File No. 313-12/10/2025-S AND QC
Government of India
Ministry of New and Renewable Energy
(Standard & Quality Control Division)

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Atal Akshay Urja Bhawan,
CGO, Complex, Lodhi Road
New Delhi-110003
Dated: 29.09.2025

OFFICE MEMORANDUM

Subject: Circulation of draft Guidelines for series approval of Storage Batteries for conducting testing in test Labs for implementation of Solar Systems, Devices and Component Goods Order 2025.

The undersigned is directed to forward the draft Guidelines for series approval of Storage Batteries for conducting testing in test Labs for implementation of Solar Systems, Devices and Component Goods Order 2025 for comments of the Stakeholders. The comments, if any, may be sent to rajkumarb.mnre@gov.in within 15 days from the notification of this OM.

Yours faithfully

(Rajkumar Bhawariya)

Scientist C

To:

Director (NIC), MNRE – for uploading on website of the Ministry.

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Ministry of New & Renewable Energy

(Standards & Quality Control Division)

Guidelines for series approval of Storage Batteries for conducting testing in test Labs for implementation of Solar Systems, Devices and Component Goods Order 2025.

The guidelines are issued to facilitate labs/manufacturers in formation of series of products for approval of product family for performance testing of storage batteries (lead acid, Li-ion (portable and industrial application) and nickel based chemistry type) in test labs for compulsory registration with BIS for implementation of the Solar Systems, Devices and Component Goods Order 2025. The following series guidelines will be followed for conducting tests on storage batteries as per IS 16270 by test labs.

Definition of Product Family

A product family can be defined by the maximum configuration of components/sub-assemblies plus a description of how the models are constructed from the maximum configuration using these component and sub-assemblies. All models which are included in the family typically have common design, construction, parts or assemblies essential to ensure conformity with applicable requirements.

Guidelines for Quantitative Selection of Samples

IS 16270:2023 Secondary Cells and Batteries for Solar Photovoltaic Application – General Requirements and Methods of Test

1. Material and Construction

1.1. Lead-Acid Batteries

The cells/ batteries shall be manufactured with raw materials of good quality and should be free from any defects that can affect their performance. For Lead-Acid Batteries, the containers shall have been made using hard rubber, transparent SAN, fibre-reinforced plastic or polypropylene for vented type and polypropylene co-polymer, acrylonitrile butadiene styrene, styrene-acrylonitrile or any other acid-resistant plastic material for sealed batteries. The plastic containers, sulphuric acid, water and separators used shall conform to the requirements as per applicable standards in Cl. 7.2 of IS 16270.

1.2. Nickel-Cadmium and Nickel-Metal Hydride Batteries

The containers shall have been made using high strength alkali resistant material such as nickel-plated mild steel, stainless steel or nonporous plastic. The potassium hydroxide and distilled water with lithium hydroxide additive shall be used for preparation of the electrolyte and will be made up to a specific concentration as specified by the manufacturer. Separators used shall be alkali-resistant having insulating capacity.

1.3. Lithium-Ion Batteries

The cells/batteries shall be manufactured using high-quality raw materials and must be free from any defects that may impact their safety, performance, or lifecycle. For Lithium-

Ion Batteries, the cell casing shall be made from suitable materials as per the cell type (cylindrical, prismatic, or pouch). The battery pack enclosures shall be made of flame-retardant and impact-resistant materials. All materials and components used shall conform to applicable national/international standards and safety guidelines.

2. Procedure for submitting batteries for testing

The batteries for testing shall be picked at random by the testing laboratory from a batch. The manufacturer shall provide the information regarding material of the containers, separator used, and type of sealing adopted (in case of sealed batteries) and the overall dimensions with the samples picked by test labs. For vented type lead-acid batteries, suitable level indicators for batteries made in opaque containers, minimum and maximum marking for transparent containers to indicate the electrolyte level and connectors shall be provided for each cell by the manufacturer.

2.1. Charging of batteries

The manufacturer shall recommend the procedure to be followed for charging of the cells/ batteries to the test laboratory. If the information is not provided by the customer, the procedure described in applicable standards mentioned in Cl. 7.2 shall be followed. Variations in temperature and humidity can affect the performance and life of the cells/ batteries. Manufacturer's recommendations on the operating temperature and humidity limits during testing of batteries shall be observed as mentioned in Cl. 4.3.9 of IS 16270. If information is not provided, conditions mentioned in Table 2 shall be observed.

