Government of India
Ministry of Railways
(Railway Board)

INDIAN RAILWAYS STANDARD SPECIFICATION FOR SOLAR PHOTOVOLTAIC MODULE

Serial No. IRS:S 84-92

0. FOREWORD

0.1 This specification is issued under the fixed serial No. S-84 followed by the year of adoption as standard in the case of revision.

ADOPTED 1991

0.2 This specification requires reference to the following specifications:

IS: 12834:1989	Solar photovoltaic energy systems - Terminology.
IS: 12762 (Pt.1) 1989	Specification for photovoltaic devices (Measurement of photovoltaic current voltage characteristics).
IS: 12763: 1989	Procedure for temperature and irradiance corrections to measured I-V characteristics of crystalline silicon photovoltaic Devices.
IS: 7088	Anodised aluminium.
IS: 9000	Basic environmental testing procedure for electronic and electrical items.

0.3 Wherever reference to any of the above mentioned specification appears in this specification, it shall be taken as a reference to the latest issue of that specification.

0.4 This specification is intended chiefly to cover the technical provisions and provisions relating to supply of materials and does not include all the necessary provisions of a contract.

1. SCOPE

1.1 This specification covers the general and technical requirements and tests for solar photovoltaic module (for use in Railway S&T installation) for the correctness of its material, design, manufacture, testing procedure and electrical characteristics.

2. DEFINITIONS

2.1 The basic photovoltaic device, which generates electricity when exposed to sunlight, shall be called a “Solar Cell”.

2.2 The smallest complete environmentally protected assembly of interconnected solar cells shall be called “Module”.

2.3 A group of modules fastened together, pre-assembled and interconnected, designed to serve as an installable unit in an Array shall be called “Panel”.

2.4 A mechanically integrated assembly of modules or panels together with support structure, but exclusive of foundation, tracking, thermal control and other components, as required to form a dc power producing unit shall be called an “Array”.

2.5 Irradiance(Total): The total solar radiant power incident upon unit area of an inclined surface (Wm^{-2}) is called total solar irradiance.

2.6 Conversion Efficiency: The ratio of the maximum power to the product of area and irradiance expressed as a percentage.

$$n = \frac{\text{Maximum power}}{\text{Area x irradiance}} \times 100\%$$

3. GENERAL REQUIREMENTS

3.1 The solar module for the purpose of this specification shall consist of the following three main components.

3.1.1 Toughened front glass.

3.1.2 A suitable mounting frame.

3.1.3 An assembly of suitably interconnected, silicon solar cells working on the principle of photovoltaic conversion of sunlight into electricity.

3.2 The silicon wafers cut from the large crystal shall be polished and necessary chemical treatment shall be given to achieve requisite surface characteristics for optimum efficiency of individual cells.

3.2.1 P-N junction on individual wafer shall be made by injecting impurity (phosphorous or any other suitable material) by diffusion process.

3.2.2 The solar cells required to form a module shall be connected in series/ parallel through tinned copper foils. These shall be mounted behind a high transparency, toughened glass front surface. Two thin transparent films of suitable plastic material, preferably (Ethylene Vinyl Acetate) shall be interposed between the solar cell layer and the front glass and the solar cell layer and the back plastic laminate. This assembly shall then be kept in a temperature controlled oven at a suitable temperature, so that the above assembly becomes a solid mass with the cells protected against corrosion, moisture, pollution and weathering.

3.2.3 The transparency of toughened glass used shall not be less than 91%. A certificate to this effect shall be submitted by the supplier. A copy of test results from a recognized test house or their own laboratory shall be submitted at the time of type approval.

3.3 The complete solar module shall be sealed in an Anodized Aluminium Frame with RTV silicon rubber compound filling around the edges to give further moisture barrier and shock resistance.

3.4 The output terminals of the module shall be provided on the back of the solar PV-module. Terminal block shall be made of Nylon-6. It shall be housed in a HDPE-UV stable junction box secured physically uniformly to the frame of the PV module. The junction box should have a hinged lid with self-holding fasteners enabling easy handling. The box lid should be secured with a gasket for greater protection against ingress of moisture (conforming to IP-55) of IS: 2147-62). Cable outlets from solar PV module terminal shall be through cable glands to be provided in the junction box (with addl. knockouts provided) to help in series /parallel connection of solar PV modules. The junction box should have common terminals with suitable by pass diodes for prevention of hot spot problem.

