

**PV GAP
RECOMMENDED
SPECIFICATION**

PVRS 7

First edition
2003-07

DC supplied lighting systems with fluorescent lamps for photovoltaic (PV) stand-alone systems. Blank detail specification —

Qualification Approval under the IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components (IECEE).

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PV GAP

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FOREWORD

- 1) PV GAP (Global Approval Program for Photovoltaics) is a not-for-profit international organization, dedicated to the sustained growth of global photovoltaics (PV) markets to meet energy needs world-wide in an environmentally sound manner. Its mission is to promote and encourage the use of internationally accepted standards, quality management processes and organizational training in the design, fabrication, installation, sales and services of PV systems. To this end, it joins with PV related industries, international organizations, testing laboratories, government agencies, financing institutions, non-governmental organizations, and private foundations, in developing and developed countries.
- 2) PV GAP co-operates closely with the International Electrotechnical Commission (IEC) in respect of standardization (principally with IEC Technical Committee N° 82, Solar Photovoltaic Energy Systems) and certification (with the IEC System for Conformity Testing and Certification of Electrical Equipment, IECEE).

PV GAP publishes specifications that have been developed and recommended by experts from the PV industry and other organizations, to be used as interim, recommended specifications until the corresponding IEC standards can be completed. The acceptance of these PV GAP "Recommended Specifications" is voluntary. PV GAP only recommends these specifications but disclaims any liability for their utilization.

It should be noted that, as soon as a corresponding IEC standard is issued, the PV GAP "Recommended Specification" is withdrawn. This is announced on the PV GAP website www.pvgap.org, together with information about the new IEC standard.

- 3) The present PV GAP Recommended Specification has been endorsed by the PV GAP Technical Committee, and approved by the PV GAP Executive Board. Members of the Technical Committee and the Executive Board bodies are listed on the website www.pvgap.org.
- 4) General enquiries about PV GAP may be addressed to the publisher, which is the PV GAP Secretariat, c/o IEC Central Office, 3 rue de Varembé, Box 31, CH 1211 Geneva 20, Switzerland, E-mail rk@iec.ch, TP +41 22 919 02 16, TF +41 22 919 03 01.

The publisher will be pleased to receive any comments from users of this PV GAP Recommended Specification. All comments will be acknowledged.

Whilst every effort has been made to ensure the accuracy of the contents of this PV GAP Recommended Specification, the publisher can accept no responsibility for any errors that may have occurred.

**DC supplied lighting systems
with fluorescent lamps for
photovoltaic (PV) stand-alone systems**

Blank detail specification —

**Qualification Approval under the IEC
Quality Assessment System for Electronic Components (IECQ-CECC)**

1 General

1.1 Scope

This PV GAP Recommended Specification is a blank detail specification applicable to lighting systems with fluorescent lamps for photovoltaic (PV) stand-alone systems with a nominal system voltage below 24V, of assessed quality.

This specification references Ciemat (Research Centre for Energy, Environment and Technology – Madrid, Spain) requirements and methods of test to be used in detail specifications derived from this specification, and lists the technical criteria that are necessary and sufficient to assess the quality of the lighting systems in accordance with the IECQ approval procedure described in IECQ 03.

1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this PV GAP Recommended Specification.

Ciemat Component test procedures for DC supplied lighting systems with fluorescent lamps for photovoltaic (PV) stand-alone systems. Version 1.2 (reproduced in PVRS 7A).

IECEE 03: 2008-10, *Rules of Procedure of the Scheme of the IECEE for Mutual Recognition of Conformity Assessment Certificates for Electrotechnical Equipment and Components (CB-FCS).*

ISO 9001: 2000, *Quality management systems - Requirements*

1.3 Informative references

Operating Guide of the CB-FCS Scheme, see www.iecee.org

2. IEC Guide 102: 1996, *Electronic Components — Specification Structures for Quality Assessment (Qualification Approval and Capability Approval)*

1.4 Front page of detail specification

The layout of the front page of a detail specification shall be as follows (see key below)

(1)	IECEE PVRS 7 AAxxxx Edition: 200x Page 1 of x	(2)
DC supplied lighting systems with fluorescent lamps for photovoltaic (PV) stand-alone systems of assessed quality, in accordance with :	(3)	
1. Ciemat Component test procedures for DC Supplied Lighting Systems With Fluorescent Lamps For Photovoltaic (PV) Stand-Alone Systems. Version 1.2.		
Type (instant start, preheating, tubular lamp, CFL, self ballasted, etc)		
Rating (Input voltage(V), light current (A)):		(5)
Block schematic drawing		(6)
Outline drawing Dimensions in millimetres	(7)	Applications :
Optical and Electrical characteristics (see 2.1)		(9)
Mechanical and environmental characteristics (see 2.2 and 2.3)		(10)
Information about manufacturers who have lanterns approved according to this detail specification is available on the IECEE website www.iecee.org .		

Key to front page:

The numbers between brackets on the front page correspond to the following indications which should be given.