3. Sampling and Sequence of tests

3.1. Stationary Lead Acid Batteries (Vented types):

The number of samples shall be taken from the production batch for testing, in accordance with IS 16270:2023, to meet the requirements specified in Clause 8.4.1 and Table 6. All the cells/ batteries submitted as a batch shall have the same nominal voltage, rated capacity, electrolyte composition and specific gravity and overall dimensions as mentioned in IS 13369/ IS 1651. The cells/ batteries shall be indelibly and durably marked on the outside of the cells or batteries with source of manufacture, Ah capacity, Year of Manufacture and Country of Origin and other details as per the relevant clauses of IS 13369/ IS 1651. The testing sequence for stationary lead acid batteries (vented type) is provided in Table 6 as per IS 16270(2023).

3.2. Stationary Lead Acid Batteries (Valve Regulated types) & Tubular Gel VRLA Batteries:

The number of samples shall be taken from the production batch for testing, in accordance with IS 16270:2023, to meet the requirements specified in Clause 8.4.1 and Table 6. All the cells/ batteries submitted as a batch shall have the same nominal voltage, rated capacity, electrolyte composition and specific gravity and overall dimensions as mentioned in IS 15549. Cells/ batteries shall be indelibly and durably marked on the outside of the cells with source of manufacture, Ah capacity, Year of Manufacture and Country of Origin as per Cl. 8 of IS 15549. The testing sequence for stationary lead acid batteries (valve regulated type) is provided in Table 6 as per IS 16270(2023).

3.3. Vented Nickel-Cadmium Batteries:

The number of samples shall be taken from the production batch for testing, in accordance with IS 16270:2023, to meet the requirements specified in Clause 8.4.1 and Table 6. All the cells submitted as a batch shall have the same nominal voltage, rated capacity, electrolyte composition and overall dimensions. The cells/ batteries shall be marked on the outside of the cells with source of manufacture, nominal voltage, rated capacity, month and year of manufacture and cell designation as per Clause 6 of IS 10893:1984 (Single Cells) or Clause 6 of IS: 10918-1984 (Vented Nickel-Cadmium Batteries). The markings on the cells/ batteries shall be permanent and non-deteriorating. The testing sequence for vented nickel-cadmium batteries is provided Table 6 as per IS 16270(2023).

3.4. Nickel-Cadmium Prismatic Rechargeable Single Cells with Partial Gas Recombination

The number of samples shall be taken from the production batch for testing, in accordance with IS 16270:2023, to meet the requirements specified in Clause 8.4.1 and Table 6. All the cells submitted as a batch shall have the same nominal voltage, rated capacity, electrolyte composition and overall dimensions. The cells/ batteries shall be durably marked on the outside of the cells with source of manufacture and cell designation and be fitted with red washer or indented or raised symbol for positive terminal as per Clause 5.3 of IS 15767:2008. The testing sequence for Nickel-Cadmium Prismatic Rechargeable Single Cells is provided in Table 6 as per IS 16270(2023).

Table 1 Sampling and Sequence test as per Table 6 IS 16270:2023

Sl No.	Type Test	Battery							
		1	2	3	4	5	6	7	8
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
i)	Physical verification (verification of marking and dimensions) (**5.4** and **7.2**)	✓	✓	✓	✓	✓	✓	✓	✓
ii)	Capacity test (**8.1**)	✓	✓	✓	✓	✓	✓		
iii)	Endurance test (**8.2**)							✓	✓
iv)	Charge retention test (**8.3**)	✓	✓						
v)	Cyclic endurance in photovoltaic application (**8.4**)			✓	✓				
vi)	Sulphation test (**8.5**) (only for lead-acid batteries)					✓	✓		
vii)	Water loss test (**8.6**) (only for flooded types lead-acid batteries)	✓	✓						

3.5. Portable Nickel-Cadmium Batteries

The number of samples shall be taken from the production batch for testing, in accordance with IS 16270:2023, to meet the requirements specified in Clause 8.4.1 and Table 6. All the cells submitted as a batch shall have the same nominal voltage, rated capacity, nominal Ah rating, electrolyte composition and overall dimensions. The cells shall be marked on the outside of the cells with name of manufacturer/ supplier, nominal voltage, rated capacity, polarity, date of manufacture and cell designation as per Clause 5.3 of IS 16048 (Part 1):2013. The markings on the cells shall be permanent and non-deteriorating. The testing sequence for Nickel-Cadmium Prismatic Rechargeable Single Cells is provided in as per IS 16270(2023).

