EMBEDDED GENERATOR INSTALLATION (EGI) COMPLIANCE TEST REPORT

APPLICABLE TO:
LOW VOLTAGE EMBEDDED GENERATOR (EG) CONNECTIONS THAT ARE LESS THAN 1MW IN TOTAL CAPACITY

Revision 8

Note 1. **In terms of South African legislation, the user or lessor is responsible for the safety of the embedded generation facility**
Note 2. **ECSA Professional body registration required for signing off this EGI compliance test report**
Note 3. **All listed items need to be completed for this form to be valid:**
Note 4. **All tests and requirements in this form must be done in person or witnessed in person by the signatory, for this form to be valid.**
Note 5. **A copy of the signed Certificate of Compliance (CoC), to be submitted as an annexure to this report. This certificate will exclude the EGI components but include all components of the circuit from the Customer Distribution Board up to the terminals at the end of the cable connected to the Embedded Generator. The EG installation shall be certified to comply with all prescriptions in this test report by the ECSA professional (PrEng or PrTech) competent registered person.**
Note 6. **When confirmation is required, answer "Yes" or "N/A" unless specifically instructed to indicate "Yes". The report shall not be issued if any "No" answers appear**
Note 7. **Supplementary information is provided at the end of the form to further explain what is needed in order to complete this report.**

1. CERTIFICATE OF COMPLIANCE (CoC) NO. Issued under SANS 10142 -1		Date of Issue:
2. Name of building		
3. Physical Address of installation		
4. Type of EG installation: Inverters, batteries, standby generator, other (specify all combinations used)		
5. Total Generation Capacity installed in KWp (DC) AND total KW (AC)		
6. EGI compliance to all inspection and test requirements in NRS 097-2-1 and ALL grid codes (Indicate ***YES*** in confirmation)		
7. Signage boards installed at relevant places, agreed with Utility, and in accordance with SANS standards (Indicate ***YES*** in confirmation)		

8. Dead Grid Safety Lock (DGSL) Confirm manufacturer details and required electrical tests completed. (Indicate **N/A** if there is a lockable isolation switch installed that has been agreed with Utility - refer to ***item 8 in the SUPPLEMENTARY NOTES*** for more details)	
9. Electromechanical switch with a coil energised from the utility side (Indicate **N/A** if there is a lockable isolation switch installed that has been agreed with Utility- refer to ***item 9 in the SUPPLEMENTARY NOTES*** for more details)	
10. Lockable isolation switch that is accessible to Utility is installed (Indicate ***YES or N/A.*** *N/A is applicable* if a DGSL or electromechanical switch is installed that has been agreed with the Utility.	
11. Have operating instructions been provided for the installation? (Indicate ***YES*** in confirmation)	
12. Make of inverters Manufacturer detail – Include details of the inverter test certificates as annexure to this report Model No.'s for all generator units / inverters No. of generator units / inverters installed including the KW size for each unit / inverter	
13. Islanding test (indicate ***YES*** in confirmation of test completion)	
14. Synchronisation test (indicate **YES** in confirmation of test completion)	
15. Notices applied to all control points and the areas containing the EGI in accordance with Electrical Machine Regulation 5. (indicate ***YES*** in confirmation)	

16. Where an alternative supply is installed, it complies with the SANS requirements in respect of these type of connections including a changeover switch and indicator. (indicate ***YES*** in confirmation)	
17. Structural requirements, as per SANS 10400, related to the EGI identified and addressed (indicate ***YES or N/A***)	
18. Reverse power flow blocking protection has been installed and commissioned to prevent reverse power flow into the utility distribution electricity network (Indicate ***YES or N/A***)	
19. Protection settings have been set to comply with NRS 097-2-1 and the approved generation capacity maximum output of the inverter has been limited by appropriate hardware or software settings. (Indicate ***YES*** in confirmation)	

I ……(competent person's name) hereby declare that I have inspected the installation, examined the associated design and documentation. I have witnessed the relevant tests. I confirm that the information given above is correct and complies with the Grid Codes, NRS standards, SANS standards and the applicable statutory requirements.

ECSA PrEng or PrTech, Registration no…….. Date……..

