

RESEARCH DESIGNS & STANDARDS ORGANISATION

(Traction Installation Directorate)

Reasoned Document for Draft Specification of solid core porcelain insulators for 25 KV A.C. 50 Hz single phase overhead traction lines No. TI/SPC/OHE/INS/0071

All changes in final draft specification w.r.t. draft specification have been marked in red colour and deletion as strikeout in final draft specification , which is also uploaded with this document.

1. Draft revised Specification no TI/SPC/OHE/INS/0070, Rev-01 of solid core porcelain insulators for 25 KV A.C. 50 Hz single phase overhead traction lines was uploaded on RDSO website for 30 days (from 19.08.2020 to 18.09.2020) for comments and suggestion.
2. Comments have been received from two firms.

SN.	RDSO specification clause & description	Comments by the Firm M/s Saravana Golabal Energy Limited.	RDSO Remarks
1.	Clause No.4.3 Acceptance Test (Sl.No.11) Analysis by X-Ray Diffractometry (XRD) and Scanning Electron Microscopy (SEM) and Energy Dispersive X-Ray Analysis (EDXA).This test shall be conducted when the order quantity for stay ,bracket & 9-tone insulator (all together) are more than 1000 nos. For this purpose, all orders placed (by CORE, zonal Railways etc.) within 15 days shall be clubbed together.	Analysis by X-Ray Diffractometry (XRD) and Scanning Electron Microscopy (SEM) and Energy Dispersive X-Ray Analysis (EDXA).This test shall be conducted when the order quantity for stay ,bracket & 9-tone insulator (all together) are more than 1000 nos. For this purpose, all orders placed (by CORE, zonal Railways etc.) within 15 days shall be clubbed together.	Accepted. Para in clause no 4.3 has been modified suitably and made new clause no 5.4.1 (SN 11) as follows:- “Analysis by X-Ray Diffractometry (XRD) and Scanning Electron Microscopy (SEM) and Energy Dispersive X-Ray Analysis (EDXA). This test shall be conducted as per Clause 5.6.2 “

	<p>2. Clause No 5.3 Sampling Plans shall be as under:</p> <p>The number of insulators (sample size) to be picked up at random (by any random number generation method) from the lot offered for acceptance tests as tabulated below:</p> <p>NOTE: - For stay, bracket & 9-tonne, if the order is for small quantities i.e. less than 800 Nos., the manufacturer can club different orders & total insulator clubbed quantity shall be upto 800 (max.) nos. and will be treated as offered quantity. The number of insulators (sample size) to be picked up at random (by any random number generation method) from the lot offered for acceptance tests shall be in accordance with the TABLE-2. The insulators picked up at random in accordance with the above sample size shall be equally distributed for mechanical load and mechanical performance tests given in TABLE-3.</p>	<p>For stay, bracket & 9 tonne, if the order is for small quantities i.e. less than 300 800 Nos, the manufacturer can club different orders & total insulator clubbed quantity shall be upto 800 (max.) nos. and will be treated as offered quantity.</p> <p>Clarification required whether 800 nos. itemwise or (stay arm + bracket + 9 tonne= 800 nos.)</p> <p>We wish to submit that except Shaping, the raw material used for manufacturing, chemical composition, pre kiln and post kiln manufacturing process remains the same for all railway insulators. Hence we request this clubbing of small order quantities must be for all six items (stay arm, bracket, 9 tonne, post, sectioning and operating rod insulators). For Stay, Bracket, 9 tonne insulators - request clubbing of small order quantities upto 800 nos.(itemwise) For Post, Sectioning and operating rod insulators - request clubbing of small order quantities upto 500 nos. (itemwise)</p>	<p>Accepted.</p> <p>Clarification is asked by firm. RDSO has clarified that 800 nos. is item wise. This has already been modified suitably in draft specification as Clause 5.6.1.</p>
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3.	<p>Clause 5.4.6 At least one fragment of porcelain from each insulator broken during the mechanical load test and mechanical performance test shall be tested for bulk density while any one fragment of porcelain broken during the mechanical load test and the mechanical performance test shall be analyzed for chemical composition.</p>	<p>Presently we are conducting chemical composition test in one fragment from every kiln firing cycle of total offered lot. Kindly clarify any one fragment from total offered lot (or) order wise (or) item wise.</p>	<p>Accepted.</p> <p>Clarification is asked by firm. RDSO has clarified that any one fragment from item wise.</p> <p>This has already been modified suitably in draft specification as Clause 5.6.1.</p>
SN.	RDSO specification clause & description	<p>Comments by the Firm M/s Grasim Industries Limited. Unit: Aditya Birla Insulators</p>	RDSO Remarks
4.	<p>Clause 2.3 Note: IEC publication IEC 815</p>	<p>Note: IEC publication 60815</p>	<p>Accepted Modified as new-1.4(SN -5) and 6.4</p>
5.	<p>Clause 4.2.4 Impurity: <2% (Values between 2-3%, if found during the test result shall be reviewed by RDSO upto 31.03.2008 only)</p>	<p>Impurity: <2.50%</p>	<p>Partially accepted. CI 4.2.4 Impurity between 2 to 3% till 31.03.2008 now in clause no.. 5.3.4 <2% impurity is fixed . Increasing percentage of impurities life of insulator decreases Hence 2.5 % can not be accepted.</p>
6.	<p>Clause 4.2.4 Alpha Quartz: Values shall be recorded and should preferably be Zero.</p>	<p>Alpha Quartz: Values shall be less than 1.75%</p>	<p>Not accepted. To maintain the quality clause 5.3.4 is with preferably be Zero.</p>
7.	<p>Clause 5.2.2.1 Prototype approval shall be accorded for a period of 2 years only.</p>	<p>Prototype approval shall be accorded for a period of 5 years only.</p>	<p>Accepted.</p> <p>Clause 5.2.2.1 has been deleted</p>
8.	<p>Clause 5.3.1 The sample size for conducting XRD, SEM & EDAX analysis will be at least one insulator for every 1000 insulators or part thereof offered for CHP clearance...</p>	<p>The sample size for conducting XRD SEM & EDXA analysis will be at least one insulator for every 2000 insulators or part thereof offered for CHP clearance</p>	<p>Not accepted Reason of not acceptance : Increasing the sampling lot size will compromise the inspection quality of insulator (Clause no 5.6.2 of final draft spec.)</p>

