

# Electrical Tester for Single-Phase and DC

## Clarifying the ECA(SA)'s stance and legislation as it currently stands

By Anthony Schewitz, Regional Director: Highveld

Over the past two to three years, there have been various opinions and arguments around whether an Electrical Tester for Single-Phase (ETSP) (commonly known as a Single-Phase Tester) can issue a CoC for a PV installation. The short answer is NO. An ETSP can only issue a CoC for the AC portion fed from an inverter.

### The following scenarios inform this answer:

- Can an ETSP issue a CoC for an installation fed (i.e plugs, lights etc.) from A single-phase grid? **YES**
- Can an ETSP issue a CoC for an installation fed (i.e plugs, lights etc.) from a single-phase generator? **YES**
- Can an ETSP issue a CoC for an installation fed (i.e plugs, lights etc.) from a single-phase inverter? **YES**
- Can an ETSP issue a CoC for the DC portion (Panels, Batteries etc) for an installation fed through an inverter? **NO**

The ETSP would have to get an Installation Electrician (IE) or Master Installation Electrician (MIE) to sign off the DC portion.

There have been statements made discrediting portions of standards to suit a narrative advocated by certain individuals and associations and there have been brazen statements and videos made asserting the specific narrative which allowed the unqualified, plumbers and other trades to claim stakes in our industry.

I would caution people to rather petition a change in legislation through the correct channels prior to twisting the legislation to suit prerogatives. Associations and citizens must respect the law as it is written; not the law that they want. Unless we want to create openings for illegal operators to infest and create anarchy.

The ECA(SA) stance is that an Electrical Tester for Single-Phase is limited by the scope of the regulation and therefore is not competent to sign off DC installations in this regard.

### Electrical Installation Clarification

Since PV started the argument, it may be best to explain one simple concept around PV. PV is part of an electrical installation the conventional definition of which is often misinterpreted as applying only conventional sources: Eskom, Municipalities, Body Corporates and the like. This common misinterpretation of the defines of 'Point of Supply' as being conventional sources only is contrary to the regulation, whereas it applies to all sources

of supply, conventional and otherwise, including DC and alternative supplies and only excludes the equipment thereof. The definitions would include any supply DC, AC, battery, transformer, generator, 24v, 230v, 1000v, it intention being to cover all parts of the consumer installation.

*'supplier', in relation to a particular electrical installation, means any person who supplies or contracts or agrees to supply electricity to that electrical installation; and*

*'point of consumption' means any point of outlet or the supply terminals of machinery which is not connected to a point of outlet and which converts electrical energy to another form of energy: **Provided** that in the case of machinery which has been installed for any specific purpose as a complete unit, the point of consumption shall be the supply terminals which have been provided on the unit of machinery for that purpose;*

*'point of control' means the point at which an electrical installation on or in any premises can be switched off by a user or lessor from the electricity supplied from the point of supply, or the point at which a particular part of an electrical installation on or in any premises can be switched off where different users occupy different portions of such premises;*

*'point of supply' means the point at which electricity is supplied to any premises by a supplier;*

*'electrical installation' means any machinery, in or on any premises, used for the transmission of electricity from a point of control to a point of consumption anywhere on the premises, including any article forming part of such an electrical installation irrespective of whether or not it is part of the electrical circuit, but excluding:*

- (a) any machinery of the supplier related to the supply of electricity on the premises;*
- (b) any machinery which transmits electrical energy in communication, control circuits, television or radio circuits;*
- (c) an electrical installation on a vehicle, vessel, train or aircraft; and*
- (d) control circuits of 50V or less between different parts of machinery or system components, forming a unit, that are separately installed and derived from an independent source or an isolating transformer;*