I confirm that I am "competent" in terms of the ECSA act and regulations.

Name of Competent Person……..…… (In good standing with ECSA)

Telephone no…….……..

Email address……..……..

Signature…….……..…….

SUPPLEMENTARY NOTES FOR COMPLETING EGI TEST REPORT:

Item 1 on main form:
The CoC does not cover the embedded generator plant. It is for the "balance" of the system. It can only be issued by a "registered person" in terms of the "electrical Installations Regulations", i.e. a registered Electrician.

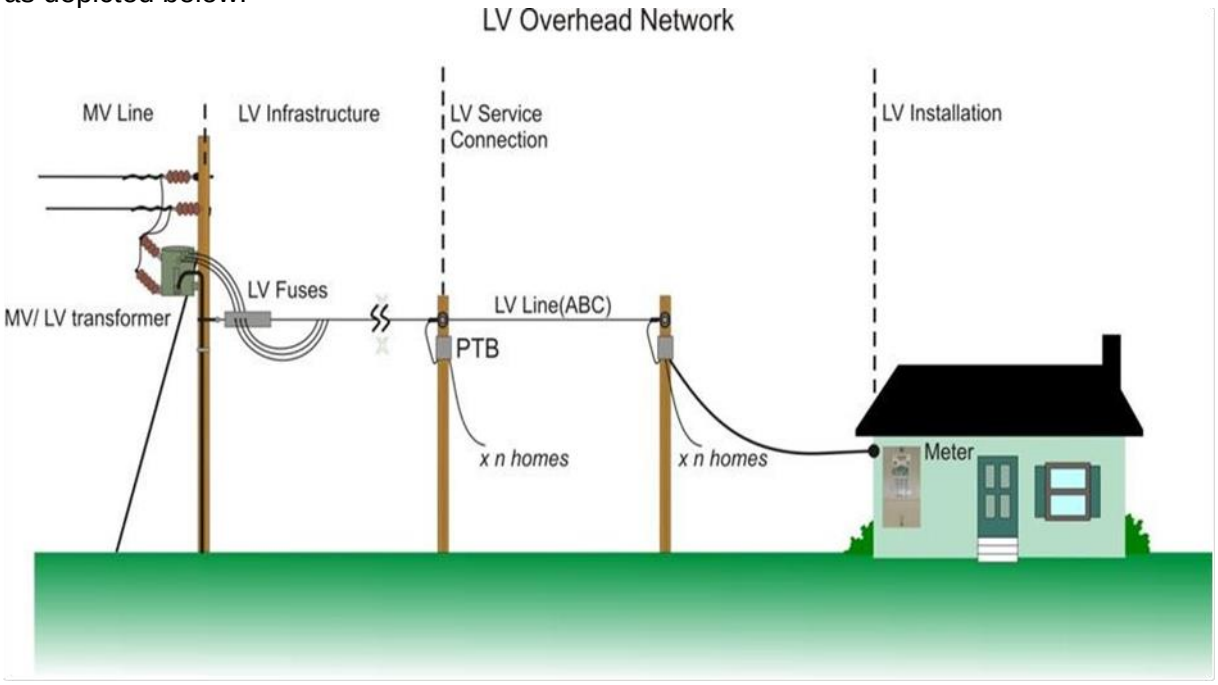
Item 4 on main form:
- This form only deals with embedded generators rated at up to 1MVA which is limited to the static power converter(s) (inverter-based machines).
- Including the control and protection gear within a customer's network that operates in synchronism with low-voltage networks. For avoidance of any doubt, the point of generator connection must be at low voltage even if the point of utility supply is not at low voltage.
- Other forms are needed for machines other than static power converters.

Item 5 on main form:
This is the sum of all the inverters rating for the installation.

Item 6 on main form:
Provide the inverter NRS 097-2-1 compliance certificate as supporting information and list the certificate number (company details of issuing authority).

