication of such notice on any date other than that stipulated by the advertiser;

27.2. erroneous classification of a notice, or the placement of such notice in any section or under any heading other than the section or heading stipulated by the advertiser;

27.3. any editing, revision, omission, typographical errors or errors resulting from faint or indistinct copy.

Liability of advertiser

28. Advertisers will be held liable for any compensation and costs arising from any action which may be instituted against the Government Printer in consequence of the publication of any notice.

Customer inquiries

Many of our customers request immediate feedback/confirmation of notice placement in the gazette from our Contact Centre once they have submitted their notice – While **GPW** deems it one of their highest priorities and responsibilities to provide customers with this requested feedback and the best service at all times, we are only able to do so once we have started processing your notice submission.
GPW has a 2-working day turnaround time for processing notices received according to the business rules and deadline submissions.
Please keep this in mind when making inquiries about your notice submission at the Contact Centre.

29. Requests for information, quotations and inquiries must be sent to the Contact Centre ONLY.

30. Requests for Quotations (RFQs) should be received by the Contact Centre at least **2 working days** before the submission deadline for that specific publication.

GOVERNMENT PRINTING WORKS - BUSINESS RULES

Payment of cost

31. The Request for Quotation for placement of the notice should be sent to the Gazette Contact Centre as indicated above, prior to submission of notice for advertising.

32. Payment should then be made, or Purchase Order prepared based on the received quotation, prior to the submission of the notice for advertising as these documents i.e. proof of payment or Purchase order will be required as part of the notice submission, as indicated earlier.

33. Every proof of payment must have a valid **GPW** quotation number as a reference on the proof of payment document.

34. Where there is any doubt about the cost of publication of a notice, and in the case of copy, an enquiry, accompanied by the relevant copy, should be addressed to the Gazette Contact Centre, **Government Printing Works**, Private Bag X85, Pretoria, 0001 email: info.egazette@gpw.gov.za before publication.

35. Overpayment resulting from miscalculation on the part of the advertiser of the cost of publication of a notice will not be refunded, unless the advertiser furnishes adequate reasons why such miscalculation occurred. In the event of underpayments, the difference will be recovered from the advertiser, and future notice(s) will not be published until such time as the full cost of such publication has been duly paid in cash or electronic funds transfer into the **Government Printing Works** banking account.

36. In the event of a notice being cancelled, a refund will be made only if no cost regarding the placing of the notice has been incurred by the **Government Printing Works**.

37. The **Government Printing Works** reserves the right to levy an additional charge in cases where notices, the cost of which has been calculated in accordance with the List of Fixed Tariff Rates, are subsequently found to be excessively lengthy or to contain overmuch or complicated tabulation.

Proof of publication

38. Copies of any of the *Government Gazette* or *Provincial Gazette* can be downloaded from the **Government Printing Works** website www.gpwonline.co.za free of charge, should a proof of publication be required.

39. Printed copies may be ordered from the Publications department at the ruling price. The **Government Printing Works** will assume no liability for any failure to post or for any delay in despatching of such *Government Gazette*(s)

GOVERNMENT PRINTING WORKS CONTACT INFORMATION

Physical Address:	Postal Address:	GPW Banking Details:
Government Printing Works	Private Bag X85	**Bank:** ABSA Bosman Street
149 Bosman Street	Pretoria	**Account No.:** 405 7114 016
Pretoria	0001	**Branch Code:** 632-005

For Gazette and Notice submissions: Gazette Submissions: **E-mail:** submit.egazette@gpw.gov.za

For queries and quotations, contact: Gazette Contact Centre: **E-mail:** info.egazette@gpw.gov.za
Tel: 012-748 6200

Contact person for subscribers: Mrs M. Toka: **E-mail:** subscriptions@gpw.gov.za
Tel: 012-748-6066 / 6060 / 6058
Fax: 012-323-9574

GOVERNMENT NOTICES • GOEWERMENTSKENNISGEWINGS

DEPARTMENT OF AGRICULTURE, LAND REFORM AND RURAL DEVELOPMENT

NO. 4984 **21 June 2024**

REVISED TARIFFS, RATES AND SCALES FOR THE GOODS AND SERVICES PROVIDED BY THE DEPARTMENT IN TERMS OF THE SUBDIVISION OF AGRICULTURAL LAND ACT, ACT NO. 70 OF 1970 AND CONSERVATION OF AGRICULTURAL RESOURCES ACT, ACT NO. 43 OF 1983

NOTICE FOR PUBLIC

I, Angela Thoko Didiza, Minister for Agriculture, Land Reform and Rural Development hereby give notice to all interested institutions, organizations and individuals on the revised tariffs for services rendered in terms of the Subdivision of Agricultural Land Act (SALA), Act No. 70 of 1970 and Conservation of Agricultural Resources Act (CARA), Act No. 43 of 1983.

Key revision includes:

Updating and new tariffs for the goods, services or supplies rendered under the two legislations being the Subdivision of Agricultural Land Act (SALA), Act No. 70 of 1970 and Conservation of Agricultural Resources Act (CARA), Act No. 43 of 1983.

1. Subdivision of Agricultural Land Act (SALA), Act No. 70 of 1970

1.1 Appeal tariff applicable from 1 April 2024 is R 7 577.00 per appeal

2. Conservation of Agricultural Resources Act (CARA), Act No. 43 of 1983

2.1 Appeal tariff applicable from 1 April 2024 is R 1 487.00 per appeal.

2.2 50% of average cost of herbicide for control of listed species of the genus and Nasella by farmers

2.3 Labour Tariff for control of listed species of the genus Opuntia and Nasella is R 1 487.00 per hectare.

For more information, please contact the Executive Officer for Conservation of Agricultural Resources Act (CARA), Act No. 43 of 1983 and Subdivision of Agricultural Land Act (SALA), Act No. 70 of 1970, using the details below:

Attention: The Director: Land and Soil Management, Attention Ms R.L. Bosoga.

Post to: Private Bag X 120, Pretoria, 0001; or

Deliver To: 20 Steve Biko Street, Acadia, PRETORIA;

or Enquiries in relation to Conservation of Agricultural Resources Act (CARA), Act No. 43 of 1983, may be emailed to : MpumeN@dalrrd.gov.za alternatively (012) 319 7567 and for the Sub division of Agricultural Land Act (SALA), Act No. 70 of 1970, may be emailed to: SerahMu@dalrrd.gov.za alternatively (012) 319 7480.

REVISED TARIFFS, RATES AND SCALES FOR THE GOODS AND SERVICES PROVIDED BY THE DEPARTMENT IN TERMS OF SUBDIVISION OF AGRICULTURAL LAND ACT (SALA), ACT NO. 70 OF 1970 AND THE CONSERVATION OF AGRICULTURAL RESOURCES ACT (CARA), ACT NO. 43 OF 1983

TARIFF STRUCTURE (2024/25)

	NATURE OF SERVICE, GOODS OR SUPPLIES PROVIDED	TARIFF APPLICABLE FROM 01 APRIL 2023	TARIFF APPLICABLE FROM 01 APRIL 2024
	LAND AND SOIL MANAGEMENT		
1	Subdivision of Agricultural Land Act, 1970 (Act No. 70 of 1970)	R 7 128.00 per appeal	R 7 577.00 per appeal
2	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)		
2.1	Appeal under section 21	R 1 399.00 per appeal	R 1 487.00 per appeal
3	Performance of certain acts in accordance with the Conservation of Agriculture Resources Act, 1983 (Act No 43 of 1983)		

3.1	Subsidy on weed control in terms of Weed Control Scheme.	50% of average cost of herbicide for control of listed species of the genus and Nasella by farmers Nasella tenuissima (Tin.) Barworth (=Stipa tenuissima (Trin.) Nasella trichotoma ((Nees) Arech. (=stipa trichotoma nees) Opuntia exaltata A Berger (=Austrocylindroputia exatata (A Berger) Backeb.) Opuntia fulgida Engelm. O. rosea misapplied in South Africa.) Opuntia imbricata (Haw.) DC. (=Cylindropucata (Haw.) Knuth) Opunia lindheimeri.Engelm (= O.tradospina Griffiths) Opuntia spinulifera Salm-Dyck Cost per hectare for control of listed species of the genus Opuntia and Nassella	50% of average cost of herbicide for control of listed species of the genus and Nasella by farmers Nasella tenuissima (Tin.) Barworth (=Stipa tenuissima (Trin.) Nasella trichotoma ((Nees) Arech. (=stipa trichotoma nees) Opuntia exaltata A Berger (=Austrocylindroputia exatata (A Berger) Backeb.) Opuntia fulgida Engelm. O. rosea misapplied in South Africa.) Opuntia imbricata (Haw.) DC. (=Cylindropucata (Haw.) Knuth) Opunia lindheimeri.Engelm (= O.tradospina Griffiths) Opuntia spinulifera Salm-Dyck Cost per hectare for control of listed species of the genus Opuntia and Nassella
3.2	Control of weeds by Weed Teams	R 1 399,00 per hectare for control of listed species of the genus Opuntia and Nasella-	R 1 487,00 per hectare for control of listed species of the genus Opuntia and Nasella-

DEPARTMENT OF HEALTH

NO. 2985 **21 June 2024**

HEALTH PROFESSIONS ACT, 1974 (ACT NO.56 OF 1974)

REGULATIONS DEFINING THE SCOPE OF THE PROFESSION OF DIETITIANS

The Minister of Health has, under section 33 (1) of the Health Professions Act, 1974 (Act No. 56 of 1974) and on the recommendation the Health Professions Council of South Africa, made the Regulations in the Schedule.

DR. M.J PHAAHLA, MP
MINISTER OF HEALTH
DATE: 04/06/2024

SCHEDULE

Definitions

1. In these Regulations, any word or expression to which a meaning has been assigned in the Act shall have that meaning, unless the context otherwise indicates -

"professional board" means the Professional Board for Dietetics and Nutrition established in terms of section 15 of the Act; and

"**Act**" means the Health Professions Act, 1974 (Act No. 56 of 1974).

Acts pertaining to the Scope of the Profession of Dietitians

2. The optimization of the nutritional well-being of individuals and groups in different settings by-

(a) using evidence-based theory and practice of nutrition to prevent, treat, and manage nutrition related diseases;

(b) utilizing a comprehensive body of knowledge of principles of nutritional sciences to advise on food, nutrition, and nutritional care in an ethical and responsible manner to communities or population groups during the different stages of the life cycle of all individuals;

(c) advocating for the nutrition profession, services, and programmes;

(d) assessing the nutritional status (anthropometric, biochemical, clinical and dietary, socio-economic; medication interactions) and concomitant health risks of clients or patients and groups using relevant methodologies;

(e) conceptualizing, planning, implementing, managing, evaluating and documenting appropriate nutritional prescriptions for individual patients or clients with specific nutritional needs;

(f) communicating effectively to inform and to change behaviour using appropriate counselling methods or skills;

(g) conceptualising, planning, implementing, monitoring, evaluating and documenting appropriate intervention strategies to address nutrition and related health issues and diseases;

(h) planning and executing an effective food service system based on the specific food and nutritional needs of the healthy and the ill;

(i) managing human, financial, and other resources to ensure optimal and equitable delivery of nutrition services at all levels of service delivery;

(j) conceptualizing, formulating, implementing and communicating nutrition related research;

(k) planning, implementing, managing, evaluating, monitoring, and documenting procedures and policies relating to human, financial, operational, and other resources; and

(l) applying critical and creative thinking in working effectively within a multidisciplinary environment contributing to the personal, social, and economic development of the society in an ethical and professional manner within a human rights perspective.

Are acts pertaining to the scope of the Profession of Dietitians.

Repeal

3. The Regulations Defining the Scope of the Profession of Dietetics as published under Government Notice R891 in R*egulation Gazette* 4684 of 26 April 1991 and Regulations Defining the Scope of Profession of Dietitians published under Government Notice No. 4407 in Regulation Gazette 50164 of 23 February 2024 are hereby repealed.

Short title

4. These Regulations are called Regulations Defining the Scope of the Profession of Dietitians, 2024.

ANNEXURE B

DEPARTMENT OF HEALTH

NO. 4407 **23 February 2024**

HEALTH PROFESSIONS ACT, 1974 (ACT NO.56 OF 1974)

REGULATIONS DEFINING THE SCOPE OF THE PROFESSION OF DIETITIANS

The Minister of Health intends, under section 33 (1) of the Health Professions Act, 1974 (Act No. 56 of 1974) and on the recommendation the Health Professions Council of South Africa, to make the regulations in the Schedule.

DR. MJ PHAAHLA, MP
MINISTER OF HEALTH
DATE: 22/01/2024

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SCHEDULE

Definitions

1. In these regulations, any word or expression to which a meaning has been assigned in the Act shall have that meaning, unless the context indicates otherwise:-

"professional board" means the Professional Board for Dietetics and Nutrition established in terms of section 15 of the Act; and

"the Act" means the Health Professions Act, 1974 (Act No. 56 of 1974).

Acts pertaining to the scope of the profession of Dietitians

2. The optimization of the nutritional well-being of individuals and groups in different settings by-

(a) using evidence-based theory and practice of nutrition to prevent, treat, and manage nutrition related diseases;

(b) utilizing a comprehensive body of knowledge of principles of nutritional sciences to advise on food, nutrition, and nutritional care in an ethical and responsible manner to communities or population groups during the different stages of the life cycle of all individuals;

(c) advocating for the nutrition profession, services, and programmes;

(d) assessing the nutritional status (anthropometric, biochemical, clinical and dietary, socio-economic; medication interactions) and concomitant health risks of clients or patients and groups using relevant methodologies;

(e) conceptualizing, planning, implementing, managing, evaluating, and documenting appropriate nutritional prescriptions for individual patients or clients with specific nutritional needs;

(f) communicating effectively to inform and to change behaviour using appropriate counselling methods or skills;

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(g) conceptualising, planning, implementing, monitoring, evaluating and documenting appropriate intervention strategies to address nutrition and related health issues and diseases;

(h) planning and executing an effective food service system based on the specific food and nutritional needs of the healthy and the ill;

(i) managing human, financial, and other resources to ensure optimal and equitable delivery of nutrition services at all levels of service delivery;

(j) conceptualizing, formulating, implementing and communicating nutrition related research;

(k) planning, implementing, managing, evaluating, monitoring, and documenting procedures and policies relating to human, financial, operational, and other resources;

(l) applying critical and creative thinking in working effectively within a multidisciplinary environment contributing to the personal, social, and economic development of the society in an ethical and professional manner within a human rights perspective;

are acts pertaining to the Scope of the Profession of Dietitians.

Repeal

3. The regulations Defining the Scope of the Profession of Dietetics as published under Government Notice R891 in *Regulation Gazette* 4684 of 26 April 1991 are hereby repealed.

Short title

4. These regulations are called Regulations Defining the Scope of the Profession of Dietitians, 2024.

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DEPARTMENT OF HEALTH

NO. 4986 **21 June 2024**

TRADITIONAL HEALTH PRACTITIONERS ACT, 2007
(ACT NO. 22 OF 2007)

TRADITIONAL HEALTH PRACTITIONERS REGULATIONS 2024

The Minister of Health intends, in terms of Section 47 read with Section 21 of the Traditional Health Practitioners Act, 2007 (Act No. 22 of 2007), and after consultation with the Council, to make the regulations in the Schedule.

Interested persons are invited to submit any substantiated comments or representations on the proposed draft Regulations, to the Director General of Health, Private Bag X828, Pretoria, 0001 or bruce.mbedzi@health.gov.za (For the attention of the Director: Traditional Medicine), within three months of the date of publication of this notice.

DR M.J PHAAHLA, MP
MINISTER OF HEALTH
DATE: 04/06/2024

SCHEDULE

DEFINITIONS

1. In these Regulations, a word or expression to which a meaning has been assigned in the Act, bears the meaning so assigned and, unless the context otherwise indicates-

"Council" means the Interim Traditional Health Practitioners Council contemplated in section 4 of the Act;

"Practitioner" means Traditional Health Practitioner registered in terms of section 21 of the Act;

"Registrar" means the person appointed as such as contemplated is section 18 of the Act; and

"the Act" means Traditional Health Practitioners Act, 2007 (Act No. 22 of 2007).

APPLICATION AND REGISTRATION OF PRACTITIONER

2. (1) Any person wishing to be registered as a Practitioner must apply on **FORM THPA1** to the Registrar to be registered and practice as a Practitioner as contemplated in Section 21 of the Act.

(2) The application Form must be accompanied by fees as stipulated in the Table of Fees.

(3) The Registrar must enter the name of the person who meets the requirements contemplated in Section 21 in the register and issue the practice certificate to the person registered as such.

CATEGORIES OF TRADITIONAL HEALTH PRACTICE THAT MUST UNDERGO EDUCATION OR TRAINING

3. The following categories of traditional health practice must undergo education or training at any accredited training institution or educational authority or with any traditional tutor:

(a) Divination;

(b) Herbalism;

(c) Traditional birth attendant's practice; and

(d) Traditional surgeon (circumcision) practice.

REGISTRATION OF STUDENTS (AMATHWASA)

4. (1). Any person who wishes to register as a student practitioner must lodge an application with the Registrar as follows:

(a) Complete the application form attached as **FORM THPA2** to these Regulations;

(b) The application Form must be accompanied by fees as stipulated in the Table of Fees;

(c) The certified copies of the following documents must be attached to the application form:

(i) South African Identity book or card;

(ii) Letter from accredited institution or traditional tutor; and

(iii) (Adult Education and Training) AET Level 1 or equivalent or have relevant and demonstratable experience.

MINIMUM STANDARD OF EDUCATION

5. No one may be registered as a student practitioner unless he or she has attained an AET Level 1 educational level or equivalent and has in his or her possession letter of admission indicating the training or course to be undertaken from the tutor or institution registered and accredited by the Council to provide or offer the training or course.

DURATION OF EDUCATIONAL PROGRAMME

6. (1) The Divination student must attend or undergo training for minimum period of twelve months in which period the student practitioner must learn at least

(i) diagnosis,

(ii) preparation of herbs, and

(iii) conducting traditional consultation.

(2) The student herbalist must undergo training for a minimum period of twelve months in which period the student must learn to:

(i) identify and collect/harvest;

(ii) prepare herbs;

(iii) harvest herbs sustainably;

(iv) dispense herbs;

(v) store herbs safely; and

(vi) conduct traditional consultation.

(3) The student traditional birth attendant must undergo training for a minimum period of twelve months during which the practitioner must learn:

(i) human reproduction;

(ii) pregnancy;

(iii) delivery of baby; and

(iv) pre- and post-natal care.

(4) The student traditional surgeon practice must undergo training for at least two years.

MINIMUM AGE AND STANDARDS OF GENERAL EDUCATION

7. (1) The student practitioners for Divination and Herbalism, must be at least 18 years, and Traditional Surgeon and Traditional Birth Attendant must be 25 years old, to qualify for examination for a certificate entitling the holder thereof to registration in terms of this Act.

(2) The student practitioner contemplated in sub regulation (1) must at least have attained the Level 1 AET or equivalent or have relevant and demonstratable experience.

REGISTRATION BY THE COUNCIL OF PERSONS PROVIDING TRAINING

8. The Council must register the persons providing training on **FORM THPA3** on payment of fee as determined or reflected in the Table of Fees attached to these Regulations.

REGISTRATION OF TRADITIONAL PRACTITIONERS STUDENTS

9. (1) The registered students must submit the logbook that details the observations and procedures undergone during their training.

(2) The logbook must be signed by the Institution or Tutor as proof of the fulfilment of the requirements for the qualification.

(3) The student must submit the certificate of completion of the training from their Institution or Tutor to the Council.

CIRCUMSTANCES UNDER WHICH ANY APPLICANT FOR THE REGISTRATION OF ANY CATEGORY OR SPECIALITY MAY BE EXEMPTED FROM ANY OF SUCH REQUIREMENTS

10. The applicant who, on promulgation of these Regulations, is a Diviner, Herbalist, Traditional Birth Attendant or Traditional Surgeon may be registered as such by the Registrar on the basis of the documentary proof that he or she may produce to the Registrar, or on basis that the community regarded him or her to a Diviner, Herbalist, Traditional Birth Attendant or Traditional Surgeon.

PROCEDURE TO DISPOSE APPLICATION FOR FEES CHARGED BY PRACTITIONER

11. (1) The Council must, on receipt of an application contemplated in Section 42(3) of the Act, request the Practitioner to submit the statement of account detailing services rendered to the patient.

(2) Upon receipt the statements of account referred to sub-regulation (1) above, the Council must consider such statement in relation to the services rendered within two weeks of receipt thereof.

(3) The Council must make a determination of the amount which, in their opinion, should have been charged by the Practitioner for the services rendered to the patient to which the account relates.

(4) The Council must in writing inform both the Practitioner and the patient of their determination.

Short title

12. These regulations are called Traditional Health Practitioners Regulations, 2024.

FORM THP A1

TRADITIONAL HEALTH PRACTITIONERS COUNCIL	**APPLICATION FOR REGISTRATION**

NON COMPLIANT APPLICATION WILL BE REJECTED.
Please PRINT and return the ORIGINAL FORM to:
The Registrar ITHPC, Private Bag X828 Pretoria 0001 by registered mail for ease of tracking mail.
Dr AB Xuma Building, 1112 Voortrekker Road, Pretoria 0001

For office use only

Date received:
Receipt number:
Amount:
Province:

1. Please mark the relevant category clearly.

DIVINER	
HERBALIST	
TRADITIONAL BIRTH ATTENDANT	
TRADITIONAL SURGEON	

Personal details

2. Full first names :______________________________

3. Surname______________________________(required for statistical purposes)

4. Race: ____________________ 5. Nationality: ____________________

6. Identity number: ______________________________(attach copy of photograph page of ID)

7. Postal address:

____

______________________________Code:____________________

8. Residential address: ____

____

9. Tel: (Home): ( ) ______________________(Cell): ______________

(Fax): ( )_____________(E-mail):___________________________

The following is submitted in support of the application.

10. Proof of payment for the Registration fee.
11. A copy of my identity document or birth certificate.
12. Proof of Training "Initiation in terms of Traditional Medicine".
13. Character reference by people not related to you.

I hereby declare that I am the person referred to in the attached documents. I also declare that I have never been convicted of any criminal offence or been debarred from practice by reason of unprofessional conduct.

and that, to the best of my knowledge and belief, no proceedings involving or likely to involve a charge of offence or misconduct is pending against me at present.

SIGNATURE: .... **Date:**

Return this application together with payment/proof of payment and relevant documents to:

The Registrar

Interim Traditional Health Practitioners Council

Private Bag X 828

PRETORIA

0001

FORM THP A2

TRADITIONAL HEALTH PRACTITIONERS COUNCIL OF SOUTH AFRICA THPA2	APPLICATION FOR REGISTRATION (STUDENT)
NON COMPLIANT APPLICATION WILL BE REJECTED. Please PRINT and return the ORIGINAL FORM to: The Registrar ITHPC, Private Bag X 828, Pretoria 0001 by registered mail for ease of tracking mail. Dr AB Xuma Building, 1112 Voortrekker Road, Pretoria 0001	**For Office use only** **Date received:** **Receipt number:** **Amount paid:** **Province:**

1. **PLEASE MARK THE RELEVANT CATEGORY OF REGISTRATION CLEARLY**

DIVINER	
HERBALIST	
TRADITIONAL BIRTH ATTENDANT	
TRADITIONAL SURGEON	
OTHER (Specify)	

PERSONAL DETAILS

2. (Prof, Dr, Mr, Mrs, Miss) ______________ Surname: ________________________________

3. Full Name(s): ____

4. Race: ______________ 5. Gender______________ (required for statistical purposes)

6. Nationality ______________________________________

7. Identity number: ________________________________(attach copy of photograph page of ID)

8. Postal address: ____

____Code:__________________

9. Residential address:

____

10. Tel: (Home): ( ) ____________________(Cell): ( )_

(Fax) :( )____________________(E-mail):____________________

The following is submitted in support of the application.

10. Proof of payment for the Registration fee.
11. A copy of certified identity document or birth certificate.
12. Letter from accredited institution or traditional tutor
13. In respect of which THP Category (if any) are you already registered with the council - state council registration number(s) and list Categories:
14. Please indicate the minimum duration that the training will take and whether it is a full-time class attendance or part-time class attendance

I hereby certify that all the information provided, and documentation submitted is true and correct.

SIGNATURE: .... **Date:**

Return this application together with payment/proof of payment and relevant documents to:

The Registrar

Interim Traditional Health Practitioners Council

Private Bag X 828

PRETORIA

0001

FORM THP A3

TRADITIONAL HEALTH PRACTITIONERS COUNCIL OF SOUTH AFRICA THPA	APPLICATION FOR REGISTRATION (TRAINING INSTITUTIONS)
NON COMPLIANT APPLICATION WILL BE REJECTED. Please PRINT and return the ORIGINAL FORM to: The Registrar ITHPC, Private Bag X 828, Pretoria 0001 by registered mail for ease of tracking mail. Dr AB Xuma Building, 1112 Voortrekker Road, Pretoria 0001	<u>For Office use only</u> Date received: Receipt number: Amount paid: Province:

1. Please mark the relevant category of interest clearly.

DIVINER	
HERBALIST	
TRADITIONAL BIRTH ATTANDANTS	
TRADITIONAL SURGEON	

Provider details

2. Training Institution:________________________________

3. Physical address: ________________________________

____

4. Postal address:

____

____Code:______________

5. Purpose of application: Provision of

Module		Course		Practical Skill	

6. Has the above been accredited elsewhere?

Yes	

No	

7. (If yes), name the accreditation No. and the accreditation Body:

8. Duration of the Training offered

____

9. Tutors Qualifications: ______________________

7. Contact Details

CONTACT PERSON 1	Title: Mr; Mrs; Prof; Dr	
	Full Name:	
	Contact No:	
	Cell No:	
	Fax No:	
	Email Address:	
CONTACT PERSON 2	Title: Mr; Mrs; Prof; Dr	
	Full Name:	
	Contact No:	
	Cell No:	
	Fax No:	
	Email Address:	

The following is submitted in support of the application.

10. Proof of payment for the Registration fee.
11. A copy of the identity document or birth certificate.
12. Proof of qualification.
13. Character reference by people not related to you.
14. Highest secondary school standard attained: ______________________(attach certified copy)

I hereby declare that I am the person referred to in the attached documents. I also declare that I have never been debarred from practice by reason of unprofessional conduct and that, to the best of my knowledge and belief, no proceedings involving or likely to involve a charge of offence or misconduct is pending against me at present.

SIGNATURE: .... **Date:**

Return this application together with payment/proof of payment and relevant documents to:

The Registrar
Interim Traditional Health Practitioners Council
Private Bag X 828
PRETORIA
0001

TABLE OF FEES			
	Regulation	Amount	Renewal
1	Regulation 2 (1) - Application for registration as a traditional health practitioner: **FORM THP A2**	R 1000,00	R500.00
2	Regulation 4 (1) - Application for registration as a student practitioner: **FORM THP A2**	R 200,00 (Year 1)	R100.00 subsequent years
3	Regulation 8 - Registration by Council of persons providing courses or training: **FORM THP A3**	R 5000,00	R1500.00

DEPARTMENT OF WATER AND SANITATION

NO. 4987 **21 June 2024**

NATIONAL WATER ACT, 1998

PROPOSED WATER RESOURCE CLASSES AND RESOURCE QUALITY OBJECTIVES FOR THE USUTHU TO MHLATHUZE CATCHMENTS IN THE INKOMATI-USUTHU AND PONGOLA-MTAMVUNA WATER MANAGEMENT AREAS

I, Senzo Mchunu, in my capacity as Minister of Water and Sanitation, and duly authorised in terms of section 13(4) of the National Water Act, 1998 (Act No. 36 of 1998), hereby publish for public comment, the notice on the proposed water resources classes and the associated Resource Quality Objectives, as set out in the Schedule and intended to be issued in terms of section 13(1) of the National Water Act, 1998 (Act No. 36 of 1998).

Any person who wishes to submit comments in connection with the proposed Water Resources Classes and Resource Quality Objectives is hereby invited to do so within 60 days from the date of publication of this Notice by -

(a) Posting such comments to the following address:
Department of Water and Sanitation
Private Bag X 313
Pretoria
0001

Or

(b) Delivering such comments by hand to the following address:
Department of Water and Sanitation
Ndinaye Building
178 Francis Baard Street
Pretoria

Or

(c) Emailing such comments to the following email address: Ms Lebogang Matlala
Email: matlalal@dws.gov.za

Comments must be addressed to the Director: Water Resource Classification and marked for the attention of Ms Lebogang Matlala. Comments received after the closing date shall not be considered.

MR SENZO MCHUNU
MINISTER OF WATER AND SANITATION
DATE: 28/05/24

SCHEDULE

PROPOSED WATER RESOURCE CLASSES AND RESOURCE QUALITY OBJECTIVES FOR USUTHU-MHLATHUZE CATCHMENTS IN THE INKOMATI-USUTHU AND PONGOLA-MTAMVUNA WATER MANAGEMENT AREAS

1 DEFINITIONS

In this Schedule any word or expression to which a meaning has been assigned in the Act shall have the meaning so assigned and, unless the context indicates otherwise -

"Class I water resource" means a water resource in which the configuration of ecological categories of the water resources within a catchment, results in an overall condition of that water resource that is minimally altered from its pre-development condition, and as defined in the Water Resource Classification System;

"Class II water resource" means a water resource in which the configuration of ecological categories of the water resources within a catchment, results in an overall condition of that water resource that is moderately altered from its pre-development condition and as defined in the Water Resource Classification System;

"Class III water resource" means a water resource in which the configuration of Ecological Categories of the water resources within a catchment, results in an overall condition of that water resource that is significantly altered from its pre-development condition and as defined in the Water Resource Classification System;

"Water Resource Classification System" means the Regulations for the Establishment of the Classification System, 2010 as prescribed in Government Notice No. R. 810 of 17 September 2010;

"Ecological category" means the ecological condition of that water resource in terms of the deviation of its biophysical components from a predevelopment condition;

"Ecological Water Requirements' in relation to a water resource, means the quantity and quality of water of that resource that is required to maintain the said water resource in its assigned Ecological Category;

"Integrated unit of analysis" means a water resource catchment that incorporates a socio-economic zone, but is defined by a watershed;

"Percentile" means the non-exceedance probability i.e., at the 95^{th} percentile, 95 percent of values must be less than or equal to the value; and at 50^{th} percentile, 50 percent of values must be less than or equal to the value;

"Present Ecological State" means the current health or integrity of various biological attributes of the resource, compared to the natural or close to natural reference conditions;

"Recommended Ecological Category" means a category indicating the realistically attainable ecological management target for a water resource;

“Resource Quality Objectives” means descriptive qualitative statements and numerical values for the biological, physical, and chemical attributes of the significant water resources throughout the catchments;

“Resource Unit” means a basic unit of a water resource to which Resource Quality Objectives will apply;

“Target Ecological Category” means the ultimate target to achieve a sustainable system both ecologically and economically, considering the Present Ecological State and Recommended Ecological Category.

2 DESCRIPTION OF THE WATER RESOURCE

(1) The Water Resource Classes and Resource Quality Objectives are determined for all or part of every significant water resource within the Usuthu-Mhlathuze Catchments of the Inkomati-Usuthu and Pongola-Mtamvuna Water Management Areas as set out below:

Water Management Areas:	Inkomati-Usuthu and Pongola-Mtamvuna
Drainage Region:	W Primary Drainage Region (excluding Eswatini)
River(s):	W1 catchment (main river: Mhlathuze).
	W2 catchment (main river: Umfolozi).
	W3 catchment (main river: Mkuze).
	W4 catchment (main river: Pongola) - part of this catchment area falls within Eswatini.
	W5 catchment (main river: Usutu) - much of this catchment falls within Eswatini.
	W7 catchment (Kosi Bay and Lake Sibaya).

(2) The date from which the Resource Quality Objectives will apply shall be the date stipulated in the *Gazette* wherein the final approved Resource Quality Objectives for the Usutu-Mhlathuze catchments in the Inkomati-Usuthu and Pongola-Mtamvuna Water Management Areas will be published.

3 DETERMINATION OF THE CLASS OF WATER RESOURCE IN TERMS OF SECTION 13(1)*(a)* OF THE ACT

(1) The proposed water resource classes, which are in accordance with the Water Resource Classification System, for the Usuthu to Mhlathuze catchments (W1 - 5, and 7) are as listed in Table 1 of Annexure A according to the overall class per integrated unit of analysis; and as illustrated in Figure 1 of Annexure A.

(2) The integrated units of analysis in the Usuthu to Mhlathuze catchments (W1 - 5, and 7) are listed in Table 2 and illustrated in Figure 2 of Annexure A.

(3) A summary of the resource units and quaternary catchments are listed in Table 3 and indicated in Figure 8 (Annexure A).

(4) The summary of water resource classes per integrated unit of analysis and ecological categories for the Usuthu to Mhlathuze catchments (W1 - 5, and 7) are as listed in Table 4 (Annexure A).

4 RESOURCE UNITS SELECTED WITH PROPOSED RESOURCE QUALITY OBJECTIVES

(1) Table 5 (Annexure A) provides:

(i) the listed Integrated Unit of Analysis in the Usuthu to Mhlathuze catchments for which Resource Quality Objectives are proposed;

(ii) the selected Water Resources (Rivers, Wetlands, Groundwater, and Estuaries) for which Resource Quality Objectives are proposed; and

(iii) reference to subsequent tables that list the proposed Resource Quality Objectives per selected sub-components (river: quantity, quality, habitat, biota or wetlands, groundwater, estuary) per Resource Unit.

(2) Resource Quality Objectives for rivers per Integrated Unit of Analysis and Resource Unit within the Usuthu to Mhlathuze catchments are specified in Table 6 (hydrological RQOs), Table 8 (habitat and biota RQOs for High Priority sites) and Table 9 (water quality RQOs for High Priority sites) of Annexure A.

(3) Resource Quality Objectives for priority wetland clusters and systems in selected Resource Units in the Usuthu to Mhlathuze catchments are set out in Table 10 (Annexure A).

(4) Regional and Resource Unit specific Resource Quality Objectives for groundwater in priority Groundwater Resource Units in the Usuthu to Mhlathuze catchments are set out in Table 11 with Resource Quality Objectives for groundwater-fed lakes set out in Table 12 of Annexure A.

(5) Resource Quality Objectives for Estuary components in priority Resource Units are as set out in Table 15 (Annexure A).

The Annexure to this Notice, containing the proposed water resource classes and Resource quality objectives, can be accessed from:

https://www.dws.gov.za/rdm/WRCS/utm.aspx

or requested from:

Director: Water Resource Classification
Attention: Ms Lebogang Matlala
Department of Water and Sanitation
Ndinaye Building
178 Francis Baard Street
Private Bag x 313
Pretoria 0001
E-mail: matlalal@dws.gov.za

General Notices • Algemene Kennisgewings

DEPARTMENT OF AGRICULTURE, LAND REFORM AND RURAL DEVELOPMENT

NOTICE 2581 OF 2024

NAMC
Promoting market access for South African agriculture

Block A | 4th Floor | Meintjiesplein Building | 536 Francis Baard Street | Arcadia |0002
Private Bag X935 | Pretoria | 0001
Tel: 012 341 1115 | Fax: 012 341 1811/1911
http://www.namc.co.za

NEWS STATEMENT BY THE NATIONAL AGRICULTURAL MARKETING COUNCIL

AMENDED APPLICATION FOR STATUTORY MEASURES:

LEVIES ON WHEAT, BARLEY AND OATS IN TERMS OF THE MARKETING OF AGRICULTURAL PRODUCTS ACT, 1996, (ACT NO 47 OF 1996), AS AMENDED

INVITATION TO DIRECTLY AFFECTED GROUPS IN THE WINTER CEREAL INDUSTRY TO FORWARD COMMENTS REGARDING THE AMENDED REQUEST FROM THE WHEAT FORUM

On 28 March 2024 as amended on 9 April 2024, the National Agricultural Marketing Council (NAMC) received a request from the Wheat Forum, that the Minister of Agriculture, Land Reform and Rural Development, in terms of section 15 of the Marketing of Agricultural Products Act (MAP Act), approve the proposed statutory levies (VAT excluded) for the different winter cereal commodities produced and imported, to be collected and administered by the South African Winter Cereal Industry Trust (SAWCIT), for a period of four years.

On 6 June 2024, the NAMC received an amended application from the Wheat Forum. The Wheat Forum considered the inputs from the NAMC and industry advisors on the advantages and disadvantages of Trusts versus Non Profit Companies (NPC) and resolved that a NPC should rather be the vehicle to administer the proposed winter cereal statutory levies. The Wheat Forum will establish the SA Winter Cereal Industry Agency (NPC) (SAWCIA) to administer the proposed statutory levies, which are as follows:

Commodity	*Period*	*Amount (VAT excluded)*
Wheat	1/10/2024 to 30/09/2025	R 12.00 per metric ton
	1/10/2025 to 30/09/2026	R 12.70 per metric ton
	1/10/2026 to 30/09/2027	R 13.40 per metric ton
	1/10/2027 to 30/09/2028	R 14.30 per metric ton
Barley	1/10/2024 to 30/09/2025	R 12.00 per metric ton
	1/10/2025 to 30/09/2026	R 12.70 per metric ton
	1/10/2026 to 30/09/2027	R 13.40 per metric ton
	1/10/2027 to 30/09/2028	R 14.30 per metric ton
Oats	1/10/2024 to 30/09/2025	R 10.00 per metric ton
	1/10/2025 to 30/09/2026	R 10.60 per metric ton
	1/10/2026 to 30/09/2027	R 11.20 per metric ton
	1/10/2027 to 30/09/2028	R 11.90 per metric ton

The purpose and aims of this statutory measure are to provide financial support to winter cereal information, research and transformation functions, which the winter cereal industry identified as essential and are in the interest of the industry.

This request was unanimously supported by the Wheat Forum members on the recommendation of the Wheat Forum Steering Committee, on behalf of the directly affected groups in the winter cereal industry.

Statutory levies have been imposed previously, on wheat, barley and oats (which expired in September 2020) to provide financial support for research projects, quality testing, the supply of generic market information to all role-players and to assist with the development of emerging farmers of winter cereals in South Africa. These levies were administered by the Winter Cereal Trust.

The Board of Directors of the SAWCIA shall consist of no less than 10 (ten) ordinary Directors and no more than 2 (two) co-opted independent Directors, to be nominated and appointed as follows:

Ordinary Directors:
(a) Two (2) Directors shall be representatives of the Minister and shall be nominated and appointed in writing by the Minister.
(b) Three (3) Directors shall be representatives of Winter Cereal producers in the Republic and shall be nominated and appointed in writing by Grain SA and the South African Grain Farmers Association (SAGRA) with Grain SA nominating and appointing two (2) Directors and SAGRA nominating and appointing one (1) Director.
(c) Two (2) Directors shall be representatives of Winter Cereal processors in the Republic, one (1) nominated and appointed in writing, respectively by the National Chamber of Milling and the the South African Chamber of Baking.
(d) One (1) Director shall be a representative of the sector in the industry dealing with Winter Cereal storage and shall be nominated and appointed in writing by Agbiz Grain.
(e) One (1) Director shall be a representative of the sector in the industry dealing with end-consumers of Winter Cereals in the Republic and shall be nominated and appointed in writing by SANCU.
(f) One (1) Director shall be a representative of the sector in the industry dealing with the trading in cereals and oilseeds and shall be nominated and appointed in writing by the SA Cereals and Oilseeds Traders Association.

Co-opted Independent Directors:
(g) The Directors on the Board shall have the option and may co-opt onto the Board no more than two (2) independent Directors to assist the Board from to time.

SAWCIA will have the following objectives:
To undertake and/or financially support scientific, economic, technical, or industrial research with regard to winter cereals in the Republic, inclusive of, but not necessarily limited to:
(a) Acting in the capacity of Levy Administrator for the implementation, administration and enforcement of a Statutory Levy introduced on any winter cereals in the Republic.
(b) Supporting the procurement and maintenance of information required by the industry.
(c) Broadening market access in respect of winter cereals in the Republic.

(d) The provision of support or assistance to emerging farmers as producers of winter cereals in the Republic, in order to improve capacity to start and manage agricultural operations.
(e) To financially support the administration of the Wheat Forum.

Business Plan:

The budgeted income by means of the proposed statutory levies is based on an expected success rate of a conservative 85% in the collection of levies. It is budgeted that an average annual total income of R42.2 million, of which R37.9 million would be from the wheat levy, could be collected in the next four years, depending on the crop size.

The guidelines of the NAMC regarding the utilisation of statutory levy funds, which currently stipulate that at least 20% of levies collected should be used for transformation projects, were taken into account.

The envisaged budget for the first year (2024/25) is as follows:

- 9.5% of the total budgeted levy income is allocated to the Administration and Contingency Fund. According to the NAMC Regulations, the proposed allowable allocation for administration expenses should not exceed 10%.
- 2.5% of the total budgeted levy income is allocated to commission that might be payable to those persons who have collected and paid the levy to SAWCIT and have conformed to the provisions of the proposed statutory measure.
- 28% of the total budgeted levy income is allocated to the funding of information.
- 20% of the total budgeted levy income is allocated to the funding of transformation. To date, the transformation has not necessarily been part of SAWCIT's voluntary levy, and there is not currently a formal transformation business plan in place. However, with the statutory application, the trust will meet the NAMC's prescribed requirements.
- 40% of the total budgeted levy income is allocated to the funding of research. Funds will be allocated to various research fields based on a model accepted by the winter cereal industry.

	R
Administration and Contingency Fund	4 006 223
Commission payable to levy collectors	1 054 269
Information	11 807 815
Transformation	8 434 153
Research	16 868 307
Total annual income for 2024/25	**42 170 767**

Invitation to comment:

As the proposed statutory levies are consistent with the objectives of the Marketing of Agricultural Products Act, the NAMC is investigating the level of support for this specific statutory levy application.

Directly affected groups in the winter cereal industry are kindly requested to submit any comments or objections regarding the proposed statutory levies, to the NAMC per e-mail to lizettem@namc.co.za on or before 5 July 2024, to enable the Council to formulate its recommendation to the Minister in this regard.

NON-GOVERNMENTAL ORGANIZATION

NOTICE 2582 OF 2024

CORRECTED NOTIFICATION: ENVIRONMENTAL AUTHORISATION APPLICATION PROCESS FOR SEARCHER GEODATA RECONNAISSANCE PERMIT

Searcher Geodata UK Ltd (hereafter referred to as the applicant - Searcher) has recently undertaken a 3D seismic survey offshore of the west coast of South Africa as part of the reconnaissance permit 12/1/043. The survey commenced in January 2024 and ceased in April 2024. Due to the fact that a Reconnaissance Permit can only be valid for 1 year the 043 permit will expire on the 10 November 2024. Searcher was not able to complete the intended survey during the 2023-2024 season, due to the viable acquisition windows and vessel availability. Searcher has consequently applied for a new Reconnaissance Permit over the same area. A new Environmental Authorisation will be required in order for Searcher to continue under a new Reconnaissance Permit.

Searcher has appointed Environmental Impact Management Services (Pty) Ltd (EIMS) as the Environmental Assessment Practitioner (EAP) to assist with undertaking the required authorisation processes (including the statutory public participation)

Applicant:	**Searcher Geodata UK Ltd**
Application:	Environmental Authorisation (EA) in accordance with the Environmental Impact Assessment (EIA) Regulations (GNR982 of 2014, as amended)- Listed Activity 21(b) (GNR 983): *Any activity including the operation of that activity which requires a reconnaissance permit in terms of section 74 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity as contained in this Listing Notice or in Listing Notice 3 of 2014, required to exercise the reconnaissance permit, excluding-* *(a) any desktop study; and* *(b) any arial survey.* **NOTE: The Listed Activity above has been corrected in this notice.*
Location:	Searcher proposes to undertake a 3D seismic survey off the West Coast of South Africa. The proposed project area is located between approximately 256 km offshore of St Helena Bay, extending north along the western coastline to approximately 220 km offshore of Hondeklip Bay. The survey area at the closest point is approximately 218 km offshore of the coast of the Western and Northern Cape. The main survey area corner coordinate points are as follows:

1) 30°39'24.92"S, 13°21'1.71"E	4) 31° 5'40.95"S, 15° 9'38.63"E	6) 32°35'33.64"S, 13°54'25.99"E
2) 30°14'20.36"S, 14° 4'1.43"E	5) 32°35'25.54"S, 15° 9'38.92"E	7) 32°10'0.54"S, 13°58'47.25"E
3) 31° 5'40.95"S, 14°53'2.67"E		

EIMS will be following the procedures defined in the EIA Regulations for undertaking a Basic Assessment process. In accordance with Chapter 6 of the EIA Regulations, a public participation process will be undertaken. You are hereby invited to register and comment on the proposed project and application/s. Please note that only registered I&AP's will be informed of future project information and opportunities for participation. By registering as an interested and affected party you consent to the collection and processing of your personal information as per the EIMS Privacy Notice available at www.eims.co.za/public-participation. To avoid missing out on opportunities for public participation please submit I&AP registrations, or any queries, comments, or concerns with regards to this application, as soon as possible to EIMS at:

Contact Person: Alex Msipa
EIMS Reference Number: 1623
Postal Address: P.O. Box 2083; Pinegowrie; 2123
Telephone: (011) 789 7170/ Fax: (086) 571 9047
E-mail: Searcher48@eims.co.za

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Please include the project reference number 1623 in all correspondence.

Public Open Days will be held from June 24 - July 5, 2024. A virtual public meeting is scheduled for July 10, 2024. The Basic Assessment Report is available for public review and comment from June 21 to July 22, 2024. Please visit www.eims.co.za/public-participation for full details.

NIE-REGERINGSORGANISASIE

KENNISGEWING 2582 VAN 2024

2582 "NEMA (Act 107 of 1998), NEMWA (Act 59 of 2008), NWA (Act 36 of 1998)": Gekorigeerde kennisgewing: Omgewingsmagtigingsaansoekproses vir

GEKORIGEERDE KENNISGEWING: OMGEWINGSMAGTIGINGAANSOEKPROSES VIR VERKENNINGSPERMIT

Searcher Geodata UK Ltd (hierna na verwys as die aansoeker, Searcher) het onlangs 'n 3D seismiese opname vn die kus van die weskus van Suid-Afrika onderneem as deel van die verkenningspermit 12/1/043. Die opname het in Januarie 2024 begin en in April 2024 gestaak. As gevolg van die feit dat 'n Verkenningspermit slegs vir 1 jaar geldig kan wees, sal die 043-permit op 10 November 2024 verval.Searcher kon nie die beoogde opname gedurende die 2023-2024-seisoen voltooi nie, weens die geldige verkrygingsvensters en vaartuigbeskikbaarheid. Searcher het gevolglik aansoek gedoen vir 'n nuwe Verkenningspermit oor dieselfde gebied. 'n Nuwe Omgewingsmagtiging sal vereis word sodat Searcher onder 'n nuwe Verkenningspermit kan voortgaan.

Searcher het Environmental Impact Management Services (Edms) Bpk (EIMS) as die Omgewingsassesseringspraktisyn (EAP) aangestel om te help met die onderneem van die vereiste magtigingsprosesse (insluitend die statutêre openbare deelname)

Aansoeker:	**Searcher Geodata UK Ltd**
Aansoek:	Omgewingsmagtiging (OM) in ooreenstemming met die Omgewingsimpakbepaling- (OIB) regulasies (GNR 982 van 2014, soos gewysig)- Gelyste Aktiwiteit 21(b) (GNR 983): *Enige aktiwiteit insluitend die uitvoering van daardie aktiwiteit wat 'n verkenningspermit benodig ingevolge artikel 74 van die Wet op die Ontwikkeling van Minerale en Petroleumhulpbronne sowel as enige ander toepaslike aktiwiteit soos vervat in hierdie Noteringskennisgewing of in Noteringskennisgewing 3 van 2014 wat vir die uitoefening van die verkenningspermit vereis word, uitsluitend* *(a) enige lessenaarstudie en* *(b) enige lugopname* **LET WEL: Die Gelyste Aktiwiteit hierbo is in hierdie kennisgewing reggestel.*
Ligging:	Searcher Seismic stel voor om 'n 3D seismiese opname aan die Weskus van Suid-Afrika te onderneem. Die voorgestelde projekgebied is geleë tussen ongeveer 256 km vanaf die kus van St Helenabaai, wat noord langs die westelike kuslyn strek tot ongeveer 220 km van die kus van Hondeklipbaai . Die opnamegebied by die naaste punt is ongeveer 218km van die kus van die Wes- en Noord-Kaap af. Die koördinaatpunte van die hoofhoeke van die opname area is soos volg:

1) 30°39'24.92"S, 13°21'1.71"E
2) 30°14'20.36"S, 14° 4'1.43"E
3) 31° 5'40.95"S, 14°53'2.67"E
4) 31° 5'40.95"S, 15° 9'38.63"E
5) 32°35'25.54"S, 15° 9'38.92"E
6) 32°35'33.64"S, 13°54'25.99"E
7) 32°10'0.54"S, 13°58'47.25"E

EIMS sal die prosedures volg soos voorgeskryf en vereis in die Omgewingsimpakbepaling (OIB) Regulasies (GRN982 van 2014, soos gewysig) vir die onderneming van 'n Basiese Evaluering (BA) proses. In ooreenstemming met Hoofstuk 6 van die OIB-regulasies, sal 'n openbare deelnameproses onderneem word. U word hiermee uitgenooi om te registreer en kommentaar te lewer op die voorgestelde projek en aansoek/e. Neem asseblief kennis dat slegs geregistreerde B&GP's direk ingelig sal word oor toekomstige projekinligting en geleenthede vir deelname. Deur as 'n B&GP te registreer, stem jy in tot die versameling en verwerking van jou persoonlike inligting soos per die EIMS Privaatheidskennisgewing beskikbaar by www.eims.co.za/public-participation. Om te verhoed dat geleenthede vir publieke deelname misgeloop word, dien asseblief B&GP-registrasies, of enige navrae, kommentaar of bekommernisse met betrekking tot hierdie aansoek, so gou as moontlik in by EIMS deur gebruik te maak van die volgende kontakbesonderhede:

Kontak Persoon: Alex Msipa
EIMS Verwysings Nommer: 1623
Pos adres: P.O. Box 2083; Pinegowrie; 2123
Telefoon: (011) 789 7170/ Faks: (086) 571 9047
E-pos: Searcher48@eims.co.za
Sluit asseblief die projek verwysingsnommer 1623 in alle korrespondensie in.

EIMS ENVIRONMENTAL IMPACT MANAGEMENT SERVICES

Openbare Opedae sal van 24 Junie - 5 Julie 2024 gehou word. 'n Virtuele openbare vergadering is geskeduleer vir 10 Julie 2024. Die Basiese Assesseringsverslag is beskikbaar vir publieke hersiening en kommentaar vanaf 21 Junie tot 22 Julie 2024. Besoek asseblief www.eims.co.za/public-participation/ n vir volledige besonderhede.