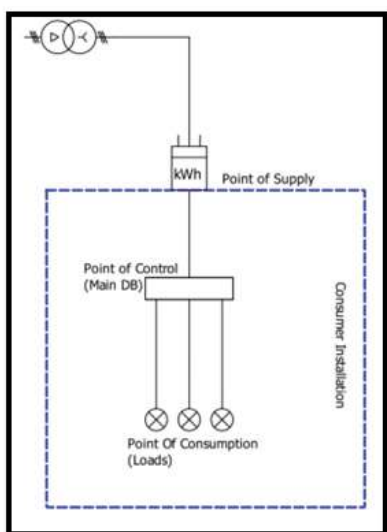


Image 1: Diagram of a Conventional Installation

SANS 60364-7-712 - which is a normative addition to SANS 10142-1 since its adoption in Edition 2 2017 - gives additional clarity to the installation sequence when including PV in the scope of the code. Where the supply source of energy is the PV panel and the consumption point ends either feeding back to the supply - as in the case of grid-tied - or feeding into the consumer's installation - as in the case of back up - or both, as in the case of hybrid. As far as batteries are concerned, they are still covered in SANS 10142-1 and are treated as a source of energy.

The equipment of a PV installation, like any other item of equipment, is dealt with only so far as its selection and application in the installation is concerned.

A PV installation starts from a PV module or a set of PV modules connected in series with their cables, provided by the PV module manufacturer, up to the user installation or the utility supply point (point of common coupling).

Requirements of this document apply to

- PV installations not connected to a system for distribution of electricity to the public,
- PV installations in parallel with a system for distribution of electricity to the public,
- PV installations as an alternative to a system for distribution of electricity to the public,
- appropriate combinations of the above

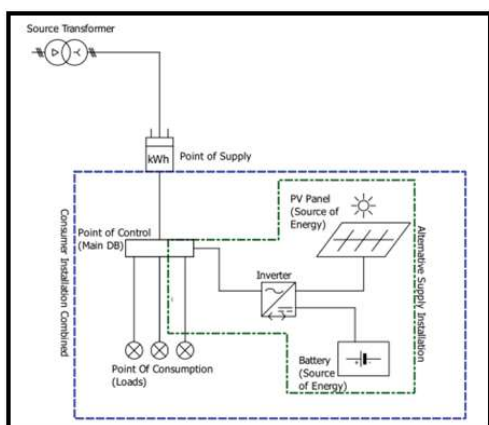


Image 2: Electrical Installation including an Inverter, Battery, and PV Panel

## Registration versus Qualification

When the Department of Employment and Labour issues a person with a 'Wireman's Licence' they do not issue them with a qualification, they furnish them with a registration which comes attached to a letter stating that it is still the property of the DoEL and they can withdraw the registration at any given time.

Registrations are quite different from qualifications. They are issued by a body, and based on proof of competency achieved, meaning you have achieved a qualification and would like to register to further your aptitude of your qualification in an industry. Engineers, for example, register with Engineering Council of South Africa (ECSA), whereas electricians and contractors do not have a formal body, and currently registration is enforced by the Department of Employment and Labour.

They are responsible for guidance on the minimum requirements to register as per sub-regulation 11(2) of the Electrical Industry Regulations. The DoEL continuously publish the requirements to register in Occupational Health and Safety 3/1/5/7/9 and have guide the use of the registrations through the definitions and their limitations.

The most important thing to remember about registrations are that qualifications limit the work you can carry out under said registration. Both registrations limit the applicant to stay in their registrations. With the premise being to 'stay in your lane'; to keep to your competencies.

### Examples

- An electrical engineer cannot act as a mechanical engineer.
- A PR tech, cannot act as a PR Eng.
- A Civil Engineer cannot sign off or practice as an electrical engineer.
- An IE cannot act as a MIE.
- An Engineer cannot act as a Doctor.
- An Electrician cannot act as a plumber.
- A ETSP cannot act as an IE.

Extract from the EIR of 2009

### 11. Application for Registration as a Registered Person

(1) An application for registration as a registered person shall be made to the chief inspector in the form of Annexure 5 (not in this publication) together with the registration fee prescribed by regulation 14

(2) Any natural person who satisfies the chief inspector that he or she (a) has sufficient knowledge of the rules applicable to electrical installations in the category for which the application is being made; and

(b) has appropriate practical experience in respect of the electrical installation, verification and certification of the construction, testing and inspection of the type of electrical installation for which application is being made, shall be registered as an electrical tester for single-phase, an installation electrician, or a master installation electrician, as the case may be

(3) The chief inspector shall furnish a registered person with the appropriate certificate of registration and enter such registration into the national database