3.6. Portable Nickel-Metal Hydride Batteries

The number of samples shall be taken from the production batch for testing, in accordance with IS 16270:2023, to meet the requirements specified in Clause 8.4.1 and Table 6. All the cells submitted as a batch shall have the same nominal voltage, rated capacity, electrolyte composition and overall dimensions. The cells shall be durably marked on the outside of the cells with name of manufacturer/ supplier, nominal voltage, rated capacity, polarity, date of manufacture and cell designation as per Clause 5.3 of IS 16048 (Part 2):2013. The testing sequence for Portable Nickel-Metal Hydride Batteries is provided in Table 6 as per IS 16270(2023).

3.7. Lithium ion and other electro chemistries: Li-ion (Portable and industrial application as per IS 16047 Part 3 & IS 16822 Secondary Cells and Batteries containing Alkaline or other non-acid Electrolytes - Secondary Lithium Cells and Batteries.)

The number of samples shall be taken from the production batch for testing, in accordance with IS 16270:2023, to meet the requirements specified in Clause 8.4.1 and Table 6. All the cells submitted as a batch shall have the same nominal voltage, electrolyte composition and overall dimensions. Suitable connectors shall be provided for each cell by the manufacturer at the test laboratory. The manufacturer shall also recommend the procedure to be followed for charging of the cells/ batteries to the test laboratory. The cells/ batteries shall be marked on the outside of the cells as per Clause 5.3 as per IS 16047 part (3) for portable application and Clause 5.1 as per IS 16822 for industrial application. The markings on the cells/ batteries shall be permanent and nondeteriorating. In addition to these, the manufacturer shall also provide the following information:

1. Type and material of the container
2. Li-ion chemistry/ technology
3. Material of the separator
4. Overall dimensions and weight of each complete cell/ battery
5. Nominal voltage and rated capacity of the cell/ battery

The testing sequence for Lithium-Ion Batteries is provided in Table 6 as per IS 16270(2023).

4. Requirement

The pass criterion shall be strictly followed in accordance with the clause No. 8 & 9 of IS 16270 (2023).

5. Selection of Representative Model

The short-term tests such as Capacity test shall be performed on all ratings included in the series. In case any test sample fails any one of the short terms test, the particular rating shall be resubmitted for the testing.

Among the product range of cells / batteries from a manufacturer, the representation model of cell/battery shall be tested as per type tests mentioned in the Table 6 of IS 16270:2023. The highest rated capacity sample will be subjected to all type test (including endurance tests) and the product qualifying will be issued test reports to all samples covered in the series.

For cells / batteries to be considered in the same series, the manufacturer has to submit an undertaking to the test lab that all the models have been manufactured with no change in the grid alloy composition, grid purity, grid thickness, ingredients used in the electrode preparation, method of preparation and thickness of the electrodes and quality systems followed for manufacturing. Table 2 gives the series of batteries for type testing of secondary lead acid cells/ batteries as per IS 16270.

Table 2 ***Series of secondary lead acid cells/ batteries for type testing as per IS 16270***

Series of secondary lead acid cells/ batteries for type testing as per IS 16270			
Type	**Series**	**Range of Capacities**	**Representative Model**
2V Flooded Lead Acid Cells	**A**	≤ 400 Ah	400 Ah or Highest rating in series
	B	>400 Ah and ≤ 700 Ah	700 Ah or Highest rating in series
	C	>700 Ah and ≤ 1000 Ah	1000 Ah or Highest rating in series
	D	> 1000 Ah	Highest rating in series
2V VRLA Cells	**A**	≤ 200 Ah	200 Ah or Highest rating in series
	B	> 200 Ah and ≤ 500 Ah	500 Ah or Highest rating in series
	C	> 500 Ah and ≤ 1000 Ah	1000 Ah or Highest rating in series
	D	> 1000 Ah	Highest rating in series
12V Flooded Lead Acid Batteries	**A**	≤ 20 Ah	20 Ah or Highest rating in series
	B	> 20 Ah and ≤ 100 Ah	100 Ah or Highest rating in series
	C	>100 Ah	Highest rating in series
12V VRLA Batteries	**A**	≤ 50 Ah	50 Ah or Highest rating in series
	B	> 50 Ah and ≤ 100 Ah	100 Ah or Highest rating in series
	C	>100 Ah	Highest rating in series

Table 3 give the series of batteries for type testing of secondary cells/ batteries of nickel-based chemistry as per IS 16270.

