

REASONED DOCUMENT ON COMMENTS/SUGGESTIONS RECEIVED ON DRAFT OF INDIAN RAILWAY STANDARD SPECIFICATION FOR SPHEROIDAL GRAPHITE CAST IRON INSERTS SERIAL NO. IRS/T-46(FOURTH REVISION)

Clause no.	Existing Clause in IRS/T-46 Specification for SGCI Inserts	Proposed Modified Para/Clause of IRS/T-46 Specification for SGCI Inserts	Received from	Comments/Suggestion	Discussion & reason for accepting/rejecting the suggestion	Final Modified Para/Clause of IRS/T-46 Specification for SGCI Inserts
	INDIAN RAILWAY STANDARDS SPECIFICATION FOR SPHEROIDAL GRAPHITE CAST IRON INSERTS SERIAL NO. T-46-2023 (THIRD REVISION- MAY 2023)	INDIAN RAILWAY STANDARDS SPECIFICATION FOR SPHEROIDAL GRAPHITE CAST IRON INSERTS SERIAL NO. T-46- 2023 2024 (THIRD 4 TH REVISION- MAY-2023 DEC 2024)	-	No comments	-	INDIAN RAILWAY STANDARDS SPECIFICATION FOR SPHEROIDAL GRAPHITE CAST IRON INSERTS SERIAL NO. T-46- 2023 2025 (THIRD 4 TH REVISION- MAY-2023 JANUARY 2025)
0.4	All Correction slips /Corrigendum (Corrigendum no. 1 to 3) issued till date have been incorporated in this revision.	All Correction slips /Corrigendum (Corrigendum no. 1 to 3) issued till date have been incorporated in this revision.	-	No comments	-	All Correction slips /Corrigendum (Corrigendum no. 1 to 3) issued till date have been incorporated in this revision.
1.1	This standard covers the manufactures, internal checking/testing and record keeping for quality assurance, offering material for inspection, testing and inspection and packing of spheroidal graphite Cast Iron Inserts for concrete sleepers hereinafter referred to as "Inserts". Contract awarding party has been referred to as "Purchaser" and its nominated inspection agency/representative as "Inspection Agency/Authority". The firm entrusted with manufacture and supply of inserts, is referred to as "Manufacturer".	This standard covers the manufactures, approval of samples , internal checking/testing and record keeping for quality assurance, offering material for inspection, testing and inspection and packing of Spheroidal Graphite Cast Iron Inserts for concrete sleepers hereinafter referred to as "Inserts". Contract awarding party has been referred to as "Purchaser" and its nominated inspection agency/representative as "Inspection Agency/Authority". The firm entrusted with manufacture and supply of inserts, is referred to as "Manufacturer".	-	No comments	-	This standard covers the manufactures, approval of samples , internal checking/testing and record keeping for quality assurance, offering material for inspection, testing and inspection and packing of Spheroidal Graphite Cast Iron Inserts for concrete sleepers hereinafter referred to as "Inserts". Contract awarding party has been referred to as "Purchaser" and its nominated inspection agency/representative as "Inspection Agency/Authority". The firm entrusted with manufacture and supply of inserts, is referred to as "Manufacturer".