2 Characteristics

2.1 Optical and electrical characteristics

All the properties quoted after 100 hours of working

Luminous flux of the lamp (excluding the luminaire)	lm
Luminous flux of lighting system	lm
Ballast input voltage or range of voltage	V
System power consumption	W
System current consumption	A
Output frequency of the ballast	kHz
Operating temperature	°C
Overload protection	
Reverse-polarity protection	
Additional functions (Dimming, ...)	

2.2 Mechanical characteristics

Terminal diameter (in the range from min - max)	mm
Mounting orientation	
Mass	kg
Case dimensions	mm
Reflector, refractor or diffuser properties (material)	
Fasteners	
Degree of protection (IP code)	
Cables (recommended diameter)	mm
Spare parts	

2.3 Environmental characteristics

Range of operating temperature	°C
Range of storage temperature	°C
Maximum relative humidity	%

2.4 Additional information (not for inspection purposes)

For example

- Service life
- Warranty period

3 Qualification Approval procedure

3.1 General

The approval procedure shall be in accordance with IEC 60384-1

NOTE Approval includes current registration/certification to ISO 9001 (see 5.1 h of IEC 60384-1)

3.2 Primary stage of manufacture

“The primary stage of manufacture is that stage (or those stages) of the manufacturing operation at which, and beyond which, the manufacturer shall demonstrate that he has control over all aspects of the processes that affect the quality of the finished product.

NOTE – A manufacturer, himself, does not necessarily have direct control of all aspects of any preceding processes, although he does have the responsibility for accepting the quality achieved by them.

This may be that stage of the manufacturing operation at which partly manufactured components can be evaluated economically without precise knowledge of the preceding processes.” (IEC Guide 102: 1996)

The primary stage of manufacture is the interconnection of the components (including sub-assemblies) to form the complete lighting system.

3.3 Subcontracting

Subcontracting of the primary and subsequent stages of manufacture is permitted. The PV GAP “PV Quality Seal” holder of the product shall ensure quality system conformity with ISO 9001.

3.4 Technical requirements

Testing, and pass criteria shall be in accordance with Reference 1.

NOTE This blank detail specification cannot add requirements that do not exist in Reference 1.

- Appearance and labels.
- Lamp sockets and holder.
- Luminous flux.
- Power consumed.
- Abnormal conditions.
- Reverse polarity.
- Luminaire requirements.
- Lumen maintenance.
- Starting.
- Continuous working.
- Starting voltage.
- Frequency.
- Battery voltage.

Reporting, and issuing of the Conformity Assessment Certificate, shall be in accordance with IEC 60384-1 (see in particular clauses 7, 8 and 9) and clause 20 of normative reference 1.

3.5 Increased severity

Detail specifications derived from this blank detail specification may make the severities of test, the end-of-test requirements, or the sampling levels, more severe. These severities, or requirements, can never be made less stringent.

3.6 Preparation of detail specifications

An individual manufacturer may prepare a detail specification from this blank detail specification and submit it to the responsible national organization for verification of compliance to the IEC rules and the allocation of a number. After completion of the testing in accordance with IEC 603 and in agreement with the chosen National Certification Body of the CB-FCS, the manufacturer or the responsible national organization shall publish the detail specification.

Alternatively, a group of manufacturers may act together to produce a common detail specification with one of them accepting the responsibility for the submission for verification and the allocation of a number, the procedure being the same as above.

The above actions may be in co-operation with one or more customers.

Detail specifications may also be prepared by a responsible national organization or by an IEC technical committee (in this case, IEC TC 82, Solar photovoltaic energy systems).

3.7 Product identification and traceability

The minimum period for maintenance of records shall be as prescribed by the National Certification Body referred to in 3.6 above .

4 Quality conformance inspection

Quality conformance inspection comprises the tests stated in table 1:

- group A: lot-by-lot tests;
- group C: periodic tests.

See flow charts in clause 8.

Table 1 — Test schedule for quality conformance inspection

	Destructive or non-destructive	Conditions of test	Performance requirements
GROUP A INSPECTION 10 samples of each lot Subgroup A1 1 Visual inspection Labelling Lamp socket and holder	ND		As in 4 of Reference 1 As in 2.1 of Reference 1 As in 5 of Reference 1
Subgroup A2 2 Luminous flux 3 Power consumed	D D	As in 6.1.2 of Reference 1	As in 6.1 of Reference 1 As in 6.2 of Reference 1
Subgroup A3 4 Abnormal conditions 5 Reverse polarity 6 Luminaire requirements	D D	As in 6.7.1 of Reference 1 As in 6.6.1 of Reference 1	As in 6.7 of Reference 1 As in 6.6 of Reference 1 As in 6.8 of Reference 1
GROUP B INSPECTION Covering additional important characteristics			