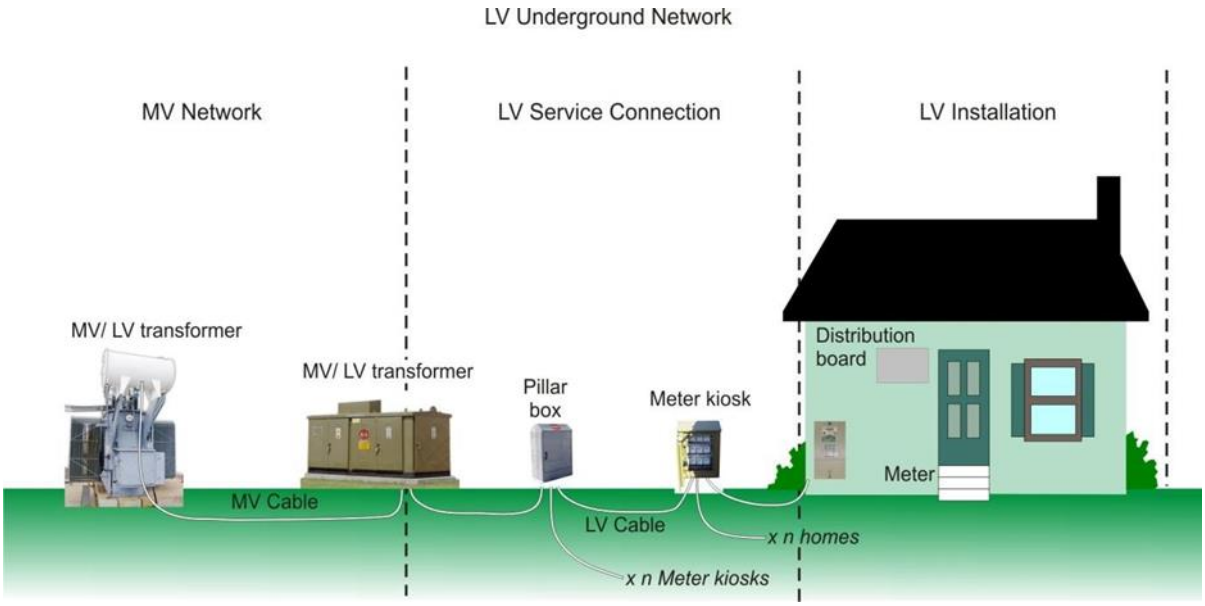
Item 7 on main form:
Signboards to be placed at every relevant operating point including the Eskom meter box/kiosk.

For overhead system, the operating point will be the fuses and LV circuit breakers (located at the Transformer structure, at the Pole Top Box (PTB) and at the meter box) as depicted below.



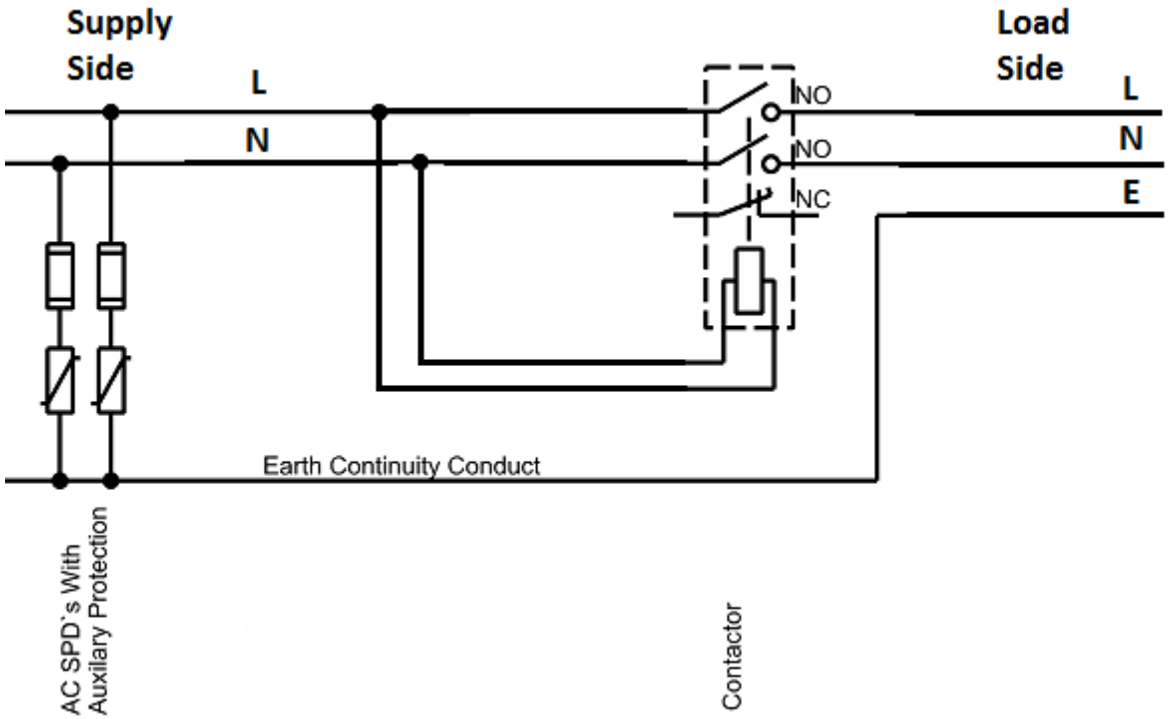
For underground system, the operating point will be the minisub (MV/LV transformer) and LV circuit breakers and or fuses located at the pillar-box, meter kiosk or meter box as depicted in figure below.