<u>ISAZISO ESILUNGISIWEYO:</u> ISICELO SESIGUNYAZISO SEZE NDALO NOKUSINGQONGILEYO SE SEARCHER GEODATA (RECONNAISSANCE PERMIT)

I-Searcher Geodata UK Ltd (emva koku ekubhekiselwa kuyo njengomfaki-sicelo - Searcher) yandula ukwenza uphando lwe-3D seismic kulwandle olusentshona yoMzantsi Afrika njengenxalenye yemvume (i-reconnaissance permit) 12/1/043. Uvavanyo laqala kweyoMqungu ku-2024 laze laphela kuTsazimpunzi. Ngenxa yokuba iPhepha-mvume le-reconnaissance linokuba semthethweni unyaka omnye kuphela imvume ka-043 iya kuphelelwa ngomnhla we-10 kweyeNkanga ku-2024. I-Searcher ayikwazanga ukugqiba uphando olucetyiweyo ngexesha eliphakathi kweminyaka u-2023-2024, ngenxa yexesha elivumelekileyo lokwenza uphando lwe-3D seismic kunye nokufumaneka kweenqanawa zophando. I-Searcher ngenxa yoko iye yafaka isicelo sephepha mvume ye-reconnaissance elitsha kwindawo enye. Ugunyaziso olutsha lokusiNgqongileyo luya kufuneka ukuze i-Searcher iqhubeke phantsi kweMvume le-reconnaissance entsha.

I-Searcher iqeshe u-Environmental Impact Management Services (Pty) Ltd (EIMS) njenge-Environmental Assessment Practitioner (EAP) ukuncedisa ekwenzeni iinkqubo zogunyaziso ezifunekayo (kubandakanywa nentatho-nxaxheba yoluntu ngokusemthethweni).

Umfaki Sicelo:	**Searcher Geodata UK Ltd**
Umsebenzi odwelisiwe:	Ugunyaziso leze Ndalo nokusiNgqongileyo (EA) ngokuvumelana nemiThetho yoHlolo oluChaphazela okusiNgqongileyo nezeNdalo (EIA) (i-GRN982 ka 2014, njengoko itshintshiwe)- Umsebenzi Odwelisiweyo 21(b) (GNR 983): *Nawuphi na umsebenzi oquka ukwenziwa kwaloo msebenzi ofuna imvume yokuphenya ngokwecandelo 74 loMthetho woPhuhliso lweMithombo yeziMbiwa namaFutha, kwakunye nawo nawuphi na umsebenzi ongomnye njengoko uqulethwe kwesi Saziso siDwelisiweyo okanye okwiSaziso esiDwelisiweyo 3 sika 2014, ekufuneka kusetyenziswe imvume yokuphenya, ngaphandle-* *(a) kwalo naluphi na uphononongo lwakwikhompyutha; kunye* *(b) nalo naluphi na uhlolo elenziwa ubhabha.* *<u>*QAPHELA: Umsebenzi odweliswe apha ngasentla ulungisiwe kwesi saziso.</u>*
Indawo:	I-Searcher Seismic iceba ukwenza uphando lwe-3D seismic kuNxweme oluseNtshona loMzantsi Afrika. Indawo yeprojekthi ecetywayo iphakathi malunga nama-256km kude nonxweme lwaseSt Helena Bay, inabela emantla kunxweme olusentshona ukuya malunga ne-220km kude nonxweme lwaseHondeklip Bay . Indawo yovavanyo kweyona ndawo ikufutshane imalunga nama-218km kude nonxweme kunxweme lweNtshona kunye noMntla Koloni. Iikona zesiza sendawo yovavanyo zezi zilandelayo:

1) 30°39'24.92"S, 13°21'1.71"E	4) 31° 5'40.95"S, 15° 9'38.63"E	6) 32°35'33.64"S, 13°54'25.99"E
2) 30°14'20.36"S, 14° 4'1.43"E	5) 32°35'25.54"S, 15° 9'38.92"E	7) 32°10'0.54"S, 13°58'47.25"E
3) 31° 5'40.95"S, 14°53'2.67"E		

I-EIMS iza kulandela iinkqubo ezichazwe kwiMimiselo ye-EIA (GRN982 ka-2014, njengoko i-amendiwe) ukuze kuqhutywe inkqubo yoVavanyo loChaphazeleko lwezendalo (Basic Assessment - BA). Ngokuhambelana neSahluko sesi-6 seMimiselo ye-EIA, inkqubo yentatho-nxaxheba yoluntu iya kwenziwa. Uyamenywa ukuba ubhalise kwaye unike izimvo ngeprojekthi ecetywayo kunye nezicelo. Nceda uqaphele ukuba zii-I&APs ezibhalisiweyo kuphela eziya kwaziswa ngokuthe ngqo ngengcaciso yeprojekthi yexesha elizayo kunye namathuba okuthatha inxaxheba. Ngokubhalisa kwiQela labanomdla nabachaphezelekayo uvumelana nokuqokelelwa nokusetyenziswa kwee nkcukacha zakho zabucala ngokwe Saziso se-EIMS sokusetyenziswa kwee Nkcukacha zabucal esifumaneka ku www.eims.co.za/public-participation. Ukuze ungaphoswa ngamathuba okuthatha inxaxheba koluntu nceda ungenise ubhaliso lwe-I&AP, okanye nayiphi na imibuzo, izimvo, okanye iinkxalabo malunga nesi sicelo, ngokukhawuleza kangangoko kunokwenzeka kwi-EIMS apha:

Umntu woQhakamshelwano: Alex Msipa
Inombolo yesalathisi ye-EIMS: 1623
Idilesi yeposi: P.O. Box 2083; Pinegowrie; 2123
Umnxeba: (011) 789 7170/ Ifekisi: (086) 571 9047
I-imeyile: Searcher48@eims.co.za

Nceda ufake inombolo yesalathiso yeprojekthi engu-1623 kuyo yonke imbalelwano.

IiNtsuku zeeNtlanganiso zoLuntu eziluhlobo lwe-Open Day ziya kubanjwa ukusuka ngomhla wama-24 kuJuni ukuya kumhla wesi-5 kuJulayi 2024. Intlanganiso kawonke-wonke eyakubanjwa ngobuchwephetshe bekhompyutha (vitual) icwangciselwe umhla we-10 kaJulayi 2024. Ingxelo yoHlolo lwezeNdalo nokusiNgqongileyo eluhlobo oluSisiseko (Basic Assessment Report) iyafumaneka ukuze iphononongwe luluntu kwaye lunike izimvo ukususela nge-21 kaJuni ukuya kwi-22 kaJulayi 2024. Nceda undwendwele www.eims.co.za/public-participation ukuze ufumane iinkcukacha ezipheleleyo.

DEPARTMENT OF TRADE, INDUSTRY AND COMPETITION

NOTICE 2583 OF 2024

INTERNATIONAL TRADE ADMINISTRATION COMMISSION OF SOUTH AFRICA

NOTICE OF INITIATION OF AN INVESTIGATION INTO THE ALLEGED CIRCUMVENTION OF THE ANTI-DUMPING DUTY ON LAMINATED SAFETY GLASS CLASSIFIABLE UNDER 7007.29 THROUGH COUNTRY HOPPING FROM THE PEOPLE'S REPUBLIC OF CHINA VIA THE REPUBLIC OF MALAYSIA

The International Trade Administration Commission of South Africa (the Commission) received an application alleging that circumvention through country hopping from the People's Republic of China (China) to the Republic of Malaysia (Malaysia) of laminated safety glass classifiable under tariff subheading 7007.29 is taking place. Section 60.8 of the Anti-Dumping Regulation (ADR) states that "Country hopping shall be deemed to take place if imports, following the imposition of anti-dumping duties or provisional payment or the initiation of an anti-dumping investigation, switch to a supplier related to the supplier against which an anti-dumping investigation has been or is being conducted and that is based in another country or customs territory."

THE APPLICANT

The Application was lodged by PFG Building Glass Pty Ltd ("Applicant"), a major producer of the subject product in the Southern African Customs Union (SACU).

THE PRODUCT

The product allegedly being circumvented is laminated safety glass originating in or imported from Malaysia, classifiable under tariff subheading 7007.29. Based on the information submitted by the Applicant, the Commission decided that the SACU products and the imported products are "like products" for purposes of comparison in terms of the ADR.

THE ALLEGATION OF CIRCUMVENTION (COUNTRY HOPPING)

The Applicant alleged that subsequent to the imposition of the definitive anti-dumping duty on imports of laminated safety glass originating in or imported from China, Chinese exporters have shifted exporting of the subject products from China to some of their related companies in Malaysia. The Applicant further provided a list of related companies of the Chinese exporters that were identified in the original investigation.

Further to that, analysis of the change in the trade pattern of the import data from China and Malaysia pre and post imposition of the final duties on laminated safety glass from China indicates the possibility of country hopping from China to Malaysia.

On this basis, the Commission found that there was *prima facie* evidence to indicate that country hopping, in terms of ADR 60.8, is taking place.

THE ALLEGATION OF DUMPING

The allegation of dumping is based on the comparison between the normal values previously established in the original investigation in accordance with ADR 62.3 and the export price derived from the import statistics obtained from the South African Revenue Services (SARS). On this basis, the Commission found that there was *prima facie* evidence of dumping, and the dumping margin was determined to be 443%.

THE ALLEGATION OF MATERIAL INJURY

The Applicant alleges and submitted sufficient evidence from original investigation, that the SACU industry is experiencing material injury and a threat of material injury with regard to the subject product. On this basis, the Commission found that there was *prima facie* proof that material injury, or threat of material injury, and causal link in the original investigation that was considered for purposes of this application in line with ADR62.2.

PERIOD OF INVESTIGATION

The investigation period for dumping is from 01 December 2023 to 29 February 2024.

PROCEDURAL FRAMEWORK

Having decided that there is sufficient evidence and a *prima facie* case to justify the initiation of an investigation, the Commission has begun an investigation in terms of section 16 of the International Trade Administration Act, 2002 (the ITA Act). The Commission will conduct its investigation in accordance with the relevant sections of the ITA Act, the World Trade Organisation Agreement on Implementation of Article VI of the GATT 1994(the Anti-Dumping Agreement) and the Anti-Dumping Regulations of the International Trade Administration Commission of South Africa (ADR). Both the ITA Act and the ADR are available on the Commission's website (www.itac.org.za) or from the Trade Remedies section, on request.

In order to obtain the information it deems necessary for its investigation, the Commission will send non-confidential versions of the application and questionnaires to all known importers and exporters and known representative associations. The trade representatives of the exporting countries have also been notified. Importers and other interested parties are invited to contact the Commission as soon as possible in order to determine whether they have been listed and were furnished with the relevant documentation. If not, they should immediately ensure that they are sent copies. The questionnaire has to be completed and any other representations must be made within the time limit set out below.

CONFIDENTIAL INFORMATION

Please note that if any information is confidential then a non-confidential version of the information must be submitted for the public file, simultaneously with the confidential version. In submitting a non-confidential version the following rules are strictly applicable and parties must indicate:

- X where confidential information has been omitted and the nature of such information;
- X reasons for such confidentiality;
- X a summary of the confidential information which permits a reasonable understanding of the substance of the confidential information; and
- X in exceptional cases, where information is not susceptible to summary, reasons must be submitted to this effect.

This rule applies to all parties and to all correspondence with and submissions to the Commission, which unless indicated to be confidential and filed together with a non-confidential version, will be placed on the public file and be made available to other interested parties.

If a party considers that any document of another party, on which that party is submitting representations, does not comply with the above rules and that such deficiency affects that party′s ability to make meaningful representations, the details of the deficiency and the reasons why that party′s rights are so affected must be submitted to the Commission in writing forthwith (and at the latest 14 days prior to the date on which that party′s submission is due). Failure to do so timeously will seriously hamper the proper administration of the investigation, and such party will not be able to subsequently claim an inability to make meaningful representations on the basis of the failure of such other party to meet the requirements.

Subsection 33(1) of the ITA Act provides that any person claiming confidentiality of information should identify whether such information is *confidential by nature* or is *otherwise confidential* and, any such claims must be supported by a written statement, in each case, setting out how the information satisfies the requirements of the claim to confidentiality. In the alternative, a sworn statement should be made setting out reasons why it is impossible to comply with these requirements.

Section 2.3 of the ADR provides as follows:

"The following list indicates "information that is by nature confidential" as per section 33(1)(a) of the Main Act, read with section 36 of the Promotion of Access to Information Act (Act 2 of 2000):

(a) management accounts;
(b) financial accounts of a private company;
(c) actual and individual sales prices;
(d) actual costs, including cost of production and importation cost;
(e) actual sales volumes;
(f) individual sales prices;
(g) information, the release of which could have serious consequences for the person that provided such information; and
(h) information that would be of significant competitive advantage to a competitor;

Provided that a party submitting such information indicates it to be confidential

ADDRESS

The response to the questionnaire and any information regarding this matter and any arguments concerning the allegation of dumping and the resulting material injury must be submitted in writing to the following address:

Physical address	**Postal address**
The Senior Manager: Trade Remedies I	The Senior Manager:
International Trade Administration Commission	Trade Remedies I
Block E – The DTI Campus	Private Bag X753
77 Meintjies Street	PRETORIA
SUNNYSIDE	0001
PRETORIA	SOUTH AFRICA
SOUTH AFRICA	

PROCEDURES AND TIME LIMITS

The Senior Manager: Trade Remedies I, should receive all responses, including non-confidential copies of the responses, not later than 30 days from the date hereof, or from the date on which the letter accompanying the abovementioned questionnaire was received. The said letter shall be deemed to have been received seven days after the day of its dispatch.

Late submissions will not be accepted except with the prior written consent of the Commission. The Commission will give due consideration to written requests for an extension of not more than 14 days on good cause shown (properly motivated and substantiated), if received prior to the expiry of the original 30-day period. Merely citing insufficient time is not an acceptable reason for an extension. Please note that the Commission will not consider requests for extension by the Embassy on behalf of foreign producers.

The information submitted by any party may need to be verified by the Investigating Officers in order for the Commission to take such information into consideration. The Commission may verify the information at the premises of the party submitting the information, within a short period after the submission of the information to the Commission. Parties should therefore ensure that the information submitted would subsequently be available for verification. Specifically, it is planned to verify the information submitted by the foreign producers within three to five weeks subsequent to the submission of the information. This period will only be extended if it is not feasible for the Commission to do it within this time period or upon good cause shown, and with the prior written consent of the Commission, which should be requested at the time of the submission. It should be noted that unavailability of, or inconvenience to appointed representatives, will not be considered to be good cause.
Parties should also ensure when they engage representatives that they will be available at the requisite times, to ensure compliance with the above time frames. Parties should also ensure that all the information requested in the applicable questionnaire is provided in the specified detail and format. The questionnaires are designed to ensure that the Commission is provided with all the information required to make a determination in accordance with the ITA Act and the ADR. The Commission may therefore refuse to

verify information that is incomplete or does not comply with the format in the questionnaire, unless the Commission has agreed in writing to a deviation from the required format. A failure to submit a non-confidential version of the response that complies with the rules set out above under the heading *Confidential Information* will be regarded as an incomplete submission.

Parties, who experience difficulty in furnishing the information required, or submitting information in the format required, are urged to make written applications to the Commission at an early stage for permission to deviate from the questionnaire or provide the information in an alternative format that can satisfy the Commission′s requirements. The Commission will give due consideration to such a request on good cause shown.

Any interested party may request an oral hearing at any stage of the investigation in accordance with Section 5 of the ADR, provided that the party indicates reasons for not relying on written submissions only. The Commission may refuse an oral hearing if granting such hearing will unduly delay the finalisation of a determination. Parties requesting an oral hearing must provide the Commission with a detailed agenda for, and a detailed version, including a non-confidential version, of the information to be discussed at the oral hearing at the time of the request.

If the required information is not received in a satisfactory form within the time limit specified above, or if verification of the information cannot take place, the Commission may disregard the information submitted and make a finding on the basis of the facts available to it.

Should you have any queries, please do not hesitate to contact Mr. Zuko Ntsangani at zntsangani@itac.org.za and Ms. Mosa Sebe at msebe@itac.org.za.

DEPARTMENT OF TRADE, INDUSTRY AND COMPETITION

NOTICE 2584 OF 2024

STANDARDS ACT, 2008
STANDARDS MATTERS

In terms of the Standards Act, 2008 (Act No. 8 of 2008), the Board of the South African Bureau of Standards has acted in regard to standards in the manner set out in the Schedules to this notice.

SECTION A: DRAFTS FOR COMMENTS

The following draft standards are hereby issued for public comments in compliance with the norm for the development of the South Africa National standards in terms of section 23(2)(a) (ii) of the Standards Act.

Draft Standard No. and Edition	Title, scope and purport	Closing Date
SANS 3859:2024 Ed 2	*Standard test methods for selenium in water.* These test methods cover the determination of dissolved and total recoverable selenium in most waters and wastewaters. Both test methods utilize atomic absorption procedures, as follows	2024-07-04
SANS 41001:20XX Ed 1	*Facility management — Management systems Requirements with guidance for use*. This document specifies the requirements for a facility management (FM) system when an organization	2024-07-23
SANS 41017:20XX Ed 1	*Facility management — Guidance on emergency preparedness and management of an epidemic.* This document provides general guidance to organizations on how to plan for, mitigate and/or manage the risks and impacts of an epidemic event to protect facility-related health, safety and well-being	2024-07-23
SANS 2092:20xx Ed 1	*Dielectric dissipation factor for quality assessment of new globally impregnated MV stator windings.* The standard is applicable to new globally impregnated ac windings (OEM and rewound) with rated voltages above 1 000 V employing form-wound windings with a micaceous insulation system.	2024-07-23
SANS 10400-O:20XX Ed 4	*The application of the National Building Regulations Part O: Lighting and ventilation.* This part of SANS 10400 provides deemed-to-satisfy requirements for compliance with part O (Lighting and Ventilation) of the National Building Regulations	2024-08-06
SANS 241:20XX Ed 7	*Drinking water quality.* This standard specifies the quality requirements for safe drinking water to be supplied to consumers	2024-08-27
SANS 11202:20XX Ed 2	*Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions applying approximate environmental corrections.* This International Standard specifies a method for determining the emission sound pressure levels of machinery or equipment, at a work station and at other specified positions nearby, in situ. A work station is occupied by an operator and may be located in open space, in the room where the source under test operates, in a cab fixed to the source under test, or in an enclosure remote from the source under test. One or more specified positions may be located in the vicinity of a work station, or in the vicinity of an attended or unattended machine. Such positions are sometimes referred to as bystander positions	2024-08-22
SANS 11203:20XX Ed 1	*Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions from the sound power level.* This International Standard specifies two methods for determining the emission sound pressure levels of machinery and equipment, at a work station and at other specified positions nearby, by calculation from the sound power level. The principal purpose of this determination is to permit comparison of the performance of different units of a given family of machinery or equipment, under defined environmental conditions and standardized mounting and operating conditions. The data obtained may also be used for the declaration and verification of emission sound pressure levels as specified in IS0 4871.	2024-08-22
SANS 51992-1-1:2024 Ed 1	*Eurocode 2: The design of concrete Structures Part 1-1: General rules and rules for buildings.* Eurocode 2 applies to the design of buildings and civil engineering works in plain, reinforced and prestressed concrete. It complies with the principles and requirements for the safety and serviceability of structures, the basis of their design and verification that are given in EN 1990: Basis of structural design	2024-08-22

SCHEDULE A.1: AMENDMENT OF EXISTING STANDARDS

The following draft amendments are hereby issued for public comments in compliance with the norm for the development of the South African National Standards in terms of section 23(2)(a) (ii) of the Standards Act.

Draft Standard No. and Edition	Title	Scope of amendment	Closing Date
SANS 339:20XX Ed 1.2	*Sorbents for hydrocarbon-based products*	Amended delete the annex on notes to purchasers	2024-07-23
SANS 651:20XX Ed 3.2	*Low-foam laundry detergent (for use in automatic and non-automatic domestic washing machines)*	Amended to delete the annex on notes to purchasers	2024-07-29
SANS 1370:20XX Ed 1.4	*Fluxes for the submerged arc welding of carbon and carbon manganese steels*	Amended to delete the appendix on notes to purchases	2024-08-06
SANS 1553-2:20XX Ed 1.4	*PVC-U window and door frames for external use. Part 2: Windows with frames made from PVC-U profiles*	Amended to delete the annex on notes to purchasers	2024-08-06
SANS 1130:20XX Ed 1.5	*Fibre reinforcing material for pipe wrapping*	Amended to delete the annex on notes to purchasers	2024-08-20
SANS 1891-1:20XX Ed 1.2	*Performance requirements for clothing Part 1: Shirts*	Amended to update the referenced standards	2024-08-20

SCHEDULE A.2: WITHDRAWAL OF THE SOUTH AFRICAN NATIONAL STANDARDS

In terms of section 24(1)(C) of the Standards Act, the following published standards are issued for comments with regard to the intention by the South African Bureau of Standards to withdrawn them.

Draft Standard No. and Edition	Title	Reason for withdrawal	Closing Date
SANS 5448ED3:20XX	*Effect of heat on appearance and texture of textile fabrics*	The standard is not used as the process of assessment is often disputed and debatable.	2024-08-27

SCHEDULE A.3: WITHDRAWAL OF INFORMATIVE AND NORMATIVE DOCUMENTS

In terms of section 24(5) of the Standards Act, the following documents are being considered for withdrawal.

Draft Standard No. and Edition	Title	Reason for withdrawal	Closing Date

SECTION B: ISSUING OF THE SOUTH AFRICAN NATIONAL STANDARDS

SCHEDULE B.1: NEW STANDARDS

The following standards have been issued in terms of section 24(1)(a) of the Standards Act.

Standard No. and year	Title, scope and purport
SANS 21503:2024 Ed 1	*Project, programme and portfolio management — Guidance on programme management.* This document gives guidance on programme management. It is applicable to any type of organization including public or private and any size or sector, as well as any type of programme in terms of complexity.

SCHEDULE B.2: AMENDED STANDARDS

The following standards have been amended in terms of section 24(1)(a) of the Standards Act.

Standard No. and year	Title, scope and purport
SANS 868-3-1:2024 Ed 1.2	*Compression-ignition engine systems and machines powered by such engine systems, for use in mines and plants with explosive gas atmospheres or explosive dust atmospheres or both Part 3-1: Hazardous locations on surface — Basic explosion-protected engines.* This part of SANS 868 specifies constructional and performance requirements for basic explosion-protected engines for use in hazardous locations in surface plants and works. It facilitates the repair of the engine as a specialized activity.
SANS 868-3-2:2024 Ed 1.1	*Compression-ignition engine systems and machines powered by such engine systems, for use in mines and plants with explosive gas atmospheres or explosive dust atmospheres or both Part 3-2: Hazardous locations on surface — Explosion-protected engine systems.* This part of SANS 868 specifies constructional and performance requirements for explosion protected engine systems for use in hazardous locations in surface plants and works. It facilitates the repair of the engine systems as a specialized activity
SANS 1332:2024 Ed 2.1	*Accessories for medium-voltage XLPE and impregnated paper-insulated power cables (3,8/6,6 kV to 19/33 kV).* This standard covers the requirements for accessories for medium-voltage cables used on a.c. systems of voltages from 3,8/6,6 kV up to and including 19/33 kV. Accessories for both XLPE and impregnated paper-insulated (PILC) cables are covered
SANS 61557-7:2024 Ed 1.1	*Electrical safety in low voltage distribution systems up to 1 000 V AC and 1 500 V DC — Equipment for testing, measuring or monitoring of protective measures Part 7: Phase sequence.* This part of IEC 61557 specifies the requirements applicable to measuring equipment for testing the phase sequence in three-phase distribution systems. Indication of the phase sequence can be mechanical, visual and/or audible
SANS 62262:2024 Ed 1.1	*Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code).* This document refers to the classification of the degrees of protection provided by enclosures against external mechanical impacts when the rated voltage of the protected equipment is not greater than 72,5 kV
SANS 3001-CO3-2:2024 Ed 1.2	*Civil engineering test methods Part CO3-2: Concrete durability index testing — Oxygen permeability test.* This part of SANS 3001 describes the method to test for oxygen permeability on concrete specimens that have been prepared by coring and cutting concrete cubes in the laboratory, or by taking cores from concrete elements on site
SANS 1010:2024 Ed 3.2	*Bunting.* This standard covers requirements for two types of fabric suitable for use in the decoration of government and civic buildings and in the manufacture of flags
SANS 1254:2024 Ed 1.2	*Fusible interlinings.* This standard covers requirements for three types of fusible interlinings, i.e. woven, non-woven and knitted weft insert fabrics, that are suitable for use in washable or dry-cleanable garments (or both).

SANS 1270:2024 Ed 3.2	*General requirements for woven textile piece-goods and household articles.* This standard covers the general requirements for woven textile piece-goods and for the make-up of household articles
SANS 1896:2024 Ed 1.2	*Candles, illuminating.* This standard specifies the requirements for candles suitable for illuminating purposes, but does not cover decorative candles

SCHEDULE B.3: WITHDRAWN STANDARDS

In terms of section 24(1)(C) of the Standards Act, the following standards have been withdrawn.

Standard No. and year	Title
SANS 60598-2-6:1994	*Luminaires Part 2: Particular requirements Section 6: Luminaires with built-in transformers or convertors for filament lamps edition 1*
SANS 373-1:2009 Ed 2	*Reprocessing of endoscopes Part 1: Flexible endoscopes and accessories*
SANS 373-2:2009 Ed 1	*Reprocessing of endoscopes Part 2: Rigid endoscope, associated components and accessories*

SCHEDULE B.4: REINSTATEMENT OF WITHDRAWN STANDARD

In terms of section 4(2) (l) the South African Bureau of Standards has established the following technical committees:

Draft Standard No. and Edition	Title	Scope of amendment	Reason

SCHEDULE B.5: ESTABLISHMENT OF TECHNICAL COMMITTEES

In terms of section 4(2) (l) the South African Bureau of Standards has established the following technical committees:

Technical Committee No.:	Title	Scope

SCHEDULE B.6: DISBANDMENT OF TECHNICAL COMMITTEES

In terms of section 4(2) (l) the South African Bureau of Standards has disbanded the following technical committees:

Technical Committee No.:	Title	Scope

If your organization is interested in participating in these committees, please send an e-mail to Dsscomments@sabs.co.za for more information.

SCHEDULE 5: ADDRESS OF THE SOUTH AFRICAN BUREAU OF STANDARDS HEAD OFFICE

Copies of the standards mentioned in this notice can be obtained from the Head Office of the South African Bureau of Standards at 1 Dr Lategan Road, Groenkloof, Private Bag X191, Pretoria 0001.

DEPARTMENT OF TRADE, INDUSTRY AND COMPETITION

NOTICE 2585 OF 2024

INTERNATIONAL TRADE ADMINISTRATION COMMISSION OF SOUTH AFRICA

In accordance with the provisions of the Anti-Dumping Regulations (“ADR”) of the International Trade Administration Commission of South Africa (“the Commission”), any definitive anti-dumping duty shall be terminated on a date not later than five years from the date of imposition, unless the authorities determine, in a review initiated before that date on their own initiative or upon a duly substantiated request made by or on behalf of the domestic industry, that the expiry of the duty would be likely to lead to continuation or recurrence of dumping and injury.

The Commission hereby notifies all interested parties that, unless a duly substantiated request is made by or on behalf of the Southern African Customs Union (“SACU”) industry, indicating that the expiry of the duty would be likely to lead to continuation or recurrence of dumping and injury, the following anti-dumping duties will expire during 2025:

PRODUCT	COUNTRY	RATE OF ANTI-DUMPING DUTY	DATE OF IMPOSITION OF THE DUTY	DATE OF EXPIRY OF DUTY	DATE OF SUBMISSION
Polyethylene terephthalate (PET)	China (Produced by Zheijiang Wankai New Materials Co. Ltd	28.26%	19/05/2020	18/05/2025	06/11/2024
Polyethylene terephthalate (PET)	China (Produced by Far Eastern Industries (Shangai) Ltd)	26.4%	19/05/2020	18/05/2025	06/11/2024
Polyethylene terephthalate (PET)	China (excluding those produced by Zheijiang Wankai New Materials Co. Ltd, Far Eastern Industries (Shangai) Ltd, Jiangyin Xingyu New Materials Co. Ltd, Jiangyin Xingtai New Material Co. Ltd and Jingsu Xingye Plastic	28.89%	19/05/2020	18/05/2025	06/11/2024

PROCEDURAL FRAMEWORK

The Commission will conduct its investigation in accordance with the relevant sections of the International Trade Administration Act ("ITA Act") and the ADR, with due regard to the World Trade Organisation Agreement on Implementation of Article VI of the GATT 1994 ("the Anti-Dumping Agreement"). The ITA Act and the ADR are available from the Commission's website (www.itac.org.za) or from the Trade Remedies section, on request.

Manufacturers of the subject product listed above in the SACU, who wish to submit a request for the duty to be reviewed prior to the expiry thereof, are requested to do so within the time limit set out below. In the instances where no replies are received from the SACU manufacturers within these time limits, the Commission will recommend the termination of the duties on the date of expiry.

SACU manufacturers, who submit a request within the time limit indicated in the section "Procedures and Time Limits" below, are requested to submit duly substantiated information indicating that the expiry of the duty would be likely to lead to continuation or recurrence of dumping and material injury to the Commission, on the dates as specified below:

PRODUCT	COUNTRY	DATE OF IMPOSITION OF THE DUTY	DATE OF SUBMISSION
Polyethylene terephthalate (PET)	China	19/05/2020	06/11/2024

The Commission will consider the information submitted in order to determine whether *prima facie* evidence exist to justify the initiation of a review. Should the Commission decide to initiate a review, notice will be given in the *Government Gazette* and other parties, being exporters and importers of the subject products, will be requested to comment and provide information.

CONFIDENTIAL INFORMATION

Please note that if any information is considered to be confidential, a non-confidential version of the information must be submitted for the public file simultaneously with the confidential version. In submitting a non-confidential version, the following rules are strictly applicable, and parties must indicate:

- where confidential information has been omitted and the nature of such information;
- reasons for such confidentiality;
- a summary of the confidential information which permits a reasonable understanding of the substance of the confidential information; and
- In exceptional cases, where information is not susceptible to summary, a sworn statement setting out the reasons why it is impossible to comply should be provided.

A sworn statement is defined as a written sworn statement of fact voluntarily made by an affiant or deponent under an oath or affirmation administered by a person authorized to do so by law. Such statement is witnessed as to the authenticity of the affiant's signature by a taker of oaths, such as a Commissioner of Oaths or Notary Public. An affidavit is a type of verified statement or showing, or in other words, it contains verification, meaning it is under oath or penalty of perjury and this serves as evidence to its veracity and is required for court proceedings.

Please note that the Commission will not accept a sworn statement signed by a representative, as defined in the ADR, of the interested party concerned.

This rule applies to all parties and to all correspondence with and submissions to the Commission, which unless indicated to be confidential and filed together with a non-confidential version, will be placed on the public file and be made available to other interested parties.

If a party considers that any document of another party, on which that party is submitting representations, does not comply with the above rules and that such deficiency affects that party's ability to make meaningful representations, the details of the deficiency and the reasons why that party's rights are so affected must be submitted to the Commission in writing forthwith (and at the latest 14 days prior to the date on which that party's submission is due). Failure to do so timeously will seriously hamper the proper administration of the investigation, and such party will not be able to subsequently claim an inability to make meaningful representations on the basis of the failure of such other party to meet the requirements.

Subsection 33(1) of the ITA Act provides that any person claiming confidentiality of information should identify whether such information is *confidential by nature* or is *otherwise confidential* and, any such claims must be supported by a written statement, in each case, setting out how the information satisfies the requirements of the claim to confidentiality. In the alternative, a sworn statement should be made setting out reasons why it is impossible to comply with these requirements.

Regulation 2.3 of the ADR provides as follows:

"The following list indicates "information that is by nature confidential" as per section 33(1) (a) of the Main Act, read with section 36 of the Promotion of Access to Information Act (Act 2 of 2000):

- *(a) management accounts;*
- *(b) financial accounts of a private company;*
- *(c) actual and individual sales prices;*
- *(d) actual costs, including cost of production and importation cost;*
- *(e) actual sales volumes;*
- *(f) individual sales prices;*
- *(g) information, the release of which could have serious consequences for the person that provided such information; and*
- *(h) information that would be of significant competitive advantage to a competitor.*

Provided that a party submitting such information indicates it to be confidential."

ADDRESS

The requests by manufacturers in the SACU of the subject products, and the duly substantiated information indicating what the effect of the expiry of the duties will be, must be submitted in writing to the following address or on the emails below:

Physical address
The Senior Manager: Trade Remedies I
International Trade Administration
Commission
Block E – Uuzaji Building
The DTI Campus
77 Meintjies Street
SUNNYSIDE
PRETORIA
SOUTH AFRICA

Postal address
The Senior Manager: Trade Remedies I
Private Bag X753
Pretoria
0001
SOUTH AFRICA

These responses can also be sent via e-mail to the following addresses: zntsangani@itac.org.za and msebe@itac.org.za.

PROCEDURES AND TIME LIMITS

Manufacturers in the SACU of the subject products listed above, who wish to submit a request for the duty to be reviewed prior to the expiry thereof, are requested to do so not later than close of business on **22 July 2024**.

SACU manufacturers who submit a request by **22 July 2024**, should submit duly substantiated information, indicating that the expiry of the duty would be likely to lead to continuation or recurrence of dumping and material injury, to the Commission.

It should be noted that the investigation process is complex and the Commission is subject to strict time limits within which to complete the investigation. Late submissions will therefore not be accepted, except with the prior written consent of the Commission. The Commission will give due consideration to written requests for an extension of not more than 14 days on good cause shown (properly motivated and substantiated), if received prior to the expiry of the original period.

Merely citing insufficient time is not an acceptable reason for an extension.

The information submitted by any party may need to be verified by the Investigating Officers in order for the Commission to take such information into consideration. The Commission may verify the information at the premises of the party submitting the information within a short period after the submission of the information to the Commission. Parties should therefore ensure that the information submitted will subsequently be available for verification. It is planned to do the verification of the information submitted by the exporters within three to five weeks subsequent to submission of the information. This period will only be extended if it is not feasible for the Commission to do it within this time period or, for an applicant requesting an extension, upon good cause shown, and with the prior written consent of the Commission, which should be requested at the time of the submission. It should be noted that unavailability of, or inconvenience to, consultants will not be considered to be good cause.

Parties should also ensure when they engage consultants that they will be available at the requisite times, to ensure compliance with the above time frames. Parties should also ensure that all the information requested in the applicable questionnaire is provided in the specified detail and format. The questionnaires are designed to ensure that the Commission is provided with all the information required to make a determination in accordance with the ITA Act and the ADR, and with due consideration to the rules of the Anti-Dumping Agreement. The Commission may therefore refuse to verify information that is incomplete or does not comply with the format in the questionnaire, unless the Commission has agreed in writing to a deviation from the required format. A failure to submit an adequate non-confidential version of the response that complies with the rules set out above under the heading *Confidential Information* will be regarded as an incomplete submission.

Parties, who experience difficulty in furnishing the information required, or submitting in the format required, are therefore urged to make written applications to the Commission at an early stage for permission to deviate from the questionnaire or provide the information in an alternative format that can satisfy the Commission's requirements.

The Commission will give due consideration to such a request on good cause shown.

Any interested party may request an oral hearing ITA in accordance with Regulation 5 of the ADR, provided that the party indicates reasons for not relying on written submissions only. The Commission may refuse an oral hearing if granting such hearing would unduly delay the finalisation of a determination. Parties requesting an oral hearing shall provide the Commission with a detailed agenda for, and a detailed version of, including a non-confidential version, the information to be discussed at the oral hearing at the time of the request.

If the required information and arguments are not received in a satisfactory form within the time limit specified above, or if verification of the information cannot take place, the Commission may disregard the information submitted and make a finding on the basis of the facts available to it.

Enquiries may be directed to the Acting Senior Manager: Trade Remedies I, Mr Zuko Ntsangani, at zntsangani@itac.org.za

DEPARTMENT OF TRADE, INDUSTRY AND COMPETITION

NOTICE 2586 OF 2024

INTERNATIONAL TRADE ADMINISTRATION COMMISSION

SUNSET REVIEW OF THE ANTI-DUMPING DUTY ON UNFRAMED GLASS MIRRORS OF A THICKNESS OF 2MM OR MORE BUT NOT EXCEEDING 6MM CLASSIFIABLE UNDER TARIFF SUBHEADING 7009.91 ORIGINATING IN OR IMPORTED FROM THE PEOPLE'S REPUBLIC OF CHINA ("CHINA"): FINAL DETERMINATION

In accordance with Regulation 53.1 of the International Trade Administration Commission's Anti-Dumping Regulations ("ADR"), any definitive Anti-Dumping duty shall be terminated on a date not later than five years from its imposition, unless the authorities determine, in a review initiated before that date on their own initiative or upon a duly substantiated request made by or on behalf of the domestic industry within a reasonable period of time prior to that date, that the expiry of the duty would likely lead to the continuation or recurrence of dumping and material injury to the Southern African Customs Union ("SACU") Industry.

On 15 June 2022, the International Trade Administration Commission of South Africa ("the Commission" or "ITAC") notified interested parties through Notice No. 1087 of 2022 in *Government Gazette* No. 46550, that unless a substantiated request is made indicating that the expiry of the anti-dumping duty against imports of unframed glass mirrors originating in or imported from the People's Republic of China ("China") would likely lead to the continuation or recurrence of dumping and injury, the anti-dumping duty on unframed glass mirrors originating in or imported from China would expire on 20 December 2023.

A detailed response to the Commission's sunset review questionnaire was received from PFG Building Glass, a division of PG Group (Pty) Ltd ("the Applicant"), on behalf of the SACU industry on 20 June 2023. After all deficiencies were identified and addressed, an updated final application was received on 21 July 2023.

The Applicant alleged that the expiry of the anti-dumping duty on the subject product originating or imported from China would likely lead to the recurrence of dumping and material injury to the SACU industry.

The Applicant submitted sufficient evidence and established a *prima facie* case to enable the Commission to arrive at a reasonable conclusion that a sunset review investigation be initiated.

On 22 September 2023, the investigation was initiated through Notice No. 2036 of 2023, which was published in *Government Gazette* No. 49325.

Subsequent to the initiation of the investigation, all known interested parties were informed, provided with the non-confidential application, and requested to respond to the relevant questionnaires.

No responses were received from any exporter/manufacturer or any SACU importer of the subject product.

Essential facts letters were issued to interested parties to allow comments on the Commission's consideration prior to it making its final determination. No comments were received from any interested party on the Commission's essential facts letters.

The Commission made a final determination that the expiry of the anti-dumping duty on unframed glass mirrors originating in or imported from China would likely lead to the recurrence of dumping and the recurrence of material injury.

The Commission made a final determination to recommend to the Minister of Trade, Industry and Competition that the current anti-dumping duty on unframed glass mirrors originating in or imported from China, be maintained as follows:

Tariff Heading/ Subheading	Description	Imported from or originating In	Rate of Anti-Dumping Dut
7009.91	Unframed glass mirrors, of a thickness of 2 mm or more but not exceeding 6 mm	China	40.22%

The Minister approved the Commission's recommendation. The Commission's detailed reasons for its final determination are set out in Report No. 728.

Enquiries may be directed to the investigating officer, Mr Busman Makakola at Bmakakola@itac.org.za or Mr Emmanuel Manamela at EManamela@itac.org.za.

BOARD NOTICES • RAADSKENNISGEWINGS

BOARD NOTICE 627 OF 2024

ENSURING THE
EXPERTISE TO GROW
SOUTH AFRICA

Code of Practice for the Performance of Aeronautical Engineering Work

R-02-COP-AER

Revision 0: 22 August 2023

ENGINEERING COUNCIL OF SOUTH AFRICA
Tel: 011 607 9500 | Fax: 011 622 9295
Email: engineer@ecsa.co.za | Website: www.ecsa.co.za

ECSA

Document No.: R-02-COP-AER	Revision No.:0	Effective Date: 22/08/2023	ECSA
Subject: Code of Practice for the Performance of Aeronautical Engineering Work			
Compiled by: Manager RPS	Approved by: Executive RPS	Next Review Date: N/A	Page 2 of 24
Date:16/01/2023	Date: 27/06/2023		

TABLE OF CONTENTS

LIST OF TABLES

DEFINITIONS

In this Code, any word or expression defined in the Act has that meaning, unless the context dictates otherwise:

Act means the Engineering Profession Act, 46 of 2000.

Aeronautical Engineer means a Professional Engineer registered in terms of 18(1)(a)(i) of the Act who has experience specifically in the 11 practice areas of Aeronautical Engineering.

Aeronautical Engineering Practitioner means an engineering graduate from either Aeronautical or Mechanical Engineering who undertakes the Aeronautical Engineering Work in the capacity of Engineer, Technologist and Technician. These persons must be registered in terms of section 18(1)(a) or section 19(2)(b) of the Act to undertake the Aeronautical Engineering Work.

Aeronautical Engineering Specialist Work means Aeronautical Engineering Work that requires training, knowledge and experience outside the normal education curriculum and beyond that which is obtained in the general practice of the profession.

Aeronautical Engineering Work means Engineering Work identified in terms of section 26 of the Act, specifically in the discipline of Aeronautical Engineering.

Candidate means a person who is registered in terms of section 19(2)(b) of the Act.

Category of registration means the categories of registration provided for in section 18(1)(a) of the Act, i.e., Professional Engineers, Professional Engineering Technologists, Professional Certificated Engineers and Professional Engineering Technicians.

Code of Conduct means the code of conduct for registered persons in terms of Act.

Competent Person means a person who has the required knowledge, training, experience and, where applicable, qualifications specific to the work or task being performed, provided that, where appropriate, qualifications and training are registered in terms of the provisions of the National Qualification Framework Act, 67 of 2008, those qualifications and that training are regarded as the required qualifications.

Document No.: R-02-COP-AER	Revision No.:0	Effective Date: 22/08/2023	ECSA
Subject: Code of Practice for the Performance of Aeronautical Engineering Work			
Compiled by: Manager RPS	Approved by: Executive RPS	Next Review Date: N/A	Page 5 of 24
Date:16/01/2023	Date: 27/06/2023		

Discipline means the disciplines of engineering as recognised by ECSA.

ECSA Council means the Engineering Council of South Africa established in terms of section 2 of the Act.

Engineering Work means the work identified means the process of applying engineering and scientific principles, concepts, contextual and engineering knowledge to the research, planning, design, implementation and management of work in both the natural and built environments in terms of section 26 of the Act.

Flight Testing means a specialised branch of aeronautical engineering that focuses on developing specialised equipment required for testing of the aircraft performance and associated systems and sub-systems in flight.

Ground testing means a series of tests carried out on the aircraft systems and sub-systems on the ground before undergoing first flight.

Identification of Engineering Work means the Identification of Engineering Work as gazetted.

Overarching Code of Practice means the Overarching Code of Practice for the Performance of Engineering Work as gazetted.

Registered Person means a person registered with the Engineering Council of South Africa in terms of the Act under one of the categories referred to in section 18.

Risk means the effect of uncertainty on the objectives of a design; it is expressed in terms of a combination of the consequences of an event and the likelihood of occurrence.

ABBREVIATIONS

CAD	Computer-aided design
CAM	Computer-aided manufacturing
CFD	Computational fluid dynamics
COP	Code of practice
CPD	Continuing professional development
DSTG	Discipline-specific Training Guide
ECSA	Engineering Council of South Africa
FEA	Finite element analysis
HMI	Human machine interface
HUMS	Health and usage monitoring system
NDT	Non-destructive testing
Pr Eng	Professional Engineer
Pr Tech Eng	Professional Engineering Technologist
Pr Techni Eng	Professional Engineering Technician
RCA	Root cause analysis
SOP	Standard operating procedure

1. INTRODUCTION

This Code of Practice has been developed by the Engineering Council of South Africa (ECSA) to supplement the Code of Conduct for Registered Persons: Engineering Profession Act, 46 of 2000.

Section 27 of the Engineering Profession Act, 46 of 2000, empowers ECSA to draw up codes of practice in addition to codes of conduct and requires all registered persons to comply with such codes. While codes of conduct regulate behaviour, codes of practice regulate engineering practice.

The Code also details the ethical values and professional standards that ECSA expects all registered persons to adhere to as prescribed under the Code of Conduct for registered persons in terms of the Act.

Section 18(1) of the Act provides for the registration of professionals and candidates in four categories of registration: Professional Engineers, Professional Engineering Technologists, Professional Engineering Technicians, Professional Certificated Engineers, and registration in Specified Categories as prescribed by Council. Section 18(2) prohibits persons so registered from practising in a category other than that in which they are registered.

In line with these requirements, this Code of Practice classifies Engineering Work in the sub-discipline of Aeronautical Engineering in terms of its complexity and stipulates the category of registration and the level of competence required for the execution of such work.

2. POLICY STATEMENT

This Code is a statement of good practice for the performance of Aeronautical Engineering Work by Registered Persons. It is applicable to the discipline of Aeronautical Engineering Profession. Section 27(3) of the Act requires Registered Persons to adhere to the requirements of this Code when they perform mechanical work.

Furthermore:

(a) It classifies Aeronautical Engineering Work according to the complexity of the problem, the nature of the environment, the methods employed, the risks involved and the consequences of failure.

(b) It sets out the level of competence required from persons registered in any of the categories of registration provided for in Section 18(1) of the Act for the performance of Aeronautical Engineering Work of varying complexities.

(c) This Code stipulates requirements for the practice of Aeronautical Engineering Work and provides a statement of recognised good practice.

(d) Where a Code, Act or Policy is referenced, the latest version thereof applies.

3. PURPOSE

The purpose of this Code of Practice is to ensure that any person undertaking Aeronautical Engineering Work meets the prescribed requirements when practising and executing Aeronautical Engineering Work within the jurisdiction of the Act. This Code also sets appropriate levels of competence regulating the execution of Aeronautical Engineering Work and specifying technical standards and best practice. Among others, this Code of Practice ensures the following:

(a) Registered persons apply their specialised knowledge within their competence and skill in accordance with all relevant legislation.

(b) All Aeronautical Engineering Work is performed by a competent person and uniform competency and conduct standards apply to all registered persons.

(c) Aeronautical Engineering Work is performed in accordance with generally accepted norms and standards of the Aeronautical Engineering profession.

(d) Registered Persons apply their specialised knowledge and skill within their respective area of competence to ensure that engineering practice is appropriate, applicable, acceptable, affordable and sustainable.

4. APPLICABLE LEGISLATIVE FRAMEWORK

Section 27 of the Act empowers the Council to draw up codes of practice in addition to codes of conduct and requires all registered persons to comply with such codes.

This Code should be read in conjunction with the following:

- Engineering Profession Act, 46 of 2000, as amended
- ECSA Code of Conduct, as amended
- Occupational Health and Safety Act, 85 of 1993, as amended
- ECSA Overarching Code of Practice for the performance of Engineering Work, as amended
- Identification of Engineering Work Regulations, as amended
- All other relevant and applicable legislation.

5. AERONAUTICAL ENGINEERING WORK

Aeronautical Engineering is that branch of engineering that deals with the design, development, build, testing, production and maintenance of all types of flight vehicles and related systems.

This type of engineering involves applied mathematics, physics, theory, knowledge and problem-solving skills to transform flight-related concepts into functioning aeronautical designs that are then built and operated.

Aeronautical Engineering Work requires a strong understanding of core areas that typically include scientific principles of flight mechanics, computational fluid dynamics, combustion and propulsion, aerospace structures, materials, mathematics and physics.

In addition, Aeronautical Engineering Professionals use tools such as computer-aided design (CAD), computer-aided manufacturing (CAM), finite element analysis (FEA), computational fluid dynamics (CFD), bespoke code, spreadsheets and first principles engineering tools and wind tunnel technologies.

Aeronautical Engineers are generally appointed in one or more of the following positions:

- Aeronautical Design Engineer
- Aeronautical Systems Engineer
- Aeronautical Certification Engineer
- Aeronautical Flight Test Engineer
- Aeronautical Research Engineer or
- Aeronautical Engineering Academic.

Aeronautical Engineering Technicians and Technologists are appointed in the roles similar to abovementioned positions at an appropriate level of complexity as prescribed in **R-05-AER- PT** and **R-05-AER-PN** respectively.

5.1 Range of Aeronautical Engineering problems and activities

For the purposes of this Code, engineering problems and activities are classified as complex, broadly defined, well-defined and specifically defined problems. The basis of the classification of engineering problems is given in the **R-02-STA-PE/PT/PCE/PN** and **R-02-STA-SC** documents, available on the ECSA website.

Aeronautical Engineering Work may, in terms of **Table 1**, be classified as work executed in one or more of the Fields/Areas in Column 2, involving one or more of the activities listed in Column 3 and making use of one or more of the Methods/Tools in Column 4. **Table 1** is a guideline and not an exhaustive list of Fields/Areas, Activities or Methods/Tools.