(4) A registered person shall on request produce his or her certificate of registration to an inspector, an approved inspection authority for electrical installations, a supplier or any person to whom he or she intends to issue a certificate of compliance

(5) A registered person shall inform the chief inspector of any changes affecting his or her registration within 14 days after such change

Extract from the ECSA – Code of Conduct

<p><b>3.1 Competency</b></p> <p><b>Registered Persons: -</b></p> <p>(a) must discharge their duties to their employers, clients, associates and the public with due care, skill and diligence.</p> <p>(b) may only undertake work which their education, training and experience have rendered them competent to perform and is within the category of their registration.</p> <p>(c) must, when carrying out work, adhere to norms of the profession.</p>
--

**Electrical Installation Regulations and Registered Persons**

The EIR as it applies specifically to the electrical installations, classifies three types of registered persons: the Single-Phase Tester, the Installation electrician and the Master Installation Electrician, and impose limitations based on proven competencies, as demonstrated to the Chief Inspector in respect of sub-regulation 11(2) (previously sub-regulation 9(2)). The definition guides one on part of the limitation:

*‘registered person’ means a person registered in terms of—*

- (a) regulation 11; or
- (b) regulation 9 of the Electrical Installation Regulations, 1992, as an electrical tester for single-phase, an installation electrician or a master installation electrician, as the case may be;

*‘electrical tester for single-phase’ means a person who has been registered as an electrical tester for single-phase in terms of regulation 11(2) for the verification and certification of the construction, testing and inspection of electrical installations supplied by a single-phase electricity supply at the point of control, excluding specialised electrical installations;*

*‘installation electrician’ means a person who has been registered as an installation electrician in terms of regulation 11(2) for the verification and certification of the construction, testing and inspection of any electrical installation, excluding specialised electrical installations;*

*‘master installation electrician’ means a person who has been registered as a master installation electrician in terms of regulation 11(2) for the verification and certification of the construction, testing and inspection of any electrical installation;*

The EIR of 1992 created and implemented the following definitions, automatically imposing limitations specific to single-phase supplies.

*“electrical tester for single-phase” means a person who has been registered as an electrical tester for single-phase in terms of regulation 9 and who has been approved by the chief inspector for the verification and certification of the construction, testing and inspection of electrical installations supplied by a single-phase electricity supply;*

*“installation electrician” means a person registered as an installation electrician in terms of regulation 9 who has been approved by the chief inspector for the verification and certification of the construction, testing and inspection of any electrical installation excluding specialised electrical installations: Provided that this exclusion shall come into effect only on 1 July 1994;*

*“installation work” means the installation, extension, modification or repair of an electrical installation, including the connection of machinery at the supply terminals of such machinery;*

*“master installation electrician’ means a person who has been registered as a master installation electrician in terms of regulation 9 and who has been approved by the chief inspector for the verification and certification of the construction, testing and inspection of any electrical installation;*

**Application for registration as an accredited person**

9.(1) (a) Application for registration as an accredited person shall be made to the chief inspector in the form of Annexure 3.

(b) The application shall be accompanied by the fees determined in terms of regulation 11.

- (2) Any natural person who satisfies the chief inspector that he –
  - (a) has gained sufficient **experience in and knowledge of a trade relevant to the qualifications for registration;**
  - (b) has gained sufficient knowledge of the **theory applicable to electrical installations and possesses the minimum qualifications laid down by the chief inspector;** and
  - (c) has gained **sufficient knowledge of the rules and the safety standards applicable to electrical installations,** shall at the discretion of the chief inspector be registered as an electrical tester for single-phase, an installation electrician or a master installation electrician, as the case may be, and the **chief inspector shall furnish him with a certificate of registration subject to such conditions or restrictions as he may deem necessary.**

(3) An accredited person shall on request produce his certificate of registration to an inspector, a supplier or any other person to whom he issues or towards whom he contracts to issue a certificate of compliance.

The legislation above does not specify the limitation of AC versus DC outright due to the regulations themselves being onerous in nature and being all applicable, with only ETSP being specified clearly.