NB: LV bus bar forms part of MV and so whenever work must be done on the LV bus bar, operating has to done on the MV side of the transformer and apply ORHVS rules accordingly.



Item 8 on main form:
The clarification of the DGSL will be determined as part of the scope of works provided by the Utility. The Utility has complete control of what is needed as part of the application and quotation for grid requirements of this installation. If there is an accessible isolation switch that has been agreed with the Utility that will allow for the disconnection of the entire supply, then no DGSL is needed.

Item 9 on main form:
In case where a DGSL device is not available the following circuit shall be implemented as an interim solution to perform equivalent function as a DGSL device, it shall be connected in series with the inverter:



Item 10 on main form:

- Where practically possible, a Utility accessible isolation switch is the preferred isolation solution for all installations.
    - For points of supply at LV, the isolation switch will be located on the customer side of the installation
    - For points of supply at MV/HV the isolation/switching point requirements will follow the design and operating regulations for MV/HV installations.
- The Utility will determine the acceptable location of the isolation switch for LV supplies.
- The isolation switch will be for full load breaking capacity and designed in accordance with SANS 62335
- The Utility has complete control of what is needed as part of the application and quotation for grid requirements of this installation.

Figure below shows a typical isolation point and labeling for a dedicated LV supply

Item 11 on main form:

In case of faults
The customer should:

- Isolate his / her generator from Eskom network before isolating individual inverters and DC sources. Operating points should be clearly marked on customer single line diagram.
- Perform fault finding and clear the fault before restoration of supply. There should be a fault-finding procedure to enhance fault clearing process.
- Eskom should be informed once the fault is suspected to be on the Eskom side.

In case of fires
Faults on electrical system should not be extinguished by use of water.
The customer:

- Should isolate his / her generator from Eskom network before isolating individual inverters and DC sources. Operating points should be clearly marked on customer single line diagram.
- Should shut-down the plant through standardized procedure.
- In case of solar system, the solar panels should be covered with fire retardant material or apply equivalent technique to prevent solar panels from generating during fire / fault condition.

Item 12 on main form:
If this information is contained as part of the NRS 097 -2-1 test reports, indicate as such. If this information is separate to the test report, and the space provided is not enough for all the details, please provide a separate attachment to this report and list the document reference number in space provided.

Item 13 on main form:
The following process should be followed:

- Ensure the customer generator is connected to Eskom supply.
- Confirm correct voltages at generator terminals
- Confirm the generator is producing power (kW)
- Once all the above are confirmed to be correct, switch OFF the point of supply circuit breaker
- Wait for few minutes and confirm if the SSEG has shut down completely.
- Confirm the generated power is zero and terminal voltages of the generator are zero.

Item 14 on main form:

Once item 13 is completed and confirmed to be correct, switch back ON the point of supply circuit breaker.

- Confirm correct voltages at generator terminals
- Confirm the generator is producing power (kW)