Table 1: Aeronautical Engineering Work

Number (Column 1)	Field/Area (Column 2)	Activities (Column 3)	Methods/Tools (Column 4)
1	Aircraft Design	• Conceptual design • Preliminary design • Detailed design	• Brainstorming • First principles engineering methods • CAD • CAM • CFD • FEA
2	Aircraft Structure	• Fabrications	• CAD

Document No.: R-02-COP-AER	Revision No.:0	Effective Date: 22/08/2023	ECSA
Subject: Code of Practice for the Performance of Aeronautical Engineering Work			
Compiled by: Manager RPS Date:16/01/2023	Approved by: Executive RPS Date: 27/06/2023	Next Review Date: N/A	Page **11** of **24**

Number (Column 1)	Field/Area (Column 2)	Activities (Column 3)	Methods/Tools (Column 4)
		• Re-engineering • Repairs • Modifications	• CAM • First principles analysis • NDT • Fabrication tools • FEA
3	Aircraft Propulsion Systems	• Design • Re-engineering • Upgrade and optimisation • Repairs • Manufacture • Modifications	• CAD • CAM • FEA • CFD • NDT • First principles analysis • Heat transfer analysis • Rotor dynamics • Materials selection and development • Manufacturing simulations
4	Aerodynamics	• Aircraft design • Airfoil selection • Drag reduction	• Wind tunnel testing • CFD • First principles analysis
5	Avionics	• Automation of avionics control • Re-engineer obsolete systems • Software optimisation and upgrade • Fabrication	• Analysis of control response • Ergonomic analysis • Flight and ground testing • Simulators • Hardware in the loop ground test
6	Aeroelasticity	• Flutter analysis and testing	• Structural response analysis • Ground vibration testing • Wind tunnel testing • Flight testing
7	Stability and Control	• Control optimisation	• Wind tunnel testing

Document No.: R-02-COP-AER	Revision No.:0	Effective Date: 22/08/2023	ECSA
Subject: Code of Practice for the Performance of Aeronautical Engineering Work			
Compiled by: Manager RPS	Approved by: Executive RPS	Next Review Date: N/A	Page 12 of 24
Date:16/01/2023	Date: 27/06/2023		

Number (Column 1)	Field/Area (Column 2)	Activities (Column 3)	Methods/Tools (Column 4)
		• Wings and winglets re-engineering • Structural re-design • Stabilisation of hydraulic control	• Flight testing • Hardware in the loop • Simulators
8	Aircraft systems (hydraulic, pneumatic and avionics)	• Response time optimisation • Automate auxiliary hydraulic and pneumatic control systems	• Flight testing • Ground testing • Test bench systems
9	Wind-tunnel testing	• Aerodynamic characterisation • Measurement of aerodynamic coefficients • Airflow optimisation • Flow visualisation • Flutter testing • Force and pressure measurements • Aerodynamic damping tests	• Wind tunnels • Balances • Various visualisation techniques, including tufts, oil flow, particle image velocimetry etc • Various • Static and dynamic force measurement • Dynamic test rigs
10	Flight Test Engineering	• Testing Criteria • Ground Testing • Flight Testing	• Ground and flight test techniques. • Data analysis techniques • Software programs for data reduction: Matlab, MS Excel, Python, etc.
11	Aircraft Performance Monitoring	• Fuel consumption or efficiency • Flight hours • Rate of incident • Flight data monitoring • Health and usage monitoring system (HUMS)	• Performance software • Human machine interface (HMI)

Number (Column 1)	Field/Area (Column 2)	Activities (Column 3)	Methods/Tools (Column 4)
12	Airport/Airfield management	• Scheduling and logistics • Maintenance of runways, • Lighting and other airfield components and systems. • Equipment operations and maintenance	• Airport management software • Terminal management Software for the maintenance and monitoring of assets, buildings, electrical grids, environmental systems.
13	Certification and System Safety Programmes	• Ground testing • Flight testing	• Ground and flight test techniques. • Data analysis techniques • Software programs for data reduction: Matlab, MS Excel, Python, etc.
14	Flight operations and technical support	• Scheduling and maintenance logistics	• Scheduling software
15	Research and Development	• Any of the above activities performed for the purposes of generating new, local or international knowledge and innovation	• All the above
16	Academic Teaching and Learning	• Generation of course material • Lecturing of related aeronautical topics • Supervision of student research projects	• Lectures and supervision of activities listed above

5.2 Aeronautical Engineering sub-disciplines

The Aeronautical Engineering sub-disciplines ECSA recognises are provided in the Discipline-specific Training Guides **R-05-AER-PE**, **R-05-AER-PT** and **R-05-AER-PN** for each category of registration. These can be found on the ECSA website.

5.3 Categories of registration

Aeronautical Engineering professionals' category of registration is determined by the Council in terms of Section 18(1) of the Act. The categories of registration include:

- Professional Engineer (Pr.Eng) registered in terms of Section 18(1)(a)(i) of the Act
- Professional Engineering Technologist (Pr.Tech Eng) registered in terms of Section 18(1)(a)(ii) of the Act
- Professional Engineering Technician (Pr.Techni Eng) registered in terms of Section 18(1)(a)(iv) of the Act
- Specified Category Practitioner registered in terms of Section 18(1)(c) of the Act
- A candidate registered in terms of Section 18(1)(b) of the Act.

5.4 Overlaps

The Aeronautical Engineering Practitioners must comply with respective legal requirements and the requirements of this Code of Practice when performing Aeronautical Engineering Work.

Persons registered in a particular discipline may perform Engineering Work in a different discipline if their knowledge, training, experience and applicable qualifications specifically render them competent to perform such work. Specifically in this Code, Aeronautical Engineering Practitioners must work with other engineering disciplines to ensure that confusion is minimised regarding which engineering discipline should perform certain tasks, as per Paragraph 7.3 of the **Overarching Code of Practice for Performance of Engineering Work**.

6. AERONAUTICAL ENGINEERING COMPETENCY REQUIREMENTS

The Core Competencies Required to Perform Identified Engineering work can be found in the gazetted "Identification of Engineering Work"; the General Requirements and Requirements for Registered Persons are listed in the "Overarching Code of Practice".

6.1 General requirements

(a) Any person who performs Aeronautical Engineering Work must be registered with ECSA in the appropriate professional registration category and must comply with the Act, as well as any requirement contemplated in the Act.

(b) All Aeronautical Engineering Work must be carried out by a competent Aeronautical Engineering Registered Person who is qualified by virtue of knowledge, training, experience and applicable qualifications to perform such work.

(c) All Registered Persons must confine their performance of Aeronautical Engineering Work to the areas in which they are competent, subject to the provisions of (b) above.

(d) All Registered Persons must undertake continuing professional development (CPD) or independent learning activities sufficient to maintain and extend their competence in line with current good practice in the industry.

(e) Registered Persons' competence and the nature of the work they are competent to perform should be assessed in terms of the criteria applicable to them.

6.2 Criteria for assessment of competency

The criteria for assessing competency are defined in the ECSA Competency Standard for Registration in Professional Categories as **PE/PT/PN** (**R-02-STA-PE/PT/PN**) and **R-02-STA-SC**.

6.3 Competence levels

Engineers' competency level varies depending on their level of education, experience and specialised skills. Generally, there are three levels of engineering competency, as listed in the Table 2 below.

Document No.: R-02-COP-AER	Revision No.:0	Effective Date: 22/08/2023	ECSA
Subject: Code of Practice for the Performance of Aeronautical Engineering Work			
Compiled by: Manager RPS	Approved by: Executive RPS	Next Review Date: N/A	Page 16 of 24
Date:16/01/2023	Date: 27/06/2023		

Table 2: Engineering competency levels

Competency Level	Description	Responsibility	Experience & Registration	Risk Level
Junior	Refers to recently graduated or Candidate Technicians, Technologists and Engineers. They are typically assigned routine tasks and require close supervision from more experienced Technicians, Technologists or Engineers.	Juniors are responsible for executing tasks assigned by their supervisors. They are expected to learn the basics of engineering design, analysis and testing.	• 0–3 years • Candidate	Low
Senior	Seniors have several years (at least 5 years) of experience in their field and have demonstrated proficiency in their work. They are capable of managing complex projects and providing technical guidance to junior engineers.	Senior engineering practitioners are responsible for overseeing projects from conception to completion. They are expected to analyse data, provide solutions to problems and ensure that projects are completed within budget and on time.	• 5–10 years • Pr.Eng • Pr.Tech Eng • Pr.Techni Eng	Medium
Competent	These are the most experienced engineering practitioners in a company or project team. They have extensive knowledge of their field and are responsible for managing large-scale projects.	Competent engineering practitioners are responsible for managing teams of engineers, developing project timelines and budgets, and overseeing the design and implementation of complex systems.	• More than 10 years • Pr.Eng • Pr.Tech. Eng • Pr.Techni. Eng	High

6.4 Risk analysis

Aeronautical Engineers must perform thorough risk analyses, which are crucial elements of the design process to ensure the safety of aircraft and passengers. Risk mitigation must include the structured process of:

- identifying potential hazards
- assessing their likelihood and severity
- implementing measures to reduce or eliminate them.

This process includes performing safety analyses, developing safety requirements and designing safety-critical systems. Impact mitigation involves designing aircraft systems and structures to withstand potential impacts, such as bird strikes or lightning strikes. This process includes performing impact analyses, designing structures and systems with sufficient strength and redundancy and implementing safety measures such as fire suppression and emergency response procedures.

Both risk and impact mitigation require a thorough understanding of aircraft systems, their failure modes and their potential interactions with other systems. Aeronautical engineers use advanced computer simulations, testing and analysis techniques to identify potential risks and impacts and design aircraft systems to mitigate them.

6.5 Risk levels

Aeronautical has three risk levels: low, medium and high. These risk levels are determined by the potential consequences of a failure or error in the system.

Table 3: Risk Levels

Risk Level	Scenario	Example	Impact
Low	Refers to scenarios where the consequences of a failure are minor, such as a small decrease in performance or a minor inconvenience.	A minor malfunction in an aircraft's entertainment system would be considered low risk.	• No media coverage. • Defect can be resolved without impacting operation.

Document No.: R-02-COP-AER	Revision No.:0	Effective Date: 22/08/2023	ECSA
Subject: Code of Practice for the Performance of Aeronautical Engineering Work			
Compiled by: Manager RPS	Approved by: Executive RPS	Next Review Date: N/A	Page 18 of 24
Date:16/01/2023	Date: 27/06/2023		

Risk Level	Scenario	Example	Impact
Medium	The consequences of a failure are more significant, such as an interruption in service or a loss of function.	A malfunction in the landing gear of an aircraft would be considered a medium risk.	• Trigger investigation by local aviation authority. • Defect impact operation of specific fleet or type for short period of time. • Minor penalty imposed by aviation authority. • Local media coverage.
High	The consequences of a failure are severe, such as a loss of life or catastrophic damage to the system	An engine failure just after rotation or anywhere during flight would be considered high risk.	• Grounding of airline or fleet for extended period. • Substantial impact to national and regional aviation industry. • Hefty fines and penalty imposed. • International media coverage.

It is critical to identify and assess the risk level of each situation to ensure appropriate safety measures are in place and to minimize the potential consequences of failures or errors in the system.

7. AERONAUTICAL ENGINEERING GOOD PRACTICE

7.1 General good practice

All work carried out or services rendered must be performed:

- in accordance with accepted norms and standards of Aeronautical Engineering
- in an ethical and responsible manner in accordance with the ECSA Code of Conduct
- within the area of competency with honesty, fidelity and integrity
- in accordance with all applicable legislation, Acts and standards

Prior to taking a role in Aeronautical Engineering, Aeronautical Engineering Registered Persons must ensure that they possess the competencies required to undertake the work.

Prior to undertaking any task, Aeronautical Engineering Registered Persons must ascertain and document:

- the purpose of the activities
- the approach to be used in executing the activities
- the performance requirements for the activities
- any statutory, regulatory or other requirements that may pertain to the activities.

The Aeronautical Engineering Registered Person must consider the likely variation in input parameters and the accuracy of the models or methods used in the execution of all engineering analyses.

All calculations must be independently checked, either by another suitably qualified registered person or by alternative calculation methods.

Prior to approving any work or signing any completion certificate, Aeronautical Engineering Registered Persons must ensure sufficient detailed checks or inspections to warrant such approval. Where the checks or inspections were limited in any way or carried out by a third party, the approval must be qualified accordingly.

7.2 Health, safety and environment

All Aeronautical Engineering Work must be done in accordance with the following:

- Occupational Health and Safety Act, as amended
- National Environmental Management Act, as amended
- Any other applicable legislation.

Cognisance must be taken of health and safety requirements from planning to completion of work.

The environmental impact of all Aeronautical Engineering Work should be assessed, and appropriate measures taken to minimise such impacts or to remediate areas so impacted.

Aeronautical Engineering Registered Person must involve relevant expertise when identified impacts are outside their area of expertise.

The client must be notified immediately of any condition that is observed that may compromise the health and safety of persons or the environment.

7.3 Ethical considerations

Registered Persons must comply with the ECSA Code of Conduct.

Cognisance should be taken of any potential social and cultural impacts of the Aeronautical Engineering Work on the communities within which work is conducted.

The client must be notified immediately of any condition that is observed that may result in social or cultural impacts.

7.4 Standards and codes of practice

All Aeronautical Engineering Work must be done in accordance with accepted norms and standards. Any deviation from such norms and standards must be clearly stated.

7.5 Aeronautical Engineering data

Sufficient quantitative or qualitative data is required for all Aeronautical Engineering tasks. Aeronautical Engineering Registered Persons should ensure that the data used is adequate for the intended purpose. Where this is not the case, additional data should be obtained or the work should be based on parameter values selected such that the occurrence of less favourable values is unlikely.

Data analysis should be presented in sufficient detail to allow independent assessment of the data.

7.6 Reporting

During the planning of an activity, Aeronautical Engineering Registered Persons should ascertain the purpose for which the activity is required and the nature of the proposed activity. Aeronautical Engineering Registered Persons must ensure that the proposed activity is capable of yielding the information required for that purpose.

Aeronautical Engineering Registered Persons should advise the client of the effect of any restrictions placed on the activity that are likely to adversely affect the accuracy or adequacy of the data obtained. This information may be presented as a single report or in two separate reports: a factual report and an interpretive report. All assumptions must be clearly documented together with the reason for the specific assumption.

7.7 Quality and risk management

Aeronautical Engineering Registered Persons must implement quality and risk management systems covering all aspects of their work, appropriate to the nature and size of the work.

Quality and risk management systems must be reviewed regularly. Compliance with the quality and risk management systems should be audited at least annually. Organisations undertaking Engineering Work should consider external certification, such as ISO 9001, ISO 45001 and ISO 14001.

8. ADMINISTRATION

(a) The Council is responsible for the administration of this Code, including its publication, maintenance and distribution.

(b) The Council must ensure that this Code and all amendments thereto are available on the ECSA website and must upon request, provide a copy thereof.

(c) The Council must take all reasonable steps to introduce this Code to the general public.

9. INTERPRETATION AND COMPLIANCE

9.1 Interpretation

(a) The word “must” indicates a peremptory provision.

(b) The word "should" indicates a provision directive or informative in character, requiring substantial compliance only.

9.2 Compliance

Failure to comply with a peremptory provision of this Code constitutes improper conduct in terms of the Act. Failure to comply with a directive or informative provision of this Code may constitute improper conduct in terms of the Act if its consequences are significant.

10. FURTHER INFORMATION

Further insights and information can be found in the following publications:

- Engineering Council of South Africa Code of Conduct
- Engineering Council of South Africa Overarching Code of Practice for the performance of Engineering Work.

Document No.: R-02-COP-AER	Revision No.:0	Effective Date: 22/08/2023	E C S A
Subject: Code of Practice for the Performance of Aeronautical Engineering Work			
Compiled by: Manager RPS Date:16/01/2023	Approved by: Executive RPS Date: 27/06/2023	Next Review Date: N/A	Page **23** of **24**

REVISION HISTORY

Revision no.	Revision date	Revision details	Approved by
Rev A	16 January 2023	New Document	RPS & Working Group
Rev B	02 March 2023	Incorporation of comments received from Broader Consultation	RPS & Working Group
Rev C	11 May 2023	Presentation before Steering Committee	Code of Practice Steering Committee
Rev D	24 May 2023	Updates to include additional information relating to Risk, Overlaps and Competencies	RPS & Working Group
Rev E	19 June 2023	Updates to incorporate comments from Steering Committee.	RPS & Working Group
Rev F	20 June 2023	Recommendation for approval	Code of Practice Steering Committee
Rev.0	10 July 2023	Approval	RPSC
Rev.0	22 August 2023	Ratification	Council

The Code of Practice for:

Aeronautical Engineering

Revision 0 dated 22 August 2023 consisting of 24 pages have been reviewed for adequacy by the Business Unit Manager and is approved by the Executive: Research, Policy and Standards (**RPS**).

....
Business Unit Manager

25 March 2024
Date

....
Executive: RPS

2024/04/05
Date

This definitive version of this policy is available on our website.

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QM-TEM-001 Rev 1 – ECSA Policy/Procedure

Document No.: R-02-COP-AER	Revision No.:0	Effective Date: 22/08/2023	ECSA
Subject: Code of Practice for the Performance of Aeronautical Engineering Work			
Compiled by: Manager RPS	Approved by: Executive RPS	Next Review Date: N/A	Page **24** of **24**
Date:16/01/2023	Date: 27/06/2023		

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[1] Engineering Council of South Africa. Rules of Conduct for Registered Persons Engineering Profession Act, 2000. Board Notice 256 of 2013. Government Gazette No. 37123 of 13 December 2013.

[2] Engineering Qualifications in the Higher Education Qualifications Sub-Framework E-23 P.

[3] Identification of Engineering Work Regulations, No. 44333, Government Gazette, 26 March 2021.

[4] Overarching Code of Practice for the Performance of Engineering Work, No. 44333, Government Gazette, 26 March 2021.

[5] Framework for development of ECSA Codes of Practice Revision 1: 29 January 2019.

[6] **R-02-COP-ELE:** Electrical Engineering Code of Practice

[7] **R-02-COP-IND:** Industrial Engineering Code of Practice

[8] **R-02-COP-MEC:** Mechanical Engineering Code of Practice

[9] **R-05-AER-PE**: Discipline-specific Training Guide for Registration as a Professional Engineer in Aeronautical Engineering (Section 6).

[10] **R-02-STA-PE/PT/PCE/PN**: Competency Standard for Registration in Professional Categories as **PE/PT/PCE/PN**.

BOARD NOTICE 628 OF 2024

ENSURING THE
EXPERTISE TO GROW
SOUTH AFRICA

Code of Practice for the Performance of Agricultural Engineering Work

R-02-COP-AGR

REVISION No. 0: 30 March 2023

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ECSA

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Compiled by: Manager RPS Date: 20/03/2022	Approved by: Executive RPS Date: 27/01/ 2023	Next Review Date: N/A	Page **2** of **22**

TABLE OF CONTENTS

LIST OF FIGURE

LIST OF TABLES

ABBREVIATIONS

API	American Petroleum Institute
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
BMPs	Best Management Practices
BSI	British Standards Institution
CAD	Computer-aided design
CAM	Computer-aided manufacturing
CFD	Computational fluid dynamics
CoP	Code of Practice
CPD	Continuing Professional Development
ECSA	Engineering Council of South Africa
EPA	Engineering Profession Act (Act. No. 46 of 2000)
FEA	Finite element analysis
IFE	The Institution of Fire Engineers
ISO	International Standard Organization
SANS	South African National Standards
SAE	Society of Automotive Engineers

DEFINITIONS

Act means the Engineering Profession Act, 46 of 2000 "as revised".

Code of Conduct means the Code of Conduct for Registered Persons: Engineering Profession Act, 46 of 2000, Board Notice 41 of 2017 – Government Gazette 142 No. 40691.

Competency means a combination of knowledge, training, experience and applicable qualifications that enables an individual to perform a task or an activity successfully.

Competent Person means a person who has the required knowledge, training, experience and, where applicable, qualifications specific to the work or task being performed, provided that, where appropriate, qualifications and training are registered in terms of the provisions of the National Qualification Framework Act, 67 of 2008, those qualifications and that training are regarded as the required qualifications.

Council means the Engineering Council of South Africa established by Section 2 of the Act.

Discipline means the disciplines of engineering as recognised by the Engineering Council of South Africa.

ECSA means the Engineering Council of South Africa established by Section 2 of the Act.

Agricultural Engineering Work means the process of applying engineering and scientific principles, concepts, contextual and engineering knowledge to the research, planning, design, implementation, maintenance and management of work in the natural and built environments. It includes advisory services, assessment of engineering designs and determination of the risks posed by the design on workers, the public, and the environment.

Identification of Engineering Work Regulations means the Identification of Engineering Work Regulations, Board Notice 21 of 2021, Gazette No. 44333, dated 26 March 2021, as amended.

Overarching Code of Practice means the Overarching Code of Practice for the Performance of Engineering Work, Board Notice 20 of 2021, Government Gazette No. 44333, 26 March 2021, as amended.

Practice means any engineering professional service, advisory service or creative work requiring engineering education, training and experience and the application of special knowledge of the mathematical, physical and engineering sciences, or creative work such as consultation, research, investigation, evaluation, planning, surveying, risk assessment and design, in connection with any public or private utility, structure, building, machine, equipment, process, work or project.

Practitioner (or engineering practitioner) means a person who performs engineering work or provides advisory services relating to engineering work. It includes both registered persons and unregistered persons.

Profession means Engineering Profession.

Professional Registration Category means a professional registration category as specified under Section 18(1) (a)–(c) of the Act, including Professional Engineer, Professional Engineering Technologist, Professional Certificated Engineer, Professional Engineering Technician, Candidate and Specified Category Practitioner.

Registered Person means a person registered under a category referred to in Section 18 of the Act.

Specified Categories means those registration categories classified as such by ECSA, for example, those related to fire protection systems, lifting machinery and medical equipment.

Unregistered Person means any person undertaking engineering work who is not registered in terms of the Act. This does not include persons registered by other statutory bodies and are part of teams undertaking engineering work.

1. INTRODUCTION

In terms of Section 27(1) of the Act, the Council must draw up a Code of Conduct for Registered Persons and may draw up a Code of Practice in consultation with the Council for the Built Environment, Voluntary Associations, and registered persons. The Council is also responsible for administering the Code of Conduct and the Code of Practice and ensuring that these codes are available to all members of the public at all reasonable times. An "Overarching Code of Practice for the Performance of Engineering Work" was therefore developed and published in the Government Gazette dated 26 March 2021, which further in this document is referred to as the "Overarching Code of Practice", for brevity. The Overarching Code of Practice applies to all engineering disciplines.

Respective disciplines and subdisciplines may develop their own codes of practice to complement this code, of which this Agricultural Engineering Code of Practice is an example. The Agricultural Engineering Code of Practice is specifically aimed at Agricultural Engineering and should be read in conjunction with the Overall Code of Practice and is not intended to duplicate the requirements thereof.

2. POLICY STATEMENT

This code is a statement of good practice for the performance of Agricultural Engineering work by Registered or Unregistered Persons. It is applicable to the entire Agricultural Engineering profession. Section 27(3) of the Act requires Registered Persons to adhere to the requirements of this code when they perform agricultural work.

3. PURPOSE AND SCOPE OF THIS DOCUMENT

The purpose of this Code of Practice is to ensure that any person undertaking Agricultural Engineering work meets the prescribed requirements when practicing and executing Agricultural Engineering work within the jurisdiction of the Act. This Agricultural Engineering Code of Practice describes fields of work for Agricultural Engineering, sets appropriate levels of competence, regulating the execution of Agricultural Engineering work and specifying technical standards and best practices.

This Code of Practice also applies when an Agricultural Engineering practitioner performs Agricultural Engineering work in the specified categories, such as those related to dam safety, fire protection systems, lifting machinery and medical equipment. Additional codes of practice, specific to the specified category, may also apply in these contexts.

4. APPLICABLE LEGISLATIVE FRAMEWORK

This Agricultural Engineering Code of Practice should be read in conjunction with the Act and related documents, in particular the Code of Conduct for Registered Persons, the Overarching Code of Practice, and the Identification of Engineering Work Regulations.

Section 27 of the Act empowers the Council to draw up Codes of Practice in addition to codes of conduct and requires all registered persons to comply with such codes.

5. AGRICULTURAL ENGINEERING FIELDS OF WORK

Agricultural Engineers use engineering knowledge and skills with and within the environment to connect the living world of plants, soil, water, and animals with the technology of engineering (i.e., systems, structures, and machines). They operate at the interfaces between engineering science and practice, agricultural production and processing and environmental management, as illustrated in

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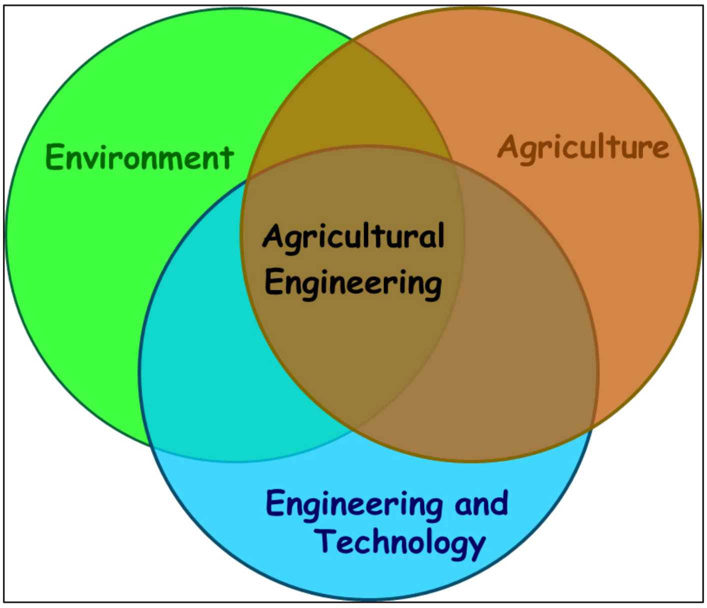

Figure 1: Focus of Agricultural Engineering

Agricultural Engineers design, develop and apply technology in the following broad fields:

- Land and water engineering
- Animal production
- Plant production
- Aquacultural engineering
- Agro-processing engineering
- Energy and biomass engineering
- Application of information technology and precision agricultural principles in agricultural production systems.

Due to the multidisciplinary nature of Agricultural Engineering, Agricultural Engineers generally practice in one or more of the following areas:

5.1 Food, Fibre and Energy Production Systems

The design, management and/or advising on technology for food, fibre and energy production systems in a highly variable and changing climate which includes the following:

- The design, sizing, selection, and management of agricultural machinery, implements and equipment for field operations (e.g., for soil preparation, planting, harvesting, storage, and transport of produce).
- The testing and evaluation of new agricultural machinery and equipment.
- The use of precision agriculture technologies (e.g., GIS, GPS, remote sensing, mechatronics) to ensure optimal and sustainable agricultural production systems which takes due consideration of the environment.
- The design and operation of transportation and logistics systems to move produce from fields to storage facilities, factories, and consumers.

5.2 Intensive Controlled Agricultural Environments

The design and management of intensive animal and plant production structures and control systems which may have controlled environments for optimal plant (e.g., greenhouses) and animal (e.g. broiler units, dairy plants, milking parlours) production. This includes hydroponics, aeroponics, aquaculture production systems and integrated agri-aquaculture systems, i.e., plant and fish production in the same controlled environment system.

5.3 Renewable Energy

The use of renewable sources of energy by the design, development of infrastructure and the application of technology to grow and utilise sustainable sources of energy (e.g. hydro, biogas, biofuels, solar, wind) and the processing of agricultural products and biomass into bio-energy (e.g. anaerobic digesters).

5.4 Agricultural Product Processing Engineering

The design and management of food processing and storage systems to add value to raw products using technology to process and preserve food and animal feed, and ensuring products are safe for human and animal consumption. This involves structures such as cold stores, pack houses, factories and processing plants for agricultural produce, including cooling, heating, dehydration and pasteurisation facilities, produce handling, processing and storage, silo facilities, fish processing plants and abattoirs.

5.5 Agricultural Infrastructure Engineering

The design, construction, operation, repairs and maintenance of agricultural structures and infrastructure (e.g., farm buildings, farm roads, minor river crossings and bridges, animal handling facilities, waste handling and management facilities, spray races and dips), including the determination and specification of construction methods, materials and quality standards and construction supervision.

5.6 Agricultural Mechanisation Engineering

Design, manufacture, manage and advise on power and energy systems for agricultural production, including design, sizing, selection and management of agricultural machinery and equipment (e.g. engines, motors, pumps, fans, pipes), testing and evaluating new agricultural machinery and equipment.

5.7 Irrigation and Drainage Engineering and Management

The design, manufacture, testing and evaluation, and management of irrigation systems to meet crop water requirements and irrigate plants efficiently to obtain optimal yield per unit of water applied, including the design and installation of surface and subsurface drainage systems for land conservation, limiting soil erosion and promoting sustainable optimal crop production.

5.8 Hydrology and Agricultural Water Use Management

The design and management of agricultural and rural water resource systems, including the design of dams, canals, boreholes, extraction works and pipe networks for water supply to agriculture and humans, the assessment of the availability of water resources to meet demands for water in a highly variable climate in South Africa, the management of water resources by reconciling demands for water with the available supplies, the design of soil and water conservation systems to control runoff and thus minimise erosion and maximise agricultural production, and by sustaining the environment by minimising any negative impacts of agricultural practices.

5.9 Food and Fibre Process Engineering

The design and management of food and fibre processing and storage systems to add value to raw products by the use of technology to preserve and process food and animal feed, and ensuring products are safe for human consumption (e.g. structures, cold stores, pack houses, factories and plants for agricultural produce value addition, cooling, heating, dehydration and pasteurisation facilities, grain handling, storage and silo facilities, fish processing plants, abattoirs, marketing structures).

5.10 Handling and Management of Agricultural Waste

The design, construction and management of effluent and waste from both intensive animal production (e.g., dairies, piggeries, broilers) and processing facilities (e.g. abattoirs) and plant/crop-based processing facilities (e.g. residues and wastewater) required to cycle nutrients and to minimise any impact on the environment.

5.11 Natural Resources and Environmental Engineering

This involves applying engineering principles to conserve, sustain and, if necessary, regenerate natural functioning in the environment which is impacted by agricultural production practices. This includes the design of structures and systems for wetlands protection, water supply structures such as dams and reservoirs, surface runoff management and control, subsurface drains where necessary, design of erosion control structures, and the design and management of pesticide and nutrient runoff and treatment systems to improve the quality of runoff.

5.12 Education & Training

Registered persons in the Education and training sector present lectures, tutorials & seminars on theoretical topics associated with agricultural engineering. They run practicals and projects that illustrate implementation of the theory, They also evaluate understanding and comprehension of material presented.

5.13 Reference to the Overarching Code of Practice

Please also refer to the Overarching Code of Practice for an overarching description of the nature of engineering work, the range of engineering problems and engineering activities and the categories of registration; and to the **Identification of Engineering Work Rules** for "Identified engineering work", "Category Differentiation and Engineering Activities" and "Identified Engineering Work in Agricultural Engineering Discipline".

6. COMPETENCY REQUIREMENTS OF AGRICULTURAL ENGINEERING PRACTITIONERS

The Overarching Code of Practice for “General Requirements" and "Requirements for Registered Persons"; and the Identification of Engineering Work Regulations stipulates the "Core Competencies Required to Perform Identified Engineering Work".

Any person who performs any Agricultural Engineering work must comply with the Engineering Profession Act. An Agricultural Engineering practitioner should be registered with ECSA in the appropriate professional registration category applicable to the level of service performed. An Agricultural Engineering practitioner should possess the necessary core competency in the applicable field to perform such core service as a professional engineer, professional engineering technologist or professional engineering technician.

Agricultural Engineering practitioners, depending on their tertiary education, training and experience, category of registration and recognition by the profession, generally function at one of two distinct levels. The Levels 1 to 2 of competence required for Agricultural Engineering practitioners, and a career path to achieving these levels, are indicated in **Figure 6.1**.

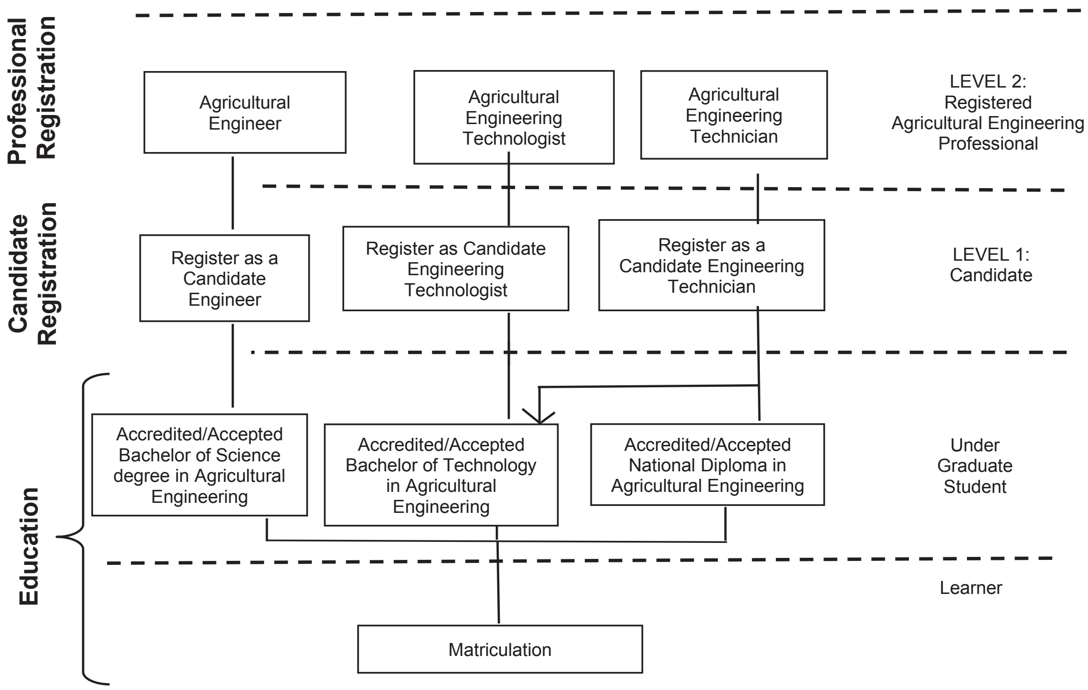

Figure 6.1:The Competence Levels of Agricultural Engineering Practitioners

Depending on the tertiary education, training and experience, category of registration and recognition by the profession, Agricultural Engineering practitioners function at one of two distinct levels as indicated in **Table 1**. The level of practitioner assuming responsibility for engineering solutions and the design is linked to the category of risk. The risk may include (where appropriate) risk to the health and safety of people and society, the natural and built environment, property, financial interests and related project timescales.

Table 1. Competence levels of Agricultural Engineering practice

Level	Designation	Typical characteristics of the practitioner
1	Candidate Agricultural Engineer	The practitioner shall have the required tertiary education qualification in Agricultural Engineering. The practitioner shall work under the supervision and control of an appropriately registered professional.
2	Registered Agricultural Engineering professional	The practitioner shall be registered with the Engineering Council of South Africa as a Professional Engineer or Professional Engineering Technologist or Professional Engineering Technician in the Agricultural Engineering discipline. The registered professional shall possess a level of knowledge and experience in keeping with the norms of the profession.

6.1 Practicing within Level of Competence

All Agricultural Engineering practitioners shall execute Agricultural Engineering work and they shall conduct work within their area and level of competence.

6.2 Continuing Professional Development

Competence may be developed through a combination of knowledge and understanding, generally acquired through educational programmes, Continuing Professional Development (CPD) and experience. Agricultural Engineering practitioners shall continue to continuously develop their knowledge, skills and expertise according to ECSA's Standard for Continuing Professional Development (**ECPD-01-STA**).

7. AGRICULTURAL ENGINEERING GOOD PRACTICE

7.1 Minimum Practice Requirements

All work shall be carried out or services rendered shall be:

- in accordance with the requirements of the applicable Acts and regulations;
- in an ethical and responsible manner in accordance with the Code of Conduct;
- in accordance with accepted norms and standards in the industry;
- within the practitioner's area of competency.

7.2 Agricultural Engineering Design

For the fields of work summarized in section 5 above, Agricultural Engineering design combines the use of principles and elements from various engineering disciplines and natural and animal sciences to provide sustainable engineering solutions for living and life-giving resources in such a way as to protect and preserve them. In Agricultural Engineering, a "system" is implied to be an element of civil, mechanical, electrical, and electronic engineering systems or a combination of these to form a multidisciplinary system. A system may include natural resources, devices, equipment, machinery, processes, services, structures, and software.

Prior to undertaking the design of a system, the Agriculture Engineering practitioner shall ascertain and document:

- current knowledge and state of practice of the problem to be solved;
- the use to which the system is to be put;
- the bounds of the system, including delineating the bounds of responsibility of the practitioner;
- the actions (loads, displacements, environmental controls, operating conditions, etc.) to be exerted on the system under normal and permissible limits or tolerances;
- the expected performance levels and constraints for the system under normal and permissible limits;
- the conditions under which the system is to be operated; and

- all relevant statutory, regulatory, or other requirements that may pertain to the system as listed in section 7.6, including Occupational Health and Safety issues related to the construction and operation of the system.

When designing a system, prudent engineering principles shall be followed, emphasising efficiency, flexibility, maintainability, safety, and reliability in an economical and environmentally responsible and sustainable manner.

A design document should record the application of the overall design principles to the system. At a minimum, the design document shall provide the following information:

- Principles used and assumptions made in the design;
- Acts and regulations, codes, standards, considered and applied in the design;
- Design criteria applied;
- Selection criteria, which may include operating conditions, materials, geometries, etc.;
- Descriptions of analyses performed and their relevant results, such as system performance, capacity and life; and
- Strategies selected for relevant system life cycle stages, such as commissioning, operation, maintenance, support, and decommissioning;
- Instructions for operation, maintenance, support, etc., should be appended to the design document.

All design calculations shall be verified independently by a suitably qualified person.

7.3 Design Drawings

The design drawings shall be prepared in accordance with accepted industry standards such as SANS, ANSI, ASAE/ASABE, ISO, BSI or ASME. It is the duty of the responsible Agricultural Engineering practitioner to ensure that the drawings are complete, accurate, unambiguous, and clear. A responsible registered Agricultural Engineering (i.e. Level ≥ 2) practitioner shall approve all design drawings of agricultural engineering solutions. Engineering drawings record design decisions and shall form part of a design document for Agricultural Engineering work.

The design drawing shall include the following:

- Name and signature of the responsible registered Agricultural Engineering practitioner;
- Name and address of the Agricultural Engineering consulting firm, government department or private company responsible for the design.
- All symbols and units used shall be consistent with the symbols used in the code of practice or the standard used in the design.

7.4 Retention of Project Documents

Retention of documents such as calculations, design notes, construction documents/drawings or reports must be kept for a minimum of 10 years, as required by the Code of Conduct, or for a more extended period mandated by an Act or regulation, applicable in the context after commissioning the project. The documents shall be kept in an appropriately secured paper, digital or electronic format and shall be accessible for the required period. The Agricultural Engineering practitioner must take reasonable safe-keeping measures such as keeping offsite and cloud backups of the documents.

7.5 Due Diligence

The Engineering Management Institute1 defines due diligence as follows:

> "*By definition, due diligence is any number of concepts or processes involving an investigation of a design, engineering calculation, contract, or some other item where a certain standard of*

[1] Engineering Management Institute. 2011. Due diligence in your life. [Accessed: 13 February 2022]

care is needed".

In the engineering practice context, due diligence is the requirement that an engineering practitioner takes all reasonable steps to protect the interests of all parties and resources that might be affected by his/her actions or inaction before an incident occurs.

Agricultural Engineering practitioners shall apply due diligence and comply with the competence levels and responsibilities detailed in Table 6.1 and be able to demonstrate that they have:

- identified all actual or potential hazards to the interests of the client, employer or public associated with the work;
- assessed the risk to the interests of all affected parties associated with the identified hazards;
- taken steps to control or reduce the identified hazards and risks; and
- communicated the risks to all affected parties.

7.6 Compliance with Acts, Regulations and Legislation

Agricultural Engineering practitioners shall ensure compliance with the following Acts and legislation:

- Occupational Health and Safety Act (Act 85 of 1993)
- Engineering Profession Act (Act No. 46 of 2000)
- National Water Act (Act No. 36 of 1998)
- Water Services Act (Act No. 108 of 1997)
- National Building Regulations and Building Standards Act 103 of 1997
- National Environment Management Act 107 of 1998

- Agricultural Legislation covering the following Acts, among others, as the case may be:
  - Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
  - Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947)
  - Abattoir Hygiene Act, 1992 (Act no. 121 of 1992)
  - Conservation of Agricultural Resources Act, 1983 (act no. 43 of 1983) (provincial)
  - Fencing Act, 1963 (Act No. 31 of 1963)

7.7 Application of Codes and/or Standards

All Agricultural Engineering work must be carried out in accordance with the norms and standards of the discipline. These norms and standards include the Agricultural Engineering national and international standards, industry standards, codes of practice and best management practices (BMPs).

As an accepted industry norm, standards and codes shall be applied as and when required by government regulation, customers, or end-user requirements. The Agricultural Engineering practitioner must ensure that all standards and codes used abide by the applicable Acts and regulations. Standards and codes may be used in place of regulations where it can be proven that the requirements of the standard or code meet and/or exceed those prescribed by regulations and/or law. Any deviations from the standards or codes requested by the customer or end-user shall be communicated to the appropriate stakeholders, supported by evidence that the deviation will not compromise the performance and safety of the system, structure or device.

Various local and international professional and regulatory bodies are recognised and accepted within the industry that develops and publishes standards, norms and guidelines related to Agricultural Engineering, notably:

- SAIAE – South African Institute of Agricultural Engineers
- SABI – South-African Irrigation Institute
- ASABE – American Society of Agricultural and Biological Engineers
- CIGR – International Commission of Agricultural and Biosystems Engineering
- SANS – South African National Standards
- ASME – American Society of Mechanical Engineers
- ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers
- ISO – International Standard Organization
- SAE – Society of Automotive Engineers
- ASTM International - American Society for Testing and Material

8. ADMINISTRATION

This Code of Practice is subject to revision by the Council from time-to-time, in consultation with the Council for the Built Environment, Voluntary Associations and Registered Persons.

The Council is responsible for administering this Code of Practice (CoP) and must ensure that the latest version of the code is posted on the Council's website.

REVISION HISTORY

Revision Number	Revision Date	Revision Details	Approved By
Rev 0. Draft A	20 March 2022	Proposed by the working group to ECSA	Working Group
Rev0. Draft B	11 May 2022	Steering Committee Draft	Steering Committee
Rev0. Draft C	08 August 2022	Broader Consultation draft	Working Group
Rev.0 Draft D	09 September 2022	Incorporation of comments received from Broader consultation	Working Group
Rev.0 Draft E	26 January 2023	Steering Committee recommendation to submit to RPSC for approval	Steering Committee
Rev 0.	14 February 2023	Approval by RPSC	RPSC
Rev 0.	30 March 2023	Ratification	Council

The Code of Practice for:

Agricultural Engineering

Revision 0 dated 30 March 2023 and consisting of 22 pages reviewed for adequacy by the Business Unit Manager and approved by the Executive: Research, Policy and Standards (**RPS**).

.... 14 April 2023 ....

Business Unit Manager Date

.... 2023/04/14 ....

Executive: RPS Date

This definitive version of this policy is available on our website

BOARD NOTICE 629 OF 2024

ENSURING THE
EXPERTISE TO GROW
SOUTH AFRICA

Code of Practice for the Performance of Chemical Engineering Work

R-02-COP-CHE

REVISION No. 0: 30 March 2023

ENGINEERING COUNCIL OF SOUTH AFRICA
Tel: 011 6079500 | Fax: 011 6229295
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ECSA

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

DEFINITIONS

Act means the Engineering Profession Act, 46 of 2000 "as revised".

Code of Conduct means the Code of Conduct for Registered Persons: Engineering Profession Act, 46 of 2000.

Competency means a combination of knowledge, training, experience and applicable qualifications that enables an individual to perform a task or an activity successfully.

Council means the Engineering Council of South Africa established by Section 2 of the Act.

Discipline means the disciplines of engineering as recognised by the Engineering Council of South Africa.

Engineering Work means the process of applying engineering and scientific principles, concepts, contextual and engineering knowledge to the research, planning, design, implementation, maintenance and management of work in the natural and built environments. It includes advisory services, assessment of engineering designs and determination of the risks posed by the design on workers, the public, and the environment.

Identification of Engineering Work means the Identification of Engineering Work as gazetted.

Overarching Code of Practice means the Overarching Code of Practice for the Performance of Engineering Work as gazetted

Practice means any engineering professional service, advisory service or creative work requiring engineering education, training and experience and the application of special knowledge of the mathematical, physical and engineering sciences, or creative work such as consultation, research, investigation, evaluation, planning, surveying, risk assessment and design, in connection with any public or private utility, structure, building, machine, equipment, process, work or project.

Profession means Engineering Profession.

Registration Category means a professional registration category as specified under Section 18(1) (a)–(c) of the Act, including Professional Engineer, Professional Engineering Technologist, Professional Certificated Engineer, Professional Engineering Technician, Candidate and Specified Category Practitioner.

Registered Person means a person registered under a category referred to in Section 18 of the Act.

Specified Category means those registration categories classified as such by ECSA, for example those related to fire protection systems, lifting machinery and medical equipment.

Specified Category Practitioner means a person registered in terms of section 18(1)(c) of the Engineering Profession Act, carrying out specifically defined engineering activities.

Unregistered Person means any person undertaking engineering work who is not registered in terms of the Act. This does not include persons registered by other statutory bodies and are part of teams undertaking engineering work.

ABBREVIATIONS

ANSI	American National Standards Institute
BSI	British Standards Institution
CAD	Computer-aided design
CFD	Computational fluid dynamics
CoP	Code of Practice
ECSA	Engineering Council of South Africa
FIDIC	International Federation of Consulting Engineers
IChemE	Institution of Chemical Engineers
ISO	International Standard Organization
OEM	Original Equipment Manufacturer
PMI	Project Management Institute
SANS	South African National Standards
SCADA	Supervisory control and data acquisition

1. INTRODUCTION

In terms of Section 27(1) of the Act, the Council must draw up a Code of Conduct for Registered Persons and may draw up a Code of Practice (CoP) in consultation with the Council for the Built Environment, Voluntary Associations and registered persons. The Council is also responsible for administering the Code of Conduct and the CoP and ensuring that these codes are available to all members of the public at all reasonable times. An "Overarching Code of Practice for the Performance of Engineering Work" was therefore developed and published in the Government Gazette dated 26 March 2021, which further in this document is referred to as the "Overarching Code of Practice", for brevity. The Overarching CoP applies to all engineering disciplines.

Respective disciplines and sub-disciplines may develop their own codes of practice to complement this code, of which this Chemical Engineering CoP is an example. The Chemical Engineering CoP is specifically aimed at Chemical and Process Engineering and gives more detail to the summary provided in the Gazetted Identification of Engineering Work and the Overarching Code of Engineering Practice. It shall be noted that Chemical Engineering and Process Engineering are used interchangeably.

2. POLICY STATEMENT

This Code is a statement of good practice for the performance of chemical engineering work by Registered persons. It is applicable to the entire chemical engineering profession. Section 27(3) of the Act requires Registered Persons to adhere to the requirements of this Code when they perform chemical engineering work.

3. PURPOSE AND SCOPE OF DOCUMENT

The purpose of this Code is to ensure that any person undertaking chemical engineering work meets the prescribed requirements when practicing and executing chemical engineering work within the jurisdiction of the Act. This Code sets appropriate levels of competence, regulating the execution of chemical engineering work and specifying technical standards and best practices.

4. APPLICABLE LEGISLATIVE FRAMEWORK

Section 27 of the Act empowers the Council to draw up Codes of Practice in addition to codes of conduct and requires all registered persons to comply with such codes.

This Code should be read in conjunction with the Act and related documents, in particular the Code of Conduct for Registered Persons, the **Overarching Code of Practice, the ECSA Discipline-Specific guidelines on Chemical Engineering** and the gazetted **Identification of Engineering Work**.

5. CHEMICAL ENGINEERING WORK

Chemical Engineering involves the planning, design, research, development, operation and maintenance of processes to convert and /or extract raw and recycled materials to products through chemical, bio-chemical and physical processes from laboratory scale to industrial scale.

Chemical engineering science or fundamentals derived from thermodynamics, fluid mechanics, energy and material transfer principles are essential in being able to successfully do the above. The chemical engineering discipline is applied in a broad range of areas including but not limited to the following:

a) Health, Safety and Environmental Management
b) Reaction kinetics, reaction and catalysis engineering
c) Water and Wastewater treatment (potable, domestic, municipal and industrial)
d) Advanced process control
e) Process modelling and simulation
f) Extractive metallurgy including pyrometallurgy, hydrometallurgy and minerals processing
g) Biochemical process engineering
h) Waste (Gas, Effluent and Solid) treatment and beneficiation
i) Process integration and intensification
j) Energy generation and consumption processes
k) Design and operation of transfer processes
l) Gas, fluid and solids flow in processes
m) Design and operation of piping and pumping systems
n) Commissioning and decommissioning of process plants including (LCA, EIA, etc)
o) Software development and commercialisation
p) Trouble-shooting operations

Table 1: Engineering Work for Chemical Engineers

Area/Field	Activity	Methods and Tools
Research/ Development	• Identify areas/topics to research/develop • Examine the literature • Develop an hypothesis • Test the hypothesis – experimentally or by computer modelling • Present the finding of the research in papers published in journals & conferences	• Access to libraries, journals, texts and experts • Bench scale laboratories & equipment • Pilot plant scale laboratories & equipment • Simulation packages • CFD • Access to workshop skills

Area/Field	Activity	Methods and Tools
	• Explore scale up of equipment from bench scale to pilot scale • If needed, scale up pilot plant to demonstration scale plant	
Process and Equipment Design	• Identify different process technologies for a required application • Evaluate the technologies to make an optimum choice • Develop block process flow diagrams for the chosen process route (technology) • More detailed Flow sheeting basing on the process block diagrams • Develop process Piping and Instrumentation Diagrams (P&IDs) • Carry out mass and energy balances for the required process per the P&ID • From the mass and energy balances, and the P&ID, determine the equipment sizes (based on projected throughput of the system as well as industry standards for quality and vessel standard sizes) • Develop the control philosophy of the plant • Determine material of construction for the vessels (informed by the process material characteristics, , MSDSs and other sources) • Develop 3-D models for the Plant configuration and Facility layout for optimisation of space • Evaluate the safety requirements for the plant • Develop Operation and Maintenance Manuals for the plant (in liaison with other disciplines) • Evaluate the cost of the plant (from design to installation, involving other disciplines and OEMs)	• Journals • Industry magazines • OEM articles • National Standards applicable for the final product specifications (e.g SANS 241 for drinking water, EMA for emissions) • Equipment and piping design codes & standards • Costing (economic evaluation of choices) • Microsoft Visio • Bentley Process Design (Microstation) • ChemCAD • AutoCAD • Solid Works • Excel • Various process-specific simulation software packages e.g Biowin- for Waste Water Plant Design; WaterPro for Potable Water plant design, JKSimet for mineral process plant design; WADISO for liquid conveying network hydraulic system modelling) • Industry Standards for vessel sizes (e.g ratios of dimensions, standard aspect ratios etc) • OEM standards for vessel sizes • Material Safety Data Sheets (MSDS) • HAZOP and HAZAN • LOPA • Other Plant Safety evaluation tools

Area/Field	Activity	Methods and Tools
		• OHSAct guidelines (e.g Pressure Equipment Regulations et al) • OEM data books for vessels etc • Plant costing software (where applicable)
Process Safety Engineering (Risk & Impact mitigation)	• Comply with Occupational Health & Safety Act • Develop and implement a Process Safety Management system and a Risk management plan • Ensure risk analysis is carried out on all new projects, revamps, modifications and repairs	• Process safety management software & skills to enable: ○ HAZOP/HAZAN/LOPA analysis ○ Process simulation ○ Major Hazardous Installation Regulations.
Engineering Project Management and Contract Management	• Where a process plant and design is done inhouse and the implementation of the design is to be done by external contractors/plant and equipment vendors/installers, the Chemical Engineer gets involved in developing the design and the contractual conditions for a tender document to advertise the project to the market (to receive bids for the project implementation) • Evaluation of received bids in liaison with other disciplines (like legal, Supply Chain Management) ensure sound Memoranda of Agreement (MOAs) are developed to manage contractual implementation of the project • Developing a project programme for the implementation of Engineering project e.g new plant design and construction project or project for the modification of an existing plant installation /facility) through identification of the different scope activities and sequencing plus timelines- normally this will be a multi-disciplinary process	• MS Projects • Primavera • SAP Project Portfolio Management (SAP PPM) • General Conditions of Contract (GCC) • PMI Project Management Book of Knowledge (PMBOK) • FIDIC Conditions of Contract (Short Form of Contract; Design-Build; Design-Build-Operate-Transfer; Design-Build-Operate) • NEC conditions of Contract • IChemE Forms of Contract • Best Practice Contract Management Guidelines • Excel • MS Word • PowerPoint Presentation

Area/Field	Activity	Methods and Tools
	• Overseeing the implementation of the project e.g process plant construction or facility construction by ensuring that the process and equipment design specification is adhered to by the construction contractor • Monitoring project costs and variations • Ensuring Safety compliance (normally in liaison with a Health & Safety specialist depending on the safety-complexity of the project- or Chemical Engineer may ~~save~~ serve as the custodian of the health and safety aspects for a hazardous chemical installation) • Ensuring adherence to the Conditions of Contract governing the project (e.g contract penalties where applicable on plant construction contractor; ensuring project gets executed on time; making determinations where there may be contractual disputes or need for interpretation on the provisions of the contract governing the implementation of the project • Chairing the project Contract progress meetings with contractors involved in the project • Resolving any logistical matters that may arise during the implementation of the project • Being the interface between the project sponsor and the contractor for in-house and externally funded or developed project; Issuing out contractual correspondence.	
Implementation/ Commissioning	• Developing the project/plant commissioning Checklist • On completion of plant installation, a Chemical Engineer is part of the plant unit operation-by-unit operation	• Excel • OEM manuals • MS Word • SCADA • Data analytic tools

CONTINUES ON PAGE 130 OF BOOK 2

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PART 2 OF 3

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Area/Field	Activity	Methods and Tools
	Testing followed by full plant start-up and ramping up of operations ● Reviewing the commissioning outcome vs the initial Operation and Maintenance Manual Description and Updating the manual were relevant taking into account the outcome of the commissioning and plant control fine-tuning ● Reviewing the commissioning outcome vs the original plant design performance specification and fine-tuning the plant settings until it operates within acceptable tolerances including any reviews to the control philosophy ● Generating any snag lists for the contractor (where the new installation was done by an external contractor) to rectify following the commissioning process ● Training of operations teams and developing any necessary troubleshooting routines and standard operating procedures (SOP) for the operations teams before handover of plant ● Handing over a fully functional operating plant/installation to the operations teams ● Monitor the performance of the plant for a set period to address any teething problems that might arise.	● Plant/System Operator involvement and engagement
Production, Operations & Maintenance	● Manage the day-to-day operation of production facilities including: ● People management ○ Leading, organizing & control ● Planning & forecasting ● Financial management ● Maintenance planning, scheduling & oversight ● Risk management ● Technology management	● Planning methodologies & tools (operational & maintenance) ● Decision-making tools ● Balanced scorecard ● Benchmarking ● Data analytics ● Employee engagement process ● Communication management ● Customer Relationship management

Area/Field	Activity	Methods and Tools
Process Analysis and Optimisation	• Identifying the system challenges, investigating them and developing solutions(troubleshooting) • Structured approach to the problem-solving process • Looking at the root-cause of problems and not the symptoms (Root Cause Analysis) • The above activities can be at a typical process plant level or at a high level within organisations, allowing Chemical Engineering to find roles and input in what may ordinarily at face value appear not to be Chemical Engineering roles in the world of business e.g Business Process Analysis, Business Process re-engineering, Operations Management in non-plant operating environments, Logistics Management, Planning, Enterprise Resource Management development	• Statistical Data Analysis tools • Six Sigma • Operations Research Tools • Queuing theory systems • Just-in-time • 5-Ws and One H • 5-Ys • Fishbone diagrams • Process analysis
Education & Training	• Present lectures, tutorials & seminars on theoretical topics associated with chemical engineering • Run practicals and projects that illustrate implementation of the theory • Evaluate understanding and comprehension of material presented	• Lecture theatres, seminar rooms • Laboratories • Pilot plant or mini scale equipment • Plant visits • Vacation experience • Remote online Webinars and instruction

6. COMPETENCY REQUIREMENTS

Competency may be defined as the ability and capacity to successfully execute specific work or tasks having the relevant tertiary education, training, knowledge, experience and expertise.