9.	Clause 6.1 – 3) Routine Temperature cycle test followed by Mechanised test to check soundness of insulator.	Routine Temperature cycle test followed wooden mallet test to check the soundness of insulator.	Accepted New 5.12.1e and 5.13.5
10.	Clause 8.4 IEC publication 815 IEC publication 60815	Accepted Clause re-numbered as Clause 6.4
11.	Clause A-1.18 Artificial pollution test: IEC publication 507IEC publication 60507	Accepted Clause A-1.18 renumbered to Clause 5.2.19
SN.	RDSO specification clause & description	Internal Correction made by RDSO	RDSO Remarks
12.	In Para No 1.3, SN 2 IEC Publication 60507:2013 or latest	Internal Correction made by RDSO	BIS adopted IEC Publication 60507:2013 as IS: 8704: 2018. Clause modified accordingly
13.	In Para No 1.3, SN 4 IEC Publication 60591	Internal Correction made by RDSO	IEC Publication 60591 is withdrawn and requiremnt covered in IEC 60383
14.	In Para No 1.3, SN 7 IEC Publication 6036B - (Secretariat) 102 is replaced by IEC Publication 61467:2008	Internal Correction made by RDSO	IEC Publication 6036B - (Secretariat) 102 does not exist.
15.	In Para No 1.3, SN 8 IS:2071(Part I & III)	Internal Correction made by RDSO	Modified as IS:2071(Part I & III)-:2016-or latest
16.	In Para No 1.3, SN 9 IS: 4218 (part I & VI)	Internal Correction made by RDSO	Modified as IS: 4218:2001 (REAFFIRMED 2018) (part I & VI)
17.	In Para No 1.3, SN 9 ETI/OHE/13(4/84) Issued by Research Designs & Standards Organization(RDSO)	Internal Correction made by RDSO	Modified as ETI/OHE/13(4/84) with A& C Slip no. 1 to 4 or latest Issued by Research Designs & Standards Organization(RDSO)
18.	In Para No 1.6 IEC 60071-2:2019	Internal Correction made by RDSO	New para 1.7 Referred IEC is modified as IEC 60071-2:2018

1050191/2022/O/o PED/TI/RDSO	19	Internal Correction made by RDSO	New para 5.1.5 Acceptance criteria for prototype test In this clause a table for type test has been prepared with reference clause no of specification for clarity.
20.	Appendix A,B & C	Internal Correction made by RDSO	Appendix A has been deleted and added in clause no 5.2 of specification (SN 5.2.1 to 5.2.19) . Appendix B has been re-named as Appendix 1 and appendix C has been renamed as Appendix 2
21.		Internal Correction made by RDSO	Index has been added.
22.		Internal Correction made by RDSO	Reference of IS and IEC is updated in clause No. 1.4 and1.7.
23.	2.5	Internal Correction made by RDSO	Clause A 1.15 is modified as 5.2.15
24.	2.6	Internal Correction made by RDSO	Clause A 1.16 is modified as 5.2.16
25.	5.1.5	Internal Correction made by RDSO	Table of type test clause no has been updated to 5.2.1 to 5.2.19
26.	4.2.10	Internal Correction made by RDSO	This test shall be conducted in accordance with clause 4 Method B of IEC Publication 672-2, is modified as This test shall be conducted in accordance with clause 5 Method B of IEC Publication 672-2
27.	4.2.12	Internal Correction made by RDSO	<p>I. Percentage free a – Alumina (Corundum Phase) is modified as Percentage free alpha – Alumina (Corundum Phase)</p> <p>II. Percentage free a – Quartz (Quartz Phase) is modified as Percentage free alpha – Quartz (Quartz Phase)</p>