When we look at the limitation imposed by the definition alone it would be specific to single-phase installations which automatically cut out DC and the limitation that they work below the point of control added in 2009. This gives relatively clear guidance on where their work is accepted.

**Requirements to Register**

The ETSP is given three separate options to register, as follows:

Option 1	Option 2	Option 3
NQF 3: Electrical Engineering	Trade Test (Various) or Chemical NQF 4 (CHEITA)	5 Years Experience
Unit Standards	N2 or Grade 11 (Equivalency)	Competence in construction/ basic electrical assessment
1 Year Practical or NQF4	Unit Standards	Unit Standards
Working Knowledge Assessment of Rules	Working Knowledge Assessment of Rules	Working Knowledge Assessment of Rules



### Summarised Requirements (full requirements can be found in department guidelines)

Option 1 and 2 both have relatively good theoretical and practical experience through the official training received, the limiting factor would be Option 3 with no formal training required.

You can only judge the level (competency) of a registration or qualification by the lowest entry point, levelling everyone with the qualification/ registration at the same point of entry. Additionally, the Registrations before the incorporation of the Unit Standards were even less onerous. The above would limit the registration as an ETSP to the Competencies of Option 3.

### Competencies

Looking deeper into competencies we will be focussing on Option 3 as the lowest point of entry, as Options 1 and 2 have resonance with the IE qualification in terms of technical competence.

The requirements, as followed closely from the Guidelines published by the department, are understood as follows:

**1.3.1 Practical Experience**

(a) Provide 5 years proven experience in electrical installation work (letter from employers or certificate of service from employer).

Point 1.3.1(a) simply requires experience in electrical installation work to be provided without specifying what experience is required where we have noticed false letters and simple experience regarding electrical installation work. This experience could simply be plugs and lights installation - at worst - and have nothing relevant to the actual requirements. Additionally with the increase in fraudulent letters - with friends, for example, signing off letters of experience - brings this route into question.

The ECA(SA) would strongly recommend a link to the NBCEI worker's database for verification which would assist in eliminating some of the fraud or utilisation of the UIF structures to verify employment.

(b) Prove competence in constructing a single phase electrical installation as well as knowledge of basic electrical principles assessed at an EWSETA accredited training provider.

Point (b) is an assessment to see if the applicant can do basic construction tasks like installing a plug, a light, or wiring a DB etc. specific to Single-Phase.

(c) Submit documentary proof of successful completed unit standards on inspection, testing and certification of single-phase domestic installations as prescribed by the EWSETA.

Point (c) implies that they will be tested and found competent in the following SAQA Unit Standards (US) US113898 and US258966.

The unit standards for single-phases testers are highly restrictive and only cover domestic installations with a working knowledge of SANS 10142-1,

where each of the other unit standards specific to IE is not limited and the candidate has a statutory knowledge of SANS 10142-1 which has DC components. With DC being brought into the spotlight as being a special type of current that requires thousands of rands of training to understand, then this would not be constituted in the realm of an ETSP competency, as a simple working understanding of the standard would not be sufficient to mitigate the respective risk involved with DC. Additionally, even if you claim that trade test or NQF level 3 should reach the requirement then the same would apply to all who achieve the registration via the 'Recognised Prior Learning' method Option 3. Whereas in the training of the IE, it is far more measurable and a formal (statutory) examination on the application of the standard is more suitable.

To highlight just one of the risks involved in conflating AD and DC: DC Poses real fire, health and safety risks, wherein voltages as low as 48 volts DC can draw an arc of a few millimetres, whilst at 230V it can draw an arc well over 20mm. This means that incorrect installations or enclosures can cause substances to ignite, whereas AC sees only the formation of a spark, as the arc gets broken by the sinusoidal waveform minimising risk exponentially.

