13.1 Appendix A13.1 - Generating Plant Type Verification Test Sheet Type Approved Generating Plant (>16A per phase but ≤ 50 kW 3 phase or 17 kW 1 phase)

GENERATING PLANT DETAILS

Generating Plant Type reference:		
Generating Plant Technology:		
Manufacturer:	Tel:	Address:
	Fax:	
Technical file reference No:		
Maximum export capability (**Generating Plant** rating less parasitic load)		

TEST HOUSE DETAILS

Name and address of test house	
Telephone number	
Facsimile number	
E-mail address	

TEST DETAILS

Date of test	
Name of tester	
Signature of tester	
Test location if different from above	

POWER QUALITY

Harmonics Emissions								
Minimal Short Circuit Ratio R_{sce}:								
Value of Short Circuit Power S_{sc} corresponding to R_{sce}:								
Equipment Phases: Single Phase / Interphase / Three Phase (delete as appropriate)								
Description	Harmonic Current % = $100I_n/I_1$						Harmonic Current Distortion Factors (%)	
Harmonic:	I_3	I_5	I_7	I_9	I_{11}	I_{13}	THD	PWHD
Limit:								
Actual Value:								
Notes: Detailed requirements are specified in BSEN 61000-3-12. Where BSEN 61000-3-12 requires assessment of separate loads (i.e. for equipment with more than one rating or for hybrid equipment) then the values for each separate load shall be provided.								

Voltage Fluctuations					
Equipment meets BSEN 61000-3-3 Yes / No (delete as appropriate)					
If equipment does not meet BSEN 61000-3-2 : i) Does equipment require a supply rated ≥ 100A? Yes / No (delete as appropriate) ii) If the answer to i) is no, specify the value of Z_{ref} : (ohms) iii) If the answer to i) is no, specify the value of Z_{max}: (ohms)					
	Voltage Disturbance				
	P_{st}	P_{lt}	d(t) %	d_c %	d_{max} %
Limit (at Z_{ref})	1.0	0.65	3.3	3.3	
Actual Value (at Z_{ref})					

Notes:

Detailed requirements are specified in BSEN 61000-3-11 and BSEN 61000-3-3.

If the equipment requires a supply rated at ≥ 100A the maximum system impedance is deemed to be 0.15 + j0.15 ohms for each phase and 0.1 + j0.1 ohms for the neutral.

If the voltage disturbance values are above the limits for the specified reference impedance (Z_{ref}) then the manufacturer shall declare a maximum value of system impedance (Z_{max}) for which the equipment satisfies the voltage disturbance requirements of BSEN 61000-3-11.

	DC injection			**Power factor**		
Limit	20mA, tested at three power levels *			0.95 lag – 0.95 lead at three voltage levels		
Test Point	10%	55%	100%	212 V	230 V	248 V
Value Measured						

* Indicative values are shown for minimum, medium and maximum power levels.
# insert maximum value of dc injection and worst case pf value recorded during testing

PROTECTION TESTS				
Protection	**Setting**		**Test Results**	
Over Voltage Stage 1 L1-N or L1-L2 L2-N or L1-L3 L3-N or L1-L3	Volts %	Sec	Volts %	Sec
Over Voltage Stage 2 L1-N or L1-L2 L2-N or L1-L3 L3-N or L1-L3	Volts %	Sec	Volts %	Sec
Under Voltage Stage 1 L1-N or L1-L2 L2-N or L2-L3 L3-N or L1-L3	Volts %	Sec	Volts %	Sec
Under Voltage Stage 2 L1-N or L1-L2 L2-N or L2-L3 L3-N or L1-L3	Volts %	Sec	Volts %	Sec
Over Frequency Stage 1	Hz	Sec	Hz	Sec
Over Frequency Stage 2	Hz	Sec	Hz	Sec
Under Frequency Stage 1	Hz	Sec	Hz	Sec
Under Frequency Stage 2	Hz	Sec	Hz	Sec

Other relevant protection				

LOSS OF MAINS TEST

Method used			
Output power level *	10%	55%	100%
Trip setting			
Trip value			

* Indicative values are shown for minimum, medium and maximum power levels.

RECONNECTION TIMES

Reconnection Time	**Under/Over voltage**	**Under/Over Frequency**	**Loss of mains**
Minimum value	180 sec	180 sec	180 sec
Actual Setting			
Recorded value			

FAULT LEVEL CONTRIBUTION

Short Circuit Test

This test should determine the value of short circuit current at the **Generating Plant** terminals.

The **Generator** shall declare, to the **DNO,** the maximum short circuit current contribution from the **Generating Unit** and the conditions under which this exists.

One method for determining the short circuit current contribution is described below.

The short circuit current contribution of the **Generating Unit** shall be measured upon application of a short circuit on the **Generating Unit** terminals (all phases / phase to neutral) with the machine operating at full load output steady state conditions.

Current measurements shall be taken from application of fault until the time the fault has been disconnected, following operation of the **Generating Unit** protection. A current decay plot shall be produced for each phase from inception of the fault until the **Generating Unit** has been disconnected. The plot will need to show the highest value of peak short circuit current, eg for a **Generating Unit** supplying a purely inductive load the highest value of peak short circuit current will result when the fault is applied at a voltage zero. Where practicable the tests will need to determine values for all of the relevant parameters listed in the table below. These parameters are described in IEC 60909[1] whilst this standard is primarily for three-phase generators the methodology for determining these parameters can be applied to single-phase generators.

For rotating machines and linear piston machines the test should produce a 0 – 2.0s plot of the short circuit current as seen at the **Generating Plant** terminals.

Short Circuit Parameters

Parameter	**Symbol**	**Value**
Peak short-circuit current	i_p	
Initial value of aperiodic component	A	
Initial symmetrical short-circuit current *	I''_k	
Decaying (aperiodic) component of short-circuit current *	i_{DC}	
Reactance / Resistance Ratio of source *	X/R	

[1] **IEC 60909-0:2001 -** Short-circuit currents in three-phase a.c. systems. Calculation of currents

* Values for these parameters should be provided where the short circuit duration is sufficiently long to enable interpolation of the plot

SELF MONITORING – SOLID STATE SWITCHING

Test	Yes / No
It has been verified that in the event of the solid state switching device failing to disconnect the **Generating Plant**, the voltage on the output side of the switching device is reduced to a value below 50 volt within 0.5s.	

COMMENTS