Engineering work referred to in this section shall imply chemical/process engineering or work within this discipline of engineering.

6.1 Requirements for Registered Persons

a) Registered Persons must comply with the provisions of the Act.

b) Registered Persons must demonstrate competence in accordance with the latest revision of the applicable ECSA Competency Standards. The applicable competency standards are:

- Competency Standard for Registration in Professional Categories as **PE/PT/PN R-02-STA-PE/PT/PN.**
- Specified Category Practitioner: Competency Standard for Registration in a Specific Category **R-02-SC**.

c) Registered Persons may not undertake Engineering Work involving engineering problems and/or engineering activities more complex than those applicable to their category of registration as set out in the above referenced competency standards.

d) Engineering Work performed by a person who is registered in the category of Candidate must be carried out under the supervision and control of a Registered Person in accordance with the provision of clause 6.5.

e) Registered Persons must comply with the Council's CPD requirements.

6.2 General requirements

a) All Engineering Work must be carried out by a competent engineering practitioner who is qualified by virtue of knowledge, training, experience, expertise and applicable qualifications to perform such work (relevant to the category of registration).

b) Chemical engineering practitioners shall perform duties within the scope of the relevant category of registration as stipulated in the Government Gazette No 44333, 26 March 2021, and as read together with this discipline-specific Chemical Engineering CoP.

c) All Practitioners must confine their performance of Engineering Work to the disciplines in which they are competent and / or registered by the Council, subject to the provisions of (a) above.

d) Practitioners' competence and the nature of the work they are competent to perform should be assessed in terms of the criteria applicable to Registered Persons.

e) When discharging their professional duties, all Practitioners must act with competence , due diligence, and integrity, in the public interest, and must exercise all reasonable professional ethics, skill and care.

f) All Practitioners must take all reasonable steps to ensure that persons working under their authority are both suitably equipped and competent to carry out the tasks assigned to them and must accept responsibility for work carried out under their supervision.

g) All Practitioners must undertake continuing professional development (CPD) or independent learning activities sufficient to maintain and extend their competence in line with current good practice in the industry and keep adequate records of professional development undertaken.

h) All Practitioners must encourage others to advance their learning and competence.

i) All Practitioners must give due weight to facts, published standards and guidance relevant to the profession and the wider public interest.

j) All Practitioners must ensure their work is lawful and justified.

k) ECSA may publish Guidance Notes and Policies to Practitioners from time to time containing advice as to specific conduct which is to be regarded as proper or improper as the case may be. Such notes shall be deemed to be part of this CoP. In the event of any conflict between this CoP and any such Guidance Notes and Policies, this CoP takes priority.

l) On attaining professional registration status with ECSA, all Practitioners agree to abide by this CoP. Practitioners re-affirm their commitment to this Code annually by maintaining their Professional Registration.

m) This Code is made and published as required under the By-laws of ECSA. All Practitioners must read and interpret it in accordance with those By-laws.

6.3 Confidentiality

a) All Practitioners must observe the proper duties of confidentiality owed to appropriate parties and must respect and protect personal information and intellectual property.

b) All Practitioners may have access to confidential personal information and are required to comply with the data protection legislation (POPIA). Practitioners may not disclose this information to any third party, other than in accordance with the law. This may include the "Protection of State Information Bill" (as amended). Failure to comply with these requirements will lead to disciplinary action under this Code and/ or subject to legal sanction.

c) Practitioners must ensure the security of personal information that they may handle.

d) Practitioners must comply with all legal or ECSA requirements regarding the use of ECSA's trademarks, goodwill, logos, corporate identity or other intellectual property (whether registered or unregistered).

e) Practitioners have a duty to declare any actual or perceived conflicts of interest and to report any unsafe, dangerous situations or practices and any malpractice observed.

f) All situational analyses should be based on objective judgment and sound scientific evidence.

g) All practitioners, when using any forms of the media, should do so responsibly and be prepared to defend their position and ensure that they do not bring the position of a member or the SAIChE/ ECSA into disrepute.

h) All transactions to be done with due diligence and transparency.

6.4 Overlaps

a) Persons registered in a particular discipline may perform Engineering Work in a different discipline if their knowledge, training, experience and applicable qualifications specifically render them competent to perform such work and subject to the expressed permission of ECSA.

b) Persons registered as professionals under a Professions' Act other than the Engineering Profession Act may not perform Engineering Work even if their knowledge, training, experience and applicable qualifications specifically render them competent to perform such work without the expressed permission of ECSA.

c) Chemical engineering has a bearing on many activities of industry and even commerce and hence there may be no clearly defined boundaries. In such cases the experienced and appropriately registered engineer would recognize the competencies required and hence act appropriately.

The Overarching Code of Practice for Engineering Work must be consulted when any overlap occurs.

6.5 Levels of competencies and relevant types of Work

The competencies of chemical engineering practitioners depend on the following:

- Tertiary education
- Training
- Experience and expertise
- Reputation and recognition in the profession
- category of professional registration

Document No.: R-02-COP-CHE	Revision No.: 0	Effective Date: 30/03/2023	ECSA
Subject: Code of Practice for the Performance of Chemical Engineering Work			
Compiled by: Manager RPS Date:27/09/2023	Approved by: Executive RPS Date: 27/01/2023	Next Review Date: N/A	Page **19** of **26**

Table 2: Risk based two levels of Competency for Chemical Engineering Practitioners:

Level of Competency	Registration Category	Qualities of Practitioner	Risk of Work Done
1	Candidate	Possess tertiary educational qualification(s) in Chemical Engineering. Works under supervision or mentorship of a person/Person(s) who meet(s) the stipulated level of Competency for the work. (Gov. Gazette No:44333, March 2021)	None to low
2	Professionally Registered person	Person registered with ECSA as a Professional Engineer/ Professional Engineering Technologist/ Professional Certificated Engineer/ Professional Engineering Technician in the discipline of Chemical Engineering.	ledium to High

6.6 Work Competencies required for Chemical Engineering Practitioners

This classification is normally defined in terms of THREE risk categories (see **Table 3**).

Table 3: Nature of Chemical Engineering work and Risk level

Category of Work	Level of Risk	Nature of Chemical Engineering Work
1	Low	The work is simple, involving the application of engineering and scientific principles with a low level of analysis and basic design principles and standards. Here the safety, health and environmental risks and impacts are low under the supervision of a relevantly competent person.
2	Medium	Here the work entails slightly more detailed and challenging analyses. Design principles and solution often require more research and data including validation. Good communications and report writing skills are essential.
3	High	In this category, more complex analyses and solutions, skills, planning, management and experience at a higher level than level 2. Here groundbreaking/innovative/creative solutions might be utilized to address both usual and unique problem situations. At this level an appropriately qualified and experienced statutory responsible person (Professionally registered with ECSA) should supervise and ensure that all measures are taken to eliminate or mitigate risk.

6.7 Levels of Competency of Chemical Engineering Practitioners by Category

There are several levels of competency for chemical engineering practitioners starting from base level, matriculation, with mathematics and science, to Professional Engineer (see **figure 1**).

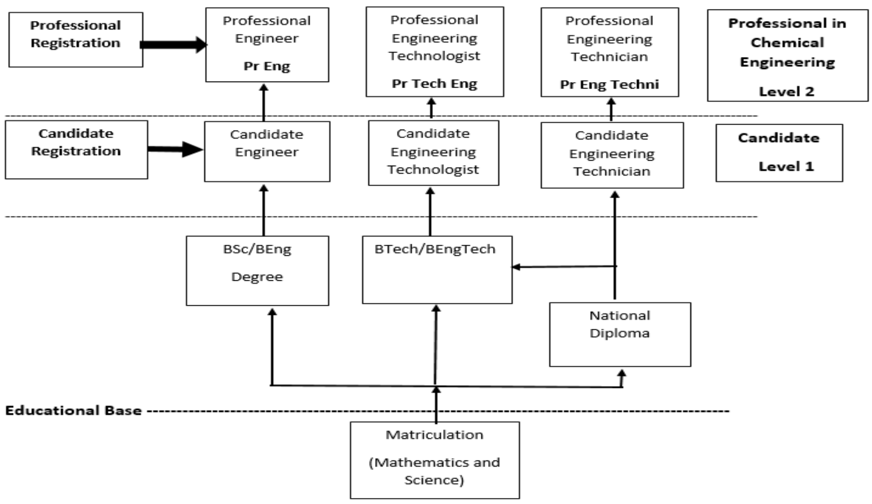

Fig. 1: Levels of Competency and Registration For Chemical Engineering Practitioners

Figure 1: Levels of Competency and Registration for Chemical Engineering Practitioners

6.8 Competencies for Critical Chemical Engineering Work

Work which involves special installations which pose serious risks to health, the environment, property, finance and other sensitive areas. These will include Major Hazardous Installations are those where there is a risk of explosion, fire, release of toxic gases, hazardous biological or radio-active materials.

Chemical Engineering Practitioners should demonstrate competencies in the following areas:

1. Good working knowledge of chemistry, mathematics, physics and chemical engineering fundamentals

2. Effective communications and report writing
3. Knowledge of relevant standards, rules, legislation
4. Good working knowledge of Health, Safety and Environmental aspects
5. Good planning and management skills
6. Engineering ethics
7. Relevant financial knowledge and ability
8. Conceptualization and design
9. Operations and maintenance requirements
10. Keep abreast of knowledge, skill, expertise and developments in the discipline

6.9 Misrepresentation of Competency

Chemical engineering practitioners shall conduct work in accordance with the ECSA Code of Conduct and limited to the confines of their level of competency, experience and registration.

6.10 Competency to perform Chemical Engineering Work

A practitioner eligible to perform chemical engineering work should meet the following requirements

1. Hold a recognized tertiary qualification in the discipline of Chemical Engineering
2. Be registered with ECSA in the appropriate professional registration category
3. Execute duties in accordance with the registration level as stipulated in Government Gazette 44333, of 26 March 2021.
4. Have the necessary core competency in the relevant area of work to perform such core services within the applicable category of registration.
5. Commit to upskilling knowledge, experience, skills, expertise, and keep abreast of technology and developments in and relevant to the discipline.

6.11 Category Differentiation for Chemical Engineering Problems and Activities

Differentiation of categories of Chemical Engineering work is based on how problems and activities are defined and assigned to the appropriate category of registration as indicated in **Table 4**.

Table 4: Differentiation of Work is based on definition and category of Professional Registration

Category of Registration	Professional Engineer (Pr Eng)	Professional Engineering Technologist (Pr Tech Eng)	Professional Engineering Technician (Pr Eng Techni)	Candidate
Level of Work	A complex engineering problem and activity	Broadly-defined engineering problem and activity	Well-defined engineering problem and activity	Specifically-defined engineering problem and activity

7. GOOD PRACTICE

All work carried out or services rendered shall be:

a) In accordance with accepted codes, norms and standards related to Chemical Engineering such as ISO, FIDIC, ANSI, BSI but not limited to these

b) In an ethical, safe and environmentally sustainable and responsible manner in accordance with the Code of Conduct,

c) Within the area of competency with honesty, fidelity and integrity,

d) In accordance with the Labour Relations Act (Act 66 of 1995) as amended,

e) In accordance with the Protection of Personal Information Act (Act 4 of 2013) as amended,

f) Any other applicable legislation.

Prior to taking a role in Chemical Engineering, the Chemical Engineering registered person shall ensure that he or she possesses the competencies required to undertake the work safely and correctly.

Prior to undertaking any task, the Chemical Engineering registered person shall ascertain and document:

a) the purpose of the activities;
b) the approach that will be used in the execution of activities;
c) the performance requirements for the activities;
d) any statutory, regulatory or other requirements that may pertain to the activities (including applicable Standards and Codes).

The Chemical Engineering registered person shall take into account the likely variation in input parameters and the accuracy of the models or methods used and shall consider all possibilities.

All calculations shall be independently checked, either by another suitably qualified registered person or by alternative calculation methods.

Prior to approving any work, or signing any completion certificate, the Chemical Engineering registered person shall ensure sufficient detailed checks or inspections to warrant such approval. Where the checks or inspections were limited in any way or carried out by a third party, the approval shall be qualified accordingly.

8. ADMINISTRATION

The Council shall be responsible for the Administration of this CoP, including its publication, maintenance and distribution.

The Council shall ensure that the CoP and all amendments there to are available on the ECSA Website and shall, upon request, provide a copy thereof.

The Council shall take all reasonable steps to introduce the CoP to the general public.

Document No.: R-02-COP-CHE	Revision No.: 0	Effective Date: 30/03/2023	ECSA
Subject: Code of Practice for the Performance of Chemical Engineering Work			
Compiled by: Manager RPS	Approved by: Executive RPS	Next Review Date: N/A	Page **25** of **26**
Date:27/09/2023	Date: 27/01/2023		

REVISION HISTORY

Revision Number	Revision Date	Revision Details	Approved By
Rev 0. Draft A	27 September 2022	Proposed by the working group to ECSA	Working Group
Rev0. Draft B	07 October 2023	Steering Committee Draft	Steering Committee
Rev0. Draft C	07 October 2022	Broader Consultation draft	Working Group
Rev.0 Draft D	11 January 2023	Incorporation of comments received from Broader consultation	Working Group
Rev.0 Draft E	26 January 2023	Steering Committee recommendation to submit to RPSC for approval	Steering Committee
Rev 0.	14 February 2023	Approval by RPSC	RPSC
Rev 0.	30 March 2023	Ratification	Council

The Code of Practice for:

The performance of Chemical Engineering

Revision 0 dated 30 March 2023 and consisting of 26 pages reviewed for adequacy by the Business Unit Manager and approved by the Executive: Research, Policy and Standards (**RPS**).

.... 14 April 2023 ....

Business Unit Manager Date

.... 2023/04/14 ....

Executive: RPS Date

This definitive version of this policy is available on our website.

[OFFICIAL]

Document No.: R-02-COP-CHE	Revision No.: 0	Effective Date: 30/03/2023	ECSA
Subject: Code of Practice for the Performance of Chemical Engineering Work			
Compiled by: Manager RPS Date:27/09/2023	Approved by: Executive RPS Date: 27/01/2023	Next Review Date: N/A	Page 26 of 26

REFERENCES

[1] Engineering Council of South Africa. Rules of Conduct for Registered Persons Engineering Profession Act, 2000. Board Notice 256 of 2013. Government Gazette No. 37123 of 13 December 2013.

[2] Engineering Qualifications in the Higher Education Qualifications Sub-framework E-23-P

[3] Identification of Engineering Work Regulations, No. 44333, Government Gazette, 26 March 2021

[4] Overarching Code of Practice for the Performance of Engineering Work, No. 44333, Government Gazette, 26 March 2021

[5] R-05 ECSA Discipline-Specific guidelines on Chemical Engineering

[6] R-02-STA-PE/PT/PN Competency Standard for Registration in Professional Categories as PE/PT/PN

[7] Framework for development of ECSA Codes of Practice Revision 1: 29 January 2019

BOARD NOTICE 630 OF 2024

ENSURING THE
EXPERTISE TO GROW
SOUTH AFRICA

Code of Practice for the Performance of Civil Engineering Work

R-02-COP-CIV

REVISION No. 0: 30 March 2023

ENGINEERING COUNCIL OF SOUTH AFRICA
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ECSA

PREFACE

The development of the Civil Engineering Code of Practice is informed by the Overarching Code of Practice for the Performance of Engineering Work, and it leads towards transforming the industry to achieve the following objectives:

- Engineering practitioners' contributions towards quality of work produced in keeping with the project risk.
- A renewed focus on ethical behaviour in planning, design, and construction of Civil Engineering assets.
- Assist with mitigating South Africa's infrastructure challenges to support growth and prosperity.
- Ensure that all Civil Engineering practitioners provide sustainable engineering solutions in keeping with supporting design codes.
- Keep the profession relevant and current with respect to new technology that enables efficient designs and to understand the importance of learning and development.
- Implement a collective mindset towards building South Africa to be future fit, while seeking to progress our socio-economic development objectives.

In addition to the socio-economic objectives, this Code seeks to highlight key focus areas comprising the disciplines of Civil Engineering. It is not written to be a rigid document; greater granularity will be contained in the appendices. It is not intended to prescribe how civil engineering practitioners work but more why they work and what they achieve as meaningful outputs.

In addition to Civil Engineering practice, it seeks to inform the structures within which we operate of compliance requirements in performing engineering work. It is expected that all institutions employing civil engineering practitioners have the required organograms to support the effective deployment of Civil Engineering tasks. Engineering practitioners within these structures are expected to become familiar with their practice area, learn and develop excellence in the practice area, and thereafter mentor and support those who are their juniors.

Document No.: R-02-COP-CIV	Revision No.: 0	Effective Date: 30/03/2023	ECSA
Subject: Code of Practice for the Performance of Civil Engineering Work			
Compiled by: Manager RPS Date: 14/09/2022	Approved by: Executive RPS Date: 270/1/2023	Next Review Date: N/A	Page 3 of 27

TABLE OF CONTENTS

Document No.: R-02-COP-CIV	Revision No.: 0	Effective Date: 30/03/2023	ECSA
Subject: Code of Practice for the Performance of Civil Engineering Work			
Compiled by: Manager RPS	Approved by: Executive RPS	Next Review Date: N/A	Page 4 of 27
Date: 14/09/2022	Date: 270/1/2023		

LIST OF TABLES

LIST OF FIGURES

DEFINITIONS

In this Code, any word or expression defined in the Act has that meaning unless the context otherwise dictates:

Act means the Engineering Profession Act, 46 of 2000 as amended.

Code means this code of practice document.

Code of Conduct means the Code of Conduct for Registered Persons: Engineering Profession Act, 46 of 2000, Board Notice 41 of 2017 – Government Gazette 142 No. 40691.

Competency means a combination of knowledge, training, experience and applicable qualifications that enables an individual to perform a task or an activity successfully.

Competent Person means a person who is qualified by virtue of education, training, experience and contextual knowledge to perform Civil Engineering work and registered in terms of Section 18(1)(a) and (c) of the Act.

Council means the Engineering Council of South Africa, established by Section 2 of the Act.

Designer means the person undertaking work in relation to the process of devising a system, component, or process to meet desired needs. It is a decision-making process (often iterative), in which the basic sciences, mathematics, and engineering sciences are applied to convert resources optimally to meet a stated objective. Among the fundamental elements of the design process are the establishment of objectives and criteria, synthesis, analysis, construction, testing and evaluation of any Civil Engineering works and/or in its sub-disciplines, i.e., Geotechnical Engineering, Harbour Engineering, Railway Engineering, Structural Engineering, Transportation Engineering and Water Engineering, including drawings, calculations, design details and specifications.

Discipline means the disciplines of engineering and sub disciplines of Civil Engineering as recognised by the Engineering Council of South Africa.

Engineer means a professional engineer registered in terms of section 18(1)(a)(i) of the Act who has experience specifically in the field of Civil Engineering.

Engineering Practitioner means any registered professional registered in terms of section 18(1)(a) of the Act who has experience specifically in the field of Civil Engineering.

Engineering Technologist means a professional Engineering Technologist registered in terms of section 18(1)(a)(ii) of the Act who has experience specifically in the field of Civil Engineering.

Engineering Technician means a professional Engineering Technician registered in terms of section 18(1)(a)(iv) of the Act who has experience specifically in the field of Civil Engineering.

Engineering Geologist means a practitioner of engineering geology who is registered in section 18(1)(a) of the Natural Scientific Professions Act, 27 of 2003.

Engineering Work means the process of applying engineering and scientific principles, concepts, contextual and engineering knowledge to the research, planning, design, implementation, maintenance and management of work in the natural and built environments. It includes advisory services, assessment of engineering designs and determination of the risks posed by the design on workers, the public, and environment.

Geotechnical Engineering Work means Engineering Work identified specifically in the practice area of geotechnical engineering.

Harbour Engineering means Engineering Work identified specifically in the practice area of Harbour Engineering.

Identification of Engineering Work means the Identification of Engineering Work as gazetted.

Information means engineering documents and data produced or relied on in the performance of Engineering Work that form a material part of the project records, including design calculations, drawings, contract agreements, minutes of meetings and reports, whether in electronic format or otherwise.

Overarching Code of Practice means the Overarching Code of Practice for the Performance of Engineering Work as gazetted.

Practice means any engineering professional service, advisory service or creative work requiring engineering education, training and experience and the application of special knowledge of the mathematical, physical and engineering sciences, or creative work such as consultation, research, investigation, evaluation, planning, surveying, risk assessment and design, in connection with any public or private utility, structure, building, machine, equipment, process, work or project.

Practitioner means a person who performs Engineering Work. It includes both registered persons and unregistered persons.

Profession means Engineering Profession.

Railway Track Engineering Work means Engineering Work identified specifically in the sub-discipline of Railway Track Engineering.

Registration Category means a professional registration category as specified under Section 18(1)(a)–(c) of the Act, including Professional Engineer, Professional Engineering Technologist, Professional Certificated Engineer, Professional Engineering Technician, Candidate and Specified Category Practitioner.

Registered Person means a person registered under a category referred to in Section 18 of the Act.

Risk means the effect of uncertainty on the objectives of a design and is expressed in terms of a combination of the consequences of an event and the likelihood of occurrence.

Site means the area or place where the investigation or construction is being carried out.

Specialist work means the sub-disciplines of Civil Engineering, i.e., Geotechnical Engineering, Harbour Engineering, Railway Engineering, Structural Engineering, Transportation Engineering and Water Engineering that requires training, knowledge and experience outside the normal education curriculum and beyond that which is obtained in the general practice of the profession.

Specified Category means those registration categories classified as such by ECSA.

Specified Category Practitioner means a person registered in terms of section 18(1)(c) of the Engineering Profession Act, carrying out specifically defined engineering activities.

Structural engineering work means Engineering Work identified specifically in the sub- discipline of Structural Engineering.

Sub-discipline means the specialist discipline of Civil Engineering, i.e., Geotechnical Engineering, Harbour Engineering, Railway Engineering, Structural Engineering, Transportation Engineering and Water Engineering.

Transportation Engineering Work means Engineering Work identified specifically in the sub-discipline of Transportation Engineering for road-based transport and for the purposes of this document, it also includes work relating to the governance of transportation systems, public transport, the execution of a transport project, associated activities required to comply with legislation or required to ensure the transport system is a sustainable infrastructure or service.

Water Engineering Work means Engineering Work identified specifically in the sub-discipline of Water Engineering and for the purposes of this document, it also includes work relating to sanitation such as sewage collection, disposal and wastewater treatment works.

ABBREVIATIONS

CoP	Code of Practice
ECSA	Engineering Council of South Africa
Pr Eng	Professional Engineer
Pr Tech Eng	Professional Engineering Technologist
Pr Cert Eng	Professional Certificated Engineer
Pr Techni Eng	Professional Engineering Technician
QCP	Quality Control Plan
RPS	Research Policy and Standards

Document No.: R-02-COP-CIV	Revision No.: 0	Effective Date: 30/03/2023	ECSA
Subject: Code of Practice for the Performance of Civil Engineering Work			
Compiled by: Manager RPS	Approved by: Executive RPS	Next Review Date: N/A	Page 10 of 27
Date: 14/09/2022	Date: 270/1/2023		

1. INTRODUCTION

This Code of Practice has been developed by the Engineering Council of South Africa (ECSA) to supplement the Rules of Conduct for Registered Persons (Board Notice No. 15 of 2006). Section 27 of the Engineering Profession Act, 46 of 2000 empowers the Council to draw up codes of practice in addition to codes of conduct and it requires all registered persons to comply with such codes. Failure to do so constitutes improper conduct. In short, while codes of conduct regulate behaviour, codes of practice regulate engineering practice.

Section 18(1) of the Act provides for registration of professionals and candidates in four categories of registration, namely Engineers, Technologists, Technicians and Certificated Engineers. Section 18(2) prohibits persons so registered from practising in a category other than that in which they are deemed competent.

Whereas codes of conduct regulate the conduct of an individual in the professional environment as a whole, codes of practice regulate the execution of professional services in a practice area.

In line with these requirements, this Code of Practice classifies Civil Engineering Work and its sub-disciplines in terms of complexity and recommends the category of registration and the level of competence required for the execution of such work.

The Code also details the ethical values and professional standards that ECSA expects all registered persons to adhere to as a mark of their professionalism, as a condition of their registration and as affirmation of their competence and ability.

In writing this code of practice, it is recognised that various other legislation, such as each sub-discipline Act (namely, Geotechnical Engineering, Harbour Engineering, Transportation Engineering, Railway Engineering, Structural Engineering and Water Engineering), the Safety Act and the Occupational Health and Safety Act, includes definitions and specifies requirements that are to be met by “competent” persons in the practice area in the field of Civil Engineering and its sub-disciplines.

2. POLICY STATEMENT

The Code applies to the practice area of Civil Engineering and its sub-disciplines (namely, Geotechnical Engineering, Harbour Engineering, Transportation Engineering, Railway Engineering, Structural Engineering and Water Engineering).

The code identifies specific Engineering Work in the field of Civil Engineering and its sub-disciplines.

It classifies Engineering Work in the field of Civil Engineering and its sub-disciplines according to the complexity, the risks involved and the consequences of failure.

It sets out the level of competence required by persons registered in any of the categories of registration provided for in Section 18(1) of the Act for the performance of Civil Engineering Work and its sub-disciplines of varying complexity.

The code stipulates requirements for the practice of Engineering Work in the field of Civil Engineering and its sub-disciplines and it provides a statement of recognised good practice.

Where a Code or Act is referenced, the latest version thereof applies.

3. PURPOSE

3.1 In terms of the Standards Act, 29 of 1993, a code of practice is “a description of:

- the terminology to be used
- the extent of method to be applied, procedure to be followed or material to be used,
- any other requirements (e.g., competency) in connection with the execution in an orderly, systematic, practical, efficient, safe and effective manner of an act performed with a view to achieving a stated purpose or obtaining a stated result.”

3.2 The Code’s purpose is to:

(a) identify Engineering Work in the field of Civil Engineering and its sub-disciplines, and to classify such work in terms of its complexity;

(b) establish the appropriate level of competence required for the execution of various classes of Civil Engineering Work;

(c) make provision for and regulate the execution of Engineering Work in the field of Civil Engineering and its sub-disciplines by registered professionals in other fields and set technical and ethical standards for the execution of Civil Engineering Work.

4. APPLICABLE LEGISLATIVE FRAMEWORK

This code of practice should be read in conjunction with the Engineering Profession Act, 46 of 2000 and the Code of Professional Conduct (Board Notice 15 of 2006), Council for the Built Environment Act, 43 of 2000 and Occupational Health and Safety Act, Construction Regulations and other applicable regulations.

5. NATIONAL AND INTERNATIONAL COMPLIANCE

ECSA has been empowered by Section 27 of the Engineering Profession Act, 46 of 2000 to draw up a code of practice whereby all registered persons are required to comply wholly. In addition to the Act mentioned above, the development of this code of practice is guided by the ECSA Policy and Standards Framework on ECSA Policies, the Road Map for drafting the Code of Practice, which sets out steps to be taken to get the process of developing ECSA Codes of Practice and the ECSA Overarching Code of Practice.

6. CIVIL ENGINEERING WORK

6.1 Identification and classification of Civil Engineering Work

Civil Engineering work and its sub-disciplines can be identified from the gazetted, Identification of Engineering Work Regulations. This section of the code specifically identifies Civil Engineering work according to its complexity and risk-consequence and sets out the competencies required for the execution of such work.

A high-level summary of the Civil Engineering work is shown in Table 1.

Table 1: Civil Engineering Work

Characteristics	Types of work	Functions
• Theoretical experimental investigation and solving of problems. • Analysis and design solutions to meet specific objectives. • Application of knowledge and engineering technology, based on mathematics, basic sciences, information technology as well as specialist and contextual knowledge. • Management of engineering works. • Addressing the safety and environmental consequences and other impacts of engineering work. • Exercising judgment and taking responsibility for engineering work. • Conducting research and developing new or improved theories and methods related to civil engineering.	Due to the various sub-disciplines within Civil Engineering, the types of work would relate to the specific sub-discipline concerned.	• Feasibility and conceptual studies. • Project definition and planning. • Advising, reporting and auditing. • Establishing control standards and procedures to monitor performance of work. • Preparation of tender and / or working drawings. • Provision of information for the design of services. • Preparation of specifications and schedule of quantities. • Cost estimates, capital and life cycle costs, financial. • Implications and works programmes. • Draft tender documentation and tender strategies. • Advise on contractors and calling for tenders. • Procurement and tender adjudication. • Contract administration, coordination and construction monitoring. • Management of safety risk and maintenance of civil engineering solutions. • Communication of the impacts and outcomes. • Education, training and mentoring of Civil Engineering personnel.

6.2 Risk response

Risk and impact mitigation includes the probability and impact of all the risks connected with the project. The focus areas of the project must be indicated on a risk matrix. Mitigation must include the time of mitigation and the person who is responsible. Solutions must include a Plan A and a Plan B. The risk document must be a live document throughout the life cycle of a project and must include the following:

- technical risk
- environmental risk
- quality risk
- commercial risk (late or wrong deliveries of equipment)
- schedule risk
- social risk
- construction risk.

Registered Persons must implement quality and risk management systems covering all aspects of their work, appropriate to the nature of the work and the size of the organisation. Quality and risk management systems must be reviewed on a regular basis. Compliance with the system must be audited at least annually. Organisations undertaking Engineering Work should consider external certification, such as ISO 9001 and ISO 14001.

7. CIVIL ENGINEERING COMPETENCY LEVELS

7.1 Work within area of competency

Engineering Work in the field of Civil Engineering and its sub-disciplines can be identified from the gazetted, Identification of Work Regulations. This section of the code specifically identifies Civil Engineering work according to its complexity and risk-consequence and sets out the competencies required for the execution of such work.

The following criteria must be used to assess the competence of a civil engineer/technologist/ technician:

- Tertiary education (minimum base qualification as required for registration or as a recognised alternative).
- Category of registration
- Experience (experience can be defined as learning and adopting the established and developing engineering ways of work and protocols as well as assembling engineering knowledge through the practical execution of work in an engineering environment. Three years of practice experience is the minimum and, in most instances, is insufficient for professional registration).
- Knowledge (engineering knowledge is the understanding achieved through the combination of education, experience producing skill and wisdom. CPD is an essential element required to educate with wisdom in the context of experience to enhance engineering knowledge to develop the engineering expert).
- Recognition by the profession.

Civil Engineering Practitioners, depending on the tertiary education, training and experience, category of registration and recognition by the profession, function at one of two distinct levels as indicated in Table 2.

Civil Engineering Practitioners must perform their duties within the professional category limitations specified in the Identification of Engineering Work (Government Gazette No. 44333).

Table 2: Competence levels of Civil Engineering Practice

Level	Designation	Typical characteristic of the practitioner	Risk associated with work done
1	Candidate	Practitioner has a tertiary education qualification in Civil Engineering and works under supervision and control from a Professionally Registered Person.	Low risk
2	Registered professional in Civil Engineering	Practitioner is registered with the ECSA as a Professional Engineer, Professional Engineering Technologist or Professional Engineering Technician in the Civil Engineering discipline.	Moderate to High risk

It is accepted that due to the varying nature of a Civil Engineering service, rigid boundaries are not applicable, but an experienced Civil Engineering Practitioner would recognise the appropriate competence level required. A person may only conduct work for which his or her education, experience and acquired knowledge has deemed him or her competent to undertake.

7.2 Categories of work for competency

The level of practitioner assuming responsibility for Engineering Work in the field of Civil Engineering and its sub-disciplines is linked to the category of risk as defined in Table 3.

Table 3: Minimum competence level in relation to categories of risk of task to be performed

Minimum required competence level	Categories of risk	Illustrative nature of civil engineering work
1	Low	Simple Civil Engineering solutions with low safety and serviceability performance requirements where the analysis requires a simple application of design rules or direct interpretation of reference guidelines.
2	Moderate	Civil Engineering solutions with moderate to challenging safety and serviceability performance requirements where the design approach involves either a process of: • reasoning and calculation based on the application of standards, or • reasoning, calculation and consideration of accepted analytical principles, based on a combination of deductions from available information, research and data, appropriate testing and service experience.
3	High	Systems (or parts thereof) with challenging safety and serviceability performance requirements that require specialist skills, recognised expertise or knowledge beyond that required for Category 2 systems

Document No.: R-02-COP-CIV	**Revision No.: 0**	**Effective Date: 30/03/2023**	
Subject: Code of Practice for the Performance of Civil Engineering Work			
Compiled by: Manager RPS	**Approved by: Executive RPS**	**Next Review Date: N/A**	Page **17** of **27**
Date: 14/09/2022	**Date: 270/1/2023**		

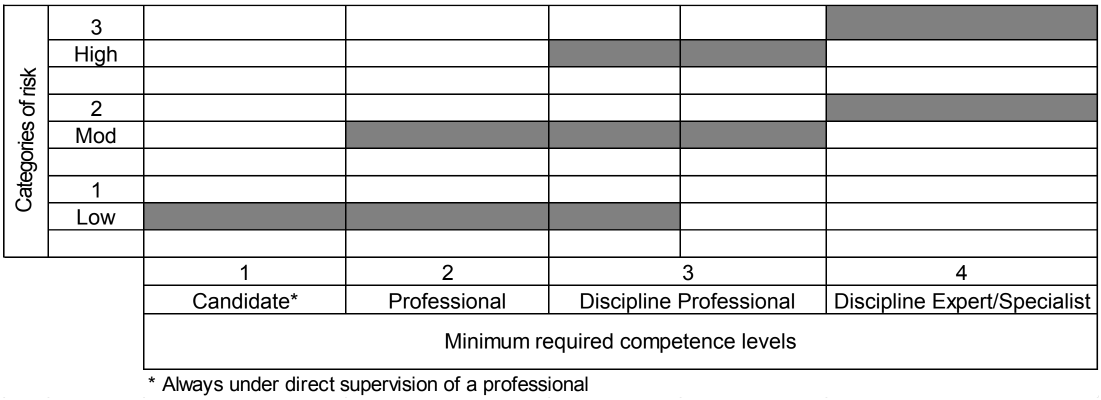

Figure 1: Minimum competence level in relation to categories of risk of task to be performed

Note 1: Competence Level 1 (candidates) are always required to work under direct supervision and control of an appropriately Registered Person.

Note 2: Registered Engineering Technicians do not usually assume responsibility for a category of risk level of higher than 1 unless they have gained vast experience within their sub discipline or the problem is well defined.

7.3 Levels of competency

The level of practitioner assuming responsibility for Engineering Work in the field of Civil Engineering and its sub-disciplines is linked to the category of risk as defined in Table 3.

The levels of competence required for Civil Engineering Practitioners and a career path to achieving these levels is indicated in Figure 2.

Document No.: R-02-COP-CIV	Revision No.: 0	Effective Date: 30/03/2023	ECSA
Subject: Code of Practice for the Performance of Civil Engineering Work			
Compiled by: Manager RPS Date: 14/09/2022	Approved by: Executive RPS Date: 270/1/2023	Next Review Date: N/A	Page 18 of 27

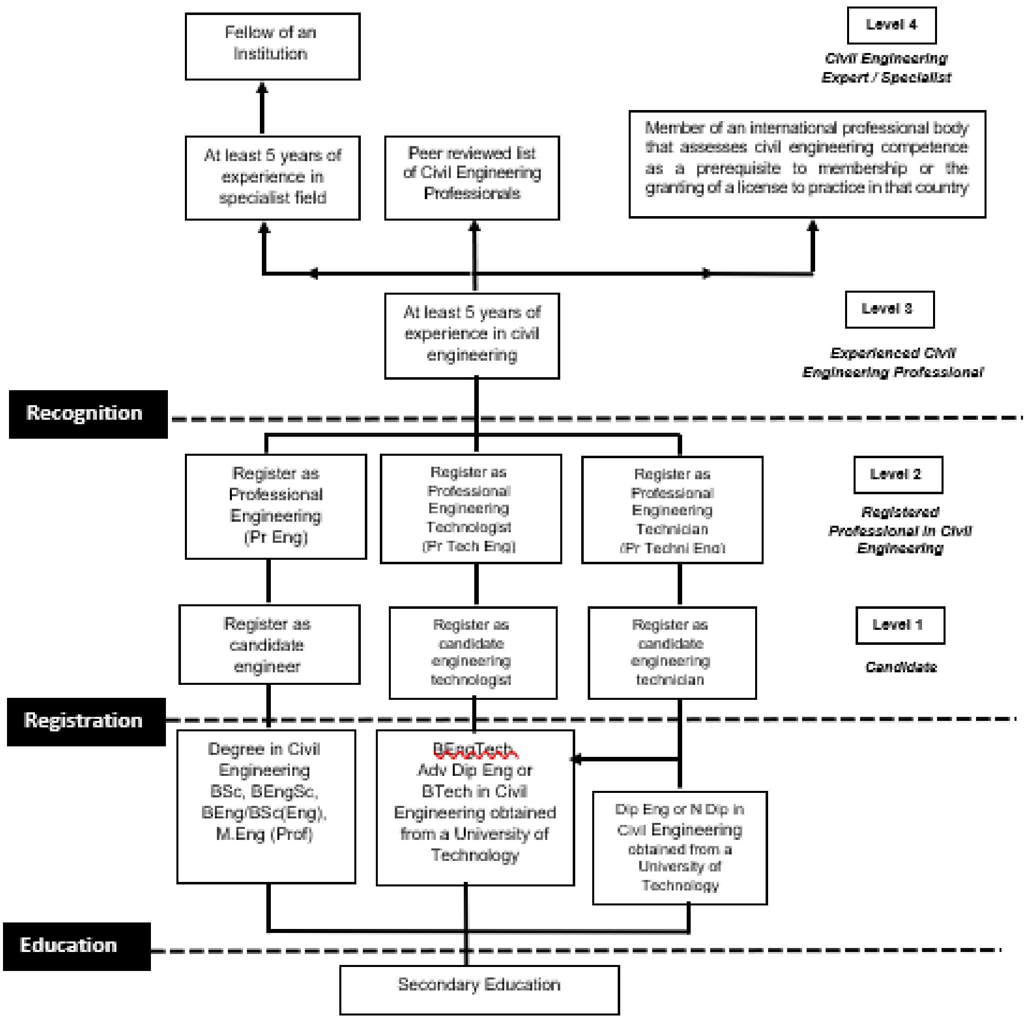

Figure 2: Levels of competence required to practise

7.4 Misrepresentation of competence

Civil Engineering Practitioners may only execute Engineering Work in the field of Civil Engineering and its sub-disciplines in accordance with the provisions of the ECSA's Code of Conduct. In particular, they must conduct work within their area of competence.

7.5 Development of knowledge, skills and expertise

Civil Engineering Practitioners must continue to develop knowledge, skill and expertise in accordance with ECSA's Standard for Continuing Professional Development (ECPD-01-STA).

8. CIVIL ENGINEERING GOOD PRACTICE

8.1 Design requirements

The design of Civil Engineering solutions must be performed by or under the direction, control and supervision of a Professionally Registered Person who needs to accept responsibility for the design. The full scope of the client requirements must be agreed and documented as part of the design package and alternative solutions considered.

The selected solution must clearly demonstrate how client requirements are met in a safe, effective and cost-efficient way to ensure adherence to reliability, availability, maintainability and safety requirements.

Problem solving through experienced engineering judgement and testing of samples is an integral part of Civil Engineering in most of the sub-disciplines where empirical judgement, experience and skill have to be used due to the lack of proven engineering formulae or procedures.

8.2 Design process

The Civil Engineering design process is a series of steps to be followed by Engineering Practitioners to create functional products and processes while solving problems. These steps include the following:

- Define the problem.
- Research the problem and specify requirements.
- Develop possible/alternative solutions.

- Evaluate and choose best solution.
- Develop and prototype solution.
- Test and evaluate solution.
- Communicate results (and redesign if required).
- Monitor the performance of the solution.

A typical final design package when the correct design process is followed includes design calculations (including simulations), drawings, test procedures and results, and other relevant technical documentation such as user requirements and specifications.

The design standards, specifications and related publications used in a design must be communicated and agreed with the client. All designs must conform to relevant Acts, design codes and regulations, as set out below.

8.2.1 Design calculations and simulation

Formal calculations must be prepared for all Civil Engineering solutions. Calculations must be recorded on calculation sheets or downloaded from a computer simulation tool to form part of a design report. For manual analysis, all analysis calculations must be shown together with the results of the analysis.

- The designer must take all reasonable steps to generally ascertain that the works being constructed on site comply with the design.
- The designer should ensure that quality control is instituted on site to ensure accordance with the design.
- The full scope of the client requirements should be agreed and documented. The designer should take steps to determine any special operational requirements, the likelihood of future changes or other factors that may increase the risk of failure
- Should the designer not be satisfied with the arrangements regarding quality control instituted on site, he or she should raise this with the construction contractor, and, if necessary, with the client. Should the quality control on site remain unsatisfactory, giving inadequate demonstration that the structure has been built in accordance with the design, the designer

should not sign off on the works, or cease all the works, in accordance to the current legislation and standards.

- All analysis should be thoroughly checked by the person conducting the design. In addition, all analysis should be reviewed for accuracy by a registered person
- The checker/auditor and/or designer should ensure that the checking/auditing has been done prior to commencement of construction. If the checker/auditor is required to verify the actual outcomes of the design analysis, this should be done by another means than that used by the original designer.
- Any changes or modification to the design, proposed by the checker/auditor should be communicated to the designer for design and implementation. The checker/auditor should sign off on the cover sheet of the original design, stating the date, his/her name, contact details and ECSA registration number.
- Approval of a design means that the design is complete, the design complies with the required standards, specifications and legislation in terms of safe operability of the line, stability and serviceability, and the design is fit for the intended purpose.

General information or data to be indicated on calculations and simulations includes the following:

- Name of client or owner
- Project title
- Title of civil engineering design under consideration
- Name of person who carried out the calculations and date undertaken
- Name of person who reviewed the calculations and date reviewed
- Project number or calculations file number
- Calculation sheet number and revision number
- Software name and version, data file name and location.

8.2.2 Design drawings

Design drawings must show all information required for implementation, application and/or installation and must be checked prior to issuing. Appropriate requirements must be included. The responsible Civil Engineering Practitioner must approve all design drawings of Civil Engineering solutions. General information or data to be indicated includes the following:

- Name of the responsible Civil Engineering Practitioner
- Name and address of the consulting firm responsible for civil design
- All symbols and units used must be consistent with the symbols used in the particular code of practice or standard being used.

Approval of a design drawing/illustrative model means that the drawing/model is complete, it conforms to the design and the technical content of the drawing/model is correct.

8.2.3 Design testing

Any tests required for design purposes must be stated and communicated to the contractor and/or client for execution. Test results and other relevant data must be filed with the calculations or overall design package.

8.2.4 Design documentation approval and preservation

Approval of designs means that the design is complete and complies with the required standards, specifications and legislation in terms of safe operation and that the design is fit for the intended purpose.

Approval of a design drawing/illustrative model means that the drawing/model is complete, that the drawing/model conforms to the design and that the civil engineering content of the drawing/model is correct.

Irrespective of client requirements regarding the retention of design information, all design drawings, calculations, computer printouts, test results, test certificates, etc. must be retained in a form easily retrievable for a period not less than that specified by the ECSA or relevant legislation. Data must be stored electronically in a recognised international format.

Should there be a need to review the approved documents, the designer must adhere to the process implemented to ensure that all changes are done, accepted and communicated to all relevant parties in good time.

8.2.5 Technology

Civil Engineering requires practitioners to work, model and construct from materials of the earth. The key take-away is that much of our technology seeks to model or simulate a form of reality in the designs that we perform. This awareness must remain at the forefront of those designing and those checking or reviewing designs. Simulating reality is and will not be a perfect science. As such practitioners must ensure optimum and pragmatic designs.

Engineering practitioners must ensure that they are familiar with practical understanding of the asset, construction methodology, phasing, temporary works, concept of constructability, life cycle costs and maintenance when designing*. It is a required attribute that all practitioners have good site experience to support decisions to commence construction, for example.*

As technology advances, the risk of disconnects between reality and design simulation grows, giving rise to site-related problems which increase both direct and consequential time and costs. The country can ill afford further corruption, poor ethics in practitioners wanting to complete the design as fast as possible with a greater focus on bottom line profits versus quality robust designs. If practitioners accept that design software is just technology support to get to a product, the industry has an improved chance of lowest cost work, balanced with quality and professionalism of producing quality assets that are fit for purpose and meet the service limits as expected.

8.3 Quality and maintenance of designs

8.3.1 Design testing

The designer must take all reasonable steps for quality control to generally ascertain that the Civil Engineering solutions implemented or installed on site comply with the design. This quality control is not limited to the actual site but also needs to include any manufacture/pre-assembly and assembly work completed.

It is recommended that a quality control plan (QCP) be instituted by the contractor and approved by the designer, which provides for not only conforming to all the requirements of the design, but also to the requirements of the codes and/or relevant specifications that the contractor is expected to satisfy. The steps must be signed off by the contractor as having been correctly completed and overviewed by the engineer for important issues.

Document No.: R-02-COP-CIV	Revision No.: 0	Effective Date: 30/03/2023	ECSA
Subject: Code of Practice for the Performance of Civil Engineering Work			
Compiled by: Manager RPS Date: 14/09/2022	Approved by: Executive RPS Date: 270/1/2023	Next Review Date: N/A	Page 24 of 27

Should the designer not be satisfied with the arrangements regarding quality control instituted on site, he or she must raise this with the contract manager (if work is external) and, where applicable and necessary, with the client. Should the quality control on site remain unsatisfactory, the designer must not sign off any work.

The designer, if satisfied that the Civil Engineering solutions have been implemented and installed in accordance with the requirements of the design, must certify that the Civil Engineering solutions have been commissioned according to relevant standards and a certification of completed works must be issued.

8.3.2 Maintenance of designs

Maintenance requirements must be defined and clarified by designer and client. This refers to both preventative and corrective maintenance types. As per the Regulations issued in terms of the Occupational Health and Safety Act, an obligation is placed on all plant owners to ensure that the Civil Engineering solutions are safe for continued use and are inspected regularly.

Should there be a risk or hazard identified, relevant parties must be notified and recommended actions communicated.

8.4 Obligations to society

Any Civil Engineering Work carried out must adhere to the following:

- Social, environmental and other possible consequences
- Honesty (truth and objectivity), integrity and fairness without discrimination
- Health, welfare and community safety
- Effects on the natural environment
- Conflicts of interest
- Confidentiality.

The Engineering Work in the field of Civil Engineering and its sub-disciplines must adhere to legislation and recognised standards in executing Civil Engineering Work, which include among others the following Acts as amended:

- Engineering Profession Act, 46 of 2000
- Occupational Health and Safety Act, 85 of 1993
- National Building Regulations and Building Standards Act, 103 of 1977
- National Environmental Management Act, 107 of 1998
- Employment Equity Act, 55 of 1998.
- Basic Conditions of Employment Act, 7 of 2018.