3.5 If required by the purchaser the module shall be fixed on a mounting bracket, which shall be suitably designed to withstand the weight of the panel. The mounting arrangement shall be suitable for pole mounting, column mounting or flat surface, as desired by the purchaser.

3.5.1 Provision for directional and angular adjustment shall be provided to get maximum utilization of incident sunlight.

3.5.2 The design/drawings of the mounting bracket shall be supplied along with the module to the purchaser.

3.6 The supplier shall give information regarding the weight and dimensions of the module, to the purchaser.

3.7 The solar photovoltaic module shall be highly reliable, light-weight and shall have a long operational life.

3.8 The recommended values of output power from each module are 4, 6, 9, 12, 30, 32, 35, 40, 50, 70, 80 & 100 watts. The purchaser shall, however, specify the output wattage of the module required by him.

3.9 The recommended nominal voltages of each module are 4, 6, 9, 12 & 24Volts. The purchaser shall, however, specify the voltage of the module required by him.

4. TECHNICAL REQUIREMENTS

4.1 The following parameters shall be clearly specified by the manufacturer for different type of solar modules manufactured by him:

a) Peak power output (Pm)
b) Current at peak power output (Im)
c) Voltage at peak power output (Vm)
d) Short circuit current (Isc)
e) Open circuit voltage (Voc)
f) Conversion efficiency of the module (n)

4.2 The values of parameters from (a) to (f) in clause 4.1 shall be specified under standard test conditions of -

(a) Cell junction temperature of 25 ± 2ºC.
(b) Irradiance of 1000 Watt/M.Sq. as measured with a reference solar cell (duly certified by a recognized national/international test house/lab. nominated for this purpose.
(c) Standard Solar spectral energy distribution.
(d) Air Mass of 1.5.

4.3 I-V curves (current-voltage characteristics) of different type of modules of different temperatures and irradiance levels shall be supplied. (Temperature range - from 25ºC to 50ºC, Irradiance range - from 400W/m² to 1000 W/m²).

4.3.1 Current and voltages defined in clause 4.3 shall be determined as per procedure laid down in Clause 4 or clause 5 of IS: 12762 (Pt.1) of 1989. The I-V measurements can be taken by a sunlight simulator also.

4.3.2 For temperature and Irradiance corrections to the measured I.V. characteristics of crystalline silicon photovoltaic devices, the procedure laid down in IS: 12763 of 1989 shall be followed.

4.3.3 Measurement shall be made either with a steady state sunlight simulator or pulsed sunlight simulator.

4.3.4 For measurement in a bright sunlight, the cell temperature and irradiance level shall be recorded for measurement corrections to the measured I-V characteristics.

4.4 During the acceptance test, the actual values obtained on various parameters as detailed in Clauses 4.1 to 4.3 shall not vary by more than 3% to ± 10% of the specified value.

4.5 The solar module shall be able to withstand a maximum hourly wind speed of 10 m/sec and impact of hailstorms of 20mm dia hitting the module at 20 meter/sec.

During type approval, test certificate from National / International standard shall be submitted.

4.6 The frame of the mounting fixture shall be made of anodized aluminium, conforming to specification IS: 7088-1973 with 20 micron anodization thickness. All other parts such as fasteners etc., shall be made of galvanized or stainless steel to make them weather-proof. In addition to holes provided for fixing on to mounting structure, extra holes are to be provided suitably in the frame for cable routing.

4.7 The solar module shall be able to withstand a maximum mean hourly rainfall of 40 mm.

4.8 The solar module shall be able to withstand humidity level of upto 95%.

4.9 The conversion efficiency of the modules upto 35W shall not be less than 8% and for modules greater than 35W shall not be less than 12%.

4.9.1 The cell efficiency of the solar cells shall be greater than 12%. During type approval the firm should submit the test certificate from National/ International solar energy centres/ test labs.

4.10 If required by the purchaser, the back plastic laminate shall be replaced by a toughened glass sheet to make the module suitable for use in coastal areas/industrially polluted areas/places where the plastic laminate is likely to get corroded.

