Certificate G59/2

The manufacturer: **Steca Elektronik GmbH**
Mammostrasse 1
D-87700 Memmingen
Germany

herby certifies, that its photovoltaic inverters (with G59/2 settings) for connection to the low voltage grid

StecaGrid 8000+ 3ph,
StecaGrid 10000+ 3ph

comply with the requirements of the Engineering Recommendation G59/2. The detailed results are summarized for the product on the following pages.

Memmingen, the 11th of June 2012

Michael Voigtsberger,
Division Manager Solar

APPENDIX 4 TYPE VERIFICATION TEST SHEET

SSEG DETAILS

Generating Plant Type reference: *StecaGrid 8000 3ph, StecaGrid 8000+ 3ph, StecaGrid 10000 3ph and StecaGrid 10000+ 3ph*		
Generating Plant Technology: *PHOTO-VOLTAIC*		
Manufacturer: *Steca Elektronik GmbH*	Tel: *+49 8331 8558-0* Fax: *+49 8331 8558-132*	Address: *Mammostrasse 1* *87700 Memmingen* *Germany*
Technical file reference No: MES100809		
Maximum export capability (Generating Plant rating less parasitic load): 8,800 W or rather 10,300 W		

TEST HOUSE DETAILS

Name and address of test house	*Steca R&D Laboratories, Steca Elektronik GmbH, Mammostrasse 1, 87700 Memmingen, Germany*
Telephone number	*+49 8331 8558-0*
Facsimile number	*+49 8331 8558-132*
E-mail address	*info@steca.de*

TEST DETAILS

Date of test	11th of June 2012
Name of tester	*Dipl.-Ing. (FH) Roland Burger*
Signature of tester	i.V.
Test location if different from above	*See above*

POWER QUALITY

Harmonic current emissions (A)									
Minimal Short Circuit Ratio R_{SCE}: 33									
Value of Short Circuit Power S_{SC} corresponding to R_{SCE}: 330 kVA									
Equipment Phases: Three Phase									
Description	Harmonic Current % = $100I_n/I_1$							Harmonic Current Distortion Factors (%)	
Harmonic	2nd	3rd	5th	7th	9th	11th	13th	THD	PWHD
Limit *	1.08	2.3	1.14	0.77	0.4	0.33	0.21	13	22
Test value	0.16	0.28	0.09	0.08	0.14	0.05	0.05	3.24	3.71

Note Detailed requirements are specified in BS EN 61000-3-12

Voltage Fluctuations and Flicker				
Equipment meets BS EN 61000-3-3				
	Starting	Stopping	Running (at rated power)	
Limit *	4%	4%	$P_{st} = 1.0$	$P_{lt} = 0.65$
Test value	0.2%	0.2%	0.101	0.101

Note Detailed requirements are specified in BS EN 61000-3-11 and BS EN 61000-3-3.

	DC injection			Power factor		
G59/2 Limit	0.25% of the AC rating of the device tested at three power levels *			0.95 lag– 0.95 lead at three voltage levels		
Test level	10%	55%	100%	212 V	230 V	248 V
Test value	*15*	*17*	*18*	*0.97*	*0.98*	*0.98*

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

PROTECTION TESTS				
Protection	Settings		Test Results	
Over Voltage Stage 1	Volts %	Sec	Volts %	Sec
L1 - N	110	1.0	110	1.0
L2 - N	110	1.0	110	1.0
L3 - N	110	1.0	110	1.0
L1 – L2	110	1.0	110	1.0
L1 – L3	110	1.0	110	1.0
L2 – L3	110	1.0	110	1.0
Over Voltage Stage 2	Volts %	Sec	Volts %	Sec
L1 - N	115	0.5	115	0.5
L2 - N	115	0.5	115	0.5
L3 - N	115	0.5	115	0.5
L1 – L2	115	0.5	115	0.5
L1 – L3	115	0.5	115	0.5
L2 – L3	115	0.5	115	0.5
Under Voltage Stage 1	Volts %	Sec	Volts %	Sec
L1 - N	87	2.5	87	2.5
L2 - N	87	2.5	87	2.5
L3 - N	87	2.5	87	2.5
L1 – L2	87	2.5	87	2.5
L1 – L3	87	2.5	87	2.5
L2 – L3	87	2.5	87	2.5
Under Voltage Stage 2	Volts %	Sec	Volts %	Sec
L1 - N	80	0.5	80	0.5
L2 - N	80	0.5	80	0.5
L3 - N	80	0.5	80	0.5
L1 – L2	80	0.5	80	0.5
L1 – L3	80	0.5	80	0.5
L2 – L3	80	0.5	80	0.5
	Hz	Sec	Hz	Sec
Over Frequency Stage 1	51.1	0.5	51.1	0.5
Over Frequency Stage 2	52.0	0.5	52.0	0.5
Under Frequency Stage 1	47.5	0.5	47.5	0.5
Under Frequency Stage 2	47.0	0.5	47.0	0.5

LOSS OF MAINS TEST

Method used	*frequency shift*		
Output power level *	10%	55%	100%
Trip setting	-	-	-
Trip value	<0.5 sec	<0.5 sec	<0.5 sec

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

RECONNECTION TIMES

	Under/Over voltage	Under/Over Frequency	Loss of mains
Minimum value	180 seconds	180 seconds	180 seconds
Actual Setting	*180 seconds*	*180 seconds*	*180 seconds*
Recorded value	*180 seconds*	*180 seconds*	*180 seconds*

FAULT LEVEL CONTRIBUTION

As SSEG's for PV are inverter-connected, they are deemed to automatically comply with regulations and no further tests are required.

SELF MONITORING – SOLID STATE SWITCHING

Not applicable as electro-mechanical relays used.