All Engineering Work in the field of Civil Engineering and its sub-disciplines must be carried out in accordance with the norms of the profession. Such norms are generally represented by national and international standards, industry standards, codes of practice and best practice guidelines. A Civil Engineering Practitioner must assess any deviation from recognised standards or work beyond the scope of such standards in terms of sound engineering and scientific fundamentals.

9. INTERPRETATION AND COMPLIANCE

9.1 Interpretation

The word “must” indicates a peremptory provision.

The word “should” indicates a provision directive or informative in character, requiring substantial compliance only.

The word “they” in its singular form, or its derivative forms “their/them” are pronouns used for gender neutrality.

9.2 Compliance

Failure to comply with a peremptory provision, directive or informative provision of this code of practice constitutes improper conduct in terms of the Act

10. ADMINISTRATION

The Council is responsible for administering this code of practice, including its publication, maintenance and distribution.

The Council must ensure that the code of practice and all amendments to it are available on the ECSA website and must upon request, provide a copy thereof.

The Council must take all reasonable steps to introduce the code of practice to the general public.

Document No.: R-02-COP-CIV	Revision No.: 0	Effective Date: 30/03/2023	ECSA
Subject: Code of Practice for the Performance of Civil Engineering Work			
Compiled by: Manager RPS Date: 14/09/2022	Approved by: Executive RPS Date: 270/1/2023	Next Review Date: N/A	Page **27** of **27**

REVISION HISTORY

Revision number	Revision date	Revision details	Approval by
Rev 0 Draft A	14 September 2022	New document	RPS & Working Group
Rev0. Draft B	07 October 2023	Steering Committee Draft	Steering Committee
Rev0. Draft C	07 October 2022	Broader Consultation draft	Working Group
Rev.0 Draft D	11 January 2023	Incorporation of comments received from Broader consultation	Working Group
Rev.0 Draft E	26 January 2023	Steering Committee recommendation to submit to RPSC for approval	Steering Committee
Rev 0.	14 February 2023	Approval by RPSC	RPSC
Rev 0.	30 March 2023	Ratification	Council

The Code of Practice for:

Performance of Civil Engineering Work

Revision 0 dated 30 March 2023 and consisting of 27 pages reviewed for adequacy by the Business Unit Manager and approved by the Executive: Research, Policy and Standards (**RPS**).

.... 14 April 2023

Business Unit Manager Date

.... 2023/04/14

Executive: **RPS** Date

This definitive version of this policy is available on our website.

BOARD NOTICE 631 OF 2024

ENSURING THE
EXPERTISE TO GROW
SOUTH AFRICA

Code of Practice for the Performance of Computer Engineering Work

R-02-COP-COMP

REVISION No. 0:02 June 2023

ENGINEERING COUNCIL OF SOUTH AFRICA
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ECSA

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

DEFINITIONS

In this Code of Practice, any word or expression defined in the Act has that meaning unless the context otherwise dictates.

Act means the Engineering Profession Act.

Candidate means a person who is registered in terms of Section 19(2)(b) of the Act.

Category of Registration means the categories of registration provided for in Section 18(1)(a) of the Act, i.e., Professional Engineers, Professional Engineering Technologists, Professional Certificated Engineers and Professional Engineering Technicians.

Code of Conduct means the Code of Conduct for Registered Persons in terms of the Act.

Council means the Engineering Council of South Africa established in terms of Section 2 of the Act.

Designer means the person undertaking work in relation to any structure, including drawings, calculations, design details and specifications.

Computer Engineer means a Professional Engineer registered in terms of 18(1)(a)(i) of the Act who has experience specifically in the of sub-discipline of Computer Engineering.

Computer Engineering Technician means a Professional Engineering Technician registered in terms of section 18(1)(a)(i) of the Act who has experience specifically in the sub-discipline of Computer Engineering.

Computer Engineering Technologist means a Professional Engineering Technologist registered in terms of section 18(1)(a)(i) of the Act who has experience specifically in the sub-discipline of Computer Engineering.

Computer Engineering Work means Engineering Work identified specifically in the discipline of Computer Engineering.

Engineering Work means the work identified in terms of Section 26 of the Act.

Project Engineers means Registered Persons responsible for the management of the Engineering Work within a project and its technical aspects.

Registered Person means a person registered with the Engineering Council of South Africa in terms of the Act under one of the categories referred to in sections 18 and 19.

Risk means the effect of uncertainty on the objectives of a design, expressed in terms of a combination of the consequences of an event and the likelihood of occurrence.

Specialist Work means Computer Engineering Work that requires training, knowledge and experience outside the normal education curriculum and beyond that which is obtained in the general practice of the profession.

The Code means this code of practice document.

Document No.: R-02-COP-COMP	Revision No.: 0	Effective Date: 02/06/2023	ECSA
Subject: Code of Practice for the Performance of Computer Engineering Work			
Compiled by: Manager RPS Date: 19/09/2022	Approved by: Executive RPS Date: 08/05/2023	Next Review Date:	Page 7 of 31

ABBREVIATIONS

API	American Petroleum Institute
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
CAD	Computer Aided Design
CoP	Code of Practice
CPD	Continuing Professional Development
DCS	Digital Control System
ECSA	Engineering Council of South Africa
FAT	Factory Acceptance Test
HMI	Human Machine Interface
IFE	The Institution of Fire Engineers
ISA	International Society for Automation
ISO	International Organization for Standardization
PC	Personal Computer
PLC	Programmable Logic Controller
POPIA	Protection of Personal Information Act, 4 of 2013
Pr Cert Eng	Professional Certificated Engineer
Pr Eng	Professional Engineer
Pr Tech Eng	Professional Engineering Technologist
Pr Techni Eng	Professional Engineering Technician
QCP	Quality Control Plan
Reg Eng Tech	Registered Engineering Technician
SAE	Society of Automotive Engineers
SANS	South African National Standards
SAT	Site Acceptance Test
SCADA	Supervisory control and data acquisition

1. INTRODUCTION

This Code of Practice has been developed by the Engineering Council of South Africa (ECSA) to supplement the Code of Conduct for Registered Persons: Engineering Profession Act 2000(Act No.46 of 2000).

Section 27 of the Engineering Profession Act 2000 (Act No.46 of 2000) empowers the Council to draw up codes of practice in addition to codes of conduct and it requires all registered persons to comply with such codes. While codes of conduct regulate behaviour, codes of practice regulate engineering practice.

Section 18(1) of the Act provides for registration of professionals and candidates in four categories of registration, namely Professional Engineers, Professional Engineering Technologists, Professional Certificated Engineers and Professional Engineering Technicians. Section 18(2) prohibits persons so registered from practising in a category other than that in which they are registered.

In line with these requirements, this code of practice classifies “engineering work” in the discipline of computer engineering in terms of its complexity and stipulates the category of registration as well as the level of competence required for the execution of such work.

The code does not repeat the expected ethical values and professional standards that are found in the Code of Conduct and Overarching Code of Practice.

1.1 Scope

The Code identifies specific engineering work within the computer engineering field and applies to computer engineering and its sub-disciplines: computer equipment, networks, solution design and development, process optimisation, data collection and consolidation, secure internet and network design, process automation, factory and general automation.

The Code classifies computer engineering work according to the complexity of the work and its sensitivity concerning public safety, asset and equipment safety as well as environmental stewardship. Most computer engineering work involves risk due to the nature of the product and the impact of its incorrect application.

1.2 Purpose

The purpose of the Code is to:

- identify engineering work in the discipline of computer engineering and to classify such work in terms of its complexity
- establish the appropriate level of competence required for the execution of various classes of computer engineering work
- make provision for and regulate the execution of computer engineering work by registered professionals in other fields
- set and reinforce technical and ethical standards for the execution of computer engineering work.

1.3 Applicable Legislative Framework

This Code should be read in conjunction with the following:

- Engineering Profession Act 2000 (Act No.46 of 2000)
- Code of Conduct
- Occupational Health and Safety Act, 85 of 1993
- Overarching Code of Practice for the Performance of Engineering Work
- Identification of Engineering Work Rugulations
- All other relevant legislation

2. IDENTIFICATION AND CLASSIFICATION

2.1 Practice Areas:

Computer and software engineering work includes the following:

- Conducting research and developing new or improving theories and methods related to computer and software engineering;

- Advising on and designing computer-based systems or components, systems equipment, software and distribution centres;
- Specifying production or installation methods, materials, quality and safety standards and directing production or installation work of computer-based products, software and systems;
- Supervising, controlling, developing and monitoring the operation and maintenance of computer-based systems, software, networks and equipment;
- Organising and directing maintenance and repair of existing computer-based systems, programmes and equipment;
- Researching and advising on computer-based equipment and software;
- Planning and designing computer-based communications networks based on wired, fibre optical and wireless communication media and ultra-high speed data networks;
- System analysis, designing and developing complex computer-based systems and implementing these through appropriate choice of hardware and managing the development the necessary software;
- Determining manufacturing methods for computer-based systems as well as the maintenance and repair of existing computer-based systems, networks and equipment;
- Designing usable and fit for purpose products;
- Identifying and involving all stakeholders in the design process.

2.2 Technologies

Computer and software technologies include:

- Enterprise resource planning
- Materials requirements planning
- Product lifecycle management
- Telemetry and IIOT devices
- Supply chain management
- Advanced planning and scheduling

- Advanced visioning & diagnostic systems
- Industrial software engineering
- Digital twins
- Augmented reality
- Artificial intelligence
- Machine learning
- Data management
- Data analytics
- Robotics – kinematics, electronic sensors, software integration
- Biometrics
- Solutions architect – full design approach
- Industrial internet of things and cloud systems
- Smart factory
- Autonomous processes, systems and operations
- Cyber security
- Wide area and local area network topologies
- Industrial network topologies
- Telecommunication devices and installations
- Process optimisation
- Process modelling tools
- Control philosophies
- Embedded controllers (including microcontrollers)
- Data acquisition, logging and recording
- Sensors, transducers and measurement systems
- Safety systems and design
- Additive and subtractive manufacturing
- Energy efficiency and renewable systems
- Vision systems
- Automation safety and best practices from an automation perspective

- Software programming languages and applications, Network Technology programming languages and applications and Database programming languages and applications
- Numerical analysis methods
- Single board computers
- Windows and Linux-based operating systems
- Circuit analysis and design
- Power electronics and drives – motors, drives, power supplies
- Workflow systems

2.3 Aspects

Below is an outline of the different aspects of computer engineering work:

Group A: Engineering problem solving

- Define, investigate and analyse engineering problems. These engineering problems are not limited to the computer engineering field.
- Design or develop solutions to engineering problems.
- Comprehend and apply advanced knowledge: principles, specialist knowledge, jurisdictional and local knowledge.

Group B: Managing engineering activities

- Oversee one or more engineering activities, and effectively manage time during the process.
- Maintain clear communication with all involved parties throughout the engineering activities.
- Evaluate project proposals and determine their feasibility.
- Assess potential risks associated with each project and develop risk mitigation strategies.
- Make decisions regarding the allocation of resources among various projects.
- Consider dependencies between projects and ensure they are accounted for.

- Eliminate redundant efforts across projects.
- Determine and assess any gaps in the engineering activities and address them promptly.

Group C: Impacts of engineering activities

- Recognise and address the reasonably foreseeable social, cultural and environmental effects of engineering activities.
- Meet all legal and regulatory requirements and protect the health and safety of persons during engineering activities.

Group D: Act ethically, exercise sound judgement and take responsibility

- Conduct engineering activities ethically.
- Exercise sound judgment while conducting engineering activities.
- Be responsible and accountable for making decisions on part of or all engineering activities.

Group E: Initial professional development

- Undertake professional development activities sufficient to maintain and extend competence.

2.4 Functions

The computer engineering field consists of any or a combination of the following types of work within computer devices, factory automation, process automation and general automation:

- Audits
- Build
- Business analysis
- Calibration
- Change management
- Consulting

- Functional and technical solution design documents
- Hardware and software architecture design
- Solution and application development
- Database design development and administration
- Education
- Graphic design
- Software lifecycle management
- Optimisation
- Production and plant operation
- Project management
- Prototyping
- Research
- Software and hardware upgrade
- Retirement / end-of-life replacement
- Testing and commissioning and fault-finding
- Troubleshooting and debugging.

2.5 Industries

The computer engineering field includes any industry or industry sector where the engineering work, as defined, includes among others, the following:

- The development of any system processing and/or storing confidential or restricted data.
- The development of any system essential for the continuous safe operation of people, processes or devices.
- The development of any system essential for the continuous safe manufacture or processing of physical products, including but not limited to, electricity, oil, gas, minerals, metals, food, beverages, medical equipment and devices, fast-moving consumer goods, clothing, furniture, automobiles amongst others.
- The development of any system providing a critical or campus-wide service.

- The development of any system to monitor, detect and react to adverse events before they escalate.
- The development of any system to guide processes which may alter production or financial outcomes.
- The development of any system to monitor, detect and record incidents that will have consequences to the health and safety of product, people or the environment.

3. IMPLEMENTATION

The computer engineering field is identified and categorised by the following:

3.1 Consult

Consult on the specification, design, installation, configuration, maintenance, operation, performance assessment and optimisation of the Computer systems classified in section 2.1 above.

3.2 Research

The Computer Engineering work conducts various research in the field of computer sciences and engineering. Research studies focus on the branches such as:

- Artificial Intelligence
- Machine Learning
- Embedded Systems
- Information Systems
- Process Management Systems, including but not limited to Process Control Systems.

Document No.: R-02-COP-COMP	Revision No.: 0	Effective Date: 02/06/2023	ECSA
Subject: Code of Practice for the Performance of Computer Engineering Work			
Compiled by: Manager RPS Date: 19/09/2022	Approved by: Executive RPS Date: 08/05/2023	Next Review Date:	Page 16 of 31

3.3 Specifications

Issue and interpret specifications on the installation, configuration, optimisation, operation, maintenance, testing, safety and eventual retirement or replacement of the computer systems classified in section 2.1 above.

3.4 Design and development

Use technologies, engineering knowledge or systematic approaches to develop new and improved techniques and methods to design or optimise the computer systems classified in section 2.1:

- Develop commissioning scope of work and input into the planning process.
- Develop and improve commissioning procedures.
- Develop and improve quality and maintenance plans, including maintainability.

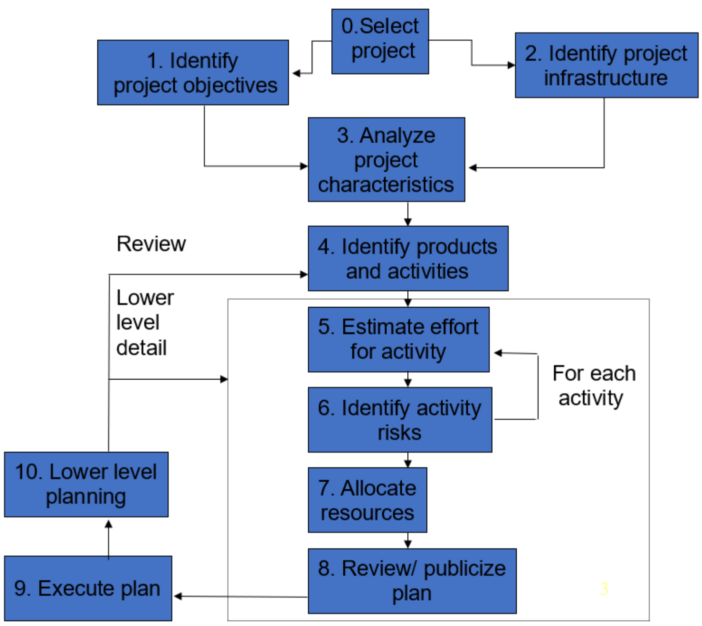

Figure 1: Process: Designing and optimizing systems

3.5 Installation

Use technical knowledge, engineering principles and technologies to install and test computer systems, hardware devices and automation systems followed by testing, monitoring, and evaluation of design, construction and installation.

3.6 Commissioning services

Commissioning services include the following:

- Provide commission engineering services.
- Provide consulting services.
- Optimise devices, control loops, processes and systems and plant.

3.6.1 Co-ordination

Co-ordinate commissioning efforts of the technical teams, considering technical, budgetary, logistical, legislative and safety requirements.

3.6.2 Management

- Ensure that commissioning quality plans and checks/check sheets are in accordance with the Original Equipment Manufacturer (OEM) procedures and specifications.
- Perform a technical investigation and root cause analysis into any issues during commissioning.
- Identify and manage or redesign repeat incidents.
- Implement corrective actions and change management.

3.7 Testing

Testing includes the following:

- Debugging of programmed systems.
- Evaluation of materials, environmental interaction, safety and manufacturing integrity, and quality.

- Perform user acceptance and factory acceptance tests to ensure safe and effective operations

3.8 Maintenance

Maintenance includes maintaining, operating and optimising:

- systems and devices within hazardous areas
- emergency shutdown systems
- industrial telecommunication systems
- robotic systems.
- Software solutions
- Systems integration
- Operator support

4. COMPETENCY REQUIREMENTS

4.1 Competence required

Any person who performs computer engineering work must comply with the requirements contemplated in the Engineering Profession Act 2000(Act No.46 of 2000) to:

- be registered with ECSA in the appropriate professional registration category applicable to the level of service performed; and
- possess the necessary core competency in the categories as specified under Section 18(1)(a)(c) of the Act, to perform such core service as a Professional Engineer, Professional Engineering Technologist, Professional Certificated Engineer, Professional Engineering Technician, or a Specified Category Practitioner in terms of Section 18(1)(c) of the Act or a Candidate registered in terms of Section 18(1)(b) of the Act.

In case of performing computer engineering work in any other category, the computer engineering registered person must comply with the relevant competency requirements imposed by ECSA.

4.2 Competence evaluation

Computer engineering registered persons may only undertake work that their education, training and experience have rendered them competent to perform and is within their registration category.

ECSA document **R-02-STA-PE/PT/PN**: Competency Standard for Registration in Professional Categories PE/PT/PN defines the criteria for assessing competency.

4.3 Risk categories (risk of occurrence versus severity of occurrence)

There are numerous factors can contribute to the failure of a project. It is crucial to identify and address these potential risks early to avoid costly and time-consuming setbacks. These risks can range from personnel shortfalls and unrealistic time and cost estimates to developing the wrong software functions and user interfaces. Additionally, gold plating, late changes to requirements, shortfalls in externally supplied components, real-time performance problems, and development that is technically too difficult can all impact the success of a software project. In this context, it's essential to understand these risks to develop effective risk management strategies and ensure project success.

Table 1: Risk Probability level

Probability level	Range
High	Greater than 50% chance of happening
Significant	30-50% chance of happening
Moderate	10-29% chance of happening
Low	Less than 10% chance of happening

Table 2: Risk reduction Techniques

	Risk reduction techniques
Personnel shortfalls	Staffing with top talent, job matching, team building, training and career development, early scheduling of key personnel. Establish external partnerships for specialised skills

Unrealistic time and cost estimates	Multiple estimation techniques, Design to cost, incremental development, recording and analysis of past projects, standardization of methods
Developing the wrong software functions	Improved software evaluation, formal specification methods, user surveys, prototyping, early user manuals. Apply Agile methodology where necessary
Developing the wrong user interface	Prototyping, task analysis, user involvement and frequent feedback
Gold plating	Requirements scrubbing, prototyping, design to cost
Late changes to requirements	Change control, incremental development, frequent feedback and feedback sessions
Shortfalls in externally supplied components	Benchmarking, inspections, formal specifications, contractual agreements, quality controls
Real-time performance problems	Simulation, prototyping, tuning, implementation of appropriate performance monitoring tools
Development technically too difficult	Technical analysis, cost-benefit analysis, prototyping, training

4.4 Overlaps

a) Persons registered in a particular discipline may perform Engineering Work in a different discipline if their knowledge, training, experience and applicable qualifications specifically render them competent to perform such work and subject to the expressed permission of ECSA.

b) Persons registered as professionals under a Professions' Act other than the Engineering Profession Act may not perform Engineering Work even if their knowledge, training, experience and applicable qualifications specifically render them competent to perform such work without the expressed permission of ECSA.

c) Chemical engineering has a bearing on many activities of industry and even commerce and hence there may be no clearly defined boundaries. In such cases the experienced and appropriately registered engineer would recognize the competencies required and hence act appropriately.

The Overarching Code of Practice for Engineering Work must be consulted when any overlap occurs.

5. GOOD PRACTICE REQUIREMENTS

5.1 General good practice

All work carried out or services rendered must be:

- in accordance with accepted norms and standards of the computer engineering field
- in an ethical and responsible manner in accordance with the Code of Conduct
- within the area of competency with honesty, fidelity and integrity
- in accordance with the Labour Relations Act, 66 of 1995, as amended
- in accordance with the Protection of Personal Information Act, 4 of 2013 (POPIA), as amended.
- any other applicable legislation.

Prior to taking a role in the computer engineering field, computer engineering registered persons must ensure that they possess the competencies required to undertake the work. In addition, prior to undertaking any task, computer engineering registered persons must ascertain and document:

- the purpose of the activities
- the approach that will be used to execute the activities
- the performance requirements for the activities
- any statutory, regulatory or other requirements that may pertain to the activities.

Computer engineering registered persons must take account of the likely variation in input parameters and the accuracy of the models or methods used and must consider the following:

- All calculations and/or specifications must be independently checked, either by another suitably qualified computer engineering registered person or by alternative calculation methods.

- Prior to approving any work, or signing any completion certificate, computer engineering registered persons must ensure sufficient detailed checks or inspections to warrant such approval. Where the checks or inspections were limited in any way or carried out by a third party, approval must be qualified accordingly.

5.2 Health, safety and environment

All computer engineering work must be done in accordance with the following:

- Occupational Health and Safety Act, 85 of 1993, as amended
- National Environmental Management Act, 107 of 1998, as amended
- Protection of Personal Information Act , 04 of 2013 as amended
- Any other applicable legislation.

Cognisance should be taken of health and safety requirements from planning to completion of any computer engineering work.

The environmental impact of all computer engineering work should be assessed and appropriate measures taken to minimise such impacts or to remediate areas so impacted.

Computer engineering registered persons must involve relevant expertise when identified impacts of the computer engineering field are outside their area of expertise.

The client must immediately be notified of any condition that is observed which may compromise the health and safety of persons or the environment.

5.3 Ethical considerations

Utilitarianism

Seek to promote the greatest amount of happiness or pleasure for society as a whole by evaluating the morality of an action based on its ability to maximize overall benefit while minimising harm.

Duty ethics

In this view, a right choice is one that follows ethical rules.

Rights ethics

In this view, a right choice is one that respects the rights of the individual person.

Virtue ethics

In this view, a right choice is one that supports good character traits (responsibility, honesty, competence, loyalty, trustworthiness, fairness, respect)

5.4 Codes and standards

All computer engineering work must be carried out in accordance with the norms of the profession, and these norms are generally represented by the Computer and Automation Engineering relevant national and international standards, industry standards, codes of practice and best practice guidelines.

Standards and codes must be applied as and when required by government regulation, customer or end-user requirements and as an accepted industry norm.

It is the duty of computer engineering registered persons to ensure that all standards and codes used abide by the applicable acts and regulations (considering that more than one country's legal frameworks may be relevant).

Standards and codes may be used in place of regulations where it can be proved that the requirements of the standard or code meet and/or exceed those prescribed by regulations and/or law.

Any deviations from the standards or codes requested by the customer or end-user should be communicated to the appropriate stakeholder, supported by evidence that the deviation will compromise the performance and safety of the system or device.

Various international bodies are recognised and accepted within industry to develop and publish standards related to the computer engineering field, notably:

- SANS – South African National Standards
- ASME – American Society of Mechanical Engineers

- ASHRAE – American Society of Heating, Refrigerating and Air-Conditioning Engineers
- ISO – International Standard Organization
- SAE – Society of Automotive Engineers
- API – American Petroleum Institute
- IFE – The Institution of Fire Engineers
- ASTM International.

5.5 Computer Engineering Data

Sufficient quantitative or qualitative data is required for all computer engineering tasks.

Computer engineering registered persons should ensure that the data used is adequate for the intended purpose. Where this is not the case, additional data should be obtained, or the work should be based on parameter values selected such that the occurrence of less favourable values is unlikely.

Data analysis should be presented in sufficient detail to allow independent assessment of the data.

5.6 Reporting

During the planning of an activity, computer engineering registered persons should ascertain the purpose for which the activity is required and the nature of the proposed activity. Computer engineering registered persons must ensure that the proposed activity can yield the information required for that purpose.

Computer engineering registered persons should advise the client of the effect of any restrictions placed on the activity that are likely to adversely affect the accuracy or adequacy of the data obtained. This information may be presented as a single report or in two separate reports: a factual report and an interpretive report. All assumptions must be clearly documented as well as the reason for the specific assumption.

5.7 Quality and risk management

ISO Standards:

ISO standards provide guidelines for various aspects of software development, including the development life cycle. For instance, ISO 12207 outlines the sequence of processes that should be followed to produce the software deliverable and the intermediate products that should pass between the processes. By following the recommended development life cycle, software developers can ensure that the end product meets the necessary quality standards and is delivered on time and within budget. Additionally, adherence to ISO standards can facilitate communication and collaboration between different teams and stakeholders involved in the software development process, leading to a more efficient and effective project outcome.

Software product Quality

ISO 9126 provides a framework for assessing the quality of software products. The attributes that determine software quality can be categorized into two types: external qualities, which are apparent to end-users of the software, and internal qualities, which are apparent to developers. By considering these attributes, software developers can ensure that the end product meets necessary quality standards and satisfies the needs of stakeholders.

Assessment of Product Quality

ISO 14598 outlines the procedures for conducting and assessing of the software product qualities defined in ISO 9126. These procedures provide a systematic and structured approach to evaluating the quality of software products based on the established criteria. By following the guidelines set forth in ISO 14598, software developers can effectively assess the quality of their products and identify areas for improvement. This can lead to the development of more reliable, maintainable, and user-friendly software products that meet the needs of all stakeholders involved in the development process.

Document No.: R-02-COP-COMP	Revision No.: 0	Effective Date: 02/06/2023	ECSA
Subject: Code of Practice for the Performance of Computer Engineering Work			
Compiled by: Manager RPS	Approved by: Executive RPS	Next Review Date:	Page 26 of 31
Date: 19/09/2022	Date: 08/05/2023		

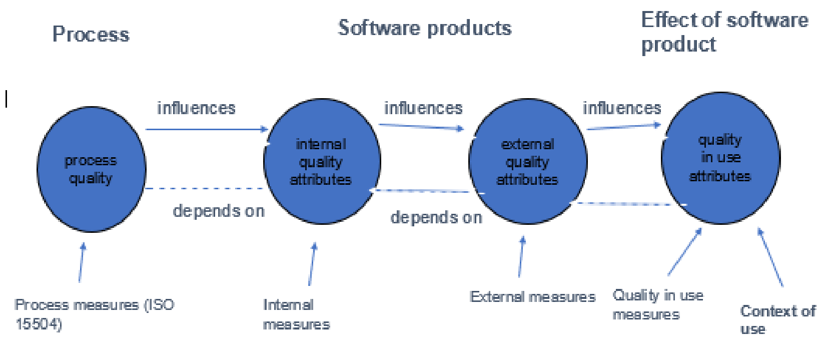

Figure 2: Quality process: influence and dependencies

5.8 The design process

Computer engineering registered persons need to follow an acceptable procedure of either a sequential or a concurrent design process that could include design procedures as follows:

Sequential design procedure

- Problem identification: First, a clear statement of the need for and objectives for the design must be written.
- Ideation: Technical documents are often used to convey concepts to multidisciplinary teams.
- Refinement/analysis: Designs may be rethought, based on engineering analysis. Process Flows, Workflows, Information Flows drawings, process or equipment state models and business process modelling notation (BPMN) tools are useful during the analysis and refinement stage. Accurate use-case models, process/workflows and information flow diagrams are created to refine the design.
- Implementation/documentation: Operating and/or user manuals providing the details of system operation are finalised and approved.

Concurrent design procedure

A systematic approach that integrates the design and development of products with the goal of optimising all elements involved in the life cycle of the product.

5.9 Design requirements

Computer engineering registered persons should incorporate engineering design processes and procedures that address society's needs, desires and problems by applying scientific principles, experience and creativity. The following subsections highlight standard procedure and practice required within project documentation.

5.9.1 Calculations and simulations

Computer designs may include calculations and simulations to demonstrate and test process operation and anomaly handling. Computer engineering registered persons are expected to use design tools to simulate, analyse and test designs efficiently, accurately and quickly. Typical design tools include the following:

- Common CAE packages used include Finite Element Analysis (FEA)
- Business Process Modelling Notation (BPMN) tools
- Unified Modelling Language (UML)
- Hazard and Operations (HAZOP) Studies
- Value Reference Model
- Software Simulation tools
- SIPOC modelling: Suppliers-Input (Requirements) - Process-Output (Requirements) - Customers
- Capability and Maturity Model Integration (CMMI)
- SOA Maturity Model
- Levels of Information Systems Interoperability (LISI) Reference Model
- Zachman Framework for Enterprise Architecture
- Supply Chain Operations Reference (SCOR)
- Value Stream Mapping (VSM)

- Manufacturing optimisation software etc.

5.9.2 Documents

Technical documents can take many forms: idea or concept drawings such as the drawings on the previous page User Requirement Specifications, Functional Design Specifications, Detail Design Specifications, Entity Relationship Diagrams, Database Design documents, Factory Acceptance Test documents, Site Integration Acceptance Test documents, Site Acceptance Test documents and Final Handover Certificates are all examples of technical documents. Technical documents serve one of three purposes:

- Visualisation
- Communication
- Validation.

5.9.3 Testing

Testing should be conducted in accordance with an established doctrine, if possible, that adheres to the project field's governing, regulatory body. If no such body exists, then testing should be done in accordance with the scientific method, with the methodology fully documented to ensure replication and validation by third parties.

5.9.4 Document Storage

All the information to manage, design, analyse, simulate, package, market and develop a product should be stored in a single complex digital database. This database should be able to be shared with a diverse (and perhaps geographically distant) group of users.

5.9.5 Quality

Computer Engineering Registered Persons should apply a systematic methodology to design "quality" into their products as well as to measure performance and make decisions based on data. Methodologies could include the following:

- Design for Six Sigma (DFSS) is an approach that uses engineering and statistical tools to design products in a way that predicts and minimises customer and manufacturing problems.
- Six Sigma is a process that originated at Motorola to improve quality by reducing or eliminating defects.
- DMAIC – Define, Measure, Analyse, Improve and Control are steps in a continuous improvement process that attempts to define and ensure critical to function (CTF) characteristics.
- QFD – Quality Function Deployment is a tool for decision-making that helps companies focus on a customer-driven approach and set of product characteristics.

5.9.6 Records

Product data management (PDM) systems or enterprise data management (EDM) systems electronically store the various types of data associated with designing and manufacturing a product. A Computer Engineering Project should include an effective PDM system that allows all the product data to be quickly stored, retrieved, displayed, printed, managed and transferred anywhere in the organisation. This allows for designs to be optimised or directly modified at any time.

5.10 Due diligence

Computer Engineering Registered Persons should endeavour to optimise an engineering solution that minimises harmful impacts on both the environment and society as far as reasonably possible. All projects, products, operations and systems created by Computer Engineering Registered Persons must adhere to “industry best practices” and legal restrictions and requirements. It is the responsibility of Computer Engineering Registered Persons to seek out and familiarise themselves with the requirements relevant to their project.

5.11 Acts and regulations

Computer Engineering Registered Persons must always ensure compliance with the appropriate acts and associated regulations. Notable national acts that may apply to Computer Engineering Work include the following:

- Engineering Profession Act 2000 (Act No.46 of 2000), as amended
- Occupational Health and Safety Act, 85 of 1993, as amended
- Mine Health and Safety Act, 29 of 1996, as amended
- National Building Regulations and Building Standards Act, 103 of 1977, as amended
- National Environment Management Act, 107 of 1998, as amended.

Document No.: R-02-COP-COMP	Revision No.: 0	Effective Date: 02/06/2023	ECSA
Subject: Code of Practice for the Performance of Computer Engineering Work			
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REVISION HISTORY

Revision Number	Revision Date	Revision Details	Approved By
Rev. 0 Draft A	19 September 2022	New document	RPS & Working Group
Rev. 0 Draft B	13 April 2023	Broader Consultation Draft	Working Group
Rev. 0 Draft C	21 April 2023	Steering Committee	Steering Committee
Rev. 0 Draft D	21 April 2023	Steering Committee recommendation to submit to RPSC for approval	Steering Committee
Rev. 0	18 May 2023	Approval by RPSC	RPSC
Rev.0	02 June 2023	Ratification	Council

The Code of Practice:

Computer Engineering

Revision 0 Dated 02 June 2023 consisting of 30 pages have been reviewed for adequacy by the Business Unit Manager and is approved by the Executive: Research, Policy and Standards (RPS).

.... 25 March 2024

Business Unit Manager Date

.... 2024/04/05...............

Executive: RPS Date

This definitive version of this policy is available on our website.

BOARD NOTICE 632 OF 2024

Code of Practice for the Performance of Electrical Engineering Work

R-02-COP-ELE

Revision 0: 25 August 2022

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ECSA

Document No.: R-02-COP-ELE	Revision No.: 0	Effective Date: 25/08/2022	ECSA
Subject: Code of Practice for the Performance of Electrical Engineering Work			
Compiler: M Hlalukana	Approving Officer: MB Mtshali	Next Review Date: N/A	Page 2 of 25

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

DEFINITIONS

In this Code of Practice, any word or expression defined in the Act has that meaning, unless the context dictates otherwise.

Act means the Engineering Profession Act, (Act 46 of 2000).

Candidate means a person registered in terms of Section 19(2)(b) of the Act.

Category of registration means the categories of registration provided for in Section 18(1)(a) of the Act, i.e., Professional Engineers, Professional Engineering Technologists, Professional Certificated Engineers and Professional Engineering Technicians.

Code of Conduct means the Code of Conduct for Registered Persons in terms of the Act.

Council means the Engineering Council of South Africa established in terms of Section 2 of the Act.

Designer means the person undertaking work in relation to any structure, including drawings, calculations, design details and specifications.

Electrical Engineer means a Professional Engineer registered in terms of 18(1)(a)(i) of the Act who has experience specifically in the sub-discipline of Electrical Engineering.

Electrical Engineering Technician means a Professional Engineering Technician registered in terms of Section 18(1)(a)(i) of the Act who has experience specifically in the sub-discipline of Electrical Engineering.

Electrical Engineering Technologist means a Professional Engineering Technologist registered in terms of Section 18(1)(a)(i) of the Act who has experience specifically in the sub-discipline of Electrical Engineering.

Electrical Engineering Work means Engineering Work identified specifically in the discipline of Electrical Engineering.

Engineering Work means the work identified in terms of Section 26 of the Act.

Professional Certificated Engineer means a Professional Certificated Engineer registered in terms of Section 18(1)(a)(iii) of the Act who has a Certificate of Competency as an Electrical

Engineer issued by the Chief Inspector and experience specifically in the sub-discipline of Electrical Engineering.

Project Engineer means a registered person responsible for the management of the Engineering Work within a project and its technical aspects.

Registered person means a person registered with the ECSA in terms of the Act under one of the categories referred to in Sections 18 and 19.

Risk means the effect of uncertainty on the objectives of a design and is expressed in terms of a combination of the consequences of an event and the likelihood of occurrence.

Specialist Work means Electrical Engineering Work that requires training, knowledge and experience outside the normal education curriculum and beyond that which is obtained in the general practice of the profession.

The Code means this Electrical Engineering Code of Practice document.

Document No.: R-02-COP-ELE	Revision No.: 0	Effective Date: 25/08/2022	ECSA
Subject: Code of Practice for the Performance of Electrical Engineering Work			
Compiler: M Hlalukana	Approving Officer: MB Mtshali	Next Review Date: N/A	Page 7 of 25

ABBREVIATIONS

CoP	Code of Practice
ECSA	Engineering Council of South Africa
FAT	Factory Acceptance Test
IDoE	Identification of Engineering Work
ISO	International Organisation for Standardisation
Pr.Cert Eng	Professional Certificated Engineer
Pr.Eng	Professional Engineer
Pr. Tech Eng	Professional Engineering Technologist
Pr.Techni Eng	Professional Engineering Technician
QCP	Quality Control Plan
Reg Eng Tech	Registered Engineering Technician
SAT	Site Acceptance Test

1. INTRODUCTION

This Code of Practice has been developed by the Engineering Council of South Africa (ECSA) to supplement the Code of Conduct for Registered Persons: Engineering Profession Act, 46 of 2000.

Section 27 of the Engineering Profession Act (Act 46 of 2000) empowers ECSA to draw up codes of practice in addition to codes of conduct and requires all registered persons to comply with such codes. While codes of conduct regulate behaviour, codes of practice regulate engineering practice.

Section 18(1) of the Act provides for registration of Professionals and Candidates in four categories of registration, namely Engineers, Technologists, Technicians and Certificated Engineers. Section 18(2) prohibits registered persons from practising in a category other than that in which they are registered.

In line with these requirements, this Code of Practice classifies Engineering Work in the discipline of Electrical Engineering in terms of its complexity and stipulates the category of registration and the level of competence required to execute such work.

The Code does not repeat the expected ethical values and professional standards that are found in the Code of Conduct and Overarching Code of Practice.

1.1 Scope and application

This code:

(a) applies to the discipline of Electrical Engineering and its sub-disciplines.

(b) identifies specific Engineering Work within the Electrical Engineering field.

(c) classifies Electrical Engineering Work according to the complexity of the work, its sensitivity with respect to public safety and environmental stewardship. It must be acknowledged that all Electrical Engineering Work involves risk.

(d) sets out the level of competence required by persons registered in any of the categories of registration provided for in Section 18(1) of the Act for the performance of Electrical Engineering Work of varying complexity.

(e) stipulates requirements for the practice of Electrical Engineering Work and provides a statement of recognised good practice.

Where a Code or Act is referenced, the latest version applies.

1.2 Purpose

In terms of the Standards Act, 29 of 1993, "a code of practice is a description of –

(a) the terminology to be used

(b) the method to be applied or the procedure to be followed

(c) the material to be used

(d) any other requirements to be met (e.g., competency) in connection with the execution in an orderly, systematic, practical, efficient, safe and effective manner of an act performed, with a view to achieving a stated purpose or obtaining a stated result."

The purpose of the Electrical Engineering Code of Practice (the Code) is to:

- provide detailed guidance on how to comply with either "Identification of Engineering Work (IDoEW) Regulations or Overarching Code of Practice for Performance of the Engineering work" per sub-Electrical discipline.
- regulate the execution of Electrical Engineering Work by registered professionals in other fields.
- set and reinforce technical and ethical standards for executing Electrical Engineering Work.

1.3 Legal framework

This Code of Practice shall be read in conjunction with the following documents:

- Engineering Profession Act, 46 of 2000
- The Code of Conduct
- The Occupational Health and Safety Act – Electrical Regulations
- The Identification of Engineering Work (IDoEW) Regulations

- The Overarching Code of Practice for Performance of the Engineering work and all other relevant legislation.

2. ELECTRICAL ENGINEERING WORK

2.1 Identification and classification of Electrical Engineering Work

Engineering Work can be identified from the gazetted Identification of Engineering Work Regulations. In addition, there have been new additions under the current Electrical Engineering specialisations following the advent of new technologies in the Electrical Engineering field; these can be categorised as follows:

- Big Data Engineer
- Biometrics Engineer
- Solution Architect Engineer
- Internet of Things Engineer
- Intelligent Transport System Engineer
- Autonomous Driving Engineer
- 3D Printing Engineer
- Cyber and Physical Systems Engineer
- Cyber Security Engineer.

A high-level summary of the Electrical Engineering Work is provided in Table 1:

Table 1: Electrical Engineering Work

Characteristics	Types of work	Functions
• Theoretical and experimental investigation and solving of problems • Analysis and design solutions to meet specific objectives • Application of knowledge and Engineering technology, based on mathematics, basic sciences, information technology as well as specialist and contextual knowledge	• Grid, hybrid and off-grid bulk power systems in the area of generation, transmission and distribution, including temporary and permanent back up power supplies • Bulk telecommunication systems in the area of transport to access technologies	• Feasibility and conceptual studies • Project definition and planning • Advising, reporting and auditing • Design and development of electrical apparatus • Manufacture and construction

Characteristics	Types of work	Functions
• Management of Engineering Works • Addressing the safety and environmental consequences and other impacts of Engineering Work • Exercising judgment and taking responsibility for Engineering Work • Conducting research and developing new or improved theories and methods related to Electrical Engineering • Advising and designing systems that generate, transmit and distribute electrical power • Supervising, controlling, developing and monitoring the operation and maintenance of electrical generation, transmission and distribution systems • Conducting research and developing new or improved theories and methods • Advising on and designing electronic devices or components, circuits, semiconductors and systems • Supervising, controlling, developing and monitoring the operation and maintenance of electronic equipment and systems • Establishing control standards and procedures to ensure efficient functioning and safety of electronic systems and equipment • Designing electronic circuits and components for use in fields such as aeronautical guidance	• End use of electricity in powering various utility services, such as water, sanitation, transportation and public lighting • End use of electricity in any other economic activity such as mining, industry and commerce • Electrical Engineering opinions • Electronic fire alarms systems • Fire suppression systems • Emergency evacuation systems • Communications among the above and control/ command/response utilities • Any other work related to the application and use of electricity	• Operation and maintenance of materials, components, plant and systems for generating, transmitting, distributing and utilising electrical energy, electronic devices, apparatus and control systems, biomedical and consumer products and process • Specifying and performing tests, research and development Specifying instrumentation, measurement and control of equipment for the monitoring and control of electrical generation, transmission and distribution systems • Advising on and designing systems for electrical motors, electrical traction and other equipment or electrical domestic appliances • Specifying electrical installation and application in industrial and other buildings and objects • Establishing control standards and procedures to monitor performance and safety of electrical generating and distribution systems, motors and equipment • Determining manufacturing methods for electrical systems as well as the maintenance and repair of existing electrical systems, motors and equipment

Characteristics	Types of work	Functions
and propulsion control, acoustics or instruments and control • Developing apparatus and procedures to test electronic components, circuits and systems • Designing, specifying and implementing control and instrumentation of plant and processes • Designing, specifying, control and monitoring of equipment for fire and safety in plant and factories • Robotics and process control of manufacturing plant • Advising on and designing telecommunications devices or components, systems, equipment and distribution centres • Supervising, controlling, developing and monitoring the operation and maintenance of telecommunication systems. networks and equipment • Determining manufacturing methods for telecommunication systems as well as the maintenance and repair of existing telecommunication systems, networks and equipment • Planning and designing of communications networks based on wired, fibre optical and wireless communication media		• Design and development of electrical apparatus • Preparation of specifications and schedule of quantities and/or working drawings • Provision of information for the design of services • Cost estimates, capital and life cycle costs, financial implications and works programmes • Draft tender documentation and tender strategies • Advise on contractors and calling for tenders • Procurement and tender adjudication • Contract administration, coordination and construction monitoring • Management of safety risk and maintenance of electrical engineering solutions • Communication of the impacts and outcomes • Education, training and mentoring of engineering personnel

2.2 Risk response

Risk and impact mitigation must include the probability and impact of all the risks connected with the project. The focus areas of the project must be indicated on a risk matrix. Mitigation must include the time of mitigation and the responsible person; solutions shall include alternative plans. The risk document must be a live document throughout the life cycle of a project and must include the following:

- Technical risk
- Environmental risk
- Quality risk
- Commercial risk (late or wrong deliveries of equipment)
- Schedule risk
- Social risk
- Construction risk
- Financial risk.

Registered Persons must implement quality and risk management systems covering all aspects of their work, appropriate to the nature of the work and the size of the organisation. Quality and risk management systems must be reviewed on a regular basis. Compliance with the system shall be audited at least annually. Organisations undertaking Engineering Work should consider external certification, such as ISO 9001 and ISO 14001.

2.3 Implementation and commissioning

Project Engineers must install, test and commission the necessary equipment or system for the specified result with compliance to appropriate standards and regulations. This process must include all actions taken during construction as part of the quality management process. This may refer to a project quality plan.

3. ELECTRICAL ENGINEERING COMPETENCIES

3.1 Work within area of competency

Electrical Engineering Registered Persons, depending on their tertiary education, training and experience, category of registration and recognition by the profession, function at one of two distinct levels as indicated in Table 2.

Electrical Engineering Registered Persons shall perform duties within the professional category limitations specified in the Identification of Engineering Work (Government Gazette No. 44333).

Table 2: Competence levels of Electrical Engineering Practice

Level	Designation	Typical characteristic of the practitioner	Risk associated with work done
1	Candidate	Person who has a tertiary education qualification in Electrical Engineering and works under the supervision and mentorship of a person who meets the requirements stated in document **R-04-T&M-GUIDE-PC/SC**.	Low risk
2	Registered Professional in Electrical Engineering (Pr. Techni Eng)	Person registered with ECSA as a or Professional Engineering Technician in the Electrical Engineering discipline as stated in document R**-05-ELE-PN/PT/PE**.	Low to Medium risk
3	Registered Professional in Electrical Engineering (Pr.Eng, Pr.Tech Eng, Pr.Cert Eng)	Person registered ECSA as a Professional Engineer, Professional Engineering Technologist or Professional Certificated Engineer in the Electrical Engineering discipline as stated in document R**-05-ELE-PN/PT/PE, R-05-PT** or **R2/1D**, respectively.	Medium to High risk

It is accepted that due to the varying nature of an Electrical Engineering service, rigid boundaries are not appropriate, but experienced Electrical Engineering Practitioners will recognise the appropriate competence level required.

3.2 Category of work for competency

The level of practitioner assuming responsibility for Electrical Engineering Work is linked to the category of risk as defined in Table 3.

Table 3: Categories of risk

Category of Electrical Engineering Work	Level of risk	Illustrative nature of Electrical Engineering Work
1	Low	Simple Electrical Engineering solutions with low electrical safety and serviceability performance requirements where the analysis requires a simple application of design rules or direct interpretation of reference guidelines.
2	Medium	Electrical Engineering solutions with moderate to challenging electrical safety and serviceability performance requirements where the design approach involves either a process of: • reasoning and calculation based on the application of standards, or • reasoning, calculation and consideration of accepted analytical principles, based on a combination of deductions from available information, research and data, appropriate testing and service experience.
3	High	Electrical Engineering solutions with challenging electrical safety and serviceability performance requirements that require specialist skills, recognised expertise or knowledge beyond that required for category 2.

3.3 Levels of competency

The levels of competence required for Electrical Engineering Registered Persons and a career path to achieving these levels (see also **Annexure A**) is indicated in **Figure 1**.

Document No.: R-02-COP-ELE	Revision No.: 0	Effective Date: 25/08/2022	ECSA
Subject: Code of Practice for the Performance of Electrical Engineering Work			
Compiler: M Hlalukana	Approving Officer: MB Mtshali	Next Review Date: N/A	Page 16 of 25

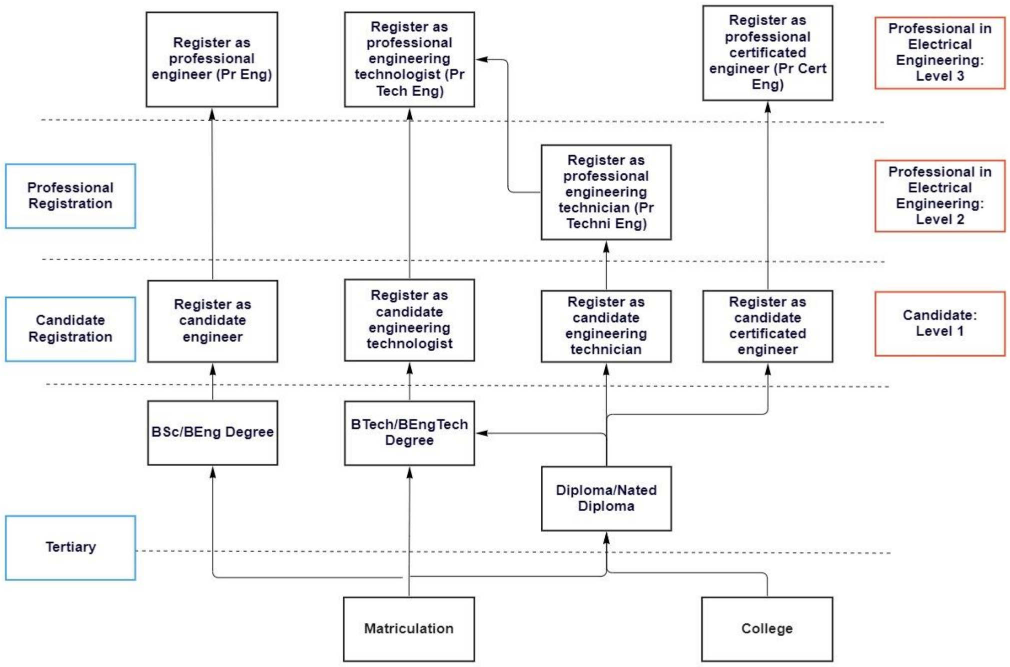

Figure 1: Levels of competence required to practise Electrical Engineering

3.4 Identified critical Electrical Engineering systems

3.4.1 Critical Electrical Engineering systems

The following Electrical Engineering systems are designated as critical Electrical Engineering systems, thus, those that may have high risk and high consequences on the economy, health and environment.

- **Power** – bulk generation, bulk transmission and distribution, end-use, back-up systems
- **Telecommunications** – electronic communication networks and systems, broadcast technologies
- **Electronics** – automation and control systems, instrumentation
- **Utilities** – water services, health systems, transportation.

The various Electrical Engineering types of work associated with the activities outlined in Section 3.4.1 shall only be approved/certified/supervised by Registered Persons who possess expanded competencies for the critical Electrical Engineering systems.

3.4.2 General electrical competencies

Every electrical installation has inherent risk. As a result, all Electrical Engineering Work that is not indicated in Section 3.4.1 shall be supervised by a Registered Practitioner.

3.5 Misrepresentation of competence

Electrical Engineering Registered Persons shall execute Electrical Engineering Work in accordance with the provisions of ECSA's Code of Conduct. In particular, they shall conduct work within their area of competence.

Accepting and performing a task that requires competence and experience that a person does not possess and performing such a task without adequate supervision by a suitably qualified and experienced Registered Person, shall constitute malpractice.

3.6 Development of knowledge, skill and expertise

Electrical engineering registered persons shall continue to develop knowledge, skills and expertise in accordance with ECSA's Standard for Continuing Professional Development (**ECPD-01-STA**).

4. ELECTRICAL ENGINEERING GOOD PRACTICE

4.1 Design requirements

The design of Electrical Engineering solutions shall be performed by or under the direction, control and supervision of a Registered Person, who must accept responsibility for the design. The full scope of the client requirements shall be agreed and documented as part of the design package and alternative solutions considered. The selected solution shall clearly demonstrate meeting client requirements in an effective and cost-efficient way to ensure adherence to reliability, availability, maintainability and safety requirements.