4.11 If required by the purchaser, an aluminum backing plate to protect the module from miscreants shall be provided.

5. TEST SCHEDULE

5.1 The following test shall constitute type test:

5.1.1 Physical and dimensional testing of module and module mounting structure (Clause 8)

5.1.2 Performance test (Clause 9)

5.1.3 Climatic test (Clause 10)

5.1.4 Insulation Resistance test (Clause 11)

5.2 Following tests shall constitute Acceptance Test:

5.2.1 Physical and dimensional testing of module and module mounting (Clause 8)

5.2.2 Performance test (Clause 9)

5.2.3 Insulation Resistance test (Clause 11)

Note: The validity of the type test approval shall be for a period of three years subject to the condition that there is no change in design, construction, material or process of manufacture during this period.

6. LOT AND SAMPLING PLAN

6.1 The manufacturer shall offer a complete list of selected set of modules, within ±10% of the specified output power to the inspecting officer. Random samples for a minimum of 20% of the lot shall be selected by the Inspecting Officer for Acceptance test. There shall be no failure during this test for acceptance of this lot. Minimum number of samples shall not be less than 3.

7. ROUTINE TEST

7.1 Physical and dimensional testing of the module and module mounting structure (Clause 8)

7.2 Performance test (Clause 9)

7.3 The routine test shall be conducted on all the modules offered for inspection. Results of the routine test shall be made available to the inspecting authority along with the offered list.

8. PHYSICAL AND DIMENSIONAL TESTING OF MODULE AND MODULE MOUNTING STRUCTURE

8.1 Physical examination: Each module shall be inspected for quality of workmanship, finish, general appearance and requirements as brought out in clause 3.

8.2 Dimensional Testing of Module

8.2.1 The module dimensions shall be checked with a standard measuring tape and the dimensions shall be within the specified limits.

8.3 Dimensional Testing of Mounting Structure

8.3.1 The dimensions of various components of the mounting structure shall be checked with the corresponding drawings.

8.3.2 A complete structure shall be assembled and module mounted on the frame for checking the correctness of fitment/assembly.

9. PERFORMANCE TEST

9.1 Performance test for individual cell/module shall be carried out as per IS: 12762 (Pt.I) of 1989.

9.1.1 Open circuit voltage Voc, Short circuit current Isc, I.V characteristics of the sample and temperature of the test sample as well as reference cell/module shall be measured.

9.1.2 Voltages and currents shall be measured to an accuracy of ±0.5% using separate voltage and current leads.

9.1.3 Short circuit current shall be measured at 0 voltage, preferably using a variable bias to offset the voltage drop, across the series resistors.

9.1.4 The reference device shall be mounted with its active surface in the test plane so that the normal of the device is parallel within ±5º to the centre line of the beam.

9.1.5 The Irradiance test plane shall be set in such a way that the reference device produces its calibrated short circuit current at the desired level. The reference device used shall be certified by a recognized National/International test house/Lab. nominated for this purpose. The test certificate in this regard shall be submitted during type test.

9.1.6 Now, the reference device shall be removed and the specimen under test shall be mounted as described in 9.1.4.

9.1.7 Without changing the simulator setting, current-voltage characteristics and temperature of the specimen shall be recorded.

9.1.8 Where it is not practical to control the temperature, a shade will be provided over the specimen to shield it from the simulator beam until the device temperature is uniform within ±2ºC at ambient air temperature. Measurements shall be made immediately after removing the shade. If the temperature of the specimen is not

the desired temperature, the measured current –voltage characteristic shall be corrected to this desired temperature using the procedure as described in IS: 12763 of 1989.

9.1.8.1 The measured current voltage characteristics shall be corrected to standard test condition or other temperature and irradiance values as per the correction procedure laid down in (Cl.2 of IS: 12763/89) Annexure B.

9.1.9 Measurement in the natural sunshine shall be made only when the total irradiance (sun+sky) is not fluctuating by more than ±1% during the measurement. When the measurements are intended for reference to standard test conditions the irradiance shall be at least 800W / m.Sq.

9.2 The test set-up shall have the facility of achieving the standard test conditions at the time of testing. The simulator cell also has the necessary current, voltage and power meters. It shall also have the facility of plotting "I-V" characteristics of the module on X-Y Plotter.