Complete certificate of compliance for a single phase domestic installation				
SAQA US ID	UNIT STANDARD TITLE			
113898	Complete certificate of compliance for a single phase domestic installation			
ORIGINATOR				
SGB Electrical Engineering & Construction				
PRIMARY OR DELEGATED QUALITY ASSURANCE FUNCTIONARY				
-				
FIELD		SUBFIELD		
Field 12 - Physical Planning and Construction		Electrical Infrastructure Construction		
ABET BAND	UNIT STANDARD TYPE	PRE-2009 NQF LEVEL	NQF LEVEL	CREDITS
Undefined	Regular	Level 4	NQF Level 04	5
REGISTRATION STATUS		REGISTRATION START DATE	REGISTRATION END DATE	SAQA DECISION NUMBER
Reregistered		2018-07-01	2023-06-30	SAQA 06120/18
LAST DATE FOR ENROLMENT		LAST DATE FOR ACHIEVEMENT		
2024-06-30		2027-06-30		

Inspect and test a single phase domestic installation				
SAQA US ID	UNIT STANDARD TITLE			
258966	Inspect and test a single phase domestic installation			
ORIGINATOR				
SGB Electrical Engineering & Construction				
PRIMARY OR DELEGATED QUALITY ASSURANCE FUNCTIONARY				
-				
FIELD		SUBFIELD		
Field 12 - Physical Planning and Construction		Electrical Infrastructure Construction		
ABET BAND	UNIT STANDARD TYPE	PRE-2009 NQF LEVEL	NQF LEVEL	CREDITS
Undefined	Regular	Level 3	NQF Level 03	10
REGISTRATION STATUS		REGISTRATION START DATE	REGISTRATION END DATE	SAQA DECISION NUMBER
Reregistered		2018-07-01	2023-06-30	SAQA 06120/18
LAST DATE FOR ENROLMENT		LAST DATE FOR ACHIEVEMENT		
2024-06-30		2027-06-30		

*In all of the tables in this document, both the pre-2009 NQF Level and the NQF Level is shown. In the text (purpose statements, qualification rules, etc), any references to NQF Levels are to the pre-2009 levels unless specifically stated otherwise.*

This unit standard replaces:

US ID	Unit Standard Title	Pre-2009 NQF Level	NQF Level	Credits	Replacement Status
113893	Test and inspect a single phase domestic installation	Level 3	NQF Level 03	10	Complete

**1.3.2 Knowledge of Statutory Requirements**

Submit proof of working knowledge of the legislation and relevant health and safety standards applicable to single phase electrical installations, assessed by an EWSETA registered assessor.

1.3.2 Limits the ETSP to a basic understanding of the rules and as such has always limited them to the simpler tasks as their accountability levels are



limited as they have not been statutorily assessed on their knowledge of their legislation and safety standards.

And as such based on the requirements stipulated that the ETSP does not poses the competency required to sign for DC.

**Misconception: DC and AC are the same thing**

Because the EIR in its reference to Single-phase does not limit DC, the argument is often posed that DC is to be *included* in AC. Using this in argument for including DC in Single-Phase is fundamentally problematic: basic words do *not* require re-definition beyond their basic or scientific intention, *unless* that scientific intention is fundamentally changed. Therefore one would use the definitions of the words in their base form of the English language.

**To clarify** DC is *not* the same as single-phase in either basic English contexts or scientific notation. And it is not the responsibility of the OHS Act, EIR or SANS to reiterate basic definitions unless they change their context.

Single-Phase, when broken down as 'single' and 'phase', basically means one rotation. Specific to electricity, this is a single rotation of EMF Electro-Motor Field etc and this is supported by standard English dictionaries as per the definitions below from the Merriam-Webster:

**phase - noun**

1: a particular appearance or state in a regularly recurring cycle of changes phases of the moon

2 a: a distinguishable part in a course, development, or cycle the early phases of her career b: an aspect or part (as of a problem) under consideration

3: the point or stage in a period of uniform circular motion, harmonic motion, or the periodic changes of any magnitude varying according to a simple harmonic law to which the rotation, oscillation, or variation has advanced from its standard position or assumed instant of starting

4: a homogeneous, physically distinct, and mechanically separable portion of matter present in a nonhomogeneous physicochemical system

5: an individual or subgroup distinguishably different in appearance or behavior from the norm of the group to which it belongs  
also : the distinguishing peculiarity

**single-phase - adjective**

: of or relating to a circuit energized by a single alternating electromotive force

**direct current —abbreviation DC - noun**

: an electric current flowing in one direction only and substantially constant in value

