

G83/G59 Compliance Testing

Narec (National Renewable Energy Centre), providers of R&D, consultancy, test and demonstration facilities, is an independent centre dedicated to accelerating the deployment and grid integration of renewable energy and low carbon technologies.

Engineering Recommendations (ER) G59/2 and G83/1-1 are the recommendations for the connection of embedded generating plant to the Distribution Network Operators (DNO) distribution systems.

Narec's Energy Link Laboratory, built at a cost of £10m is a dedicated facility comprising a suite of generation technologies, prime movers, and a fully configurable and isolated network. The laboratory is capable of carrying out G83/1-1 compliance testing on equipment with dedicated client facilities for witness testing if required.

Where equipment falls outside the scope of the G83/1-1 Engineering Recommendation, Narec also has the capability to perform G59/2 onsite witness testing.

G83/1-1 Testing

Engineering Recommendation G83/1-1 details the technical requirements for the connection of small scale embedded generators in parallel with public low voltage distribution networks. This recommendation covers small scale generator equipment rated at either 230V (1-phase) or 400V (3-phase) up to and including 16 amps per phase.

Figure 1 shows a typical schematic representation of a test set-up. Supply A is the generation equipment under test and supply B represents the distributed network supply.



Figure 2 - Typical inverter under test

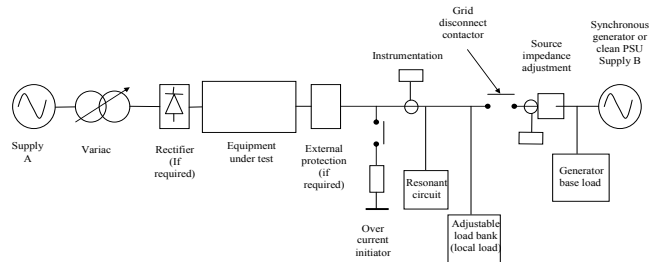


Figure 1 - Typical test arrangement

The following tests are suitable for photovoltaic (PV), micro CHP and small wind turbines connected to the grid via an inverter or similar interface device:

- Over/under frequency
- Over/under voltage
- Loss of mains protection
- Harmonic emissions to BS EN 61000-3-2
- Voltage flicker to BS EN 61000-3-3
- Over current protection to BS7671
- Power factor
- Short circuit contribution
- DC injection
- Environmental testing
- Wiring regulation compliance

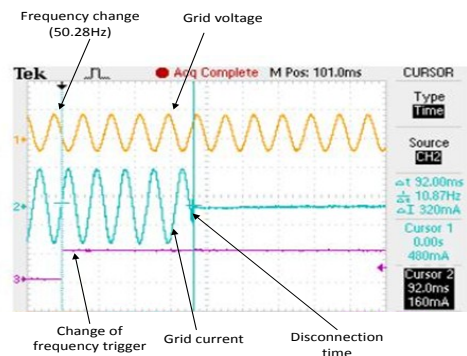


Figure 3 - Typical 'over frequency' measurement for an inverter under test validating the protective equipment

Renewable Devices Ltd – G83/1-1 compliance tests

During the development of their Swift 1.5kW wind turbine, Renewables Devices Ltd approached Narec to conduct a G83/1-1 compliance test. Narec's Energy Link Laboratory, Blyth was able to replicate the operation and grid connection of the machine, enabling the validation of the grid compliance elements of the inverter unit in accordance with the G83/1-1 standard.

Figure 4 - Swift 1.5kW wind turbine



G59/2 Testing

Engineering Recommendation G59/2 relates to the connection of embedded generating plant to public electricity suppliers distribution systems for use where the connection is made to systems at, or below, 20kV and covers generators from 16 amps per phase up to 5MW.

The following set of G59/2 tests is suitable for validating the protective equipment:

- Over/under frequency
- Over/under voltage
- Loss of mains protection

Other protection could be required and may include the detection of:

- Neutral voltage displacement
- Over current
- Earth fault
- Reverse power



Figure 5 - G59/2 test equipment

Micro and small wind turbine testing

Narec has been independently assessed by BRE Global to conduct testing of micro and small wind turbines in accordance with the Microgeneration Certification Scheme (MCS) requirements. Narec offers a range of testing and consultancy services to assist developers and manufacturers of small wind turbine devices in accordance with industry standards.

Micro and small wind testing services

Narec provide the following micro and small wind testing services:

- Pre-test advise and initial assessments
- Test site assessment and calibration
- Supply and installation of instrumentation
- Data collection and analysis
- Onsite acoustic measurements
- Design calculation verification
- Report preparation for certification



For further information on any of the above services contact:

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