9.3 The cell operated temperature shall be measured within a tolerance of ±0.5ºC.

9.4 Voltage and currents shall be measured to an accuracy of ±0.5% using independent leads from the terminals of the specimen.

10. CLIMATIC TEST

10.1 The module shall be subjected to climatic test as per Annexure A.

10.2 After each testing, the module shall be cleaned and visually examined for any abnormality.

10.3 The module shall also be tested for the electrical performance test (as per Clause 9).

10.4 After climatic test, the change in output power shall not exceed ±7.5% of the rated output power.

11. INSULATION RESISTANCE TEST

11.1 These tests shall be carried out:

i) Before climatic test
ii) After climatic test

The measurement shall be made at a potential of not less than 500V DC and the insulation shall be measured between positive & earth and negative & earth terminals brought out on the terminal block. When measured at a temperature of 40ºC and R.H of 60%, the value of the insulation resistance shall not be less than 10 M.Ohm.

12. MARKING AND PACKING

12.1 The following information shall be indelibly and durably marked on the outside of the solar panel:

12.1.1 Manufacturer's type and trade name.

12.1.2 Month and year of manufacture.

12.1.3 Country or origin.

12.1.4 Serial No.

12.1.5 Rated power.

12.1.6 Nominal voltage/current.

12.1.7 Each module shall be legible marked with the words "Indian Railway Property". The words shall be screen printed with permanent ink on the frame. The size of the letters shall be chosen depending upon the size of the module.

12.2 Each solar module shall be suitably packed separately in thermocol packing, so as to avoid any damage during transit. The mounting fixture shall be dismantled and each part shall be packed separately.

13. INFORMATION TO BE SUPPLIED BY THE PURCHASER

13.1	Rated power (Nominal)	(Clause 3.8)
13.2	Rated Voltage (Nominal)	(Clause 3.9)
13.3	Type of mounting bracket	(Clause 3.5)
13.4	Plastic laminate back/toughened Glass back/aluminum-backing plates	(Clause 4.10 & Clause 4.11)

ANNEXURE -A

CLIMATIC / ENVIRONMENTAL TEST

1. The following tests shall be conducted on one module of each type as per IS 9000.

1.1 Dry Heat Test

The module shall be tested as per IS specification 9000 Part III. The module shall be kept in a hot chamber at 70º ± 2ºC for 16 hours. At the end of this period, the module shall be allowed to recover to room temperature.

1.2 Cold Test

The module shall be tested as per specification IS: 9000 Part II. The module shall be kept in cold chamber at –10ºC ± 3ºC for 16 hours. After exposure, the module shall be taken out of the chamber and allowed to recover to room temperature.

1.3 Rapid Change of Temperature Test

The module shall be tested as per IS: 9000 Part XIV. The module shall alternately be exposed for 30 minutes to hot chamber at 70º C ± 2ºC and to cold chamber at –10ºC ± 3ºC. Ten such cycles shall be carried out. After exposure, the module shall be taken out of the chamber and allowed to recover to room temperature.

1.4 Composite Temperature / Humidity Test

The module shall be tested as per IS: 9000 Part VI. The module shall be subjected to the temperature and humidity conditions for the time duration as given in Figure 2 (enclosed). Ten such cycles shall be performed. After exposure, the module shall be taken out of the chamber and allowed to recover to room temperature.

1.5 Driving Rain Test

The module shall be tested as per IS: 9000 Part XVI. The module shall be sprayed with a tap water at room temperature and at nominal static pressure of 200 kpa for one hour. In this test, the spray from four shower heads shall be directed at an angle of 45º at each of the four upper most corners of the item.

At the conclusion of the test period, the item shall be removed from the chamber and allowed to recover as per recovery conditions given in the specification.

1.6 Vibration (Sinusoidal) Test

This test shall be conducted as per IS: 9000 (Pt.VIII)

(i) Frequency range = 10Hz – 55 Hz
(ii) Vibration Amplitude = 0.35mm (Constant)
(iii) Duration of endurance for sweep = 20 sweep cycles (10 Hz – 55 Hz – 10 Hz)
(iv) No. of axes = 3 coordinate axes
(v) Duration at resonant frequency = 30 ± 1 (Minutes)

2. FINAL MEASUREMENTS

For test corresponding to 1.1, 1.2, 1.3 & 1.4, the following shall be done at the end of recovery:

2.1 The module shall be cleaned and visually examined for any distress and it shall be tested for the electrical performance test as given in clause 4.1 & 4.3.

