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जय एके;

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

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RDSO's ANNEXURE 'H' OF INDIAN STANDARD SPECIFICATION No.IS:6848-1979
FOR LEAD ACID BATTERIES FOR TRAIN-LIGHTING & AIR CONDITIONING
SERVICES

SN	Date of Revision/ amendment	Revision/ Amendment	Page/ Clause No. of Annex.'H'	Remarks
1.	----	----	-----	1. Compliance of Railway Board order No. 97/Elect(TRS)/113/4 dated 05.06.2020 2. For comments also

APPROVED

ED/PS & EMU

Prepared By JE/Battery	Checked By Director/MRVC
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ANNEXURE-H(Rev.1)

Dec.-1996

DEVIATION TO IS: 6848- 79 WITH AMENDMENT NO. 3

SPECIFICATION FOR RAILWAY LEAD ACID BATTERIES FOR TRAIN LIGHTNG
AND AIRCONDITIONING SERVICES

DETAILS OF DEVIATIONS of IS:6848

1. Clause 3.3.4 Page 7

The existing clause shall be substitute with as under

MICRO-POROUS VENT PLUG :- Each cell shall be provided with adequate means, both for venting and for servicing of the electrolyte. The vent- cum-filling plug shall generally conform to RDSO drawing No. 4020/A Alt. 3 with the dome/filter made of ceramic or any other suitable fire retardant material. The vent cum- filling plug shall allow free escape of gases evolved during service and shall not permit electrolyte to come out on the surface of the lid. On removal of vent-cum filling plug, drawing of the electrolyte sample, servicing and checking of electrolyte shall be possible.

The material used for micro-porous vent plug shall have uniform porosity. It shall also be free from abnormally ties such as crack, breakage, foreign matter, dent etc. ~~and shall conform to the following.~~ The following tests shall be applicable on Microporous dome of the vent plug only and dome shall be taken out for this purpose.

a) Porosity : 35 ± 5%

Porosity of micro-porous filter shall be calculated as given below:-

Weigh the sample in air (W1) - keep the sample in boiling water with few drops of wetting agent (Teepol) for 30 minutes. Weigh the sample in water (W2). Next weigh the wet sample outside water (W3). Calculate porosity as under:

$$\text{Porosity \%} = \frac{(W3 - W2) - (W1 - W2)}{(W3 - W2)} \times 100$$

b) Breaking strength : Shall not be brittle. To test this, a steel ball of 200 gm shall be dropped two times from the height of 400 mm on the top and side of micro-porous dome

c) Acid resistance : Dry and weigh the (micro-porous body) dome (W1), Keep the dome in sulphuric acid of specific gravity 1.3 at 40°C for 100

hours. Remove it from acid, wash free of acid, dry and weigh (W2). Calculate the percentage loss as follows:

$$W1 = \frac{W1 - W2}{W1} \times 100$$

The loss of weight shall not be more than 0.5%.

- d) Permeability : The full charged cell shall be fitted with vent-cum-sealed float plug except the one where monometer with water is fitted. Charge the cell for 4 hours at 2.5 times of C10 rate. All sealed float guides shall be in position properly. The cell shall not develop positive pressure more than 2 mm of water column inside the cell.
- e) Dimension : Shall generally conform to RDSO's drawing. No. SKEL - 4020 /A Alt.3 or as approved by RDSO.
- f) Plastic component: plastic component to which the micro-porous top is bonded shall free from crack, flash, pin hole, air bubble, uneven shrinkage, foreign particles etc. and shall conform following (Ref. Drg. SKEL- 4020/A Alt.3).
 - a) Material : HIP/Polypropylene or superior quality.
 - b) Acid Resistance : No perceptible change
 - c) Heat : No deformation at 70.°C

2. Clause 3.3.6 Page 10

Add the following at the end of the existing clause

Sealed float guide shall be as per RDSO Drg. No. RDSO/PE/SK/0058-03 (Rev.1)

3. Clause 3.4.2 Page 10

Substitute 50 mm in lieu of 25 mm in second line of clause 3.4.2.

4. Clause 5.1.1 Page 11

The existing clause shall be substitute from as under:-

Type tests – The following shall constitute the type tests. All these tests shall be started after 3 cycles of charge/discharge at 10 hour rate. All these tests shall be conducted at 20 to 30 °C unless and other wise specifically mentioned.

5. Clause 5.1.1 Page 12.

Add the following clause after clause 5.1.1(n) in Appendix 'D'

- o) **LOSS OF WATER TEST:** After fully charging the battery should be cleaned and dried. It should be weighed immediately but not exceeding one hour after drying with an accuracy of 0.05 % or maximum least count of 50 gm for the balance used. Then all vent-cum-filling plugs should be closed tightly and connected to constant voltage charger keeping the voltage 2.4 volt per cell for 21 days in water bath at a temperature of $50 \pm 2^\circ\text{C}$. Thereafter battery is removed from circuit, dried and weighed accurately.

The water loss shall not exceed 0.133 gm/ Ah/Cell of the obtained capacity.

