MINIMAL TECHNICAL REQUIREMENTS / STANDARDS
FOR SPV SYSTEMS / PLANTS TO BE DEPLOYED DURING F.Y. 2012-2013
UNDER THE PROGRAMMES OF
MINISTRY OF NEW AND RENEWABLE ENERGY

1. PV MODULES:

1.1 The PV modules must conform to the latest edition of any of the following IEC / equivalent BIS Standards for PV module design qualification and type approval:

Crystalline Silicon Terrestrial PV Modules	IEC 61215 / IS14286
Thin Film Terrestrial PV Modules	IEC 61646 / Equivalent IS (Under Dev.)
Concentrator PV Modules & Assemblies	IEC 62108

1.2 In addition, the modules must conform to IEC 61730 Part 1- requirements for construction & Part 2 - requirements for testing, for safety qualification or Equivalent IS (Under Dev.)

1.3 PV modules to be used in a highly corrosive atmosphere (coastal areas,etc.) must qualify Salt Mist Corrosion Testing as per IEC 61701 / IS 61701.

1.4 IDENTIFICATION AND TRACEABILITY

Each PV module must use a RF identification tag (RFID), which must contain the following information:

(i) Name of the manufacturer of PV Module
(ii) Name of the Manufacturer of Solar cells
(iii) Month and year of the manufacture (separately for solar cells and module)
(iv) Country of origin (separately for solar cells and module)
(v) I-V curve for the module
(vi) Peak Wattage, Im, Vm and FF for the module
(vii) Unique Serial No and Model No of the module
(viii) Date and year of obtaining IEC PV module qualification certificate
(ix) Name of the test lab issuing IEC certificate
(x) Other relevant information on traceability of solar cells and module as per ISO 9000 series.

Until March 2013, the RFID can be inside or outside the module laminate, but must be able to withstand harsh environmental conditions.**However from 1st April 2013 onwards; RFID shall be mandatorily placed inside the module laminate**

1.5 *VALIDITY :*

The validity of the existing Certificates/Reports in the old format/procedure shall be valid till March 2013 only. Manufactures are advised to get their samples tested as per the new format/procedure before 31st March 2013, whose validity shall be for five years.

1.6 AUTHORIZED TESTING LABORATORIES/ CENTERS

PV modules must qualify (enclose test reports/ certificate from IEC/NABL accredited laboratory) as per relevant IEC standard. Additionally the performance of PV modules at STC conditions must be tested and approved by one of the IEC / NABL Accredited Testing Laboratories including Solar Energy Centre. For small capacity PV modules upto 50Wp capacity STC performance as above will be sufficient. However, qualification certificate from IEC/NABL accredited laboratory as per relevant standard for any of the higher wattage regular module should be accompanied with the STC report/ certificate.

1.6.1 Details of Test Labs are given in Annexure I.

(Any other Test Lab that has set – up for testing and wants to get included may contact Director,MNRE)

1.6.2 While applying for Testing , the Manufacturer has to give the following details:

- A copy of registration of the company particularly for the relevant product/ component/ PV system to be tested
- An adequate proof from the manufacturer, actually showing that they are manufacturing product by way production, testing and other facilities
- Certification as per JNNSM standards for other boughtout intems used in the system

Without above proof test centers are advised not to accept the samples.

1.7 WARRANTY

PV modules used in solar power plants/ systems must be warranted for their output peak watt capacity, which should not be less than 90% at the end of 12 years and 80% at the end of 25 years.

2. BALANCE OF SYSTEM (BOS) ITEMS/ COMPONENTS:

2.1 The BOS items / components of the SPV power plants/ systems deployed under the Mission must conform to the latest edition of IEC/ Equivalent BIS Standards/ MNRE specifications / as specified

below:

BOS Item / System	Applicable BIS /Equivalent IEC Standard Or MNRE Specifications	
	Standard Description	**Standard Number**
Solar PV Lighting Systems:	Solar PV Home Lighting System Solar PV street Lighting System Solar PV Lantern	As per MNRE latest Specifications dated 09.09.2011
Solar PV Systems (more than 100 Wp and up to 20 KWp Capacity only) : Charge Controller/MPPT units	Environmental Testing	IEC 60068-2 (1,2,14,30) / Equivalent BIS Std.
Power Conditioners/ Inverters**including MPPT and Protections	Efficiency Measurements Environmental Testing	IEC 61683 / IS 61683 IEC 60068-2 (1, 2, 14, 30) / Equivalent BIS Std.
Storage Batteries	General Requirements & Methods of Testing Tubular Lead Acid / VRLA / GEL Capacity Test Charge/Discharge Efficiency Self-Discharge	As per relevant BIS Std.
Cables	General Test and Measuring Method PVC insulated cables for working voltage up to and including 1100 V and UV resistant for outdoor installation	IEC 60227 / IS 694 IEC 60502 / IS 1554 (Pt. I & II)