2.2 In case of driving rain test, after standard recovery the module shall be examined for undue penetration of water and shall be checked for compliance of electrical performance characteristics as per clause 4.1 & 4.3.

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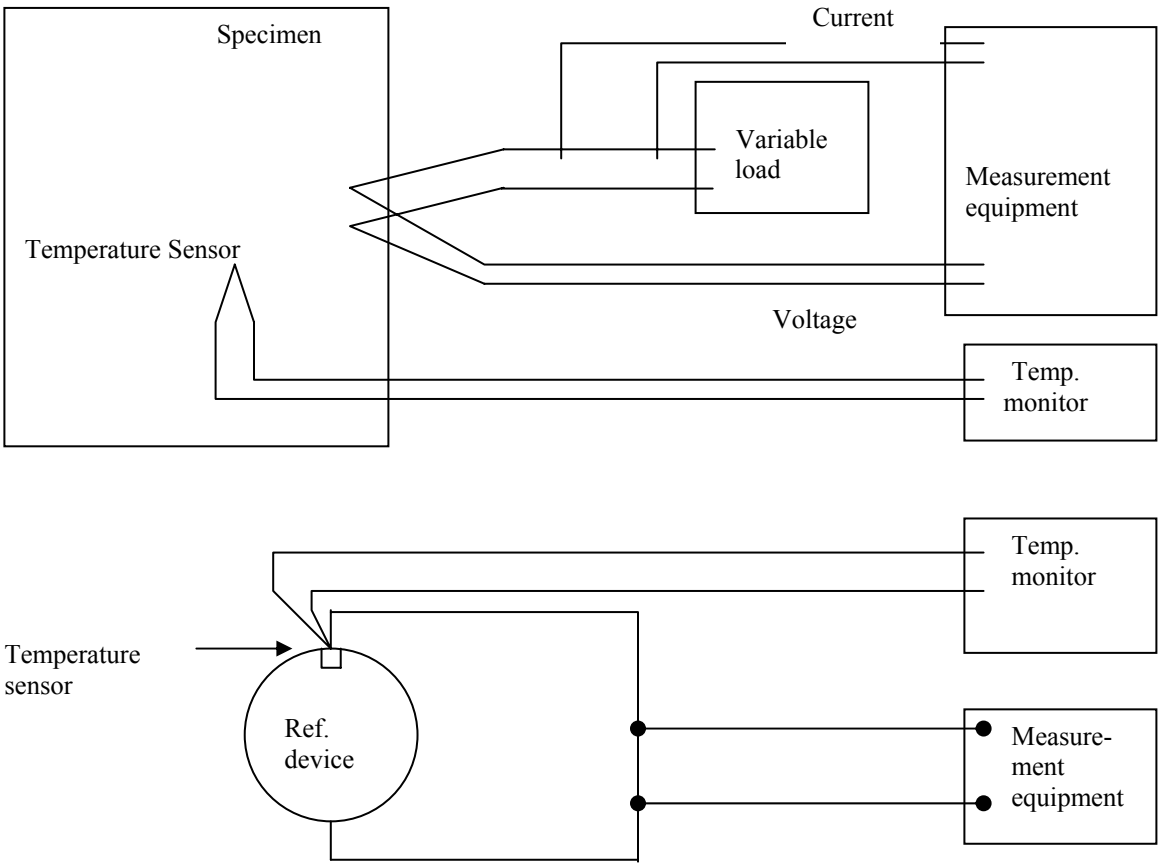

* Preferably electronic
** Precision resistor

FIG.1 – Test Connections

Fax : 91-522-2452332, 032-42100(Rly)
Telephone : 91-522-2465761
Mobile : 09794863336
Rly. : 032-42666,
E-mail : dsig8rdso@ gmail.com

सत्यमेव जयते

Government of India - Ministry of Railways
Research Designs & Standards Organisation
LUCKNOW – 226011