	D or ND	Conditions of test	Sample size & acceptance criterion (see Note 1)			Performance requirements	
			p	n	c		
GROUP C1 INSPECTION (periodic)							
Subgroup C1 Ageing							
7	Lumen maintenance	D	Without reflector, diffuser or other similar device	12	10	0	As in 6.3 of Reference 1
8	Starting	D	Accelerated cycling as 6.3.3 of Reference 1	12	10	0	As in 6.3 of Reference 1
9	Continuous working	D	Conventional cycling as 6.3.2 of Reference 1	12	10	0	As in 6.3 of Reference 1
Subgroup C2 Operation							
10	Starting voltage	ND	As in 6.4.3.1 of Reference 1	12	3	0	As in 6.4 of Reference 1
11	Frequency	ND	Measured at 90%, 100% and 120% of nominal battery voltage	12	3	0	As in 6.5 of Reference 1
12	Battery voltage	D	As in 6.4.4.1 of Reference 1	12	3	0	As in 6.4 of Reference 1
NOTE 1: in this table		p= periodicity (in months)					
		n= sample size					
		c= acceptance criterion (permitted number of non-conforming items)					

5 Modifications

Any change in the design, materials, components or processing of the system may require a repetition of some or all of the qualification tests to maintain approval.

6 Marking

Marking of the light shall be in accordance with 2.1 of Reference 2. The detail specification may also require that, in addition, the following be marked:

— Characteristic fuse values

Marking of the system package may also be required, for example

- manufacturer's name, logo or trade mark;
- model/type number;
- serial number.

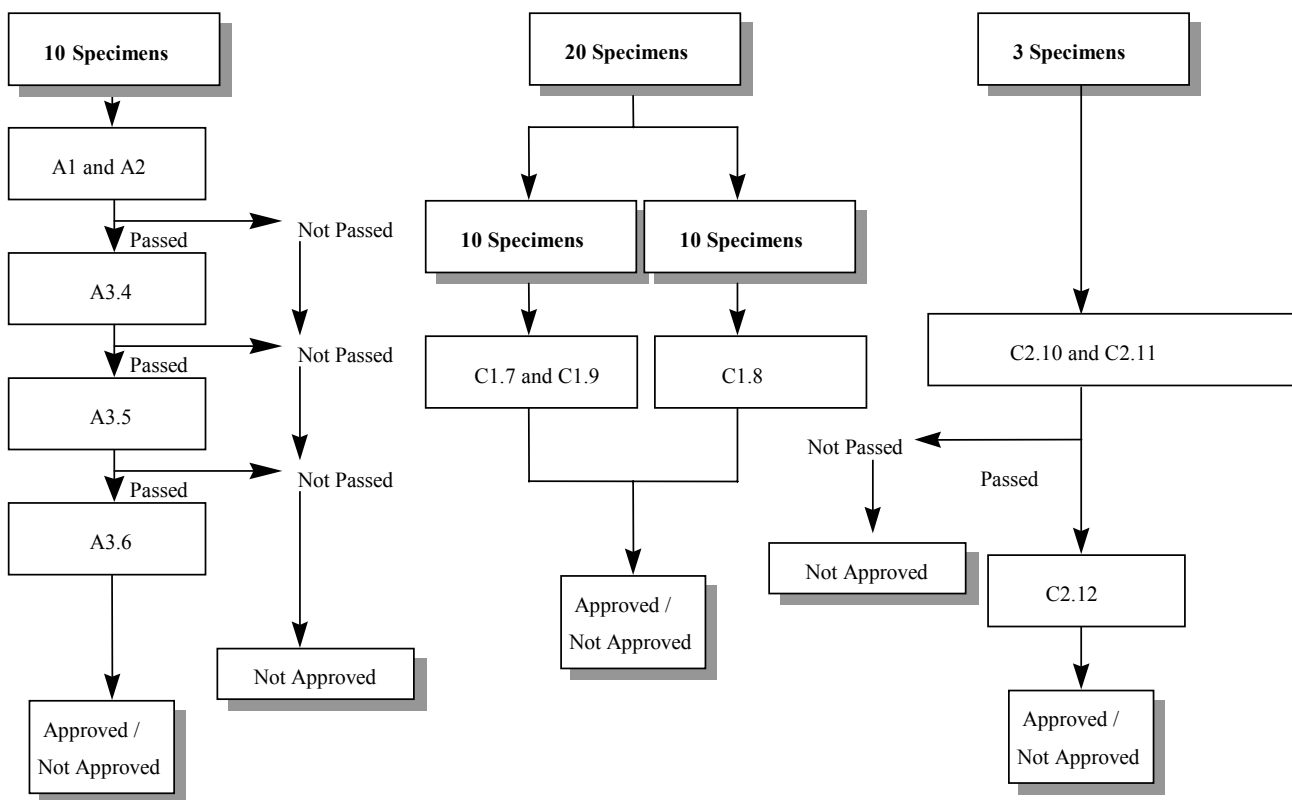
7 Documentation

The documentation shall contain the following :

- Installation instructions
- Operating instructions
- Technical data
- Troubleshooting instructions
- Safety warnings
- Information on spare parts
- Warranty

8 Flow charts

“A1” etc are the Subgroups in Table 1



9 Annexes

Annexes may be included if necessary, to show more details of the light.

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