Switches/Circuit Breakers /Connectors	General Requirements Connectors –safety A.C. /D.C.	IEC 60947 part I,II, III / IS 60947 Part I,II,III **EN 50521**
Junction Boxes /Enclosures for Inverters/Charge Controllers/Luminaries	General Requirements	IP 54(for outdoor)/ IP 21(for indoor) as per IEC 529

**In case if the Charge controller is in-built in the inverter, no separate IEC 62093 test is required and must additionally conform to the relevant national/international Electrical Safety Standards wherever applicable

2.2 AUTHORIZED TESTING LABORATORIES/ CENTERS

Test certificates / reports for the BoS items/ components can be from any of the NABL/ IEC Accredited Testing Laboratories or MNRE approved test centers. The list of MNRE approved test centers will be reviewed and updated from time to time.

2.3 WARRANTY

The mechanical structures, electrical works including power conditioners/inverters/charge controllers/ maximum power point tracker units/distribution boards/digital meters/ switchgear/ storage batteries, etc. and overall workmanship of the SPV power plants/ systems must be warranted against any manufacturing/ design/ installation defects for a minimum period of 5 years.

Accredited Test centers for MNRE Off-Grid Programme

Lab/ Organization	PV Module	Lighting Systems		Battery	Inverter >100 W		Charge Controller	
		as per MNRE Specifications	Environmental		Efficiency	Environmental	protections	Environmental
SEC	**Yes** (IEC61215upto100$W_{P)}$ NABL Accredited	**Yes** MNRE Accredited	**Yes** (Including **IP)** MNRE Accredited	**Yes** MNRE Accredited	**Yes** (upto 10KVA) MNRE Accredited	**Yes** (Including **IP)** MNRE Accredited	**Yes** MNRE Accredited	**Yes** (Including **IP)** MNRE Accredited
ERTL (east)	STC Test Facility MNRE Accredited	**Yes** NABL/ MNRE Accredited	**Yes** NABL/ MNRE Accredited	Yes Up to 1000AH	**Yes** NABL/ MNRE Accredited	**Yes** NABL/ MNRE Accredited	**Yes** NABL/ MNRE Accredited	**Yes** NABL/ MNRE Accredited
ETDC (B)	**Yes** (IEC61215)under ICEEE-CB, IEC 61701 (upto100$W_{P)}$ NABL Accredited	**Yes** NABL/ MNRE Accredited	**Yes** NABL/ MNRE Accredited	Yes Up to 100 AH	**Yes** (up to 3KVA) NABL/ MNRE Accredited	**Yes** NABL/ MNRE Accredited	**Yes** NABL/ MNRE Accredited	**Yes** NABL/ MNRE Accredited
CPRI (B)	No	**Yes** NABL/ MNRE Accredited	**Yes** NABL/ MNRE Accredited	Yes Up to 500 AH	**Yes** (up to 10KVA) NABL/ MNRE Accredited	**Yes** NABL/ MNRE Accredited	**Yes** NABL/ MNRE Accredited	**Yes** NABL/ MNRE Accredited
ERTL (N)	No	Only Electronics & luminaire NABL	**Yes** NABL Accredited	No	**Yes** (up to 5KVA)	**Yes** NABL Accredited	**Yes** (up to 5KW)	**Yes** NABL Accredited

		Accredited			NABL Accredited		NABL Accredited	
UL (B)	**Yes** (IEC61215 IEC 61730 Pt.II and IEC 61701) upto400W_P NABL Accredited	**Yes (except battery)** NABL Accredited	**Yes** NABL Accredited	No	**Yes** (up to 6KVA) NABL Accredited	**Yes** NABL Accredited	**Yes** (up to 6KW) NABL Accredited	**Yes** NABL Accredited
TUV Rhineland	**Yes** (IEC61215 & 61730 Pt-II) upto400W_P NABL Accredited	**NO**	**Yes** NABL Accredited	No	**Yes** (up to 10KVA) NABL Accredited	**Yes** NABL Accredited	**Yes** (up to 10KW) NABL Accredited	**Yes** NABL Accredited
Inter Tek	No	Only Electronics & luminaire NABL Accredited	**Yes** NABL Accredited	No	**Yes** (up to 5KVA) NABL Accredited	**Yes** NABL Accredited	**Yes** (up to 5KW) NABL Accredited	**Yes** NABL Accredited

*Beyond 10KVA self certification by the manufactures is acceptable.