No. STS/E/Cell/Solar/Vol.-XIV

Date : 25th July 2017

मुख्य संकेत एवं दूरसंचार अभियन्ता, मुख्य संकेत एवं दूरसंचार अभियन्ता (निर्माण), मुख्य संकेत एवं दूरसंचार अभियन्ता (प्रॉजेक्ट)	**Chief Signal & Telecom Engineer, Chief Signal & Telecom Engineer (Const.), Chief Signal & Telecom Engineer (Project)**
मध्य रेलवे, मुम्बई सी.एस.टी. – 400 001	Central Rly, Mumbai CST – 400 001
पश्चिम रेलवे, चर्च गेट, मुम्बई – 400 020	Western Rly, Churchgate, Mumbai – 400 020
पूर्व रेलवे, फेयरली प्लेस, कोलकाता – 700 001	Eastern Rly, Fairlie Place, Kolkata – 700 001
दक्षिण पूर्व रेलवे, गार्डन रीच, कोलकाता – 700 043	South Eastern Rly., Garden Reach, Kolkata – 43
उत्तर रेलवे, बड़ौदा हाउस, नई दिल्ली – 110 001	Northern Rly., Baroda House, New Delhi – 01
पूर्वोत्तर रेलवे, गोरखपुर – 273 012	Northeastern Rly., Gorakhpur – 273 012
पूर्वोत्तर सीमान्त रेलवे, मालीगांव, गुवाहाटी – 780 011	North Frontier Rly., Maligaon, Guwahati – 011
दक्षिण रेलवे, पार्क टाउन, चेन्नई – 600 003	Southern Rly., Park Town, Chennai – 600 003
दक्षिण मध्य रेलवे, सिकन्दराबाद – 500 371	South Central Rly, Rail Nilayam, Secunderabad– 71
पूर्व मध्य रेलवे, हाजीपुर – 841 101	East Central Railway, Hazipur - 841 101
उत्तर पश्चिम रेलवे, जयपुर – 302 006	North Western Railway, Jaipur – 302 006
पूर्व तटीय रेलवे, ग्राउन्ड तल, उत्तरी ब्लाक, समन्त विहार, भुवनेश्वर – 17	East Coast Railway, Rail Vihar, Ground floor, North Block, Samant Vihar, Bhubaneswar – 17
उत्तर मध्य रेलवे, गंगा काम्पलेक्स, सूबेदारगंज, इलाहाबाद	North Central Railway, Ganga Complex, Subedarganj, Allahabad.
दक्षिण पश्चिम रेलवे, मुख्य कार्यालय, क्लब रोड, केशवपुर, हुबली – 580 023	South Western Railway, Main Office, Club Road, Keshavpur, Hubli – 23
पश्चिम मध्य रेलवे, द्वितीय तल, डी.आर.एम. ऑफिस, जबलपुर – 482 001	West Central Railway, IInd Floor, DRM Office, Jabalpur – 482 001
दक्षिण पूर्व मध्य रेलवे, आर0ई0 ऑफिस कॉऑम्पलेक्स, बिलासपुर – 495 004	South East Central Railway, R. E. Office Complex, Bilaspur – 495 004
मेट्रो रेलवे, 33/1, जवाहर लाल नेहरू रोड, कोलकाता – 700 071	Metro Railway, 33/1, Jawaharlal Nehru Road, Kolkata – 700071
कोर , नवाब युसुफ रोड, सिविल लाइन्स, इलाहाबाद – 211 001	CORE, Nawab Yusuf Road, Civil Lines, Allahabad –211 001
निदेशक/इरिसेट, तारनाका रोड, लालागुडा, पी. ओ. सिकन्दराबाद – 17	Director/IRISET, Tarnaka Road Lallaguda, P.O. Secunderabad –17

Sub.: Amendment No. 3 to RDSO Specification No. IRS: S-84/92, for "Solar Photovoltaic Module".

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In Compliance to Vigilance Cell/RDSO's letter No. 13/Vig/Policy dated 26.07.2016 & 08.09.2016, Amendment No. 3 to Specification No. IRS:S-84/92 with Amnt.2, for "Solar Photovoltaic Module" is hereby issued with the approval of competent authority for information & implementation please.