New Para Added 1.2		"All the provisions contained RDSO's ISO procedures laid down in Document No:QO-D-8.1-11dated 20.11.2024 (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."	-	No comments	-	"All the provisions contained RDSO's ISO procedures laid down in Document No:QO-D-8.1-11 dated 20.11.2024 (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."																																																												
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		(vi) IS:22 8 (Pt.15)	Determination of Copper by Thiosulphate Iodide Method		(vi) IS:22 8 (Pt.15)	Determination of Copper by Thiosulphate Iodide Method					(vi) IS:22 8 (Pt.15)	Determination of Copper by Thiosulphate Iodide Method	
	4	IS:15 00	Method of Brinell Hardness test for metallic materials. (2nd Revision).		IS:15 00	Method of Brinell Hardness test for metallic materials. (2nd Revision).					4	IS:15 00	Method of Brinell Hardness test for metallic materials. (2nd Revision).
	5	IS:25 00 (Pt.I)	Sampling Inspection Table, Inspection by Attributes & count of defects (1st revision).		IS:25 00 (Pt.I)	Sampling Inspection Table, Inspection by Attributes & count of defects (1st revision).					5	IS:25 00 (Pt.I)	Sampling Inspection Table, Inspection by Attributes & count of defects (1st revision).
	6	IS:77 39 (Pt.V)	Code of practice for preparation of metallographic specimen, Part V iron & Steel and their examination.		IS:77 39 (Pt.V)	Code of practice for preparation of metallographic specimen, Part V iron & Steel and their examination.					6	IS:77 39 (Pt.V)	Code of practice for preparation of metallographic specimen, Part V iron & Steel and their examination.
	7	IS:16 08	Method of tensile testing of steel products other than sheet, strip, wire and tube		IS:16 08	Method of tensile testing of steel products other than sheet, strip, wire and tube					7	IS:16 08	Method of tensile testing of steel products other than sheet, strip, wire and tube
	8	IS:77 54	Method for designation of microstructure of graphite in cast iron		IS:77 54	Method for designation of microstructure of graphite in cast iron					8	IS:77 54	Method for designation of microstructure of graphite in cast iron
	9	IS:83 50	Deviations for untolerenced dimensions of Spheroidal or Nodular Graphite Castings		IS:83 50	Deviations for untolerenced dimensions of Spheroidal or Nodular Graphite Castings					9	IS:83 50	Deviations for untolerenced dimensions of Spheroidal or Nodular Graphite Castings
	10	ASTM E-351	Standard Test Methods for Chemical Analysis of Cast Iron—All Types		ASTM E-351	Standard Test Methods for Chemical Analysis of Cast Iron—All Types					10	ASTM E-351	Standard Test Methods for Chemical Analysis of Cast Iron—All Types
7.2.2	Sand mould shall be porous to allow fumes to escape out of the moulds when the molten metal is poured			Sand mould shall be porous to allow fumes to escape out of the moulds when the molten metal is poured and entrapped gases to escape out of the moulds during pouring of molten metal.			M&C Dte., RDSO	M&C Dte. has sugges ted for reword ing of clause 7.2.2.	Clause has been reworded as suggested by M&C Dte., RDSO	Sand mould shall be porous to allow fumes to escape out of the moulds when the molten metal is poured and entrapped gases to escape out of the moulds during pouring of molten metal.			

New Para Added 8.1		The manufacturer shall make few trial castings with the aim of development of inserts. The castings shall be thoroughly checked for dimension, weight, metallurgical properties and chemical composition. If on examination, any change in pattern of gating, risers and runners, and method of moulding is found necessary, it shall be carried out. The same procedure shall be repeated till all aspects of manufacture technology get corrected.	-	No comments		The manufacturer shall make few trial castings with the aim of development of inserts. The castings shall be thoroughly checked for dimension, weight, metallurgical properties and chemical composition. If on examination, any change in pattern of gating, risers and runners, and method of moulding is found necessary, it shall be carried out. The same procedure shall be repeated till all aspects of manufacture technology get corrected.
New Para Added 8.2		When the procedure is perfected, the manufacturer shall issue call letter for visit of inspecting officer and sample inserts and test samples shall be made in the presence of inspecting officer. 8 inserts for dimensional checking and other samples and test pieces as instructed by inspecting officers shall be submitted to RDSO for testing. If the samples are found satisfactory dimensionally and metallurgically, the bulk manufacture of inserts shall be allowed. Inspection/testing charges for inspection of firm, checking of gauges, making and testing of samples etc. shall be borne by the manufacturers.	Prime Ispat Limited	SGCI insert of each drawing will be inspected initially by RDSO and future inspection would be done by zonal Railway/RITES/TP I.	Initial quantity of 20000 inserts will be done by RDSO after approval.	When the procedure is perfected, the manufacturer shall issue call letter for visit of inspecting officer and sample inserts and test samples shall be made in the presence of inspecting officer. 8 inserts for dimensional checking and other samples and test pieces as instructed by inspecting officers shall be submitted to RDSO for testing. If the samples are found satisfactory dimensionally and metallurgically, the bulk manufacture of inserts shall be allowed. Inspection/testing charges for inspection of firm, checking of gauges, making and testing of samples etc. shall be borne by the manufacturers.