- p) **EQUILIBRIUM FLOAT CURRENT TEST:**

This test shall be conducted during the initial three days (72 hours) of water loss test. The battery under test shall be kept in water bath at $50 \pm 2^\circ\text{C}$. Charging voltage shall be 2.4 ± 0.05 V per cell. The float current shall be measured and recorded It shall not be more than 5 mA / AH of the obtained test capacity.

- q) Micro-porous vent plug as per clause 3.3.4 page 7. (Clause Substituted in Annexure 'H')

6. Add the following clauses after clause 5.1.1.2 page 12

~~Clause 5.1.1.3~~

~~**RENEWAL OF TYPE TEST:** After successful prototype testing and fulfilling requirements of specification, approval given by RDSO shall be valid for five years. Before completion of 5 years manufacturer shall apply for renewal of type test approval.~~

- ~~• Any deviations from bill of material and QAP approved by RDSO earlier.~~
- ~~• Implementation confirmation of modifications issued by RDSO, if any.~~
- ~~• Addition/ Deletion of Machinery and Plant.~~
- ~~• Supply orders executed by the manufacturer in last 3 years and following details should be given:~~
- ~~• PO No./Date~~
- ~~• Consignee and date of supply~~
- ~~• Quantity~~
- ~~• Rate(inclusive of all taxes)~~
- ~~• Warranty failures reported (nature of failure and action taken).~~

~~During renewal of type shall be carried out by RDSO.~~

- ~~a) C3 test as per clause 5.6~~

~~b) Ah and Wh efficiency test as per clause 5.7~~

~~e) Water loss and Equilibrium float current test as per Clause 'O' and 'p' respectively of annexure 'H'~~

~~The manufacture shall offer the battery for retype testing. For this purpose sample be picked up from any production lot at random. RDSO representative shall check dimension, mass, marking/workmanship and components verification and shall witness the above tests at firms premises or seal the sample for testing in govt. test house. The full report of testing shall be submitted to RDSO for the purpose of evaluation as per latest specification.~~

5.1.1.3 **DURATION OF TYPE TEST:** Type test as per clause 5.1.1 shall be completed within six months (Maximum) from the date of starting the type test except storage test. ~~Which shall be started within six months (max.).~~

5.1.1.4 **INSPECTING AUTHORITY:** The type test as per clause 5.1.1 of cells/monoblock batteries shall be conducted by the representative of RDSO / Lucknow, India at the works of manufacturers for which all the test facilities shall be made available by the manufacturers at their cost.

7. Clause 5.1.2.2 Page 12

Substitute Sub-Clause (a) with the following and add new Sub Clause 'C'

"Capacity test at 5 hr. rate as per clause 5.5. The capacity obtained shall be within $\pm 5\%$ of the capacity obtained (the average capacity at 27 °C) during prototype test."

Clause 5.1.2.2 Page 12 Add new sub clause (c) as follows at the end of sub clause (b)

"The weight of dry cell shall not vary more than $\pm 5\%$ of average weight obtained during prototype test"

8. Substitute the following for the existing clause 5.9.8 page 16

The minimum number of life units shall not be less than 10 units.

9. Clause 6.2 Replace the existing clause with the following.

Manufacturers shall be responsible for safe transportation of batteries. Battery should be delivered in good condition to consignee. If there is any damage during transportation manufacturer shall replace the damaged battery free of cost.

10. Add the following clauses after clause 6.2 page 18

6.3 **WARRANTY-** The manufacturer shall declare the expected life of battery in the offer as well as while submitting the technical details for type test to RDSO.

6.4 **DRAWING**:-The manufacturer shall supply one set of drawing in A4 size listed as below ~~for approval~~ while offering the cell / mono-block for type testing.

- a) Detail drawing of cell/ monoblock with dimensions of front, top and side view.
- b) Detailed drawings of container showing different sections with dimensions
- c) Part drawings with sectional details of
 - (1) Terminal post (Positive and Negative).
 - (2) Container lid.
 - (3) Pole (+ve & -ve).
 - (4) Plates (+ve & -ve groups assembly).
 - (5) Separator.
 - ~~(6) Float guide.~~
 - ~~(7) Microporous vent plug.~~
 - (8) Inter cell/unit and end cell connector.
- d) Packing details of cell/monoblock.
- e) General arrangement drawings of cells set indicating connections for cell / monoblock .
- f) Any other drawings. Considered relevant.

6.5 For the purpose of the cells/monoblock supplied against this approval, means the approval of general design features. Not with standing the approval, manufacturer is wholly and completely responsible for performance, life and reliability of battery during service.

6.6 No. design change shall be undertaken by manufacturer from prototype cell / monoblock batteries without prior approval of RDSO.

6.7 **DESIGN DOCUMENTS AND INSTRUCTIONS MANUAL**

Following documents in the spiral bound form will be submitted to RDSO.

In house the result as per appendix 'A' and 'B' shall be sent to RDSO before offering for type test. After completion of test, following documents in bound form shall be submitted in duplicate.

- Bill of Material
- Design details / Drawings
- ISO Certificate with letter of issuing authority

- Prototype test result
- Quality assurance plan.

Maintenance manual in soft and hard copy should be submitted in advance for approval.

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