(V. K. Agarwal) 25/07/17
Jt. Director/Signal-VIII
for Director General/Signal

Encl. : Copy of Amendment No. 3 to the.
Specification No IRS:S: 84/92
for "Solar Photovoltaic Module".

Copy to:

कार्यकारी निदेशक / गुणवत्ता आश्वासन / अ0अ0मा0सं0, लखनऊ	Executive Director/QA/S&T/RDSO/Lucknow
निदेशक / गुणवत्ता आश्वासन / सिगनल एवं दूरसंचार, / अ0अ0मा0सं0, निकट इरकॉट बिल्डिंग, शंकर मार्केट के पीछे, शिवाजी ब्रिज, नई दिल्ली – 110 001	Director/QA./S&T/RDSO, 1st Floor, Near IRCOT Building, Behind Shanker Market, Shivaji Bridge, New Delhi – 110 001
निदेशक / गुणवत्ता आश्वासन / संकेत एवं दूरसंचार, / अ0अ0मा0सं0, प्रथम तल, न्यू एनेक्सी बिल्डिंग, चर्चगेट, पश्चिम रेलवे, मुम्बई – 400 020	Director/QA./S&T/RDSO, 1st Floor, New Annexe Building., Western Railway, Churchgate, Mumbai – 400 020
निदेशक / गुणवत्ता आश्वासन / सिगनल एवं दूरसंचार, / अ0अ0मा0सं0, भूतल, डी0आर0एम0 ऑफिस, बंगलोर – 560 023	Director/QA./S&T/RDSO, Ground Floor, DRM Office, Bangalore – 560 023
निदेशक / गुणवत्ता आश्वासन / सिगनल एवं दूरसंचार, / अ0अ0मा0सं0, चौथी मंजिल, 17 एन.एस. रोड, वैस्ट विंग, फेयरली प्लेस, कोलकाता – 700 001	Director/QA./S&T/RDSO, 4th Floor, 17 N.S. Road, West Wing, Fairlie Place, Kolkata – 700 001
निदेशक / गुणवत्ता आश्वासन / सिगनल एवं दूरसंचार, / अ0अ0मा0सं0, हसनपुरा रोड, जयपुर – 302 006	Director/QA/S&T/RDSO,Hasanpura Road, In Front of Railway Hospital, JAIPUR – 302 006
M/s Central Electronics Ltd., 781, Desh Bandhu Gupta Road, Karol Bagh, Delhi – 110 005	
M/ Rajasthan Electronics & Instruments Ltd., 2 – Kanak Pura Industrial Area, Jaipur – 012	
M/s Tata Power Solar Systems Ltd., Plot No. 78, Phase-I, Electronic City, Hosur Road, Bangalore – 560 100	
M/s Premier Solar System (P) Ltd, 3rd Floor, V.V. Tower Karkhana, Main Road, Secunderabad – 500 015	
M/s Access Solar Limited., S-5, Phase-II, TIE, Balanagar, Hyderabad – 500 037	
M/s Andromeda Energy Technologies Pvt. Ltd,, 9-1-18 to24, No.4, S. P. Road, 1st Floor, Opposite Civil Court, Secunderabad – 500 003	
M/ HBL Power Systems Ltd., 8-2-601, Road No.10 Banjara Hills, Hyderabad – 500 034	
M/s Maharishi Solar Technology (P) Ltd.., A-14, Mohan Co-operative Industrial Estate, Mathura Road, New Delhi – 110 044	

Encl. : Copy of Amendment No. 3 to the Specification No. IRS:S: 84/92 for "Solar Photovoltaic Module".

25/07/12

(V. K. Agarwal)
Jt. Director/Signal-VIII
for Director General/Signal

Amendment No. 3

To

Specification No. IRS: S-84/92

For

"Solar Photovoltaic Module"

Following new clause is added to the Specification No IRS: S-84/92 for "Solar Photovoltaic Module"

Clause No. 14

"All the provisions contained in RDSO's ISO procedures laid down in Document No. QO-D-7.1-11 dated 19.07.2016 (titled "Vendor Changes in approved status") and subsequent versions/amendments thereof, shall be binding and applicable on the successful vendor/vendors in the contracts floated by Railways to maintain quality of products supplied to Railways".

End of Amendment No. 3