4.2 Design process

The engineering design process is a series of steps to be followed by engineers in creating functional products and processes and solving problems. These steps include the following:

- Define the problem.
- Research the problem and specify requirements.
- Develop possible/alternative solutions.
- Evaluate and choose best solution.
- Develop and prototype solution.
- Test and evaluate solution.
- Communicate results (and redesign if needed).

A typical final design package when the correct design process has been followed and shall include design calculations (including simulations), a schedule of quantities, drawings, test procedures and results, and other relevant technical documentation such as user requirements and specifications.

The design standards, specifications and related publications used in a design shall be communicated and agreed with the client. All designs shall conform to relevant Acts, design codes and regulations.

4.2.1 Design calculations and simulations

Formal calculations shall be prepared for all Electrical Engineering solutions. Calculations shall be recorded on calculation sheets or downloaded from a computer simulation tool to form part of a design report. For manual analysis, all analysis calculations shall be shown together with the results of the analysis, e.g., node voltage, load current, fault level, packet loss, signal strength or data rate.

General information or data that must be indicated on calculations and simulations includes the following:

- Name of client or owner
- Project title
- Title of Electrical Engineering design under consideration

- Name of person who carried out the calculations and date undertaken
- Name of person who reviewed the calculations and date reviewed
- Project number or calculations file number
- Calculation sheet number and revision number
- Software name and version, data file name and location
- Sketch defining electrical computer model, e.g., node numbers, element numbers, member releases, etc.
- Summary of all computer input, e.g., load cases and load combinations considered
- Summary of computer output analysis results, e.g., node voltage, load current or fault level.

4.2.2 Design drawings

Design drawings shall show all information required for implementation, application and/or installation and shall be checked prior to issuing. Appropriate requirements such as earthing or protection requirements shall be included. The responsible electrical Engineering Practitioner shall approve all design drawings of Electrical Engineering solutions.

General information or data to be indicated includes the following:

- Name of the responsible electrical engineering practitioner.
- Name and address of the consulting firm responsible for electrical design.
- All units used shall be consistent with the units used in the relevant code of practice or standard.
- All symbols shall, where applicable, be consistent with the relevant code of practice or standard.

4.2.3 Design testing

Any tests required for Electrical Engineering systems design purposes (including Prototype, Functional Tests or Factory Acceptance Tests (FAT) where required), shall be stated and communicated to the contractor and/or client for execution. Test results and other relevant data shall be filed with the calculations or overall design package.

4.2.4 Design documentation approval and preservation

- Approval of designs means the design is complete, it complies with the required standards, specifications, legislation and it is fit for the intended purpose.
- Approval of a design drawing/illustrative model means that the drawing/model is complete, it conforms to the design and that its electrical content is correct.

Irrespective of client requirements regarding the retention of design information, all design drawings, calculations, computer printouts, test results, test certificates, etc. shall be retained in a form easily retrievable for a period not less than that specified ECSA or relevant legislation.

Should there be a need to review the approved documents, the designer shall adhere to the process implemented to ensure that all changes are done, accepted and communicated to all relevant parties in good time.

4.3 Quality and maintenance of designs

4.3.1 Quality of designs

The designer shall take all reasonable steps for quality control to generally ascertain that the Electrical Engineering solutions implemented or installed on site comply with the design. This quality control is not limited to the actual site, it may also include any manufacture/pre-assembly and assembly work completed.

Where appropriate, a quality control plan (QCP), which provides for not only conforming to all the requirements of the design but also to the requirements of the codes and/or relevant specifications that the contractor is expected to satisfy, should be instituted by the contractor and approved by the designer. The steps must be signed off by the contractor as having been correctly completed and overviewed by the engineer for important issues.

Should the designer not be satisfied with the arrangements regarding quality control instituted on site, this shall be raised with the contract manager (if work is external) and, where applicable and necessary, with the client. Should the quality control on site remain unsatisfactory, the designer shall not sign off any work.

The designer, if satisfied that the Electrical Engineering solutions have been implemented and installed in accordance with the requirements of the design, shall certify that the Electrical

Engineering solutions have been commissioned according to relevant standards and a certification of completed works issued.

4.3.2 Maintenance of designs

Maintenance requirements shall be defined and clarified by both designer and client, for both preventative and corrective maintenance types. As per the Regulations issued in terms of the Occupational Health and Safety Act, all plant owners must ensure that the Electrical Engineering solutions are safe for continued use and are inspected regularly.

Should there be a risk or hazard identified, relevant parties shall be notified, and recommended actions communicated.

4.4 Ethics of Engineering

Any Electrical Engineering Work carried out shall adhere to the Rules of Conduct for Registered Persons and reinforce the dignity of the profession, taking into account the following:

- Social, environmental and other possible consequences
- Honesty (truth and objectivity), integrity and fairness without discrimination
- Health, welfare and community safety
- Effects on the natural environment
- Conflicts of interest
- Confidentiality.

The Engineering Work shall adhere to legislation and recognised standards in executing Engineering Work, which include, among others, the following Acts as amended:

- Engineering Profession Act, 46 of 2000
- Occupational Health and Safety Act, 85 of 1993
- National Building Regulations and Building Standards Act, 103 of 1977
- National Environmental Management Act, 107 of 1998
- Employment Equity Act, 55 of 1998.
- Basic Conditions of Employment Act, 7 of 2018.

All Engineering Work must be carried out in accordance with the norms of the profession. Such norms are generally represented by national and international standards, industry standards, codes of practice and best practice guidelines. An Electrical Engineering Practitioner shall assess any deviation from recognised standards or work beyond the scope of such standards in terms of sound engineering and scientific fundamentals.

5. INTERPRETATION AND COMPLIANCE

5.1 Interpretation

The word "shall" indicates a peremptory provision.

The word "should" indicates a provision directive or informative in character, requiring substantial compliance only.

The word "they" in its plural form, or its derivative forms "their/them" are pronouns used for gender neutrality.

5.2 Compliance

Failure to comply with a peremptory provision of this Code of Practice constitutes improper conduct in terms of the Act.

Failure to comply with a directive or informative provision of this Code of Practice may constitute improper conduct in terms of the Act if its consequences are significant.

6. ADMINISTRATION

The Council shall be responsible for the Administration of this Code of Practice, including its publication, maintenance and distribution.

The Council shall ensure that the Code of Practice and all amendments thereto are available on the ECSA website and shall upon request, provide a copy thereof.

The Council shall take all reasonable steps to make the Code of Practice available to the general public.

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Subject: Code of Practice for the Performance of Electrical Engineering Work			
Compiler: M Hlalukana	Approving Officer: MB Mtshali	Next Review Date: N/A	Page **23** of **25**

REVISION HISTORY

Revision number	Revision date	Revision details	Approved by
Rev 0 Draft 1	21 September 2021	New document	RPS & Working Group
Rev 0 Draft 2	24 November 2021	Comments	Code of Practice Steering Committee
Rev 0 Draft 3	14 December 201	Incorporation of received comments	RPS & Working Group
Rev 0 Draft 4	17 January 2022	Review	ERPS
Rev 0 Draft 5	27 January 2022	Revision of Level 3 on Figure 1	RPS & Working Group
Rev 0 Draft 6	01 February 2022	Recommendation for approval	Code of Practice Steering Committee
Rev.0	13 July 2022	Approval	RPSC
Rev.0	25 August 2022	Ratification	Council

The Code of Practice for:

Electrical Engineering

Revision 0 dated 25 August 2022 and consisting of 23 pages has been reviewed for adequacy by the Business Unit Assistant Manager and is approved by the Acting Executive: Research Policy and Standards (**RPS**).

Hlalukana
....
Business Unit Assistant Manager

04 October 2022
....
Date

....
Acting Executive: **RPS**

04 October 2022
....
Date

This definitive version of this policy is available on our website.

REFERENCES

Board notice 20 of 2021, Overarching Code of Practice for the Performance of Engineering Work, No. 44333, Government Gazette, 26 March 2021.

Board notice: 21 of 2021, Identification of Engineering Work Regulations, No. 44333, Government Gazette, 26 March 2021.

Code of Practice for Registered Professional Engineers, Board of professional engineers of Queensland, 29 November 2013.

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ECSA professional development model. Available at: https://www.ecsa.co.za/prodevelopment/SitePages/Development%20Process.aspx

Engineering Council of South Africa. Rules of Conduct for Registered Persons Engineering Profession Act, 2000. Board Notice 256 of 2013. Government Gazette No. 37123 of 13 December 2013.

Framework for development of ECSA Codes of Practice Revision 1: 29 January 2019.

Geotechnical Engineering Code of Practice.

R-05-ELE: Discipline-specific Training Guide for Registration as a Professional Engineer in Electrical Engineering (Section 6.3).

Standards Act, 29 of 1993.

Structural Engineering Code of Practice.

Annexure A: Suggested minimum competence levels to undertake types of Electrical Engineering Work

The suggested minimum competence levels to undertake categories of electrical engineering work are indicated in the table below.

Competence levels required to undertake categories of electrical work

Type	Category of electrical work (see Table 3)	Competence level (see Table 2)	
		2	3
Main and back-up power supply systems (grid, hybrid and off-grid)	3 2 1	 • •	• • •
Telecommunication systems	3 2 1	 • •	• • •
Electrical systems supplying key utilities	3 2 1	 • •	• • •
Electrical systems supplying other systems	3 2 1	 • •	• • •
Electrical systems deployed in explosive environments	3 2 1	 • •	• • •
Mining Electrical Engineering solutions	3 2 1	 • •	• • •
Lifting Electrical Engineering solutions and operations	3 2 1	 • •	• • •
Electrical Engineering opinions	3 2 1	 • •	• • •
Temporary Electrical Engineering solutions	3 2 1	 • •	• • •

Note 1: Competence Level 1 (Candidates) is not shown in this table as such persons are required to work under supervision and control from an appropriately registered person.

Note 2: Registered Engineering Technicians may not assume responsibility for a Category 2 structure as a whole.

BOARD NOTICE 633 OF 2024

ENSURING THE
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Code of Practice for the Performance of Industrial Engineering Work

R-02-COP-IND

Revision 0: 25 August 2022

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ECSA

Document No.: R-02-COP-IND	Revision No.: 0	Effective Date: 25/08/2022	ECSA
Subject: Code of Practice for the Performance of Industrial Engineering Work			
Compiler: M Hlalukana	Approving Officer: MB Mtshali	Next Review Date: N/A	Page 2 of 19

TABLE OF CONTENTS

DEFINITIONS

In this Code, any word or expression defined in the Act has that meaning, unless the context dictates otherwise:

Act means the Engineering Profession Act, 46 of 2000.

Candidate means a person who is registered in terms of section 19(2)(b) of the Act.

Category of registration means the categories of registration provided for in section 18(1)(a) of the Act, i.e. Professional Engineers, Professional Engineering Technologists, Professional Certificated Engineers and Professional Engineering Technicians.

Code of Conduct means the code of conduct for registered persons in terms of Act.

Competent Person means a person who has the required knowledge, training, experience and, where applicable, qualifications specific to the work or task being performed, provided that, where appropriate, qualifications and training are registered in terms of the provisions of the National Qualification Framework Act, 67 of 2008, those qualifications and that training are regarded as the required qualifications.

Council/ECSA means the Engineering Council of South Africa established in terms of section 2 of the Act.

Engineering Work means the work identified in terms of section 26 of the Act.

Registered Person means a person registered with the Engineering Council of South Africa in terms of the Act under one of the categories referred to in section 18.

Risk means the effect of uncertainty on the objectives of a design; it is expressed in terms of a combination of the consequences of an event and the likelihood of occurrence.

Industrial Engineer means a Professional Engineer registered in terms of 18(1)(a)(i) of the Act who has experience specifically in the sub-discipline of Industrial Engineering.

Industrial Engineering Technologist means a Professional Engineering Technologist registered in terms of section 18(1)(a)(i) of the Act who has experience specifically in the sub-discipline of Industrial Engineering.

Industrial Engineering Technician means a Professional Engineering Technician registered in terms of section 18(1)(a)(i) of the Act who has experience specifically in the sub-discipline of Industrial Engineering.

Industrial Engineering Work means Engineering Work identified identified in terms of section 26 of the Act specifically in the discipline of Industrial Engineering.

ABBREVIATIONS

3D	3-dimensional
ANYSYS	Analysis System
ArchiMate	Architecture Animate
CAD	Computer-Aided Design
CPD	Continuing Professional Development
CRM	Customer Relationship Management
DMAIC	Define, Measure, Analyse, Improve and Control
DoDAF	Department of Defence Architecture Framework
DSTG	Discipline-specific Training Guide
ECSA	Engineering Council of South Africa
FAST	Function Analysis Systems Technique
FMEA	Failure Modes and Effects Analysis
GERAM	Generalised Enterprise Reference Architecture and Methodology
IDEF	Integrated DEFinition Methods
ISO	International Organisation for Standardisation
JIT	Just In Time
MoDAF	Ministry of Defence Architecture Framework
PDCA	Plan, Do Check, Act
PDSA	Plan, Do, Study, Act
PERT	Project Evaluation and Review Technique
PIN	Percentage of Industry Sales
PMBOK	Project Management Body of Knowledge
Pr Eng	Professional Engineer

PRINCE2	Projects in Controlled Environments
Pr Tech Eng	Professional Engineering Technologist
Pr Cert Eng	Professional Certificated Engineer
Pr Techni Eng	Professional Engineering Technician
QFD	Quality Function Deployment
RCA	Root Cause Analysis
Reg Eng Tech	Registered Engineering Technician
SABS	South African Bureau of Standards
SAIIE	Southern African Institute for Industrial Engineering
SANS	South African National Standards
SOP	Standard Operating Procedures
SysML	Systems Modelling
TPM	Total Productive Maintenance
TQM	Total Quality Management
TWI	Training Within Industry
UAF	Unified Architecture Framework
UML	Unified Modelling Language
VSM	Value Stream Mapping

1. INTRODUCTION

This Code of Practice has been developed by the Engineering Council of South Africa (ECSA) to supplement the Code of Conduct for Registered Persons in conjunction with the Southern African Institute for Industrial Engineering (SAIIE). Section 27 of the Engineering Profession Act (Act 46 of 2000) empowers the Council to draw up Codes of Practice in addition to codes of conduct and requires all registered persons to comply with such codes; failure to do so constitutes improper conduct. Codes of conduct regulate behaviour while codes of practice regulate engineering practice.

Section 18(1) of the Act provides for the registration of professionals and candidates in four categories of registration: Professional Engineers, Professional Technologists, Professional Technicians, Professional Certificated Engineers, and registration in Specified Categories as prescribed by Council. Section 18(2) prohibits persons so registered from practising in a category other than that in which they are registered.

In line with these requirements, this Code of Practice classifies Engineering Work in the sub-discipline of Industrial Engineering in terms of its complexity and stipulates the category of registration and the level of competence required for the execution of such work.

The Code also details the ethical values and professional standards that ECSA expects all registered persons to adhere to as prescribed under the Code of Conduct for registered persons in terms of the Act.

2. POLICY STATEMENT

(a) This Code applies to the discipline of Industrial Engineering.

(b) The~~is~~ Code has reference to the Act, overarching Code of Practice for the performance of Engineering Work, competency standard for registration in Professional Categories (**R-02-STA-PE/PT/PN**) and other relevant ECSA policy documents.

(c) It classifies Industrial Engineering Work according to the complexity of the problem, nature of the environment, the methods employed, the risks involved and the consequences of failure.

(d) It sets out the level of competence required from persons registered in any of the categories of registration provided for in Section 18(1) of the Act for the performance of Industrial Engineering Work of varying complexities.

(e) This Code stipulates requirements for the practice of Industrial Engineering Work and provides a statement of recognised good practice.

(f) Where a Code, Act or Policy is referenced the latest version thereof applies.

3. PURPOSE

The purpose of this Code of Practice is to ensure that any person undertaking Industrial Engineering Work meets the prescribed requirements when practising and executing Industrial Engineering Work within the jurisdiction of the Act. This Code also sets appropriate levels of competence regulating the execution of Industrial Engineering Work and specifying technical standards and best practice. Among others, this Code of Practice ensures the following:

(a) Registered persons apply their specialised knowledge within their competence and skill in accordance with all relevant legislation.

(b) All Industrial Engineering Work is performed by a competent person and uniform competency and conduct standards apply to all registered persons.

(c) Industrial Engineering Work is performed in accordance with generally accepted norms and standards of the Industrial Engineering profession.

(d) Registered persons apply innovation in a responsible and appropriate manner within their category.

(e) Registered Persons apply their specialised knowledge and skill within their respective area of competence to ensure that engineering practice is appropriate, applicable, acceptable, affordable and sustainable.

(f) Registered Persons encourage innovation, promote social upliftment where possible in all aspects of Industrial Engineering and set examples within the profession.

4. APPLICABLE LEGISLATIVE FRAMEWORK

This Code should be read in conjunction with the following:

(a) Engineering Profession Act, 46 of 2000

(b) Code of Conduct

(c) Occupational Health and Safety Act, 85 of 1993

(d) Overarching Code of Practice for the performance of Engineering Work

(e) Identification of Engineering Work Regulations

(f) All other relevant legislation.

5. INDUSTRIAL ENGINEERING WORK

5.1 Nature of Industrial Engineering Work

Due to the dynamic nature of the profession, the diverse range of industries in which Industrial Engineers could be employed and the diverse range of sub-disciplines and specialised skills characterising the profession, it is virtually impossible to define a set of predetermined training paths for Industrial Engineers. Instead of predetermined paths, a set of guiding principles is proposed whereby Candidates can shape the course of their careers.

(a) The performance of Industrial Engineering Work requires solving industrial engineering problems and engaging in industrial engineering activities.

(b) Industrial Engineering Work encompasses a number of Industrial Engineering sub-disciplines, each dealing with a specific body of knowledge.

(c) Depending on the level of complexity, Industrial Engineering Work is carried out by registered persons possessing different levels of competence as typified by the various categories of registration given in Section 18(1) of the Act.

(d) Due to a common grounding in the mathematical and physical sciences, there are areas of overlap among the various sub-disciplines of Industrial Engineering as well as overlaps with other professions. These overlaps generally occur at a basic level and divergence increases with the degree of specialisation.

5.2 Range of Industrial Engineering problems and activities

For the purposes of this Code, engineering problems and activities are classified as complex, broadly defined, well-defined and specifically defined problems. The basis of the classification of engineering problems is given in the **R-02-STA-PE/PT/PCE/PN** and **R-02-STA-SC** documents available on the ECSA website.

Industrial Engineering Work may, in terms of **Table 1**, be classified as work executed in one or more of the Fields/Areas in Column 2, involving one or more of the activities listed in Column 3 and making use of one or more of the Methods/Tools in Column 4. **Table 1** is a guideline and not an exhaustive list of Fields/Areas, Activities or Methods/Tools.

Table 1: Industrial Engineering Work

Number (Col.1)	Field/Area (Col. 2)	Activities (Column 3)	Methods/Tools (Column 4)
1	Asset Management	• Total lifecycle management • Strategic management • Data management • Maintenance planning & scheduling materials management	RCAs FMEAs Maintenance strategies SABS/SANS 55111/2020,55001/2020, 55002/2020
2	Business Engineering	• Strategic positioning • Alignment and transformation (facilitating a common vision across stakeholders) • Assessing the *status quo* • Validating various scenarios • Eliciting critical success factors and measuring the current and perceived ideal business against such	Data modelling & visualisation platforms (tableau, R, Power BI, R4Apps)
3	Data Analytics	• Statistical modelling and data mining • Descriptive, predictive and prescriptive analysis utilising data mining • Time series,	Statistical modelling Computer science/ programming Operations research and optimisation

Number (Col.1)	Field/Area (Col. 2)	Activities (Column 3)	Methods/Tools (Column 4)
		• Forecasting and machine learning • Optimisation and simulation.	
4	Engineering Economics	• Financial planning • Evaluation of alternative solutions • Feasibility studies execution • Develop and implement performance measurement standards • Project and contract management	Present/Future worth analysis Annual worth analysis Rate of return analysis Benefit/cost analysis Breakeven analysis Cost estimation Depreciation methods Sensitivity analysis Cash flows
5	General Management	• People management • Financial management • Planning & forecasting • Resource management • Organising • Leading • Controlling • Strategy development and execution • Productivity management • Communication management • Technology management • Digital transformation • Risk management	Strategy planning and methodologies Decision-making tools Balanced scorecard Benchmarking Employee engagement surveys Customer relationship management Change management Agile methodologies Data analytics
6	Lean Operations & 6 Sigma	• Continuous improvements • Product development	PDCA/PDSA DMAIC KATA KAIZEN VSM TWI TPM
7	Manufacturing & Production Engineering	• Continuous improvement • Root cause analysis • Process scheduling	Root cause analysis Kaizen 5S

Number (Col.1)	Field/Area (Col. 2)	Activities (Column 3)	Methods/Tools (Column 4)
		• Raw material analysis • Plant maintenance • Quality control and measurement • Metrology • Green manufacturing • Statistical process control	6 Sigma
8	Project Management	• Project definition • Project planning and scheduling • Cost estimation and budgeting • Project quality management • Project risk management • Project execution and control	PMBOK PRINCE 2 LEAN Network diagrams Critical path Gantt charts Theory of constraints methods PERT Lifecycle costing
9	Quality	• Quality of service • Value addition • Process quality • Process and variation control • Product quality, functionality and design. • Quality of systems and technology • Processes alignment • Quality of design projects and programs • Quality management systems • Policies and procedures	ISO 9000/9001, Total quality management Failure analysis Weibull analysis Failure modes and effects Fault tree analysis Event tree analysis Markov state analysis Reliability block diagram QFD Statistical process control
10	Supply Chain and Logistics Management	• CRM • Forecasting • Distribution • Inventory management • Logistics • Procurement • SOP • Sustainability	Aggregate scheduling Inventory management Scheduling JIT Distribution Network Models Algorithms Graph Theory Operations research

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Subject: Code of Practice for the Performance of Industrial Engineering Work			
Compiler: M Hlalukana	Approving Officer: MB Mtshali	Next Review Date: N/A	Page 13 of 19

Number (Col.1)	Field/Area (Col. 2)	Activities (Column 3)	Methods/Tools (Column 4)
		• Demand side forecasting	
11	Systems and Reliability Engineering	• Requirements engineering • System architecting • System decomposition and aggregation • Element and component design • System implementation and integration • Verification and validation • Programme and project management • System lifecycle management • Stakeholder engagement and knowledge elicitation • Systems thinking • Systems science • General systems theory • Trade-off studies • Determination of systems efficiencies, etc. • Availability and reliability • System safety analysis	Model-based systems engineering Functional and logical decomposition Object-orientated systems engineering DoD systems design and analysis SysML UML IDEF ArchiMate UAF DoDAF MoDAF GERAM Capella Petri Nets Causal Loops Simulink Failure analysis Weibull analysis Failure modes and effects analysis Fault tree analysis Event tree analysis Markov state analysis Reliability block diagram
12	Value Management, Engineering, & Analysis	• Value Improvement practices • Technology selection • Process simplification • Reliability simulation & modelling • Customising standards and specifications • Energy optimisation	PIN analysis- perspective Modelling analysis FAST Diagramming 3D CAD

5.3 Industrial Engineering sub-disciplines

The Industrial Engineering sub-disciplines recognised by ECSA are provided in the Discipline-specific Training Guides **R-05-IND-PE**, **R-05-IND-PT** and **R-05-IND-PN** for each category of registration. These can be found on the ECSA website.

5.4 Categories of registration

Industrial Engineering professionals' category of registration is determined by the Council in terms of Section 18(1) of the Act. The categories of registration include:

a) Professional Engineer (PrEng) registered in terms of Section 18(1)(a)(i) of the Act;
b) Professional Engineering Technologist (PrTechEng) registered in terms of Section 18(1)(a)(ii) of the Act;
c) Professional Engineering Technician (PrTechniEng) registered in terms of Section 18(1)(a)(iv) of the Act;
d) Specified Category Practitioner registered in terms of Section 18(1)(c) of the Act;
e) A candidate registered in terms of Section 18(1)(b) of the Act.

6. INDUSTRIAL ENGINEERING COMPETENCY REQUIREMENTS

6.1 General requirements

(a) All Industrial Engineering Work shall be carried out by a competent Industrial Engineering Registered Person who is qualified by virtue of knowledge, training, experience and applicable qualifications to perform such work.

(b) All Registered Persons shall confine their performance of Industrial Engineering Work to the areas in which they are competent, subject to the provisions of (a) above.

(c) All Registered Persons shall undertake continuing professional development (CPD) or independent learning activities sufficient to maintain and extend their competence in line with current good practice in the industry.

(d) Registered Persons' competence and the nature of the work they are competent to perform should be assessed in terms of the criteria applicable to them.

6.2 Criteria for assessment of competency

The criteria for assessing competency are defined in the ECSA Competency Standard for Registration in Professional Categories as **PE/PT/PN** (**R-02-STA-PE/PT/PN**) and **R-02-STA-SC**.

7. INDUSTRIAL ENGINEERING GOOD PRACTICE

7.1 General good practice

All work carried out or services rendered shall be:

- in accordance with accepted norms and standards of Industrial Engineering
- in an ethical and responsible manner in accordance with the Code of Conduct
- within the area of competency with honesty, fidelity and integrity
- in accordance with the Labour Relations Act (Act 66 of 1995) as amended
- in accordance with the Protection of Personal Information Act (Act 4 of 2013) as amended
- in accordance with any other applicable legislation.

Prior to taking a role in Industrial Engineering, Industrial Engineering Registered Persons shall ensure that they possess the competencies required to undertake the work.

Prior to undertaking any task, Industrial Engineering Registered Persons -shall ascertain and document:

- the purpose of the activities
- the approach to be used in executing the activities
- the performance requirements for the activities
- any statutory, regulatory or other requirements that may pertain to the activities.

The Industrial Engineering Registered Person shall consider the likely variation in input parameters and the accuracy of the models or methods used and shall consider all likely.

All calculations shall be independently checked, either by another suitably qualified registered person or by alternative calculation methods.

Prior to approving any work or signing any completion certificate, Industrial Engineering Registered Persons shall ensure sufficient detailed checks or inspections to warrant such approval. Where the checks or inspections were limited in any way or carried out by a third party, the approval shall be qualified accordingly.

7.2 Health, safety and environment

All Industrial Engineering Work shall be done in accordance with the following:

- Occupational Health and Saftety Act, as amended
- National Environmental Management Act, as amended
- Any other applicable legislation.

Cognisance should be taken of health and safety requirements from planning to completion of work.

The environmental impact of all Industrial Engineering Work should be assessed and appropriate measures taken to minimise such impacts or to remediate areas so impacted.

Industrial Engineering Registered Person shall involve relevant expertise when identified impacts are outside their area of expertise.

The client shall immediately be notified of any condition that is observed which may compromise the health and safety of persons or the environment.

7.3 Ethical considerations

Registered Persons shall comply with the Code of Conduct.

Cognisance should be taken of any potential social and cultural impacts of the Industrial Engineering Work on the communities within which work is conducted.

The client shall immediately be notified of any condition that is observed which may result in social or cultural impacts.

7.4 Standards and codes of practice

All Industrial Engineering Work shall be done in accordance with accepted norms and standards. Any deviation from such norms and standards shall be clearly stated.

7.5 Industrial Engineering data

Sufficient quantitative or qualitative data is required for all Industrial Engineering tasks. Industrial Engineering Registered Persons should ensure that the data used is adequate for the intended purpose. Where this is not the case, additional data should be obtained, or the work should be based on parameter values selected such that the occurrence of less favourable values is unlikely.

Data analysis should be presented in sufficient detail to allow independent assessment of the data.

7.6 Reporting

During the planning of an activitiy, Industrial Engineering Registered Persons should ascertain the purpose for which the activitiy is required and the nature of the proposed activity. Industrial Engineering Registered Persons shall ensure that the proposed activity is capable of yielding the information required for that purpose.

Industrial Engineering Registered Persons should advise the client of the effect of any restrictions placed on the activity that are likely to adversely affect the accuracy or adequacy of the data obtained. This information may be presented as a single report or in two separate reports: a factual report and an interpretive report. All assumptions shall be clearly documented together with the reason for the specific assumption.

7.7 Quality and risk management

Industrial Engineering Registered Persons shall implement quality and risk management systems covering all aspects of their work, appropriate to the nature and size of the work.

Quality and risk management systems must be reviewed regularly. Compliance with the quality and risk management systems should be audited at least annually. Organisations undertaking Engineering Work should consider external certification, such as ISO 9001 and ISO 14001.

8. ADMINISTRATION

(a) The Council shall be responsible for the administration of this Code, including its publication, maintenance and distribution.

(b) The Council shall ensure that this Code and all amendments thereto are available on the ECSA website and shall upon request, provide a copy thereof.

(c) The Council shall take all reasonable steps to introduce this Code to the general public.

9. INTERPRETATION AND COMPLIANCE

9.1 Interpretation

(a) The word "shall" indicates a peremptory provision.

(b) The word "should" indicates a provision directive or informative in character, requiring substantial compliance only.

9.2 Compliance

Failure to comply with a peremptory provision of this Code constitutes improper conduct in terms of the Act. Failure to comply with a directive or informative provision of this Code may constitute improper conduct in terms of the Act if its consequences are significant.

10. FURTHER INFORMATION

Further insights and information can be found in the following publications:

- Engineering Council of South Africa Code of Conduct
- Engineering Council of South Africa Overarching Code of Practice for the performance of Engineering Work.

REVISION HISTORY

Revision no.	Revision date	Revision details	Approved by
Rev 0	12 November 2021	New Document	
Rev 0 Draft 2	24 November 2021	Comments	Code of Practice Steering Committee
Rev 0 Draft 3	14 December 201	Incorporation of received comments	RPS & Working Group
Rev 0 Draft 4	17 January 2022	Review	ERPS
Rev 0 Draft 5	11 May 2022	Presentation before Steering Commitee	Code of Practice Steering Committee
Rev 0 Draft 6	11 May 2022	Recommendation for approval	Code of Practice Steering Committee
Rev 0	13 July 2022	Approval	RPSC
Rev 0	25 August 2022	Ratification	Council

The Code of Practice for:

Industrial Engineering

Revision 0 dated 25 August 2022 consisting of 19 pages have been reviewed for adequacy by the Business Unit Assistant Manager and is approved by the Acting Executive: Research, Policy and Standards (**RPS**).

.... 04 October 2022
Business Unit Assistant Manager Date

.... 04 October 2022
Acting Executive: RPS Date

This definitive version of this policy is available on our website

BOARD NOTICE 634 OF 2024

ENSURING THE
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SOUTH AFRICA

Code of Practice for the Performance of Mechanical Engineering Work

R-02-COP-MEC

Revision 0: 25 August 2022

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ECSA

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Subject: Code of Practice for the Performance of Mechanical Engineering Work			
Compiler: M Hlalukana	Approving Officer: MB Mtshali	Next Review Date: N/A	Page 2 of 20

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

DEFINITIONS

Act means the Engineering Profession Act, 46 of 2000 as amended.

Code of Conduct means the Code of Conduct for Registered Persons: Engineering Profession Act, 46 of 2000.

Competency means a combination of knowledge, training, experience and applicable qualifications that enables an individual to perform a task or an activity successfully.

Council means the Engineering Council of South Africa established by Section 2 of the Act.

Discipline means the disciplines of engineering as recognised by ECSA.

Engineering Work means the process of applying engineering and scientific principles, concepts, contextual and engineering knowledge to the research, planning, design, implementation, maintenance and management of work in the natural and built environments. It includes advisory services, assessment of engineering designs and determination of the risks posed by the design on workers, the public, and environment.

Identification of Engineering Work means the Identification of Engineering Work as gazetted.

Overarching Code of Practice means the Overarching Code of Practice for the Performance of Engineering Work as gazetted

Practice means any engineering professional service, advisory service or creative work requiring engineering education, training and experience and the application of special knowledge of the mathematical, physical and engineering sciences, or creative work such as consultation, research, investigation, evaluation, planning, surveying, risk assessment and design, in connection with any public or private utility, structure, building, machine, equipment, process, work or project.

Profession means Engineering Profession.

Registration Category means a professional registration category as specified under Section 18(1)(a)–(c) of the Act, including Professional Engineer, Professional Engineering Technologist, Professional Certificated Engineer, Professional Engineering Technician, Candidate and Specified Category Practitioner.

Registered Person means a person registered under a category referred to in Section 18 of the Act.

Specified Category means those registration categories classified as such by ECSA, for example those related to fire protection systems, lifting machinery and medical equipment.

Specified Category Practitioner means a person registered in terms of section 18(1)(c) of the Engineering Profession Act, carrying out specifically defined engineering activities.

Unregistered Person means any person undertaking engineering work who is not registered in terms of the Act. This does not include persons registered by other statutory bodies and are part of teams undertaking engineering work.

Document No.: R-02-COP-MEC	Revision No.: 0	Effective Date: 25/08/2022	ECSA
Subject: Code of Practice for the Performance of Mechanical Engineering Work			
Compiler: M Hlalukana	Approving Officer: MB Mtshali	Next Review Date: N/A	Page 6 of 20

ABBRIVIATIONS

API	American Petroleum Institute
ASHRAE ENGINEERS	American Society of Heating, Refrigerating And Air-Conditioning
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
BSI	British Standards Institution
CAD	Computer-Aided Design
CAM	Computer-Aided Manufacturing
CFD	Computational Fluid Dynamics
CFD	Computational Fluid Dynamics
COP	Code of Practice
ECSA	Engineering Council of South Africa
FEA	Finite Element Analysis
IFE	The Institution of Fire Engineers
ISO	International Standard Organization
SANS	South African National Standards
SAE	Society of Automotive Engineers

1. INTRODUCTION

In terms of Section 27(1) of the Act, the Council must draw up a Code of Conduct for Registered Persons and may draw up a Code of Practice in consultation with the Council for the Built Environment, Voluntary Associations and Registered Persons. The Council is also responsible for administering the Code of Conduct and the Code of Practice and ensuring that these codes are available to all members of the public at all reasonable times. An “Overarching Code of Practice for the Performance of Engineering Work” was therefore developed and published in the Government Gazette, dated 26 March 2021, which this document refers to as the “Overarching Code of Practice”, for brevity. The Overarching Code of Practice applies to all engineering disciplines.

Respective disciplines and sub-disciplines may develop their own codes of practice to complement the Overarching Code of Practice, of which this Mechanical Engineering Code of Practice is an example. The Mechanical Engineering Code of Practice is specifically aimed at Mechanical Engineering and should be read in conjunction with the Overall Code of Practice; it is not intended to duplicate the requirements thereof.

2. POLICY STATEMENT

This Code is a statement of good practice for the performance of Mechanical Engineering Work by Registered Persons. It is applicable to the entire Mechanical Engineering Profession. Section 27(3) of the Act requires Registered Persons to adhere to the requirements of this Code when they perform mechanical work.

3. PURPOSE AND SCOPE OF DOCUMENT

The purpose of this Code is to ensure that any person undertaking Mechanical Engineering Work meets the prescribed requirements when practising and executing Mechanical Engineering Work within the jurisdiction of the Act. This Code sets appropriate levels of competence, regulating the execution of Mechanical Engineering Work and specifying technical standards and best practice.

This Code also applies when a Mechanical Engineering Practitioner performs Mechanical Engineering Work in the Specified Categories, such as those related to fire protection systems, lifting machinery and medical equipment. Additional codes of practice, specific to the specified category, may also apply in these contexts.

4. APPLICABLE LEGISLATIVE FRAMEWORK

Section 27 of the Act empowers the Council to draw up codes of practice in addition to codes of conduct and requires all registered persons to comply with such codes.

This Code should be read in conjunction with the Act and related documents, in particular the Code of Conduct for Registered Persons, the **Overarching Code of Practice**, and the gazetted **Identification of Engineering Work**.

5. MECHANICAL ENGINEERING WORK

Mechanical Engineering is an engineering branch that combines engineering physics and mathematics principles with materials science to design, analyse, manufacture, install, test and maintain mechanical systems and the mechanical elements of multi-disciplinary systems. Mechanical Engineering Work requires an understanding of core areas that typically include solid body statics and dynamics, materials science, solid mechanics, thermodynamics, fluid dynamics, thermal energy transfer, design methodologies and electrics. In addition, Mechanical Engineers use tools such as computer-aided design (CAD), computer-aided manufacturing (CAM), finite element analysis (FEA), computational fluid dynamics (CFD), and product lifecycle management. These are applied to manufacturing and production plants, process plants, consumer products, industrial equipment and machinery, heating and cooling systems, transport systems, medical devices, military systems, fire protection and others.

5.1 Engineering qualifications and supervision of work

It is highly recommended that all Mechanical Engineering Work be undertaken by a registered Mechanical Engineering Practitioner. In cases where work is to be performed by an unregistered Mechanical Engineering Practitioner, it recommended that the following work allocation be under the supervision of a registered Mechanical Engineering Practitioner:

Table 1: Engineering qualifications and supervision of work

Qualification	Level of Descriptors	Supervision
BEng/BSc Eng/MEng	Solving complex engineering problems and performing complex engineering activities	Pr.Eng
BTech/ BEng Tech Eng/Advanced Diploma	Solving broadly defined engineering problems and performing broadly defined engineering activities	Pr.Eng Pr.Tech Eng
National Diploma	Solving well-defined engineering problems and performing well–defined engineering activities	Pr.Eng, Pr.Tech Eng Pr.Techni Eng

5.2 Category of registration and level of descriptors

Table 2 below represents Mechanical Engineering Work, category of registration and level of descriptors for engineering activities or problems.

As per **R-02-STA-PE/PT/PN and R-02-STA-PCE**, the level of descriptors in this Code pertains to the:

- level of an engineering problem
- level of an engineering activity.

Moreover, each category of registration has three level descriptors for engineering activities and problems to consider: complex engineering activities/problems, broadly defined engineering problems and well-defined engineering problems.

Table 2: Mechanical Engineering Work

Area/Field	Methods/Techniques	Category of registration	Level descriptor
Engineering Design	Collecting and analysing data from tests on prototype, modifying design (improve existing components and systems), computer-aided design and simulation, finite element analysis (FEA)	Pr.Eng	Solving complex engineering problems and performing complex engineering activities
		Pr.Tech Eng	Solving broadly defined engineering problems and performing broadly defined engineering activities.
		Pr.Cert Eng	Solving broadly defined engineering problems and

Document No.: R-02-COP-MEC	Revision No.: 0	Effective Date: 25/08/2022	ECSA
Subject: Code of Practice for the Performance of Mechanical Engineering Work			
Compiler: M Hlalukana	Approving Officer: MB Mtshali	Next Review Date: N/A	Page 10 of 20

Area/Field	Methods/Techniques	Category of registration	Level descriptor
	Design codes and standards Design process Approval of design drawings		performing broadly defined engineering activities
		Pr.Techni. Eng	Solving well-defined engineering problems and performing well – defined engineering activities
		Candidates	Solving engineering problems and engineering activities under supervision
Reverse Engineering of mechanical components	Visual inspection, dimensional examination, data collection, procurement analysis, material analysis, destructive and non-destructive testing, draughting, FEA, economic and technical risk assessment, components classification, manufacturing process, quality assurance and control, manufacturing analysis	Pr Eng	Solving complex engineering problems and performing complex engineering activities
		Pr Tech Eng	Solving broadly defined engineering problems and performing broadly defined engineering activities
		Pr Cert Eng	Solving broadly defined engineering problems and performing broadly defined engineering activities
		Pr Techni Eng	Solving well-defined engineering problems and performing well – defined engineering activities
		Candidates	Solving engineering problems and engineering activities under supervision
Maintenance Engineering	Establish maintenance philosophy for mechanical systems Develop scope of work for repairs and refurbishment of components Inspect and trouble-shooting equipment malfunctioning, develop maintenance budget, classify components and systems, manage budget	Pr Eng	Solving complex engineering problems and performing complex engineering activities
		Pr Tech Eng	Solving broadly defined engineering problems and performing broadly defined engineering activities
		Pr Cert Eng	Solving broadly defined engineering problems and performing broadly defined engineering activities
		Pr Techni Eng	Solving well-defined engineering problems and performing well – defined engineering activities

CONTINUES ON PAGE 258 OF BOOK 3

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Document No.: R-02-COP-MEC	Revision No.: 0	Effective Date: 25/08/2022	ECSA
Subject: Code of Practice for the Performance of Mechanical Engineering Work			
Compiler: M Hlalukana	Approving Officer: MB Mtshali	Next Review Date: N/A	Page 11 of 20

Area/Field	Methods/Techniques	Category of registration	Level descriptor
		Candidates	Solving engineering problems and engineering activities under supervision
Manufacturing Engineering	Read and interpret manufacturing drawings, develop and approve process quality plans Quality control, manufacturing analysis and process, computer-aided manufacturing (CAM)	Pr Eng	Solving complex engineering problems and performing complex engineering activities
		Pr Tech Eng	Solving broadly defined engineering problems and performing broadly defined engineering activities
		Pr Cert Eng	Solving broadly defined engineering problems and performing broadly defined engineering activities
		Pr Techni Eng	Solving well-defined engineering problems and performing well – defined engineering activities
		Candidates	Solving engineering problems and engineering activities under supervision

NB: Any mechanical engineering work not listed in Table 2 or in this Code of Practice should also comply with the category of registration and level descriptors.

5.3 Specified category

Mechanical Engineering Work may include aspects of work in the specified categories, such as those related to fire protection systems, lifting machinery and medical equipment. Any Mechanical Engineering Practitioner wishes to perform such specified category should comply with Table 3 below:

Table 3: Specified category performed by Mechanical Engineering Practitioners

Specified Category	Reference Number
Fire Protection Systems design	R-05-FPSRD-SC
Lifting Machinery Inspectors	R-05-LMI-SC

Medical Equipment Maintainer	R-05-MEM-SC

5.4 Overlaps

Apart from Table 3 above, Mechanical Engineering has emerging specialties, such as pressure vessels and welding engineering. All Mechanical Engineering Practitioners who wish to perform such should comply with the respective industry and standard practices.

Moreover, in this Code, Mechanical Engineering Practitioner shall work with other engineering disciplines as per the **Overarching Code of Practice for Performance of Engineering work** as amended to ensure that confusion is minimised regarding which engineering discipline should perform certain tasks.

5.5 Professional Certificated Engineers

Mechanical Engineering Practitioners who wish to register and operate and/or practise as Professional Certificated Engineers shall obtain the Government Certificate of Competency as Mechanical Engineers, as recognised by the **Act**.

In addition, Mechanical Engineering Practitioners shall comply with respective legal requirements and the requirements of this Code of Practice when performing Mechanical Engineering Work.

6. MECHANICAL ENGINEERING COMPETENCY REQUIREMENTS

Please refer to the **Overarching Code of Practice** for “General Requirements” and “Requirements for Registered Persons”, and to the gazetted **Identification of Engineering Work** for “Core Competencies Required to Perform Identified Engineering Work”.

6.1 Competence required to perform Mechanical Engineering Work

Any person who performs any Mechanical Engineering Work must comply with the Act, as well as any other requirement contemplated in the Act, and –

- be registered with ECSA in the appropriate professional registration category applicable to the level of service performed

- possess the necessary core competency in the competency areas to perform such core service as a Professional Engineer, Professional Engineering Technologist, Professional Certificated Engineer, Professional Engineering Technician or a Specified Category Practitioner.

In case of performing Mechanical Engineering Work in the specified categories as per **section 5.3** above, such as those related to fire protection systems, lifting machinery and medical equipment, Mechanical Engineering Registered Persons must comply with the relevant competency requirements imposed by ECSA.

6.2 Competency evaluation

Mechanical Engineering Registered Persons' level of experience should also meet or exceed the requirements of the risk competency model shown in Table 4, in addition to their category of registration with reference to the complexity of the work. In the model, risk may include (where appropriate) risk to the health and safety of people and society, the natural and built environment, property, financial interests and related project timescales.

Table 4: Competency model

Level of experience	Level of supervision	Responsibility	Allowable risk
Novice	Direct and frequent supervision	Provide assistance and support for engineering activities	Low
Intermediate	General supervision	Guide and provide input for engineering activities	Medium
Competent	Work independently	Oversee and guide engineering activities	High

6.3 Categories of risks

Table 5 below defines level of risk associated with above competency model.

Table 5: Level of risk associated with the competency model

Document No.: R-02-COP-MEC	Revision No.: 0	Effective Date: 25/08/2022	ECSA
Subject: Code of Practice for the Performance of Mechanical Engineering Work			
Compiler: M Hlalukana	**Approving Officer:** MB Mtshali	**Next Review Date:** N/A	**Page 14 of 20**

Level of risk	**Impact of risk**			**Risk matrix value**
	Safety (People)	**Environment (Spillage/Pollution)**	**Reputation (Company)**	
Low	Minor injury No lost time	Minor	• Warning • No media coverage	1–5
Medium	Result in permanent disability	Major	• Major financial penalties • Local media coverage	6–12
High	Result in fatalities	Catastrophic	• Hefty financial penalties • International media coverage	15–25

These risk values are based on the 5 by 5 risk matrix (Figure 1) and calculated as follows e.g. Impact x Probability (5 x 5 = 25 – High Risk).

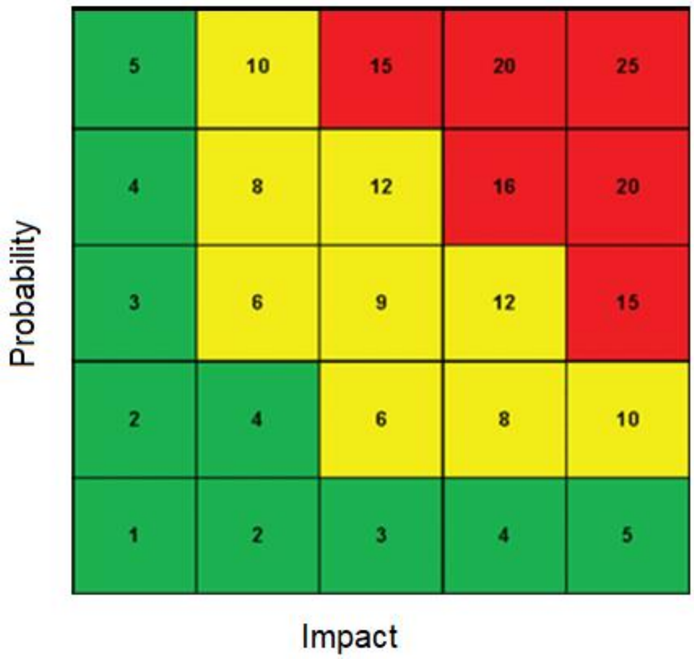

Figure 1: Risk matrix

7. PRACTICE REQUIREMENTS

7.1 Minimum practice requirements

All mechanical engineering work shall be carried out or services rendered:

- in accordance with the requirements of the applicable acts and regulations
- in an ethical and responsible manner in accordance with the Code of Conduct
- in accordance with accepted norms and standards in the industry.

7.2 Compliance to Acts and Regulations

Registered Persons must always ensure compliance with the appropriate acts and associated regulations. Notable national acts that may be applicable to Mechanical Engineering Work include:

- Engineering Profession Act, as amended
- Occupational Health and Safety Act, as amended
- Mine Health and Safety Act, as amended
- National Building Regulations and Building Standards Act, as amended
- National Environment Management Act, as amended.

7.3 Application of codes and/or standards

All Mechanical Engineering Work must be carried out in accordance with the norms of the profession, and these norms are generally represented by the mechanical engineering relevant national and international standards, industry standards, codes of practice and best practice guidelines.

Standards and codes shall be applied as and when required by government regulation, customer or end-user requirements and as an accepted industry norm. It is the duty of the engineering Registered Person to ensure that all standards and codes used abide by the applicable acts and regulations (considering that more than one country's legal frameworks may be relevant). Standards and codes may be used in place of regulations where it can be proven that the requirements of the standard or code meet or exceed those prescribed by regulations and/or law. Any deviations from the standards or codes requested by the customer or end-user should be communicated to the appropriate stakeholder, supported by evidence that the deviation will not compromise the performance and safety of the system or device.

Various international bodies are recognised and accepted within industry to develop and publish standards related to Mechanical Engineering, notably:

- SANS – South African National Standards
- ASME – American Society of Mechanical Engineers
- ASHRAE – American Society of Heating, Refrigerating and Air-Conditioning Engineers
- ISO – International Standard Organization
- SAE – Society of Automotive Engineers
- API – American Petroleum Institute
- IFE – The Institution of Fire Engineers
- ASTM International – American Society for Testing and Materials.

8. ADMINISTRATION

The Council shall be responsible for the Administration of this code of practice, including its publication, maintenance and distribution.

The Council shall ensure that the Code of Practice and all amendments thereto are available on the ECSA website and shall upon request, provide a copy thereof.

The Council shall take all reasonable steps to introduce the Code of Practice to the general public.

9. INTERPRETATION AND COMPLIANCE

9.1 Interpretation

(a) The word "must" indicates a peremptory provision.

(b) The word "should" indicates a provision directive or informative in character, requiring substantial compliance only.

9.2 Compliance

Failure to comply with a peremptory provision of this Code constitutes improper conduct in terms of the Act. Failure to comply with a directive or informative provision of this Code may constitute improper conduct in terms of the Act if its consequences are significant.

10. FURTHER INFORMATION

Further insights and information can be found in the following publications:

- Engineering Council of South Africa Code of Conduct
- Engineering Council of South Africa Overarching Code of Practice for the performance of Engineering Work.

REFERENCES

Engineering Council of South Africa. Rules of Conduct for Registered Persons Engineering Profession Act, 2000. Board Notice 256 of 2013. Government Gazette No. 37123 of 13 December 2013.

Engineering Qualifications in the Higher Education Qualifications Sub-framework E-23-P.

Identification of Engineering Work Regulations, No. 44333, Government Gazette, 26 March 2021.

Overarching Code of Practice for the Performance of Engineering Work, No. 44333, Government Gazette, 26 March 2021.

R-05-MEC-PE: Discipline Specific Training Guide for Registration as a Professional Engineer in Mechanical Engineering (Section 6).

R-02-STA-PE/PT/PCE/PN: Competency Standard for Registration in Professional Categories as PE/PT/PCE/PN.

Framework for development of ECSA Codes of Practice Revision 1: 29 January 2019.

Structural Engineering Code of Practice.

Geotechnical Engineering Code of Practice.

R-05-FSPRD-SC: Sub discipline – Specific Training Requirements for Candidate Fire Protection System Rational Designers (Fire Specialist).

R-05-MEM-SC: Sub discipline – Specific Training Requirements for Candidate Medical Equipment Maintainers.

R-05-LMI-SC: Sub discipline – Specific Training Requirements for Candidate Lifting Machinery Inspectors.