11	Tests as per Para 11 12 to 14 shall be conducted on SGCI inserts for acceptance of the material.	Tests as per Para 11 12 to 14 shall be conducted on SGCI inserts for acceptance of the material.	M&C Dte., RDSO	M&C Dte., has suggested for rewording of this clause.	Clause has been reworded as suggested by M&C Dte., RDSO	Tests as per Para 11 12 to 14 shall be conducted on SGCI inserts for acceptance of the material.
11.2.1	Phosphorus content of one insert from each batch shall be checked and shall not exceed 0.05 per cent when tested in accordance with IS:228 (Part 3) – 1987 or when checked by spectrograph with the use of joint test lug of insert as per ASTM E-351.	11.2.1 12.2.1 Phosphorus content of one insert from each batch shall be checked and shall not exceed 0.05 0.08 per cent when tested in accordance with IS:228 (Part 3) – 1987 or when checked by spectrograph with the use of joint test lug of insert as per ASTM E-351	M&C Dte., RDSO	M&C Dte., has suggested that Phosphorus content shall be kept <0.05 %	In the third revision of specification IRS/T-46 May-2023, phosphorus content was reduced from 0.08% to 0.05%, hardness was increased from 170 to 241 BHN to Min 210 BHN and tin & copper was also added. In the regular production of inserts the above parameters could not be achieved. To discuss the above issue a meeting was held on 16.01.2024 with the manufacturers and M&C officials and it was decided to have phosphorus content as 0.08% and hardness of 190 BHN and addition of tin &	11.2.1 12.2.1 Phosphorus content of one insert from each batch shall be checked and shall not exceed 0.08 per cent when tested in accordance with IS:228 (Part 3) – 1987 or when checked by spectrograph with the use of joint test lug of insert as per ASTM E-351

					copper was not to be made mandatory. Hence, there is no need to alter phosphorus content.	
11.2.2	Copper (Cu) content of one insert from each batch shall be checked and shall be in the range of 0.10 to 0.30 percent when tested in accordance with IS: 228 (Part 15-1992) or when checked by spectrograph with the use of joint test lug of insert as per ASTM E-351.	12.2.2 12.2.2 Copper (Cu) content of one insert from each batch shall be checked and shall be in the range of 0.10 to 0.30 percent when tested in accordance with IS: 228 (Part 15 1992) or when checked by spectrograph with the use of joint test lug of insert as per ASTM E-351.		No comments	-	12.2.2 12.2.2 Copper (Cu) content of one insert from each batch shall be checked and shall be in the range of 0.10 to 0.30 percent when tested in accordance with IS: 228 (Part 15 1992) or when checked by spectrograph with the use of joint test lug of insert as per ASTM E-351.
11.2.3	Tin (Sn) content of one insert from each batch shall be checked and shall be in the range of 0.01 to 0.03 percent when checked by spectrograph with the use of joint test lug of insert as per ASTM E-351.	12.2.3 Tin (Sn) content of one insert from each batch shall be checked and shall be in the range of 0.01 to 0.03 percent when checked by spectrograph with the use of joint test lug of insert as per ASTM E-351.		No comments	-	12.2.3 Tin (Sn) content of one insert from each batch shall be checked and shall be in the range of 0.01 to 0.03 percent when checked by spectrograph with the use of joint test lug of insert as per ASTM E-351.
11.4.3	In addition, tensile strength test shall also be carried out on proportionate test pieces machined out from 1% of the castings selected from every batch. The test pieces shall be machined out from suitable locations on the castings and tested in accordance with IS:1608: 2005 'Method of Tensile Testing of Steel Products Other than Sheet, Strip, Wire and Tube'. The tensile strength and elongation shall not be less than 80% of the minimum values	11.4.3 12.4.3 In addition, tensile strength test shall also be carried out on proportionate test pieces machined out from 1% of the castings selected from every batch. The test pieces shall be machined out from suitable locations on the castings and tested in accordance with IS:1608: 2005 'Method of Tensile Testing of Steel Products Other than Sheet, Strip, Wire and Tube'. The tensile strength and elongation shall not be less than 80% of the minimum values specified in clause 11.4.2 12.4.2 above.		No comments	-	11.4.3 12.4.3 In addition, tensile strength test shall also be carried out on proportionate test pieces machined out from 1% of the castings selected from every batch. The test pieces shall be machined out from suitable locations on the castings and tested in accordance with IS:1608: 2005 'Method of Tensile Testing of Steel Products Other than Sheet, Strip, Wire and Tube'. The tensile strength and elongation shall not be less than 80% of the minimum values specified in clause 11.4.2 12.4.2 above.