**The Annex M argument.**

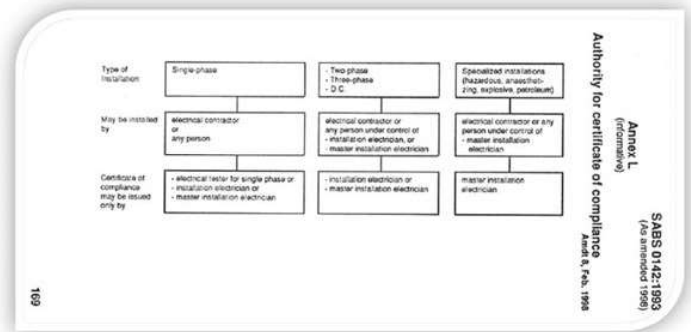
After having looked at the law we look at the safety standards and SABS committees. SANS 10142-1 is adopted by the Chief Inspector completely and in its entirety - not partially. This includes the explanations provided by the committee of which DoEL is part. We must accept SANS 10142-1 as written, not in part.

**Design and construction**

5. (1) No person may authorise, design, install or permit or require the installation of an electrical installation, **other than in accordance with a health and safety standard incorporated into these Regulations under section 44 of the Act.**

Hence SANS 10142-1 has explanations which were documented in Annex L previously.

SANS 10142-1 adopted Annexure M in SABS 0142:1993/1998 to explain two newly formed and published qualifications, namely MIE and TSP, and the chief inspector at the time would have had to consider the risks of DC, and based on those risks chose to limit DC to the IE qualification through Annex M, at the time, and even then there was DC present in the decision. And yet they didn't consider a partial acceptance lower voltage DC supplies, and in the 90's DC was used in factories, Commercial installations etc quite widely.



SABS, DoEL, ECB, ECA, AIA etc are all part of the writing of the standard and DoEL states that the acceptance of the guidance (placed in by the committee) is not accepted by them. They contradict 5(1) - and themselves - as they are represented on the SABS committee and had a hand in writing it the way it was, and currently stands. Industry accepts Annexure M's guidance in interpreting the requirements of the EIR.

The basis here is that it was never a problem with previous Chief Inspectors and the explanation Annex M provides. Until now, when publicly breaking the importance of the interpretation brings the committee who wrote it into disrepute. The industry has accepted the guidance of Annex M for over 30 years and only recently, when the question surrounding the informative nature of the Annex arose, has it been brought into question and skewed to suit a narrative.

With the latest amendment of SANS 10142-1 Edition 3.2 - which was in public comment at the time of writing - Annex M has been removed due to it being regulatory in nature. Since it has also been the cause of many arguments, it has been removed and the references fall back to the EIR.

### Cheapening the Importance of the Installation Electrician

Construing DC and AC as the same thing creates the knock-on effect of watering down the IE qualification. Including PV in the scope of the ETSP would reduce the need and drive to become an IE as then most businesses would simply use the ETSP and potentially leave a lot of IE's without work.

Accepting ETSP as the minimum would encourage fewer parties to be electrically trained as option 3 on the ETSP is the biggest loophole to obtain the relevant qualifications.

Understanding the ETSP as being the lowest level allowed to achieve the registration results in ETSP means a person who has 5 years' experience and no trade, meaning zero theoretical understanding of the dangers of DC as well as no provable theory on anything electrical, and on AC your fire risk is reduced IE's already have to prove electrical knowledge via trade test, N3 and installation rules.

### Conclusion

There are many statements from various parties on the subject, and it has caused a great divide specifically in the ETSP world where you have highly capable ETSPs who feel hard done by the interpretation we present and numerous persons and institutions have expressed their dislike of the ECA statement.

However, ETSPs have a specific role as an introductory measure. And as an introduction to the contracting industry, they have a great role. However, to expand their limitations outside the competencies of the registration places the ETSP at risk of failing and placing lives in danger.

There have also been references to persons delivering an opinion on the matter from the department verbally. This is meaningless: Unless there is a formal change or formal interpretation released by the department, the EIR as we referenced it is all we have to rely on.

Looking to the future we may be able to formalise specific training of the ETSP to expand the competencies, but this would be a discussion the whole of the industry should invest in.