1050191/2022/O/o PED/TI/RDSO	28. 4.2.13	Internal Correction made by RDSO	This test shall be conducted in accordance with clause: 5 of IEC Publication 60672-2 is modified as This test shall be conducted in accordance with clause: 6 of IEC Publication 60672-2
	29. 4.2.14	Internal Correction made by RDSO	This test shall be conducted in accordance with Clause: 6 of IEC Publication 60672-2 is modified as This test shall be conducted in accordance with Clause: 7 of IEC Publication 60672-2
	30. 4.2.15	Internal Correction made by RDSO	Appendix "C" is modified as Appendix "2".
	31. 4.2.16	Internal Correction made by RDSO	<p>I. Appendix "C" is modified as Appendix "2".</p> <p>II.artificial rain produced in accordance with Clause 3.3 of IS: 2071 (Part-I). is modified asartificial rain produced in accordance with Clause 4.4 of IS: 2071 (Part-I).</p> <p>III. Appendix "C" is modified as Appendix "2".</p>
	32. 4.2.17	Internal Correction made by RDSO	Appendix "C" is modified as Appendix "2".
	33. 4.3	Internal Correction made by RDSO	Acceptance criteria is modified as Acceptance criteria of Prototype test
	34. 4.3.4	Internal Correction made by RDSO	Impurity (Values between 2 to 3%, if found during the test result shall be reviewed by RDSO up to 31.3.2008 only) is removed.
	4.7	Internal Correction made by RDSO	Acceptance Criteria is Modified as Acceptance Criteria of Acceptance test.

1050191/2022/O/o PED/TT/RDSO	35. 4.9.5	Internal Correction made by RDSO	“Copy of the acceptance test report shall be sent immediately by the manufacturer, after acceptance or rejection of a lot, as the case may be, to Director General (TI),RDSO, Lucknow and the Purchaser. Consolidated report of financial year, should be furnished to RDSO with summary of results in the first month i.e April, of next financial year. The report shall be reviewed by RDSO, before issuing vendor directory for the period July to December of that particular year & for considering renewal” is removed
36.	4.12	Internal Correction made by RDSO	Routine Visual Examination (old SN 4.5) is modified as SN 4.12 Appendix A (A 1.20 to A 1.24) has been deleted and added in clause no 4.12.1.1 to 4.12.1.4 and 4.13
37.	4.12.1 and 4.12.1.3	Internal Correction made by RDSO	In mechanised mallet test, “mechanized” word is removed in para No 4.12.1©,4.12.1.3
38.	4.13	Internal Correction made by RDSO	clause A-1.1 is modified as clause 4.2.1
39.	6.4	Internal Correction made by RDSO	IEC 815 is modified as 60815
40.	13.0	Internal Correction made by RDSO	I. Heading” ISO” for clause is added. II. ISO document Version No: 2.0 dated 24.09.2021 or latest is modified in place of version No:1.3 dated 01.07.2020
41.		Internal Correction made by RDSO	Sub-clause 1.2 “Wherever mentioned “Director General(TI),RDSO,Lucknow” in this specification shall be read as “ Competent Authority of Vendor Approval Agency”” is added.

1050191/2022/O/O PED/II/RDSO	42. 2.2.4	Internal Correction made by RDSO	“Creepage distance of this insulator is presently 850 mm till insulator with creepage distance of 1050 mm is developed in this category” is added
	43. 2.2.5	Internal Correction made by RDSO	“Creepage distance of this insulator is presently 850 mm till insulator with creepage distance of 1050 mm is developed in this category” is added.
	44. 2.2.6	Internal Correction made by RDSO	“Creepage distance of this insulator is presently 850 mm till insulator with creepage distance of 1050 mm is developed in this category” is added.
	45. 2.3	Internal Correction made by RDSO	<p>“Standard Insulator: This insulator is used in zones in which pollution level is either light or there is no pollution. Such an insulator has a creepage distance of 850 mm and is termed as “Standard insulator”.”</p> <p>Is removed and “Porcelain insulator having creepage distance of 1050 mm is a standard insulator in this category” is added.</p>
	46. 2.4	Internal Correction made by RDSO	<p>“Polluted Zone Insulator: This insulator is used in medium and heavily polluted zones. Such an insulator has a creepage distance of 1050 mm and is termed as “Polluted Zone insulator”.”</p> <p>is removed and</p> <p>For use of insulators in polluted zone, instructions issued vide Railway Board’s letter No. 2002/EEM/161/21/Vol-II dated 30.09.2020 (attached as Annexure----) shall be followed</p>
	47. 2.4	Internal Correction made by RDSO	Note of sub-clause 2.4 is removed.

1050191/2022/O/o	48 PED/TI/RDSO	Internal Correction made by RDSO	Drawings of Stay arm Insulator (Standard), Bracket tube Insulator (Standard) and 9T Insulator (Standard) are removed.
	49.	Internal Correction made by RDSO	Clause No. 7.1 of Draft specification is now renumbered as clause 4.0 in final draft specification due to shifting Standard Atmospheric Conditions for Tests from Clause No.7.1 to Clause No.4.0.