Document No.: R-02-COP-MEC	**Revision No.: 0**	**Effective Date: 25/08/2022**	ECSA
Subject: Code of Practice for the Performance of Mechanical Engineering Work			
Compiler: M Hlalukana	**Approving Officer: MB Mtshali**	**Next Review Date: N/A**	**Page 19 of 20**

REVISION HISTORY

Revision number	Revision date	Revision details	Approved by
Rev 0 Draft 1	21 Sep 2021	New document	RPS & Working Group
Rev 0 Draft 2	24 November 2021	Submitted for Comments	CoP Steering Committee
Rev 0 Draft 3	14 December 201	Incorporation of received comments	RPS & Working Group
Rev 0 Draft 4	17 January 2022	Review	ERPS
Rev 0 Draft 5	27 January 2022	Revision of Level 3 on Figure 1	RPS & Working Group
Rev 0 Draft 6	01 February 2022	Recommendation for broader consultation	CoP Steering Committee
Rev 0 Draft 7	02 May 2022	Addressing of comments that were received from the broader consultation	RPS & Working Group
Rev 0 Draft 7	11 May 2022	Presentation before Steering Committee for final recommendation	CoP Steering Committee
Rev 0 Draft 8	11 July 2022	Recommendation for approval via Round-robin	CoP Steering Committee
Rev 0 Draft	13 July 2022	For approval	RPSC
Rev 0 Draft	25 August 2022	Ratification	Council

The Code of Practice for:

Mechanical Engineering

Revision 0 dated 25 August 2022 consisting of 19 pages have been reviewed for adequacy by the Business Unit Assistant Manager and is approved by the Acting Executive: Research, Policy and Standards (**RPS**).

Hlalukana
....
Business Unit Assistant Manager

04 October 2022
....
Date

....
Acting Executive: RPS

04 October 2022
....
Date

This definitive version of this policy is available on our website

BOARD NOTICE 635 OF 2024

ENSURING THE
EXPERTISE TO GROW
SOUTH AFRICA

Code of Practice for the Performance of Metallurgical Engineering Work

R-02-COP-MET

REVISION No. 0:01 December 2022

ENGINEERING COUNCIL OF SOUTH AFRICA
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ECSA

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Subject: Code of Practice for the Performance of Metallurgical Engineering Work			
Compiled by: Manager RPS Date: 04/07/2022	Approved by: Executive RPS Date: 03/10/2022	Next Review Date: N/A	Page 2 of 22

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

DEFINITIONS

Act means the Engineering Profession Act, 46 of 2000 "as revised".

Code means this code of practice document.

Code of Conduct means the Code of Conduct for Registered Persons: Engineering Profession Act, 46 of 2000.

Competency means a combination of knowledge, training, experience and applicable qualifications that enables an individual to perform a task or an activity successfully.

Council means the Engineering Council of South Africa established by Section 2 of the Act.

Discipline means the disciplines of engineering as recognised by the Engineering Council of South Africa.

Engineering Work means the process of applying engineering and scientific principles, concepts, contextual and engineering knowledge to the research, planning, design, implementation, maintenance, and management of work in the natural and built environments. It includes advisory services, assessment of engineering designs and determination of the risks posed by the design on workers, the public, and environment.

Identification of Engineering Work means the Identification of Engineering Work as gazetted.

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Practice means any engineering professional service, advisory service or creative work requiring engineering education, training and experience and the application of special knowledge of the mathematical, physical and engineering sciences, or creative work such as consultation, research, investigation, evaluation, planning, surveying, risk assessment and design, in connection with any public or private utility, structure, building, machine, equipment, process, work or project.

Profession means Engineering Profession.

Registration Category means a professional registration category as specified under Section 18(1)(a)–(c) of the Act, including Professional Engineer, Professional Engineering Technologist, Professional Certificated Engineer, Professional Engineering Technician, Candidate and Specified Category Practitioner.

Registered Person means a person registered under a category referred to in Section 18(1) of the Act.

Specified Category means those registration categories classified as such by ECSA, for example those related to fire protection systems, lifting machinery and medical equipment.

Specified Category Practitioner means a person registered in terms of section 18(1)(c) of the Engineering Profession Act, carrying out specifically defined engineering activities.

Unregistered Person means any person undertaking Engineering Work who is not registered in terms of the Act. This does not include persons registered by other statutory bodies who are part of teams undertaking Engineering Work.

ABBREVIATIONS

ASTM	American Society for Testing and Materials
BEng	Bachelor of Engineering
BSc Eng.	Bachelor of Sciences in Engineering
BTech	Bachelor of Technology
BEng Tech	Bachelor of Engineering in Technology
DMS	Dense Medium Separation
ECSA	Engineering Council of South Africa
HMS	Heavy Medium Separation
ISO	International Organization for Standardization
OHS	Occupational Health and Safety
Pr.Eng.	Professional Engineer
Pr.Tech Eng.	Professional Engineering Technologist
Pr.Techni Eng.	Professional Engineering Technician
SHE	Safety, Health, and Environment
SAMREC	South African Code for Reporting of Exploration Results, Mineral Resources and Mineral Reserves
SAMVAL	South African Code for Reporting of Mineral Asset Evaluations
SANS	South African National Standards

Document No.: R-02-COP-MET	Revision No.: 0	Effective Date: 01/12/2022	ECSA
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1. INTRODUCTION

In terms of Section 27(1) of the Act, the Council must draw up a code of conduct for Registered Persons and may draw up a code of practice in consultation with the Council for the Built Environment, Voluntary Associations and registered persons. The Council is also responsible for administering the code of conduct and the code of practice and ensuring that these codes are available to all members of the public at all reasonable times. An “Overarching Code of Practice for the Performance of Engineering Work” was therefore developed and published in the Government Gazette, dated 26 March 2021, which further in this document is referred to as the “Overarching Code of Practice”, for brevity. The Overarching Code of Practice applies to all engineering disciplines.

Section 18(1) of the Act provides four categories for registration of professionals and candidates, namely Engineers, Technologists, Technicians and Certificated Engineers. Section 18(2) prohibits persons so registered from practising in a category other than that in which they are registered.

In line with these requirements, the Metallurgical Engineering Code of Practice aims to supplement the Overarching Code of Practice. The Code also regulates the practice by classifying Metallurgical Engineering Work in terms of its complexity and stipulates the category of registration and the level of competence required for the execution of such work.

2. POLICY STATEMENT

This Code is a statement of good practice for the performance of Metallurgical Engineering Work by Registered Persons. It is applicable to the entire Metallurgical Engineering profession. Section 27(3) of the Act requires Registered Persons to adhere to the requirements of this Code when they perform metallurgical work.

3. PURPOSE AND SCOPE OF DOCUMENT

The Code’s purpose is to ensure that any person undertaking Metallurgical Engineering Work meets the prescribed requirements when practising and executing Metallurgical Engineering

Work within the jurisdiction of the Act. This Code sets appropriate levels of competence regulating the execution of Metallurgical Engineering Work and specifying technical standards and best practices.

This Code also applies when a Metallurgical Engineering Practitioner performs Metallurgical Engineering Work in the specified categories, such as those related to fire protection systems, lifting machinery and medical equipment. Additional codes of practice, specific to the specified category, may also apply in these contexts.

4. APPLICABLE LEGISLATIVE FRAMEWORK

Section 27 of the Act empowers the Council to draw up codes of practice in addition to codes of conduct and requires all registered persons to comply with such codes.

This Code should be read in conjunction with the Act and related documents, in particular the Code of Conduct for Registered Persons, the Overarching Code of Practice and the gazetted Identification of Engineering Work Regulations.

5. METALLURGICAL ENGINEERING WORK

The Metallurgical Engineering discipline operates primarily in the mining, minerals and metals sectors and utilises the knowledge of mathematics, chemistry, physics, mineralogy, underlying process fundamentals and process engineering to control and improve processes that separate, concentrate and recover minerals and their valuable metals from natural ores and/or secondary resources as well as transforming them into final usable products. Three career paths are available to the Metallurgist: Minerals Processing, Extractive Metallurgy and Physical Metallurgy/ Materials Engineering (**R-05-MET-PE**).

Minerals Processing is a branch of Metallurgical Engineering through which valuable minerals are separated from gangue ad/or other constituent minerals through specialised physical and physicochemical processes such as crushing and milling, flotation, jigging, scrubbing, magnetic separation, dense medium separation (DMS) and heavy medium separation (HMS), among others. The unit processes require crushing and grinding the ore to a fine size to liberate and separate the individual mineral particles from the waste rock and other constituent mineral particles. Valuable minerals and metals such as gold, silver, copper, lead, zinc, molybdenum, iron, potash, phosphate and even sand for glass are often processed by unit processes such as physical separation and froth flotation (**R-05-MET-PE**).

Extractive Metallurgy involves the extraction of metals from their natural mineral deposits or intermediate compounds from ores by chemical or physical processes, including hydrometallurgical process stages, high temperatures or pyrometallurgical process stages and electro-metallurgical process stages. The aforementioned processes may produce pre- or crude metal products that can be subjected to further processing, refining and manufacturing through unit processes such as electrowinning, alloying, casting, rolling and extrusion (**R-05-MET-PE**).

Physical Metallurgy and Materials Engineering involves the processing and fabrication of metals and alloys into finished products using unit processes such as alloying, casting, forging, welding and heat treatment, among others, and controls the physical, chemical and mechanical properties. Physical Metallurgy and Materials Engineers in addition perform research, analysis, design, production, characterisation, failure analysis and application of materials, including metals and alloys, for engineering applications based on an understanding of the properties of matter and engineering requirements (**R-05-MET-PE**).

5.1 Engineering qualifications and supervision of Engineering Work

It is highly recommended that all Metallurgical Engineering Work be undertaken by registered Metallurgical Engineering Practitioners. In cases where work is to be performed by unregistered Metallurgical Engineering Practitioners, it is recommended that the following work allocation in Table 1 be considered under the direct supervision and control of registered Metallurgical Engineering Practitioners:

Table 1: Engineering Qualifications and Supervision of Engineering work

Qualification	Level of Descriptors	Supervision
a) BEng/BSc Eng	Solving complex engineering problems and performing complex engineering activities	Pr.Eng.

Qualification	Level of Descriptors	Supervision
b) BTech/ BEng Tech Eng / Advanced Diploma	Solving broadly defined engineering problems and performing broadly defined engineering activities	• Pr.Eng. • Pr.Tech. Eng
c) National Diploma	Solving well-defined engineering problems and performing well-defined engineering activities	• Pr.Eng. • Pr.Tech. Eng • Pr Techni Eng

5.2 Category of registration and level of descriptors

Metallurgical Engineering has a diverse range of sub-disciplines operating in the mining, minerals and metals sectors in which Metallurgical Engineers could be employed, as seen in **Table 2**. Due to the diverse range of sub-disciplines and specialised skills characterising the profession, it is complex to define a set of predetermined training paths for a Metallurgical Engineer. Instead of predetermined paths, a set of guiding principles in **Table 3** is proposed whereby Candidate Engineers can shape the course of their careers. The nature of work involved in Metallurgical Engineering follows the general principles in **Table 3** across all sub-disciplines. Work performed by non-registered Metallurgical Engineers should be executed under the direct supervision and control of registered Metallurgical Engineering Practitioners as discussed in **Table 1**. In summary:

(a) The performance of Metallurgical Engineering Work requires solving industrial engineering problems and engaging in Metallurgical Engineering activities.

(b) Metallurgical Engineering Work encompasses several Metallurgical Engineering sub-disciplines, each dealing with a specific body of knowledge.

(c) Depending on the level of complexity, Metallurgical Engineering Work is carried out by Registered Persons possessing different levels of competence as typified by the various categories of registration given in Section 18(1) of the Act.

(d) Due to a common grounding in the mathematical and physical sciences, there are areas of overlap among the various sub-disciplines of Metallurgical Engineering and overlaps with other professions and/or disciplines. These overlaps generally occur at a basic level and divergence increases with the degree of specialisation.

Table 2: Different fields of metallurgy that extractive, physical and materials engineering may focus on

Minerals Processing and Extractive Metallurgy	Physical Metallurgy and Materials Engineering
• Minerals Processing Engineer • Extractive Metallurgist • Consulting Engineer • Pyrometallurgist • Hydrometallurgist • Electrometallurgist • Process Engineer • Researcher and Development Engineer • Academic Researcher or Lecturer	• Physical Metallurgist • Materials Engineer • Welding Engineer • Corrosion Engineer • Quality Assurance Engineer • Consulting Engineer • Process Engineer • Researcher and Development Engineer • Academic Researcher or Lecturer

Table 3: Metallurgy Engineering Work

Nature of Work	Activities
Investigation and problem analysis	• Collecting, analysing, and reporting data from new and existing processes, plant or equipment, and demonstrating the theoretical and practical knowledge to solve problems utilising the well-proven analytical techniques and tools. This includes the ability to use troubleshooting skills. • Using troubleshooting methodologies, literature surveys, data analysis and root cause analysis tools to identify, analyse and solve complex problems engineering problems. • Investigating properties of metals, alloys, ceramics, polymers, and other materials, and developing and assessing their commercial and engineering applications.

Nature of Work	Activities
Process plant, and equipment design and optimisation	• Collecting, analysing, and reporting data from new and existing processes, plant, or equipment, in line with design codes and standards. • Applying the principles of complex Metallurgical Engineering practice, including the critical study of complex work methods and the development of more effective techniques for recognising real and significant problems and how to solve them. • Process design and development, involving laboratory, pilot-scale or full-scale plant work to generate engineering data for the specification and design of broadly defined new metallurgical plants or the improvement of existing plants. • Prepare complex process flow sheets, material and energy balances, and engineering designs, including specifications on design, sizing and selection of equipment, service requirements, materials of construction, economics and impact on the environment. Design plants or equipment by considering the following aspects: reliability, maintainability, usability, supportability, reducibility, disposability and affordability. • Optimisation and control of a complex process or equipment to improve performance. Process optimisation involves providing solutions to the problem identified; this might be through improving the system/equipment operating parameters by modifying or installing new processes, equipment or systems.
Product Manufacturing and Characterisation	• Design new engineering materials, focusing on the relationship between composition, crystal and microstructure, processing and physical and mechanical properties. • Analyse the properties and structure of engineering materials such as metals, alloys, ceramics and composites to improve performance or create new engineering materials that meet or exceed the desired mechanical, electrical, magnetic and chemical properties stipulated by specific design codes and standards. • Design, develop, and test processes and protocols to evaluate and improve properties and performance of engineering materials, including assisting in the selection of materials for different products for new and existing applications. • Apply physical and chemical manufacturing methods to transform engineering metals, alloys and composites into semi-fabricated

Document No.: R-02-COP-MET	Revision No.: 0	Effective Date: 01/12/2022	ECSA
Subject: Code of Practice for the Performance of Metallurgical Engineering Work			
Compiled by: Manager RPS Date: 04/07/2022	Approved by: Executive RPS Date: 03/10/2022	Next Review Date: N/A	Page 13 of 22

Nature of Work	Activities
	or finished manufactured products using forming, finishing and manufacturing methods such as alloying, casting, forging, heat treatment and surface coating. • Quality control based on international manufacturing standards such as ISO, ASTM.
Project development and management	• Project task definition, including idea / problem analysis / definition need, conceptual design, basic and detailed engineering. This includes desktop research and feasibility studies to identify and select the preferred solution and develop the solution. • Designing, developing, constructing, commissioning and handing over of equipment and processing plants. • Project controls, including cost control, estimating resources, capital and operating and/or lifecycle costs, planning and scheduling, and project risk management. • Stakeholder management, including stakeholder liaison and communication and overall control of the engineering team and interfacing with client/legal entities. • Project resource management, including responsibilities relating to procurement and contracts management in line with standard codes of practice. • Managing project change and project risk.
Plant construction, commissioning, and hand over	• Plant construction, including site establishment and management, assembling of plant equipment in accordance with drawings and installation designs. • Plant commissioning – preparation of start-up, shutdown, and emergency procedures. Measurement and analysis of actual performance data versus design parameters, responsibility for performance of the plant, optimising plant performance, reviewing all safety standards, operability of the plant, sound labour relations and practices and managerial aspects. • Plant hand-over – including ‘as-built’ documentation, construction, planning and execution of punch-out and hand over.
Plant operation and maintenance	• Process plant operation, especially with direct and increasing responsibility for certain sections of the plant. • Quality control in respect of measurement and specifications.

Nature of Work	Activities
	• Plant records and operating costs. • Process control and management. • Inter-relationships between engineering personnel and management, and among members of the engineering team, especially between production and maintenance. • The impact the operation may have on the environment. • Application of economic analysis of production processes to effect optimal performance. • Management of the technical aspects metallurgical operations using tools such as on-line process monitoring, sampling, chemical analysis, data analysis and process modelling. • Management and supervision of production staff in metallurgical operations. • Application of chemical, metallurgical and process engineering fundamentals to production processes. • Undertaking fault findings in plant equipment and taking corrective action to ensure safe operation. • Ensuring that appropriate SHE systems and practices are implemented within the department / organisation. • Ensuring that plant availability, utilisation and operability throughput and recovery targets are being met. • Ensuring that all plant operations run efficiently against industry best practice and appropriate standards by updating, recording, archiving and analysing all plant related data. • Ensuring that appropriate metallurgical input is provided for business plans and forecasts (e.g., monthly, quarterly and annual forecasts). • Ensuring that cost and cash flow targets are met. • Compiling or updating appropriate policies and procedures or work instructions to align with design bases. These include policies and procedures applicable to the following: main processing plant, final recovery, slimes dam and tailings dump, return water dam and plant water supply, and maintenance bases / system / equipment life cycle plans.

Nature of Work	Activities
Safety, Health, Environmental and Quality (SHEQ) Management	• Coordinate the analysis of samples taken from metallurgical process streams to ensure safe and economic operation and advise operations personnel on process changes required to obtain desired products, processes and quality control. • Continuously apply a thorough understanding of safety, health, environment and quality policies and procedures as prescribed by legislation and/or internal company policies, and proactively identify, monitor and mitigate potential risks in accordance with legislation and best practice. • Ensure the OHS Act and other relevant standards are followed.
Plant decommissioning	• Dissemble equipment – this can be a process undertaken from one pilot plant to another depending on exploration period and requirements of the mineral processing or mining plant. • Evaluate and undertake design and analysis of the new site requirements for optimum performance. • Ensure decommissioning strategy and safety procedures are followed by understanding the chemical and physical characteristics of the equipment or plant. • Undertake and compile procedures for plant de-commissioning and consolidation for shutdown or closure. • Ensure the regulatory and statutory application and authorisation process is acquired.

6. COMPETENCY REQUIREMENTS

Reference should be made to the *Overarching Code of Practice* for “General Requirements" and “Requirements for Registered Persons”; and to the gazetted *Identification of Engineering Work* for “Core Competencies Required to Perform Identified Engineering Work”.

6.1 Competence required to perform Metallurgical Engineering Work

Any person who performs any Metallurgical Engineering Work must comply with the Act and with any other requirement contemplated in the Engineering Profession Act, namely:

- to be registered with ECSA in the appropriate professional registration category applicable to the level of service performed or if not registered, perform under direct supervision and control of a Registered Person; and possess the necessary core competency in the competency areas to perform such core service as a Professional Engineer, Professional Engineering Technologist, Professional Certificated Engineer, Professional Engineering Technician, or a Specified Category Practitioner.

6.2 Competency Evaluation

In addition to their category of registration with reference to the complexity of the work, the level of experience of Metallurgical Engineering Registered Persons should meet or exceed the requirements of the risk competency model shown in **Table 4**. In the model, risk may include (where appropriate) risk to the health and safety of people and society, the natural and built environment, property, financial interests and related project timescales.

Table 4: Competency model

Level of experience	Level of supervision	Responsibility	Allowable risk
Candidate	Direct and frequent supervision	Aid and support for engineering activities	Low
Competent	General supervision	Guide and provide input for engineering activities	Medium
Registered person	Work independently	Oversee and guide engineering activities	High

6.3 Risk Categorisation

The level of experience of Registered Persons needs to be read in conjunction with the risk matrix presented in **Table 5** and **Figure 1** below.

Table 5: Level of risk associated with the competency model

Document No.: R-02-COP-MET	Revision No.: 0	Effective Date: 01/12/2022	E C S A
Subject: Code of Practice for the Performance of Metallurgical Engineering Work			
Compiled by: Manager RPS Date: 04/07/2022	Approved by: Executive RPS Date: 03/10/2022	Next Review Date: N/A	Page **17** of **22**

Level of risk	Impact of risk			Risk matrix value
	Safety (People)	**Environment (Spillage/Pollution)**	**Reputation (Company)**	
Low	Minor injury No lost time	Minor	• Warning • No media coverage	1–5
Medium	Result in permanent disability	Major	• Major financial penalties • Local media coverage	6–12
High	Result in fatalities	Catastrophic	• Hefty financial penalties • International media coverage	15–25

The above risk values are based on the 5 by 5 risk matrix presented in Figure 1 below.

Likelihood		Consequence				
		Negligible 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
	5 Almost certain	Moderate 5	High 10	Extreme 15	Extreme 20	Extreme 25
	4 Likely	Moderate 4	High 8	High 12	Extreme 16	Extreme 20
	3 Possible	Low 3	Moderate 6	High 9	High 12	Extreme 15
	2 Unlikely	Low 2	Moderate 4	Moderate 6	High 8	High 10
	1 Rare	Low 1	Low 2	Low 3	Moderate 4	Moderate 5

Figure 1: Risk matrix

7. PRACTICE REQUIREMENTS

7.1 Minimum practice requirements

All Metallurgical Engineering Work must be carried out or services rendered:

- in accordance with the requirements of the applicable acts and regulations
- in an ethical and responsible manner in accordance with the Code of Conduct
- in accordance with accepted norms and standards in the industry.

7.2 Compliance with acts and regulations

Registered Persons must always ensure compliance with the appropriate acts and associated regulations. Notable national acts that may be applicable to Metallurgical Engineering Work include the following:

- Engineering Profession Act, as amended
- Occupational Health and Safety Act and Regulations, 85 of 1993: Driven Machinery Regulations, Pressurised Equipment Regulations
- Minerals and Energy Acts, e.g., Mineral and Petroleum Act, 28 of 2002
- Mine and Safety Act, 29 of 1996 (see www.dmr.gov.za: Design of underground dam walls, plugs and barricades, Regulations on use of water for mining)
- National Environmental Management Act, 107 of 1998
- National Environmental Management Waste Act, 59 of 2008
- Project and Construction Regulations Management Professions Act, 48 of 2000
- Nuclear Energy Act, 46 of 1999
- National Water Act, 36 of 1998: Various measures relating to pollution of a water resource; Waterworks process controller
- National Water Act, 54 of 1956: Determination of persons permitted to design dams.

7.3 Application of codes and/or standards

All Metallurgical Engineering Work must be carried out in accordance with the best practices represented by the relevant national and international standards, industry standards, codes of practice and best practice guidelines.

Standards and codes must be applied as and when required by government regulation, customer or end-user requirements and as an accepted industry norm. It is the duty of the engineering Registered Person to ensure that all standards and codes used abide by the applicable acts and regulations (considering that more than one country's legal frameworks may be relevant).

Standards and codes may be used in place of regulations where it can be proven that the requirements of the standard or code meet and/or exceed those prescribed by regulations and/or law. Any deviations from the standards or codes requested by the customer or end-user should be communicated to the appropriate stakeholders, supported by evidence that the deviation will not negatively impact the performance and safety of the system or device.

Various national and international bodies are recognised and accepted within industry to develop and publish standards related to Metallurgical Engineering, notably:

- SANS codes for Specification for Piping Design / Material (ANSI), see www.sabs.co.za.
- SANS 10248, 1023: Waste Classification and Management Regulations (e.g., tailings and waste spillage) from South Africa Constitution Act, 108 of 1996 and Hazardous Substance Act, 5 of 1973.
- ISO 9001: 2015 – Quality Management Systems
- SAMREC (South African Code for Reporting of Exploration Results, Mineral Resources and Mineral Reserves) e.g., 10320:2004.
- SAMVAL (South African Code for Reporting of Mineral Asset Evaluations) from www.sans.co.za.

Document No.: R-02-COP-MET	Revision No.: 0	Effective Date: 01/12/2022	ECSA
Subject: Code of Practice for the Performance of Metallurgical Engineering Work			
Compiled by: Manager RPS Date: 04/07/2022	Approved by: Executive RPS Date: 03/10/2022	Next Review Date: N/A	Page 20 of 22

8. ADMINISTRATION

The Council is responsible for the Administration of this Code of Practice, including its publication, maintenance, and distribution.

The Council must ensure that the code of practice and all amendments thereto are available on the ECSA Website and must upon request, provide a copy thereof.

The Council must take all reasonable steps to introduce the Code of Practice to the general public.

REVISION HISTORY

Revision number	Revision date	Revision details	Approved by
Rev 0. Draft A	04 July 2022	Proposed by the working group to ECSA	Working Group
Rev0. Draft B	20 July 2022	Broader Consultation draft	Working Group
Rev.0 Draft C	06 September 2022	Incorporation of comments received from Broader consultation	Working Group
Rev.0 Draft D	16 September 2022	Steering Committee recommendation to submit to RPSC for approval	Steering Committee
Rev 0.	13 October 2022	Approval by RPSC	RPSC
Rev.0	01 December 2022	Ratification	Council

The Code of Practice for:

Performance of Metallurgical Engineering Work

Revision 0 dated 01 December 2022 and consisting of 21 pages has been reviewed for adequacy by the Business Unit Manager and is approved by the Executive: Research, Policy and Standards (**RPS**)

.... 02 December 2022 ....

Business Unit Manager Date

.... 18 April 2023 ....

Executive: RPS Date

This definitive version of this policy is available on our website.

Document No.: R-02-COP-MET	Revision No.: 0	Effective Date: 01/12/2022	
Subject: Code of Practice for the Performance of Metallurgical Engineering Work			
Compiled by: Manager RPS Date: 04/07/2022	Approved by: Executive RPS Date: 03/10/2022	Next Review Date: N/A	Page **22** of **22**

REFERENCES

[1] Engineering Council of South Africa. Rules of Conduct for Registered Persons Engineering Profession Act, 2000. Board Notice 256 of 2013. Government Gazette No. 37123 of 13 December 2013.

[2] Engineering Council of South Africa. **R-05-MET-PE**: Discipline Specific Training Guide for Registration as a Professional Engineer in Metallurgical Engineering.

[3] Engineering Council of South Africa. **R-02-STA-PE/PT/PN** Competency Standard for Registration in Professional Categories as **PE/PT/PN**.

BOARD NOTICE 636 OF 2024

Code of Practice for the Performance of Mechatronic Engineering Work

R-02-COP-TRONIC

REVISION No. 0: 02 June 2023

ENGINEERING COUNCIL OF SOUTH AFRICA
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ECSA

TABLE OF CONTENT

LIST OF FIGURES

LIST OF TABLES

DEFINITIONS

In this Code of Practice, any word or expression that is defined in the Act retains that meaning unless the context otherwise dictates.

Act: The Engineering Profession Act, No. 46 of 2000.

Candidate: A person who is registered in terms of Section 19(2)(b) of the Act.

Category of registration: The categories of registration that are provided for in Section 18(1)(a) of the Act (i.e. Professional Engineers, Professional Engineering Technologists, Professional Certificated Engineers, and Professional Engineering Technicians).

Code of Conduct: The Code of Conduct for Registered Persons in terms of the Act.

Council: The Engineering Council of South Africa established in terms of Section 2 of the Act.

Designer: The person undertaking work in relation to any structure, including drawings, calculations, design details, and specifications.

Engineering work: The work identified in terms of Section 26 of the Act and clarified in the Identification of Engineering Work as gazetted.

Enterprise Resource Planning: A type of software that organisations use to manage day-to-day business activities such as accounting, procurement, project management, risk management and compliance, and supply chain operations.

ISA 95: An international standard of the International Society of Automation for developing an automated interface between enterprise and control systems. More commonly referred to as ANSI/ISA-95 or ISA-95, this standard has been developed for global manufacturers.

ISA 95 Level 0: The process.

ISA 95 Level 1: Intelligent devices.

ISA 95 Level 2: Control systems (e.g. programmable logic controllers [PLCs], distributed control systems [DCSs]).

ISA 95 Level 3: Manufacturing operations systems (e.g. Manufacturing Execution System [MES]).

ISA 95 Level 4: Business logistics systems.

Mechatronic Engineer: A Professional Engineer registered in terms of 18(1)(a)(i) of the Act who has specific required qualifications and demonstrated experience in the sub-discipline of Mechatronic Engineering at a complex level.

Mechatronic Engineering Technologist: A Professional Engineering Technologist registered in terms of 18(1)(a)(i) of the Act who has specific required qualifications and demonstrated experience in the sub-discipline of Mechatronic Engineering at a broadly defined level.

Mechatronic Engineering Technician: A Professional Engineering Technician registered in terms of 18(1)(a)(i) of the Act who has specific required qualifications and demonstrated experience in the sub-discipline of Mechatronic Engineering at a well-defined level.

Mechatronic engineering work: Engineering work identified specifically in the discipline of Mechatronic Engineering.

Project Engineer: A Registered Person responsible for the management of the engineering work within a project and its technical aspects.

Registered Person: A person registered with the Engineering Council of South Africa in terms of the Act under one of the categories referred to in sections 18 and 19.

Risk: The effect of uncertainty on the objectives of a design; it is expressed in terms of a combination of the consequences of an event and the likelihood of occurrence.

Specialist work: Mechatronic engineering work that requires training, knowledge, and experience outside the normal education curriculum and beyond that obtained in the general practice of the profession.

The Code: This Code of Practice document.

ABBREVIATIONS

CAD	Computer-aided design
CoP	Code of Practice
DCS	Distributed control system
ECSA	Engineering Council of South Africa
ERP	Enterprise Resource Planning
FAT	Factory Acceptance Test
HMI	Human Machine Interface
ISA 95	ISA 95, ANSI/ISA-95 or ISA-95
MES	Manufacturing Execution System
MOM	Manufacturing Operations Management
NQF	National Quality Framework
PC	Personal computer
PLC	Programmable logic controller
Pr Cert Eng	Professional Certificated Engineer
Pr Eng	Professional Engineer
Pr Tech Eng	Professional Engineering Technologist
Pr Techni Eng	Professional Engineering Technician
QCP	Quality Control Plan
SAT	Site Acceptance Test
SCADA	Supervisory control and data acquisition

1. INTRODUCTION

In terms of Section 27(1) of the Engineering Profession Act, No. 46 of 2000 (the Act), the Council must draw up a Code of Conduct for Registered Persons and may draw up a Code of Practice (CoP) in consultation with the Built Environment, Voluntary Associations, and Registered Persons. Furthermore, the Council is responsible for administering the Code of Conduct and the Code of Practice and ensuring that these codes are available to all members of the public at all reasonable times. The *Overarching Code of Practice for the Performance of Engineering Work* was, therefore, developed and published in the *Government Gazette* ~~dated~~ ~~26 March 2021~~ (Republic of South Africa, 2021b). In this document, this is referred to as the Overarching Code of Practice' for brevity. The Overarching Code of Practice applies to all engineering disciplines.

Respective disciplines and sub-disciplines may develop their own CoPs to complement this Code; this Mechatronic Engineering CoP is an example of this. The Mechatronic Engineering CoP should be read in conjunction with the Overarching Code of Practice; it is not intended to duplicate the requirements thereof.

2. SCOPE AND APPLICATION

Regarding scope and application, the Code

- applies to the discipline of Mechatronic Engineering and its sub-disciplines;
- identifies specific engineering work within the Mechatronic Engineering field;
- classifies mechatronic engineering work according to the complexity of the work and its sensitivity with respect to public safety and environmental stewardship. It must be acknowledged that all mechatronic engineering work involves risk due to the nature of the discipline. ~~of the product (electricity) and the impact of its incorrect control;~~

- sets out the level of competence required by persons registered in any of the categories of registration provided for in Section 18.1 of the Act for the performance of mechatronic engineering work of varying complexity; and
- stipulates requirements for the practice of mechatronic engineering work and provides a statement of recognised good practice.

Where a Code or Act is referenced in this document, the latest version thereof shall apply.

3. PURPOSE

In terms of the Standards Act, No 8 of 2008 (Republic of South Africa, 2008), "a code of practice" is a description of:

a) the terminology to be used.

b) the method to be applied or the procedure to be followed.

c) the material to be used.

any other requirements to be met (e.g. competency) in connection with the execution in an orderly, systematic, practical, efficient, safe and effective manner.

This document defines a set of guidelines that outlines the following accepted practices and standards for the mechatronics engineering discipline:

- Establishes a set of ethical and professional standards that define acceptable conduct, behavior and practices in mechatronics engineering.
- It serves as a benchmark for mechatronic engineering practitioners
- It provides a way to ensure that all members are held accountable to the same standards of conduct. Refer to the ECSA Codes of Conduct.

- It provides a framework for members to adhere to and enables stakeholders, including clients, customers, and the public, to have confidence that the profession or industry is ethically and responsibly managed.

4. LEGAL FRAMEWORK

This CoP shall be read in conjunction with the Engineering Profession Act, No. 46 of 2000, the Code of Conduct, the Occupational Health and Safety Act, No. 85 of 1993 and all other relevant legislation.

5. MECHATRONIC ENGINEERING WORK

5.1 Identification and Classification of Mechatronic Engineering Work

Engineering work can be identified from the gazetted identification of engineering work regulations. In addition, the development of new technologies has created the opportunity for measurement devices, control mechanisms, and automation models to expand beyond the sphere of the already known.

Automation has infiltrated all fields of engineering just as mathematics did many years ago. Specialisations include the following:

- **Mechatronic Devices:** A mechatronics system is composed of mechanical parts, electric devices, electronics components, sensors, and hardware and is operated and controlled under the supervisions and commands that are programmed through suitable software. Manufacturers and resellers of mechatronic devices make a clear distinction between mechatronic devices and its sub-systems including electronics, mechanics, and computing. Any specialist in the afore-mentioned sub-systems can be brought in the design, implementation, and maintenance of a mechatronic device

- **Factory Automation:** Factory automation is the incorporation of automation from end-to-end manufacturing processes. In manufacturing environments, automation often employs technologies such as pneumatic systems, nuclear measurement devices, hydraulic systems, computer systems, and robotic arms to create a more complex system. This leads to the integration of all four levels of the ISA 95 model, from the process to the Enterprise Resource Planning (ERP) system to the actual measuring devices. This is often called the 'smart factory'.

- **Process Automation:** Process automation is the use of advanced technology to automate and streamline industrial continuous processes to increase safety, efficiency, reduce costs, and improve the quality of products. It involves the use of various technologies such as programmable logic controllers (PLCs), sensors, robotics, machine learning, and artificial intelligence. These technologies work together to monitor and control various aspects of the production process, such as temperature, pressure, speed, and flow rate, etc.

A high-level summary of the mechatronics engineering work is presented below:

5.1.1 Characteristics

Mechatronic engineering is multi - disciplinary, involving aspects of electrical engineering, mechanical engineering, chemical engineering, industrial engineering, etc.

Mechatronic engineering work involves, among other things:

- **Advice and Design:** Advising and designing systems which generate, transmit and distribute industrial communication of control - and automation systems

- **Analysis and Design:** Analysis and design solutions to meet specific objectives. Designing, specifying and implementing Control and Instrumentation of plant and processes, and safety integrated systems in plants and factories

- **Investigations and Problem Solving:** Theoretical experimental investigation and problem solving

- **Knowledge Application:** Application of knowledge and engineering technology, based on mathematics, basic sciences, information technology as well as specialist and contextual knowledge
- **Management:** Management of Mechatronic engineering works
- **Research:** Conducting research and developing new or improved theories and methods related to the measurement techniques, control algorithms and automation philosophies of Mechatronic devices, factory automation and process automation.
- **Responsibility and Judgement:** Exercising judgment and taking responsibility for engineering work
- **Safety and Environment:** Addressing the safety and environmental consequences and other impacts of engineering work
- **Standards:** Establishing control standards and procedures to ensure efficient functioning and safety of the Mechatronic device, plant or process
- **Supervision:** Supervising, controlling, developing and monitoring the operation and maintenance of automation systems, control systems and measurement devices

5.1.2 Functions

Mechatronic Engineering consists of any or a combination of various types of work within Mechatronic Devices, Factory Automation, Process Automation, and General Automation. More detail can be found in the Discipline Specific Training Guidelines.

Below is a list of some of the functions and what each one means:

- **Audits**: An audit of an automation system is an important process of reviews that ensures that the system is functioning as intended and that all aspects of the system are compliant with applicable regulations and standards.

- **Build**: The Build of a Mechatronic system involves a series of steps that can be broadly divided into different phases while having a clear understanding of the Mechatronic system's goals and objectives, as well as the organization's needs and constraints:

- **Calibration**: Calibration of an Mechatronic system involves the process of verifying and adjusting the accuracy and performance of the sensors, instruments, and control devices used in the system

- **Commissioning**, on the other hand, is the process of verifying that the implemented product or system meets the client's requirements and is fully operational. It involves testing the functionality, performance, and reliability of the product or system, as well as ensuring that all safety and regulatory standards have been met.

- **Consulting**: Consulting is the professional service in which a person provides advice and expertise to individuals or organizations seeking solutions to automation related problems or challenges based on their specialized knowledge and experience in a particular industry or field. Mechatronic systems could comprise of various sub systems like Electrical, Chemical, Industrial, Mechanical etc., therefore these Consultants need not be specialists within Mechatronic, but could have expertise in other related fields.

- **Development**: Development of a Mechatronic system involves several steps, from identifying the requirements of the system to the eventual commissioning and maintenance of the system.

- **Education**: Education within Mechatronic engineering involves providing individuals with the knowledge and skills needed to design, develop, implement, and maintain automated systems. Mechatronic Education provides the learner with knowledge from a wide range of engineering disciplines such as Electrical and Electronic Engineering, Computer Engineering, Mechanical Engineering, Chemical Engineering and Industrial Engineering, etc.

- **Feasibility studies**: This involves an assessment of the practicality and potential of a proposed Mechatronic project or venture. The purpose of a feasibility study is to determine whether the proposed solution is viable, considering its economic, technical, legal, and operational aspects.

- **Implementation** refers to the process of putting a plan or design into action by developing and building the necessary components, systems, or software. It involves tasks such as coding, testing, integration, and deployment.

- **Installation**: Installation refers to the process of physically setting up and configuring a Mechatronic device, system or equipment in a specific location.

- **Maintenance**: Maintaining a Mechatronic system involves performing routine inspections, preventive maintenance, and corrective maintenance to ensure that the system functions correctly and meets its intended operational objectives.

- **Optimization**: In the context of Mechatronic engineering, optimization typically involves the use of advanced data analytics, machine learning, and artificial intelligence techniques to analyze data and improve system performance via feasibility studies and prototyping.

- **Production and plant operation**: Mechatronic, as per the Identification of Engineering Work, consists of Mechatronic Devices, Process Automation and Factory Automation. By Production and Plant operation, in the Mechatronic context, refers to the management and maintenance of automation systems within industrial plants or factories that produce goods or provide services. It involves overseeing the daily operations of the plant to ensure the smooth and efficient functioning of equipment and processes.

- **Programming**: Programming a Mechatronic system involves creating or configuring software that controls the behavior of the system. This software typically runs on a programmable logic controller (PLC) or a similar control device.

- **Project, budget, and team management**: Mechatronic project management is the process of planning, organizing, and coordinating the resources and activities required to complete a mechatronic project on time, within budget, and to the required quality standards. It involves managing a team of Mechatronic practitioners who are responsible for designing, developing, and implementing Mechatronic systems.

- **Prototyping**: Prototyping Mechatronic systems is the process of developing a working model of a Mechatronic system for testing and validation purposes before moving on to full-scale production. Mechatronic systems combine mechanical, electrical, industrial, and computer engineering principles to create intelligent and automated systems that perform specific functions.
- **Quality Management:** Quality Management Systems cover all aspects of the work and are appropriate to the nature of the work and the size of the organisation. Quality Management Systems are reviewed on a regular basis. Compliance with the system should be audited at least annually. Organisations undertaking engineering work should consider external certification such as ISO 9001 and ISO 14001.
- **Research**: It is a systematic process of investigation that aims to discover new knowledge, insights, and understanding about Mechatronic Devices, Factory - and Process Control algorithms.
- **Retirement / end of life replacement**: Mechatronic equipment and - systems end of life (EOL) refers to the point at which a piece of equipment or technology is no longer functional, repairable, or economically viable to continue using. At this stage, the equipment is typically retired, discarded, or recycled.
- **Risk Management:** Risk and impact mitigation includes probability and impact assessments of all the risks connected to the system or project. Risks include risks to the environment, risks to the project schedule, technical risks, etc. Risk Management systems are reviewed continuously.
- **Specifications**: Mechatronic specifications refer to the technical requirements and performance characteristics of a mechatronic system, which is an integrated system that combines mechanical, electrical, and software components. These specifications

are essential for ensuring that the system meets the desired functional requirements and performance objectives.

- **Testing and commissioning**: Testing and commissioning of Mechatronic devices and systems are critical processes that ensure that a Mechatronic system is functioning properly and meets its performance specifications before it is put into operation.
- **Troubleshooting & debugging**: Mechatronic troubleshooting and debugging are important processes that are used to identify and resolve problems with Mechatronic systems. Debugging mechatronic systems requires a multidisciplinary approach that combines mechanical, electrical, and software engineering. It also requires patience, persistence, and attention to detail. With the right tools and approach, however, it is possible to diagnose and solve problems in mechatronic systems.

5.1.3 Technologies

The Mechatronic Engineering technologies include the following:

- **Analytics:** Databases and data analytics such as Original Equipment Effectiveness (OEE)
- **Artificial intelligence (machine learning):** Employs computers and machines to mimic the problem-solving and decision-making capabilities of the human mind such as those used in machine monitoring and process control in which the technology captures and maintains data during process upsets and makes automatic adjustments with the normal warnings to operators.
- **Augmented reality**: An enhanced, interactive version of a real-world environment achieved through digital visual elements, sounds, and other sensory stimuli via holographic technology. This is also used during training exercises.
- **Autonomous instances:** Autonomous processes, systems and operations are designed, operated and maintained.

- **Big data:** Primarily refers to data sets that are too large or too complex to be dealt with by traditional data-processing application software. Data with many fields offers greater statistical power while data with higher complexity may lead to a higher false discovery rate. As technology develops (as in the case of 5G), the gathering of measurement points and process parameters increases.

- **Biometrics:** The mechatronic professional uses biometrics (body measurements and calculations related to human characteristics) as a form of identification and access control. Biometrics are also used to identify individuals in groups who require updated certification to handle sensitive material in certain environments (e.g. nuclear) and to use products such as Unilab and other laboratory instruments.

- **Computer Aided Designs:** Computer-aided design and simulation software: Mechanical, Mechatronic, Network, Hydraulic, Pneumatic, etc

- **Computerized Control:** Computerized control technologies such as SCADA, HMI, PLC, Industrial PC's, and Embedded controllers (incl. Microcontrollers)

- **Connectivity:** Interconnected network of machines, communication mechanisms and computing power to create or maintain “Smart factories” and "Smart devices."

- **Cyber Security:** Cyber security since companies started using cloud based systems

- **Digital twins:** Using computer-based software to duplicate a mechatronic device, factory, or process that includes a database with the parameters and specifications of every element in the design. This is used when there is a requirement to change one of the parameters of the process and to determine the effect that this change will have on the complete system.

- **Energy Efficiency:** Monitoring and optimizing energy efficiency and renewable systems.

- **Industrial Internet of Things:** Industrial Internet of Things and cloud systems to obtain the data the business requires.

- **Industrial Network Topologies:** Industrial network topologies such as Profinet, Industrial Ethernet, Profibus, Foundation Fieldbus, and others
- **Industrial software engineering:** Applying the principles of software engineering to design, develop, maintain, test, evaluate, and implement computer software from advanced automation algorithms to the automation of the ISA 95 stack.
- **Manufacturing:** Additive and subtractive manufacturing
- **Measuring Devices:** Sensors, transducers, and measurement systems
- **Numerical analysis methods:** Numerical analysis is a branch of mathematics that deals with the development and implementation of numerical algorithms and computational techniques to solve mathematical problems that cannot be solved analytically. It involves the use of mathematical models and algorithms to approximate solutions to complex problems that arise in engineering, science, economics, and other fields.
- **Philosophies:** Optimization of industrial processes, automation and control philosophies
- **Programming:** Programming languages – C#, Python, C, MATLAB, C++, R, etc
- **Robotics:** Involves the conception, design, manufacture, and operation of robots (mechatronic devices). The objective of the robotics field is to create intelligent machines that can assist humans in a variety of ways.
- **Safety and Best Practices:** Automation safety and best practices from an automation perspective
- **Safety Systems:** Safety systems design, implementation and maintenance in classified areas
- **Single board computers:** Single board computers (SBCs) are complete computers built on a single circuit board, which integrates all the essential components of a

computer system, such as a processor, memory, storage, and input/output interfaces. These computers are small and compact, making them ideal for embedded systems, small projects, and prototyping.

- **Solutions architecture:** Working mainly in the field of industrial information technology, designing and implementing complex technical solutions during the entire lifecycle of a solution.
- **Vision Systems:** Vision systems refer to a set of technologies that enable machines to perceive and interpret visual information from the environment. These systems are designed to replicate human vision and perception capabilities using advanced hardware and software technologies such as cameras, sensors, image processing algorithms, and machine learning.

5.1.4 Industries

The mechatronics engineering field includes the following industries:

Aerospace: Mechatronic engineering plays a crucial role in the aerospace industry, where it is used to design and develop intelligent systems that optimize the performance, safety, and reliability of aircraft and spacecraft. Mechatronic engineering combines mechanical, electronic, and computer engineering to create innovative solutions that enhance the efficiency and functionality of aerospace systems. Some of the key applications of Mechatronic engineering in the aerospace industry include:

- Flight Control Systems: Mechatronic engineering is used to develop flight control systems that optimize the performance and safety of aircraft. This includes the development of sensors, control algorithms, and actuators that can adjust flight control surfaces to stabilize the aircraft and respond to changes in flight conditions.
- Navigation Systems: Mechatronic engineering is used to develop navigation systems that enable precise navigation of aircraft and spacecraft. This includes the

development of inertial measurement units, GPS systems, and computer vision systems that can provide accurate position and velocity information.

- Propulsion Systems: Mechatronic engineering is used to develop propulsion systems that optimize the performance and efficiency of aircraft and spacecraft. This includes the development of fuel injection systems, turbofan engines, and rocket motors that provide high thrust and precise control.

- Environmental Control Systems: Mechatronic engineering is used to develop environmental control systems that optimize the comfort and safety of passengers and crew. This includes the development of systems for heating, ventilation, and air conditioning, as well as systems for cabin pressurization and air purification.

Overall, Mechatronic engineering is an essential technology in the aerospace industry, driving innovation and creating intelligent systems that optimize the performance, safety, and reliability of aircraft and spacecraft.

- **Agriculture:** Mechatronics has the potential to revolutionize the agriculture industry by increasing efficiency, productivity, and sustainability. Some examples of how mechatronics is being used in agriculture are:

  - Autonomous agricultural machines: Mechatronic systems are used in the development of autonomous agricultural machines such as tractors, harvesters, and drones. These machines can perform tasks such as planting, spraying, and harvesting crops with high accuracy and efficiency.

  - Precision agriculture: Mechatronic systems are used to develop precision agriculture technologies that allow farmers to optimize crop yields and reduce waste. This includes technologies such as GPS-guided equipment, precision irrigation systems, and sensors that monitor soil moisture and nutrient levels.

  - Livestock management: Mechatronic systems are used to develop technologies that improve livestock management, including automated feeding systems, milking machines, and sensors that monitor animal health.

- Climate control systems: Mechatronic systems are used to develop climate control systems for greenhouse farming, which can help to optimize growing conditions and reduce energy consumption.

- Food processing and packaging: Mechatronic systems are used in food processing and packaging to automate tasks such as sorting, grading, and packaging. This can help to reduce labour costs and increase efficiency.

- **Communication:** Mechatronics plays a crucial role in the communication industry, where it is used to design and develop intelligent systems that optimize the performance of communication devices and networks. Mechatronics combines mechanical, electronic, and computer engineering to create innovative solutions that enhance the efficiency, reliability, and security of communication systems. Some of the key applications of mechatronics in the communication industry include:

  - Signal Processing: Mechatronics is used to develop signal processing algorithms that enhance the performance of communication devices and networks. This includes the development of error correction techniques, modulation schemes, and compression algorithms that optimize signal quality and bandwidth. Examples are Profibus, Profinet, Foundation Fieldbus, Ethernet APL, etc.

  - Network Management: Mechatronics is used to design and develop intelligent systems that manage communication networks. This includes the development of network control systems that optimize the routing of data, as well as the development of security systems that protect against cyber threats.

  - Smart Devices: Mechatronics is used to develop smart devices, such as surgery robots, co-bots, autonomous drones, prosthetics, etc. that integrate multiple communication, mechanical and other technologies. This includes the development of sensors, processors, and communication interfaces that enable these devices to communicate with other devices and networks.

- Overall, mechatronics is an essential technology in the communication industry, driving innovation and creating intelligent systems that enhance the efficiency, reliability, and security of communication devices and networks.

- **Construction**: Mechatronics has a growing role in the construction industry, with applications ranging from heavy equipment automation to building control systems. Some examples of how mechatronics is being used in construction include:

  - Heavy equipment automation: Mechatronic systems are used to automate heavy construction equipment, such as bulldozers, excavators, and cranes. These systems can improve safety and increase efficiency by allowing machines to operate autonomously or with minimal human intervention.

  - Building control systems: Mechatronic systems are used to develop building control systems that manage heating, ventilation, and air conditioning (HVAC) systems, lighting, and security systems. These systems can improve energy efficiency and reduce operating costs.

  - Automated material handling: Mechatronic systems are used to automate material handling processes in construction, such as transporting building materials and equipment around the job site. This can improve efficiency and reduce the risk of injuries.

  - Structural health monitoring: Mechatronic systems are used to monitor the health of structures during construction and throughout their lifespan. This includes technologies such as sensors that detect structural damage and control systems that adjust building elements in response to changing conditions.

  - Prefabrication and modular construction: Mechatronic systems are used to automate the prefabrication and assembly of building components, such as walls and floors. This can reduce construction time and costs and improve quality control.

- Overall, mechatronics has the potential to improve safety, efficiency, and sustainability in the construction industry. As technology continues to evolve, we can expect to see more mechatronic solutions being developed for the construction industry.

- **Custody transfer and gauging:** Custody transfer and gauging refers to the transfer of ownership of a product, such as oil or gas, from one party to another. Mechatronics has an important role in custody transfer applications, especially in the measurement and control of the quantity and quality of the product being transferred. Some examples of how mechatronics is used in custody transfer include:

  - **Calibration:** Mechatronic systems are used to calibrate measurement devices, such as flow meters and tank gauges, to ensure that they are providing accurate measurements. This is important in custody transfer as any inaccuracies can result in financial losses for the parties involved.