Table 3 ***Series of secondary cells/ batteries of nickel/Li-ion based chemistry for type testing as per IS 16270***

Series of secondary cells/ batteries of nickel/Li-ion based chemistry for type testing as per IS 16270			
Type	**Series**	**Range of Capacities**	**Representative Model**
Vented Nickel Cadmium/ Nickel Metal Hydride Cells/ Batteries	**A**	≤ 45 Ah	Highest rating in series
	B	> 90 Ah to 500 Ah	Highest rating in series
	C	500-1000 Ah	Highest rating in series
	D	>1000 Ah	Highest rating in series
Nickel Cadmium Prismatic Single Cells with Partial Gas Recombination	**A**	> 90 Ah to 500 Ah	Highest rating in series
	B	500-1000 Ah	Highest rating in series
	C	>1000 Ah	Highest rating in series

Table 4. gives the Series of Secondary Cells/Batteries of Li-ion based Chemistry for Type Testing as per IS 16270

Table 4 Series of Secondary Cells/Batteries of Li-ion based Chemistry for Type Testing as per IS 16270

Series of Secondary Cells/Batteries of Li-ion based Chemistry for Type Testing as per IS 16270			
Type	**Series**	**Range of Capacities**	**Representative Model**
Lithium-ion Cylindrical / Prismatic / Pouch Cells / Batteries	A	≤ 20 Ah	Highest rating in series
	B	> 20 Ah to 100 Ah	Highest rating in series
	C	> 100 Ah to 500 Ah	Highest rating in series
	D	> 500 Ah to 1000 Ah	Highest rating in series
	E	> 1000 Ah	Highest rating in series

6. Safety and other information to be provided by Manufacturer/Supplier for batteries used for Photovoltaic Applications

Batteries can pose fire and explosion risk, chemical and electrical hazard if mistreated. They can also be heavy and difficult to move. They must only be installed out of reach in suitable locations for safe battery operation.

1. Suitable lifting devices shall be used for moving the batteries
2. The temperature of the battery shall be monitored and shall be maintained as per manufacturer's instructions. The terminals, screws, clamps and cables shall be regularly inspected for breakage, damage or loose connections. These should be clean, tight and free of corrosion.
3. Capability of expansion of battery bank capacity must be specified along with precautions to be taken regarding the same
4. Information regarding the level of electric shock hazard should be provided in technical sheet
5. The installation of all battery systems shall be in accordance with the safety data sheet applicable to the battery chemistry and battery system. Procedure to be followed for the regular maintenance of the battery shall be as recommended by the manufacturer.
6. For domestic installations and non-domestic installations upper DC voltages limit should be provided.
7. Exposed components shall be insulated and mechanically protected, including: terminals, Inter battery system cabling and connections.
8. In case of parallel connected batteries, each battery system shall have an isolator.
9. Safe work procedures should be developed to address potential chemical hazards which may include, cracked or damaged battery casings, spillage of electrolyte Inhalation of, and physical exposure to, electrolyte.
10. The equipment may be required for safe handling of battery systems and protection of authorised persons such as acid resistant apron, gloves, goggles, bicarbonate of soda for acid spills, or boric acid for alkaline electrolyte spills, or other suitable neutralising agent recommended by the manufacturer
11. Following information needs to be provided by the manufacturer in an instruction brochure
    i. Electrical Characteristics such as voltage range (Maximum and Minimum) and load pattern
    ii. Charging Condition: Rapid charge, trickle charge, charge time and temperature
    iii. Size, weight, terminal type, operating life and storage period
12. The batteries shall be stored as per manufacturer's instructions. Restricted access shall be provided to battery systems to prevent access by unauthorised persons.

Batteries may be placed over wooden or plastic planks on the floor. The batteries shall not be placed in damp conditions, near combustible materials or near any heat source. Suitable ventilation must be provided at storage site.

13. Procedure to be followed for disposal of scrapped batteries and recycling of batteries must be specified by the manufacturer.