  - **Control systems:** Mechatronic systems are used to develop control systems that regulate the flow of product during custody transfer. This includes the use of valves and pumps that can be controlled remotely and automated to ensure that the transfer process is efficient and accurate.

  - **Data management:** Mechatronic systems are used to manage and analyse the data generated during custody transfer. This includes data related to flow rates, tank levels, and product quality, which can be used to optimize the transfer process and improve efficiency.

  - **Flow measurement:** Mechatronic systems are used to accurately measure the flow rate of the product being transferred, such as oil or gas. This involves the use of flow meters that can provide precise measurements, even in challenging operating conditions.

  - **Tank gauging:** Mechatronic systems are used to monitor the level and temperature of product in storage tanks. This is important in custody transfer as it ensures that the correct quantity and quality of product is being transferred.

Overall, mechatronics plays a critical role in custody transfer applications by ensuring that the correct quantity and quality of product is being transferred between parties. The use of mechatronic systems can help to improve accuracy, efficiency, and safety during custody transfer processes.

- **Energy (including renewable energy and 'green technologies'):** Mechatronics plays a critical role in the energy sector, from the generation and distribution of electricity to the extraction and refinement of oil and gas. Some examples of how mechatronics is being used in the energy industry include:

  - Renewable energy generation: Mechatronic systems are used in the monitoring and control of renewable energy generation, such as wind turbines and solar panels. These systems help to optimize energy production and improve efficiency.

  - Power generation and distribution: Mechatronic systems are used to control and monitor power generation and distribution networks, including power plants, transmission lines, and substations. This helps to ensure that energy is delivered safely and efficiently to consumers.

  - Oil and gas extraction: Mechatronic systems are used in the extraction of oil and gas, including drilling and production processes. These systems help to improve safety and efficiency in the extraction process.

  - Refining and processing: Mechatronic systems are used in the refining and processing of oil and gas, including control systems that regulate the flow of raw materials and automated equipment that reduces labour costs.

  - Energy storage: Mechatronic systems are used in energy storage systems, such as batteries and capacitors. These systems help to store energy generated from renewable sources and distribute it during times of peak demand.

- Overall, mechatronics is critical to the energy sector, as it helps to improve efficiency, reduce costs, and increase safety in energy production and distribution processes. As technology continues to evolve, we can expect to see more mechatronic solutions being developed for the energy industry.

- **Finance:** Mechatronics, as a field of engineering, are indirectly contributing to the finance sector and their impact is ever increasing. Some areas where mechatronics contributes to the finance sector include:

    - Robotics and automation: Mechatronic systems are used in the development of robots and automation systems that can perform financial tasks, such as managing investment portfolios or executing trades. These systems can help to increase efficiency and reduce errors in financial transactions.

    - Cybersecurity: Mechatronic systems are used to develop cybersecurity solutions that protect financial institutions from cyber-attacks. For example, to create secure data encryption and authentication protocols.

    - Data analysis and processing: Mechatronic systems can be used to develop algorithms and data processing systems that can analyse large volumes of financial data. These systems can help financial institutions make more informed investment decisions and manage risk.

    - Smart banking: Mechatronic systems can be used to develop smart banking solutions, such as mobile banking apps and digital payment systems. These systems can help to improve customer experience and make financial transactions more convenient.

    - Overall, it indirectly contributes to the industry by improving efficiency, security, and data processing capabilities.

- **Food and beverage:** Mechatronics play an important role in the food and beverage industry, where automation and precision are critical to ensuring high-quality products and efficient processes. Some examples of how mechatronics is used in the food and beverage industry:

- Food processing: Mechatronic systems are used in food processing equipment, such as mixers, conveyors, and packaging machines. These systems help to automate the processing of food products and improve efficiency.
- Quality control: Mechatronic systems are used in quality control processes, such as checking the weight, size, and colour of food products. These systems help to ensure that products meet quality standards and reduce waste.
- Packaging and labelling: Mechatronic systems are used in packaging and labelling equipment, such as filling machines and labelling machines. These systems help to automate the packaging and labelling of products and reduce labour costs.
- Agricultural automation: Mechatronic systems are used in agricultural automation, such as the automated planting and harvesting of crops. These systems help to improve efficiency and reduce labour costs in the agricultural sector.
- Food safety: Mechatronic systems are used in food safety processes, such as detecting contaminants and pathogens in food products. These systems help to ensure that food products are safe for consumption and reduce the risk of foodborne illness.
- Overall, mechatronics is critical to the food and beverage industry, as it helps to improve efficiency, reduce labour costs, and ensure product quality and safety. As technology continues to evolve, we can expect to see more mechatronic solutions being developed for the food and beverage industry, especially in the areas of automation and quality control.

- **Fracking and shale gas operations:** Mechatronics plays a crucial role in shale gas operations, which involve extracting natural gas from shale rock formations using hydraulic fracturing or "fracking". Some examples of how mechatronics is used in shale gas operations include:

  - Drilling equipment: Mechatronic systems are used in the drilling equipment used to extract shale gas, such as the drill bit and rig. These systems help to automate the drilling process and improve efficiency.

  - Hydraulic fracturing: Mechatronic systems are used in the hydraulic fracturing equipment, such as the pumps and valves, that inject a high-pressure mixture of water, sand, and chemicals into the shale rock to release the trapped natural gas. These systems help to control the pressure and flow rate of the fracturing fluid and optimize the extraction process.

  - Control systems: Mechatronic systems are used to develop control systems that monitor and regulate the various processes involved in shale gas operations, such as drilling, fracturing, and well production. These systems help to improve safety and efficiency and reduce the risk of accidents.

  - Data analysis: Mechatronic systems are used to analyze and process data from sensors and other monitoring equipment used in shale gas operations. This data can help operators make informed decisions about the extraction process and optimize production.

  - Overall, mechatronics is critical to the shale gas industry, as it helps to improve efficiency, reduce costs, and ensure safety in the extraction process. As technology continues to evolve, we can expect to see more mechatronic solutions being developed for shale gas operations, especially in the areas of automation and data analysis.

- **Healthcare:** Mechatronics has a growing role in the healthcare industry, where it is used to develop innovative medical devices, improve patient care, and enhance the efficiency of healthcare operations. Some examples of how mechatronics is used in healthcare include:

- Medical devices: Mechatronic systems are used in the development of medical devices such as surgical robots, drug delivery systems, and prosthetics. These systems help to automate medical procedures and improve precision, accuracy, and safety.
- Diagnostic equipment: Mechatronic systems are used in diagnostic equipment such as MRI machines, CT scanners, and ultrasound machines. These systems help to produce high-quality images and improve diagnostic accuracy.
- Rehabilitation: Mechatronic systems are used in rehabilitation equipment such as exoskeletons and prosthetics. These systems help to improve mobility and quality of life for patients with mobility impairments.
- Assistive technology: Mechatronic systems are used in assistive technology such as hearing aids, cochlear implants, and vision aids. These systems help to improve the quality of life for patients with sensory impairments.
- Healthcare operations: Mechatronic systems are used in healthcare operations such as medication dispensing systems and patient monitoring systems. These systems help to automate healthcare processes and improve efficiency.
- Overall, mechatronics is critical to the healthcare industry, as it helps to improve patient care, enhance medical procedures, and increase efficiency. As technology continues to evolve, we can expect to see more mechatronic solutions being developed for healthcare, especially in the areas of medical device development and assistive technology.

- **Manufacturing (e.g. automotive, chemicals, metals, textiles, electronics):** Mechatronics plays a critical role in manufacturing, where it is used to automate production processes, improve efficiency, and enhance product quality. Here are some examples of how mechatronics is used in manufacturing:

- Robotics: Mechatronic systems are used in industrial robotics, which are used to automate a variety of manufacturing tasks such as welding, assembly, and packaging. These systems help to increase production efficiency and reduce labour costs.
- Automated production lines: Mechatronic systems are used in automated production lines, which are used to manufacture products such as cars, electronics, and household appliances. These systems help to increase production efficiency and reduce errors and waste.
- Quality control: Mechatronic systems are used in quality control processes, such as inspecting products for defects and ensuring product consistency. These systems help to improve product quality and reduce waste.
- Material handling: Mechatronic systems are used in material handling equipment, such as conveyors and robots, which are used to transport raw materials and finished products throughout the manufacturing process. These systems help to improve efficiency and reduce labour costs.
- Process control: Mechatronic systems are used in process control equipment, such as sensors and control systems, which are used to monitor and regulate manufacturing processes such as temperature, pressure, and speed. These systems help to improve efficiency and ensure product quality.
- Overall, mechatronics is critical to the manufacturing industry, as it helps to automate processes, increase efficiency, and improve product quality. As technology continues to evolve, we can expect to see more mechatronic solutions being developed for manufacturing, especially in the areas of automation and process control.

- **Maritime:** Mechatronics plays an important role in the maritime industry, where it is used to develop innovative solutions for ships, ports, and offshore structures. Some examples of how mechatronics is used in maritime applications are:

- Navigation and control systems: Mechatronic systems are used to develop advanced navigation and control systems for ships and other vessels. These systems help to improve safety, efficiency, and environmental performance.
- Autonomous vessels: Mechatronic systems are used to develop autonomous vessels, which are capable of operating without human intervention. These systems help to improve efficiency, reduce costs, and increase safety.
- Cargo handling: Mechatronic systems are used in cargo handling equipment, such as cranes and hoists, which are used to load and unload cargo from ships. These systems help to improve efficiency and reduce labour costs.
- Offshore structures: Mechatronic systems are used to develop offshore structures, such as oil rigs and wind turbines, which are used in the extraction of natural resources and the generation of renewable energy. These systems help to improve efficiency and reduce costs.
- Port automation: Mechatronic systems are used to automate port operations, such as container handling and logistics. These systems help to improve efficiency and reduce labour costs.
- Overall, mechatronics is critical to the maritime industry, as it helps to improve safety, efficiency, and environmental performance. As technology continues to evolve, we can expect to see more mechatronic solutions being developed for maritime applications, especially in the areas of navigation, automation, and cargo handling.

- **Mining:** Mechatronics has a growing role in the mining industry, where it is used to improve safety, increase efficiency, and reduce costs. Here are some examples of how mechatronics is used in mining:
  - Autonomous vehicles: Mechatronic systems are used to develop autonomous vehicles, such as trucks and loaders, which are used to transport materials and

equipment. These systems help to improve safety, reduce costs, and increase efficiency.

- Mining equipment: Mechatronic systems are used in mining equipment, such as drilling machines and excavators. These systems help to improve precision and accuracy, reduce wear and tear, and increase efficiency.
- Safety systems: Mechatronic systems are used to develop safety systems, such as collision avoidance and proximity detection systems, which help to reduce accidents and injuries.
- Data analysis: Mechatronic systems are used to analyse data from mining operations, such as equipment performance and environmental conditions. This data helps to improve efficiency, reduce costs, and optimize mining processes.
- Environmental monitoring: Mechatronic systems are used to monitor environmental conditions in and around mining operations, such as air quality and water levels. These systems help to reduce the impact of mining on the environment and improve sustainability.
- Overall, mechatronics is critical to the mining industry, as it helps to improve safety, increase efficiency, and reduce costs. As technology continues to evolve, we can expect to see more mechatronic solutions being developed for mining applications, especially in the areas of automation, safety, and data analysis.

- **Personal services:** Mechatronics is also being used in personal services to enhance customer experience, automate processes, and improve efficiency. Here are some examples of how mechatronics is used in personal services:
  - Robotics in hospitality: Mechatronic systems are used to develop robots for hotels and restaurants, which can perform tasks such as cleaning, room

service, and food preparation. These systems help to reduce labour costs and improve customer experience.

- Automated vending machines: Mechatronic systems are used in vending machines, which can dispense a variety of products such as food, drinks, and personal care items. These systems help to improve convenience and reduce labour costs.
- Personalized customer service: Mechatronic systems are used to develop systems that can personalize customer service, such as chatbots and virtual assistants. These systems can provide customized recommendations, answer customer questions, and help to improve the overall customer experience.
- Wearable devices: Mechatronic systems are used to develop wearable devices, such as fitness trackers and smart watches, which can monitor health and wellness metrics. These systems help to improve personal health and wellness and provide valuable data for healthcare providers.
- Smart home systems: Mechatronic systems are used to develop smart home systems, which can automate tasks such as temperature control, lighting, and security. These systems help to improve convenience, reduce energy costs, and enhance home security.
- Overall, mechatronics is playing an increasingly important role in personal services, as it helps to improve customer experience, automate processes, and increase efficiency. As technology continues to evolve, we can expect to see more mechatronic solutions being developed for personal services applications, especially in the areas of robotics, personalization, and wearable devices.

- **Petrochemical (e.g. gas to liquids):** Mechatronics plays an important role in the petrochemical industry. Petrochemical plants use a variety of complex equipment and systems that require advanced automation and control technologies to operate efficiently and safely. Mechatronics, which integrates mechanical engineering, electrical engineering, and computer science, provides the necessary tools and techniques to design, build, and operate these systems.

- One important application of mechatronics in the petrochemical industry is in process control systems. These systems use sensors, actuators, and control algorithms to monitor and adjust the various parameters of the production process, such as temperature, pressure, flow rate, and composition. Mechatronics technologies such as PLCs (Programmable Logic Controllers), SCADA (Supervisory Control and Data Acquisition), and DCS (Distributed Control Systems) are commonly used to automate these processes.

- Another important application of mechatronics in the petrochemical industry is in the design and control of robotic systems. Robots can be used to perform a variety of tasks in the production process, including inspection, maintenance, and material handling. Mechatronics technologies such as machine vision, motion control, and artificial intelligence are commonly used to design and control these systems.

- In addition, mechatronics can also be used in the design and control of safety systems in the petrochemical industry. These systems use sensors, alarms, and interlocks to detect and respond to potentially hazardous conditions, such as leaks, fires, and explosions. Mechatronics technologies such as fault diagnosis, fault-tolerant control, and safety-critical systems engineering are commonly used to design and control these systems.

- Overall, mechatronics plays a critical role in the petrochemical industry, helping to ensure efficient and safe production processes and reducing the risk of accidents and downtime.

- **Pipeline operation and monitoring**: Mechatronics is an important technology in pipeline operations. Pipeline systems require sophisticated control and monitoring systems to ensure efficient and safe operation, as well as to detect and respond to any potential problems. Mechatronics provides the necessary tools and techniques to design, build, and operate these systems.

- An important application of mechatronics in pipeline operations is in the design and control of pipeline monitoring systems. These systems use sensors and data analysis techniques to monitor various parameters of the pipeline, such as flow rate, pressure, temperature, and corrosion. Mechatronics technologies such as wireless sensor networks, distributed data processing, and data visualization are commonly used to design and control these systems.

- Another important application of mechatronics in pipeline operations is in the design and control of pipeline inspection systems. These systems use robots, drones, and other autonomous vehicles to inspect the pipeline for damage, leaks, or other issues. Mechatronics technologies such as machine vision, motion control, and artificial intelligence are commonly used to design and control these systems.

- In addition, mechatronics is used in the design and control of pipeline maintenance systems. These systems use robots and other automated equipment to perform maintenance tasks, such as cleaning, coating, and repairing the pipeline. Mechatronics technologies such as motion control, force feedback, and haptic interfaces are commonly used to design and control these systems.

- Overall, mechatronics plays a critical role in pipeline operations, helping to ensure efficient and safe transportation of oil, gas, and other products. Mechatronics technologies are used to design and control various systems, including monitoring, inspection, and maintenance systems, to ensure the pipeline operates safely and effectively.

- **Power generation automation:** Mechatronics plays an important role in power generation automation, which involves the use of advanced automation and control technologies to monitor and manage the generation, transmission, and distribution of electrical power. Mechatronics, which integrates mechanical engineering, electrical engineering, and computer science, provides the necessary tools and techniques to design, build, and operate these systems.

- One important application of mechatronics in power generation automation is in the design and control of power generation systems. Power generation systems include various types of generators, such as gas turbines, steam turbines, and hydroelectric generators. Mechatronics technologies such as PLCs, SCADA, and DCS are commonly used to automate these systems and ensure efficient and safe operation.

- Another important application of mechatronics in power generation automation is in the design and control of power transmission and distribution systems. These systems include power transformers, switchgear, and other equipment used to transmit and distribute electrical power. Mechatronics technologies such as real-time monitoring, fault diagnosis, and condition-based maintenance are commonly used to design and control these systems and ensure reliable and efficient power transmission and distribution.

- In addition, mechatronics can also be used in the design and control of renewable energy systems, such as wind turbines and solar panels. These systems require advanced control and monitoring systems to ensure efficient and reliable operation. Mechatronics technologies such as power electronics, energy storage systems, and smart grids are commonly used to design and control these systems and ensure efficient and sustainable power generation.

- Overall, mechatronics plays a critical role in power generation automation, helping to ensure reliable, efficient, and sustainable power generation, transmission, and distribution. Mechatronics technologies are used to design and control various systems, including power generation, transmission, and distribution systems, as well as renewable energy systems.

- **Refinery automation:** Mechatronics is a crucial technology in the automation of refinery operations. Refineries are complex facilities that require advanced automation and control technologies to operate safely, efficiently, and cost-effectively. Mechatronics, which integrates mechanical engineering, electrical engineering, and computer science, provides the necessary tools and techniques to design, build, and operate these systems.

  - One important application of mechatronics in refinery automation is in the design and control of process control systems. These systems use sensors, actuators, and control algorithms to monitor and adjust various parameters of the refining process, such as temperature, pressure, flow rate, and composition. Mechatronics technologies such as PLCs, SCADA, and DCS are commonly used to automate these systems and ensure safe and efficient operation.

  - Another important application of mechatronics in refinery automation is in the design and control of safety systems. Refineries operate with hazardous chemicals and processes, and safety systems are critical to protect personnel, equipment, and the environment from harm. Mechatronics technologies such as fault diagnosis, fault-tolerant control, and safety-critical systems engineering are commonly used to design and control these systems and ensure safe and reliable operation.

  - In addition, mechatronics can also be used in the design and control of maintenance and inspection systems. These systems use robots and other automated equipment to perform maintenance tasks, such as cleaning, inspecting, and repairing equipment. Mechatronics technologies such as machine vision, motion control, and haptic interfaces are commonly used to design and control these systems and ensure efficient and effective maintenance.

  - Overall, mechatronics plays a critical role in refinery automation, helping to ensure safe, efficient, and cost-effective refining operations. Mechatronics technologies are used to design and control various systems, including process control, safety, and maintenance systems, to ensure reliable and efficient refining operations.

- **Security:** Mechatronics plays a crucial role in the security industry, where it is used to design and develop intelligent systems that enhance the safety, security, and reliability of security operations. Mechatronics combines mechanical, electronic, and computer engineering to create innovative solutions that improve the effectiveness of security systems. Some of the key applications of mechatronics in the security industry include:
    - Surveillance Systems: Mechatronics is used to develop surveillance systems that can monitor and analyse security footage in real-time. This includes the development of high-resolution cameras, image processing algorithms, and automated tracking systems that can detect and track suspicious activity.
    - Access Control Systems: Mechatronics is used to develop access control systems that restrict access to secure areas. This includes the development of biometric authentication systems, RFID systems, and facial recognition systems that can accurately identify authorized personnel.
    - Alarm Systems: Mechatronics is used to develop alarm systems that can detect and respond to security threats. This includes the development of motion sensors, glass break sensors, and perimeter sensors that can trigger alarms and alert security personnel.
    - Robot Security Systems: Mechatronics is used to develop robotic security systems that can patrol and monitor large areas. This includes the development of autonomous robots that can navigate complex environments, detect and respond to threats, and communicate with human security personnel.
    - Overall, mechatronics is an essential technology in the security industry, driving innovation and creating intelligent systems that enhance the safety, security, and reliability of security operations.

- **Supply chain (warehousing and distribution):** Mechatronics has a significant role in supply chain management, which involves the planning, coordination, and execution of goods and services from the point of origin to the point of consumption. Mechatronics technologies are used to design and control various systems, including transportation, logistics, and warehousing systems, to ensure efficient and effective supply chain operations.
  - One important application of mechatronics in the supply chain is in the design and control of automated transportation systems. These systems use autonomous vehicles, such as drones and self-driving trucks, to transport goods
- **Terminal automation and storage:** Mechatronics plays a significant role in terminal automation, which is the process of managing and controlling the movement of containers, vehicles, and other equipment within a port or terminal. Mechatronics combines mechanical, electronic, and computer engineering to design and develop automated systems that can efficiently manage the various tasks involved in terminal automation. Some of the key applications of mechatronics in terminal automation include:
  - Automated Container Handling: Mechatronics is used to design and develop automated systems that can handle containers without human intervention. These systems can move, stack, and transport containers within the terminal, improving efficiency and reducing the risk of accidents.
  - Vehicle Tracking and Management: Mechatronics is used to design and develop systems that can track the movement of vehicles within the terminal. This helps in managing traffic flow and reducing congestion within the terminal.
  - Safety and Security Systems: Mechatronics is used to design and develop safety and security systems that can monitor the movement of containers and vehicles within the terminal. These systems can detect potential safety hazards and alert terminal operators to take necessary action.

- Data Analytics: Mechatronics is used to develop data analytics systems that can analyze the vast amounts of data generated by terminal automation systems. This helps terminal operators to identify trends, improve efficiency, and optimize operations.

- Overall, mechatronics plays a crucial role in terminal automation, enabling the development of automated systems that can improve efficiency, safety, and security within terminals.

- **Transport:** Mechatronics plays a crucial role in the transportation industry, where it is used to design and develop intelligent systems that can improve the efficiency, safety, and comfort of transportation vehicles. Mechatronics combines mechanical, electronic, and computer engineering to create innovative solutions that optimize the performance of transportation systems. Some of the key applications of mechatronics in transport include:

  - Autonomous Vehicles: Mechatronics is used to develop the sensors, controllers, and software required for autonomous vehicles. These systems use sensors, such as lidar and radar, to detect and interpret the environment, allowing the vehicle to make decisions and navigate without human intervention.

  - Electric Vehicles: Mechatronics is used to design and develop the powertrain systems for electric vehicles. These systems include electric motors, battery management systems, and power electronics that optimize the performance and efficiency of electric vehicles.

  - Advanced Driver Assistance Systems: Mechatronics is used to develop advanced driver assistance systems (ADAS) that can improve the safety of transportation vehicles. These systems include features such as lane departure warning, automatic emergency braking, and adaptive cruise control, which help to prevent accidents and reduce the risk of injury.

- Connected Vehicles: Mechatronics is used to develop systems that allow vehicles to communicate with each other and with the infrastructure. These systems can improve traffic flow, reduce congestion, and enhance safety by providing real-time information about road conditions, traffic patterns, and weather.

- Overall, mechatronics is an essential technology in the transport industry, driving innovation and creating intelligent systems that improve the efficiency, safety, and comfort of transportation vehicles.

- **Wholesale and retail trade:** Mechatronics plays an increasingly important role in the wholesale and retail industries, where it is used to design and develop automated systems that improve efficiency, accuracy, and customer experience. Mechatronics combines mechanical, electronic, and computer engineering to create innovative solutions that optimize the performance of wholesale and retail operations. Some of the key applications of mechatronics in wholesale and retail include:

  - Warehouse Automation: Mechatronics is used to develop automated systems that can manage and optimize warehouse operations. This includes the development of automated storage and retrieval systems, conveyor systems, and robotic picking systems that can handle large volumes of products efficiently.

  - Point-of-Sale Systems: Mechatronics is used to design and develop point-of-sale systems that optimize the checkout process. This includes the development of barcode scanners, cash registers, and payment terminals that improve the speed and accuracy of transactions.

  - Inventory Management: Mechatronics is used to develop inventory management systems that optimize the tracking and control of stock. This includes the development of automated stock management systems, as well as the use of sensors and data analytics to monitor stock levels and demand.

- Customer Experience: Mechatronics is used to develop systems that enhance the customer experience in wholesale and retail operations. This includes the development of interactive displays, smart fitting rooms, and personalized recommendations based on customer data.

- Overall, mechatronics is an essential technology in the wholesale and retail industries, driving innovation and creating automated systems that improve efficiency, accuracy, and customer experience.

6 MECHATRONIC ENGINEERING COMPETENCIES

6.1 Work within area of competency

Depending on their tertiary education, training, experience, category of registration, and recognition by the profession, mechatronic engineering practitioners function at one of two distinct levels as indicated in Table 1 below.

Mechatronic Engineering Practitioners shall perform duties within the professional category limitations specified in the Identification of Engineering Work (*Government Gazette,* No. 44333) (Republic of South Africa, 2021a) as updated from time to time.

Table 1: Competence levels of mechatronic engineering practice

Level	Designation	Typical characteristic of practitioner	Risk associated with work done
1	Candidate	Person who has a tertiary education qualification in Mechatronic Engineering and works under supervision and mentorship of person(s) who meet the requirements stated in document **R-04-T&M-GUIDE-PC/SC**	Low risk
2	Registered professional in Mechatronic Engineering	Person registered with the Engineering Council of South Africa as a Professional Engineer, Professional Engineering Technologist, or Professional Engineering Technician in the Mechatronic Engineering discipline as stated in document **R-05-TRONIC-PN/PT/PE**	Medium to High risk

It is accepted that because of the varying nature of mechatronic engineering services, rigid boundaries are not applicable, but the experienced mechatronic engineering practitioner can recognise the appropriate competence level that is required.

6.2 Category of work for competency

In addition to the complexity of the work, the level of the practitioner assuming responsibility for the mechatronics work is also linked to the category of risk defined in Table 2 below.

Table 2: Risk Categories

Category of mechatronic work	Level of risk	Illustrative nature of mechatronic engineering work
1	Low	Simple mechatronic engineering solutions with low mechatronic safety and serviceability performance requirements where the analysis requires a simple application of design rules or direct interpretation of reference guidelines
2	Medium	Mechatronic engineering solutions with moderate to challenging mechatronic safety and serviceability performance requirements where the design approach involves either a process of • reasoning and calculation based on the application of standards, or • reasoning, calculation, and consideration of accepted analytical principles based on a combination of deductions from available information, research and data, appropriate testing, and service experience
3	High	Mechatronic engineering solutions with challenging mechatronic safety and serviceability performance requirements that require specialist skills, recognised expertise, and knowledge beyond that required for Category 2

6.3 Overlaps

a) Persons registered in a particular discipline may perform Engineering Work in a different discipline if their knowledge, training, experience and applicable qualifications specifically render them competent to perform such work and subject to the expressed permission of ECSA.

b) Persons registered as professionals under a Professions' Act other than the Engineering Profession Act may not perform Engineering Work even if their knowledge, training, experience and applicable qualifications specifically render them competent to perform such work without the expressed permission of ECSA.

c) Mechatronic engineering has a bearing on many activities of industry and even commerce and hence there may be no clearly defined boundaries. In such cases the experienced and appropriately registered engineer would recognize the competencies required and hence act appropriately.

The Overarching Code of Practice for Engineering Work must be consulted when any overlap occurs.

6.4 Levels of Competency

The levels of competence required for Mechatronic engineering practitioners and a career path to achieving these levels are indicated in Figure 1.

Levels of Competency depends on the qualification and the experience of the mechatronic professional as defined by the Engineering Council of South Africa (ECSA) regarding the Professional Engineering Technician, the Professional Engineering Technologist, and the Professional Engineer.

Candidates work under the supervision of registered professionals until they are able to register with the ECSA in the relevant category.

Document No.: R-02-COP-TRONIC	Revision No.: 0	Effective Date: 02/06/2023	ECSA
Subject: Code of Practice for the Performance of Mechatronic Engineering Work			
Compiled by: Manager RPS Date: 26/09/2022	Approved by: Executive RPS Date: 08/05/2023	Next Review Date: N/A	Page **44** of **64**

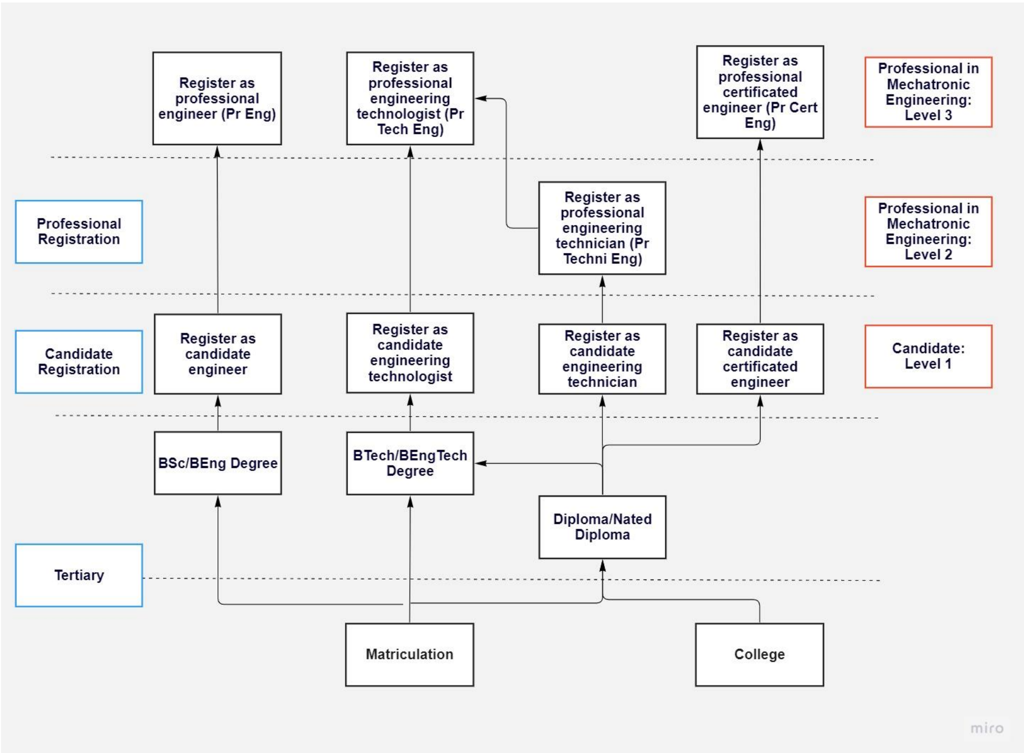

Figure 1: Levels of competence required to practise Mechatronic Engineering

6.5 Competencies required for identified critical mechatronic engineering systems

The following mechatronic engineering systems are designated as critical mechatronic engineering systems, that is, those that may have high risk and high consequences for the public, the environment, and health:

- Control systems within dangerous environments: these include nuclear reactor control and protection, anti-surge controllers on oxygen compressors, and the like.
- Control systems of mechatronic devices that interact with humans

- Measurement and control devices in dangerous classified areas such as Ex classification
- Confidential or restricted data of the system process and/or stores
- The system is essential for the continuous safe operation of the people, process, or device.
- The system provides a critical or campus-wide service.
- It is very difficult to detect the event before it happens or escalates.
- The incident will have serious consequences.
- Risk Analysis must consider the sensitivity of the data that is processed and stored by the system and the likelihood and impact of potential threat events.

6.6 Ethical requirements

Mechatronic engineering practitioners shall execute mechatronic engineering work in accordance with the provisions of the ECSA's Code of Conduct. They shall conduct work within their area of competence.

6.7 Development of Knowledge, Skill, and Expertise

Mechatronic engineering practitioners shall continue to develop knowledge, skill, and expertise in accordance with ECSA's Standard for Continuing Professional Development (see document **ECPD-01-STA**).

7 MECHATRONIC ENGINEERING GOOD PRACTICE

Mechatronic engineering is a complex field that requires a combination of mechanical, electronic, and computer engineering knowledge to design and develop advanced systems. Some examples of good practices for mechatronic engineering include:

7.1 Behavioural Characteristics

Mechatronic engineering practitioners require a specific skillset due to its multi disciplinary nature. Mechatronic engineering practitioners require a combination of technical skills, collaboration, and continuous learning to design, develop and maintain advanced systems that meet the needs of various industries. It also means knowing when to ask specialists in various fields such as electrical, mechanical, programming, etc. for assistance when required.

7.1.2 Systems thinking

- Mechatronic engineers must have a systems thinking approach that considers the entire system, including its interactions and dependencies, rather than just individual components. This approach ensures that the system is optimized for performance, reliability, and cost-effectiveness

7.1.3 Multi-disciplinary collaboration

- Mechatronic practitioners must work collaboratively with other engineers, technicians, and stakeholders from different fields. Collaboration helps to integrate various subsystems, identify issues, and optimize the system design.

7.1.4 Continuous learning

- Mechatronic engineers must stay up to date with the latest advances in mechatronic engineering, including new technologies, tools, and practices. Continuous learning helps to improve skills and knowledge and facilitates innovation and creativity.

7.2 Problem analysis

Defining a Mechatronic problem involves identifying a specific issue or challenge that requires a mechatronic solution. Some steps that can help define a Mechatronic problem include:

- **Identify the problem**: The first step is to identify the problem or challenge that needs to be addressed. This may involve observing a system or process and identifying inefficiencies, limitations, or safety concerns. A Formal Problem Analysis methodology is recommended.
- **Define the Objective**: Once the problem has been identified, it's important to define the objective of the Mechatronic solution. This may include improving system performance, increasing efficiency, reducing costs, or enhancing safety.
- **Identify the Constraints**: The next step is to identify any constraints or limitations that may impact the design of the mechatronic solution. This may include budget constraints, space limitations, safety regulations, or environmental constraints.
- **Analyse the System**: It's important to analyse the system or process that the mechatronic solution will be integrated into. This may include identifying subsystems, components, and interfaces that need to be considered.
- **Brainstorm Solutions**: Brainstorming potential solutions is an important step in defining a Mechatronic problem. This involves considering various design approaches and evaluating their feasibility, effectiveness, and potential benefits and drawbacks.
- **Refine the Problem Definition**: Once potential solutions have been identified, it may be necessary to refine the problem definition to ensure that the mechatronic solution addresses the identified problem and meets the defined objectives and constraints.

Overall, defining a Mechatronic problem involves a systematic approach to identifying a specific issue or challenge, defining the objectives and constraints of the solution, and evaluating potential design approaches to ensure that the solution meets the intended requirements and objectives.

7.3 Design

Overall, mechatronic engineering requires a combination of technical skills, collaboration, and continuous learning to design and develop advanced systems that meet the needs of various industries.

Model-based design tools such as MATLAB/Simulink, LabVIEW etc., including digital twins are often used to simulate, analyse, and optimize the performance of the system before building a physical prototype. This approach saves time and resources and ensures that the system meets the design specifications.

Standardizing practices as far as possible ensures that system designs are consistent, reliable, and interoperable. Standardization includes using common hardware and software interfaces, following coding standards, and adhering to safety and environmental regulations.

Good practice in mechatronic engineering design includes the following:

7.3.2 Design Requirements

The design of mechatronic engineering solutions shall be performed by, or under the direction, control and supervision of a Registered Person who needs to accept responsibility for the design. The full scope of the client requirements shall be agreed and documented as part of the design package and alternative solutions considered.

The selected solution shall clearly demonstrate meeting of client requirements in a safe, effective, and cost-efficient way to ensure adherence to reliability, availability, maintainability and safety requirements.

Mechatronic design requirements are essential for ensuring that the mechatronic system meets the intended functionality and performance goals. Some good practices for mechatronic design requirements include:

Mechatronic design requirements are essential for ensuring that the mechatronic system meets the intended functionality and performance goals. Some good practices for Mechatronic design requirements include:

- **Clearly defined objectives**: Clearly define the objectives and requirements of the mechatronic system before starting the design process. This includes, among others, specifying the system's intended use, functionality, performance goals, environmental constraints, and safety requirements.

- **Systematic Analysis:** Conduct a systematic analysis of the Mechatronic system, including its functional requirements, interfaces, subsystems, and interactions. This analysis helps to identify potential problems, risks, and design constraints that may impact the system's performance and reliability.

- **Modular Design:** Use a modular design approach that breaks down the Mechatronic system into smaller, more manageable subsystems. This approach simplifies the process of determining the design requirements, promotes reusability, and facilitates maintenance and repair once the solution is presented.

- **Testing and Verification:** Develop a testing and verification plan that ensures the Mechatronic system meets the design requirements and objectives. This plan should include unit testing, integration testing, and system testing to verify the performance, reliability, and safety of the system.

- **Documentation and Traceability:** Document all aspects of the Mechatronic system design, including requirements, design specifications, test plans, and verification results. This documentation facilitates traceability and ensures that the design meets the intended requirements and objectives.

Overall, following these good practices for Mechatronic design requirements can help ensure the successful design and development of Mechatronic systems that meet the intended functionality and performance goals.

7.3.3 Design Process

The engineering design process is a series of steps that is followed by most engineering disciplines. For Mechatronics engineering practitioners, many of the functions identified in paragraph Functions, needs to be followed by mechatronic engineering practitioners in creating functional products and processes and in solving problems. It usually consists of inputs from various other engineering disciplines due to the multi-disciplinary nature of Mechatronic engineering.

These steps could include the following and is normally preceded by the Determine Design Requirements phase:

These steps include the following:

- **Requirements Analysis:** The first stage involves defining the system requirements and objectives, including the intended functionality, performance goals, and constraints. This stage may also involve identifying potential risks and challenges associated with the system.
- **Conceptual Design:** In this stage, engineers develop initial design concepts and evaluate different approaches to meet the requirements and objectives identified in the previous stage. This stage may involve brainstorming, prototyping, and feasibility studies.
- **Detailed Design:** Once a concept has been chosen, engineers begin the detailed design process. This stage includes designing individual subsystems, selecting components and materials, and specifying interfaces and control systems.
- **Implementation**: During this stage, engineers build and test prototypes of the mechatronic system. This may involve manufacturing and assembling the various

subsystems, testing individual components, and verifying that the system meets the design requirements and objectives.

- **Testing and Validation:** After the prototype has been built, engineers conduct extensive testing to validate the design and ensure that it meets the performance goals and safety requirements. This stage may involve unit testing, integration testing, and system testing.

- **Deployment and Maintenance**: Once the design has been validated and tested, the system can be deployed in the field. Engineers may also provide ongoing maintenance and support to ensure that the system continues to perform reliably and effectively over time.

- **Design Calculations and Simulations:** Formal calculations shall be prepared for all Mechatronic engineering solutions. Calculations shall be recorded on calculation sheets or downloaded from a computer simulation tool to form part of a design report. For manual analysis, all analysis calculations shall be shown together with the results of the analysis, e.g. response times, alarm and trip levels, etc.

- **Documentation and Traceability:** Document all aspects of the Mechatronic system design, including requirements, design specifications, test plans, and verification results. This documentation facilitates traceability and ensures that the design meets the intended requirements and objectives.

Overall, the mechatronics design process is often iterative and may involve several cycles of design, testing, and refinement before a final product is produced. Effective collaboration and communication among multidisciplinary teams is critical to ensure that the design meets the intended requirements and objectives.

7.3.4 Design Calculations

Mechatronics is a multi-disciplinary field. Therefore, Mechatronics design involves the integration of mechanical, electrical, and software components to create complex systems.

The design calculations for mechatronics systems vary depending on the specific application and system requirements, such as:

- **Coding:** Coding refers to the process of writing code, which is a set of instructions that a computer can understand and execute. It involves writing the code in a specific programming language, which is a formal language designed to communicate with computers. The code is typically written using a text editor or an integrated development environment (IDE).

- **Component Sizing Calculations:** Component sizing calculations involve determining the size and capacity of various components in the mechatronics system. These calculations include motor size, battery capacity, and capacitor size.

- **Control System Calculations:** Calculations for control systems in mechatronics involve determining the process characteristics such as response times, pressures, flows, temperatures, alarms and absolute limits. This is used to design trip systems, alarm levels, equipment safety specifications in hazardous environments. It is also used to determine the required sensor resolutions, control algorithms, signal bandwidth, and controller bandwidth. These calculations help to ensure the accuracy and precision of the mechatronics system and the process being controlled.

- **Cost Analysis:** Cost analysis is a critical aspect of mechatronics design. It involves determining the total cost of the system, including materials, labour, and maintenance. Cost analysis helps to ensure that the mechatronics system is cost-effective and meets the requirements of the application.

- **Force and Torque Calculations:** Force and torque calculations are critical in designing the mechanical components of a mechatronics system. These calculations help determine the required motor size and gear ratios for a particular application.

- **Heat Transfer Calculations:** Heat transfer calculations are critical in mechatronics design to ensure that the system operates within safe temperature limits. These calculations help to determine the cooling requirements for the system.

- **Kinematic Calculations:** Kinematic calculations help to determine the position, velocity, and acceleration of mechanical components in a mechatronics system. These calculations are used in motion control systems, robotic arms, and other applications.

- **Programming:** This is a broader concept of coding that includes coding as well as other activities such as problem-solving, design, testing, and debugging. Programming involves not only writing code but also understanding the problem that the code is trying to solve, designing a solution that meets the requirements, and testing the code to ensure that it works as intended.

- **Power Calculations:** Power calculations are used to determine the amount of power required to drive a mechatronics system. This calculation includes the power required to move mechanical components, power needed for electronic components, and power required for control systems.

These are just some of the common calculations used in mechatronics design. The specific calculations required for a particular application will depend on the system requirements and design specifications and may involve the input from various other specialization disciplines such as Mechanical, Electrical, Chemical, Computer and Industrial engineering.

Use technologies, engineering knowledge, or systematic approaches to develop new and improved techniques and methods to design or optimise mechatronics systems:

- Develop commissioning scope of work and input into the planning process.

- Develop and improve commissioning procedures.

- Develop and improve quality and maintenance plans.

Formal calculations shall be prepared for all mechatronic engineering solutions. Calculations shall be recorded on calculation sheets or downloaded from a computer simulation tool to form part of a design report. For manual analysis, all analysis calculations shall be shown together with the results of the analysis (e.g., response times, alarm, and trip levels). Systems engineering plays a critical role in this regard.

Sufficient information and data must be indicated on calculations and simulations for audit, investigation, checking etc. purposes.

7.3.5 Simulations

Mechatronic simulations are often computer-based models that simulate the behaviour and performance of Mechatronic systems. Mechatronic simulations are used to test and validate designs, analyse system behaviour, optimize performance, and reduce development costs and time. Simulations are also used in the control of industrial plant processes by using say water to test control systems rather than the actual product.

There are several simulation methodologies that are used to model and analyse mechatronic systems. Here are a few examples:

- **Discrete event simulation:** In this methodology, the events that occur in a system are modelled as discrete events occurring at specific points in time. The simulation tracks the flow of system entities through different stages and processes, and the impact of various events on the system's overall behaviour.
- **System dynamics:** System dynamics models describe the behaviour of complex systems by representing the interactions between different components of the system.
- **Monte Carlo simulation:** This methodology involves using random sampling techniques to model the behaviour of a system.
- **Continuous simulation:** Continuous simulations involve modelling the behaviour of a system over a continuous time period, using differential equations to describe the behaviour of system components.
- **Multi-domain system simulation (MDS):** MDS is a methodology used to model and analyse complex systems that are composed of multiple interconnected domains or subsystems. These domains can be physical systems such as mechanical, electrical,

hydraulic, thermal, and others or non-physical systems such as control and signal processing systems.

7.3.6 Quality and sign-Off of designs

- **Quality of design**: The designer shall take all reasonable steps for quality control, to generally ascertain that the Mechatronic engineering solutions implemented or installed on site comply with the design. It is recommended that a quality control plan (QCP) be instituted by the contractor and approved by the designer; this QCP must conform not only to all the requirements of the design but also to the requirements of the codes and/or relevant specifications that the contractor is expected to satisfy.
- **Design Testing:** Any tests required for the purpose of mechatronic systems design (including Prototype, Functional Tests, or Factory Acceptance Test [FAT] where required) shall be stated and communicated to the contractor and/or client for execution. Test results and other relevant data shall be filed with the calculations or overall design package.
- **Quality Concerns:** Should the designer not be satisfied with the arrangements regarding quality control instituted on site, this shall be raised with the contract manager (if work is external) and, where applicable and necessary, with the client.
- **Design documentation approval:** Approval of designs means that the design is complete, is fit for the intended purpose, and complies with the required standards, specifications and legislation in terms of safe operation, loading adequacy, and fault level withstand. Approval of a design drawing/illustrative model means that the drawing/model is complete, that the drawing/model conforms to the design, and that the mechatronic content of the drawing/model is correct.
- **Sign - Off**: The steps shall be signed off by the contractor as having been correctly completed and overseen by the engineer for important issues. Should the quality control on site remain unsatisfactory, the designer shall not sign off any work.

- **Certification:** The designer, if satisfied that the Mechatronic engineering solutions have been implemented and installed in accordance with the requirements of the design, shall certify that the Mechatronic engineering solutions have been commissioned according to relevant standards and a certification of completed works issued

- **Maintenance**: Maintenance requirements shall be defined and clarified by designer and client. This refers to both preventative and corrective maintenance types. As per Regulations issued in terms of the Occupational Health and Safety Act, an obligation is placed on all plant owners to ensure that the Mechatronic engineering solutions are safe for continued use and are inspected regularly.

- **Quality Control Post Design**: This quality control is not limited to the actual site only, but also needs to include any manufacture / pre-assembly and assembly work completed.

7.3.7 Design drawings:

Design drawings shall show all information required for implementation, application, and/or installation and shall be checked prior to issuing. Appropriate requirements (temperatures, pressures, intrinsic safety requirements use cases, etc.) shall be included.

General information or data to be indicated includes the following:

- Name of the responsible Mechatronic engineering practitioner.

- Name and address of the consulting firm responsible for the mechatronic design.

- All symbols and units shall be consistent with those used in the CoP or standard that is employed.

7.3.8 Retention Period

Irrespective of client requirements regarding the retention of design information, all design drawings, calculations, computer print-outs, test results, and test certificates, etc. shall be retained in a form that is easily retrievable.

In South Africa, the retention period for mechatronic design records depends on the type of record and the industry in which the record was created.

For example, according to the South African Companies Act of 2008, companies are required to keep proper accounting records for a period of seven years. These records would include financial documents related to the mechatronic design process such as invoices, receipts, and bank statements.

In addition, certain industries in South Africa may have specific regulations that dictate the retention period for mechatronic design records. For example, the National Health Act of 2003 requires health facilities to maintain patient records for a period of six years after the patient's last visit.

It's important to note that these retention periods are minimum requirements, and in some cases, it may be advisable to retain records for a longer period. For example, if a mechatronic design project is related to a legal matter, it may be necessary to keep records for a longer period to comply with legal requirements.

In summary, the retention period for mechatronic design records in South Africa varies depending on the type of record and industry in which it was created. However, companies are generally required to keep proper accounting records for a period of seven years.

Should there be a need to review the approved documents, the designer shall adhere to the implemented process to ensure that all changes are done, accepted, and communicated to all relevant parties in good time.

7.3.9 Obligations to society

Any mechatronic engineering work carried out shall consider the ECSA Code of Conduct, the PAIA Act, the POPI Act and other relevant legislation.

The execution of engineering work shall adhere to legislation and recognised standards, which include the following Acts:

- Engineering Profession Act, No. 46 of 2000
- Occupational Health and Safety Act, No. 85 of 1993
- National Building Regulations and Building Standards Act, No. 103 of 1977
- National Environmental Management Act, No. 107 of 1998
- Employment Equity Act, No. 55 of 1998
- Basic Conditions of Employment Act, No. 7 of 2018

All engineering work must be carried out according to the norms of the profession.

Such norms are generally represented by national and international standards, industry standards, codes of practice, and best practice guidelines. A mechatronic engineering practitioner shall assess any deviation from the recognised standards or work beyond the scope of such standards in terms of sound engineering and scientific fundamentals.

7.4 System maintenance

Maintaining mechatronic systems is an important aspect of ensuring their continued operation and performance. The requirements for maintaining mechatronic designs may vary depending on the specific application and equipment involved

Some common requirements include:

- **Regular inspections:** Mechatronic designs should be inspected on a regular basis to ensure that all components are functioning properly and to identify any potential issues before they become major problems.

- **Preventive maintenance:** Preventive maintenance involves performing routine maintenance tasks, such as replacing worn components or lubricating moving parts, to prevent equipment failure and prolong the life of the mechatronic design.

- **Calibration:** Mechatronic designs often include sensors and other measurement devices that require calibration to ensure accurate and reliable operation. Calibration should be performed on a regular basis according to the manufacturer's guidelines.

- **Documentation:** Proper documentation is essential for maintaining mechatronic designs. Documentation should include design drawings, schematics, and operating manuals, as well as records of inspections, maintenance, and repairs.

- **Training:** Personnel responsible for maintaining mechatronic designs should receive proper training to ensure that they have the knowledge and skills needed to perform maintenance tasks safely and effectively.

- **Upgrades and modifications:** Mechatronic designs may need to be upgraded or modified over time to improve performance or address changing operational requirements. These upgrades and modifications should be carefully planned and executed to ensure that they do not compromise the safety or reliability of the equipment.

Overall, the requirements for maintaining mechatronic designs are multifaceted and require careful planning and execution to ensure the continued operation and performance of the equipment.

8 INTERPRETATION AND COMPLIANCE

8.1 Interpretation

The word ‘shall’ indicates a peremptory provision.

The word ‘should’ indicates a provision directive or informative in character requiring substantial compliance.

The word ‘they’ in its singular form or its derivative forms ‘their/them’ are pronouns used for gender neutrality.

8.2 Compliance

Failure to comply with a peremptory provision of this CoP constitutes improper conduct in terms of the Act.

Failure to comply with a directive or informative provision of this CoP may constitute improper conduct in terms of the Act if its consequences are significant.

9 ADMINISTRATION

The Council shall be responsible for the Administration of this CoP, including its publication, maintenance, and distribution.

The Council shall ensure that the CoP and all amendments thereto are available on the ECSA website and upon request, shall provide a copy thereof.

The Council shall take all reasonable steps to introduce the CoP to the general public.

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Subject: Code of Practice for the Performance of Mechatronic Engineering Work			
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REVISION HISTORY

Revision Number	Revision Date	Revision Details	Approved By
Rev. 0 Draft A	26 September 2022	New document	RPS & Working Group
Rev. 0 Draft B	07 October 2023	Steering Committee Draft	Steering Committee
Rev. 0 Draft C	07 October 2022	Broader Consultation Draft	Working Group
Rev. 0 Draft D	05 December 2022	Incorporation of comments received from Broader Consultation	Working Group
Rev. 0 Draft E	26 January 2023	Steering Committee	Steering Committee
Rev. 0 Draft F	21 April 2023	Steering Committee recommendation to submit to RPSC for approval	Steering Committee
Rev. 0	18 May 2023	Approval by RPSC	RPSC
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Subject: Code of Practice for the Performance of Mechatronic Engineering Work			
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The Code of Practice for

Performance of Mechatronics Engineering Work

Revision 0 dated 02 June 2023 and consisting of 64 pages reviewed for adequacy by the Business Unit Manager and approved by the Executive: Research, Policy, and Standards (**RPS**).

.... 25 March 2024

Business Unit Manager Date

.... 2024/04/05

Executive: **RPS** Date

This definitive version of this policy is available on our website.

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Structural Engineering Code of Practice

Geotechnical Engineering Code of Practice

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