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11.4.4	<p>The frequency of testing mentioned in clause 11.4.3 above may be at the discretion of the Inspecting authority be relaxed to one number per heat after ensuring consistency of quality of production in 20000 inserts. In case of results of 2 batches out of 5 batches going beyond permitted values, the frequency of testing shall be reverted back for 20000 inserts.</p>	<p>11.4.4 12.4.4</p> <p>The frequency of testing mentioned in clause 11.4.3 12.4.3 above may be at the discretion of the Inspecting authority be relaxed to one number per heat after ensuring consistency of quality of production in 20000 inserts. In case of results of 2 batches out of 5 batches going beyond permitted values, the frequency of testing shall be reverted back for 20000 inserts.</p>		No comments	-	<p>11.4.4 12.4.4</p> <p>The frequency of testing mentioned in clause 11.4.3 12.4.3 above may be at the discretion of the Inspecting authority be relaxed to one number per heat after ensuring consistency of quality of production in 20000 inserts. In case of results of 2 batches out of 5 batches going beyond permitted values, the frequency of testing shall be reverted back for 20000 inserts.</p>
11.5.1	<p>Brinell Hardness test shall be carried out on the end face of the head of all the inserts selected for tensile test in accordance with IS: 1500-2005 and hardness shall not be less than 210 BHN.</p>	<p>11.5.1 12.5.1</p> <p>Brinell Hardness test shall be carried out on the end face of the head of all the inserts selected for tensile test in accordance with IS: 1500-2005 and hardness shall not be less than 210 190 BHN.</p>	Prime Ispat Limited	<p>We would like to bring your kind attention on that hardness and Elongation have an inverse relationship, meaning that as hardness increases, elongation decreases. For SGCI</p>	<p>Suggestion cannot be accepted as Hardness range in IS-1500 is given for information only. The required test results should conform in accordance with the agreement between manufacturer and purchaser.</p> <p>Hardness has been reduced from minimum 210 BHN to minimum 190 BHN.</p>	<p>11.5.1 12.5.1</p> <p>Brinell Hardness test shall be carried out on the end face of the head of all the inserts selected for tensile test in accordance with IS: 1500-2005 and hardness shall not be less than 210 190 BHN.</p>

				insert flexibili ty and elonga tion proper ties are more critical than hardne ss ensuri ng it can withst and repetiti ve stress and strain. We are hereby reques t you that minim um limit of hardne ss should be 170 BHN.		
11.6. 1	The castings selected as per clause 11.4.3 or 11.4.4 shall also be subjected to micro examination and the structure shall be as stipulated in clause 9 of IS: 1865-1991.	11.6.1 12.6.1 The castings selected as per clause 11.4.3 12.4.3 or 11.4.4 12.4.4 shall also be subjected to micro examination and the structure shall be as stipulated in clause 9 of IS: 1865-1991.		No comme nts	-	11.6.1 12.6.1 The castings selected as per clause 11.4.3 12.4.3 or 11.4.4 12.4.4 shall also be subjected to micro examination and the structure shall be as stipulated in clause 9 of IS: 1865-1991.

ANNE EXU RE- VI	Firm _____	Firm _____		No comme nts	-	Firm _____																																																																																							
	Chemical Analysis Report of finished Castings	Chemical Analysis Report of finished Castings				Chemical Analysis Report of finished Castings																																																																																							
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ANNE XURE- IX	No. _____ Date: _____ (Address of Inspection Agency) Dear Sirs, SUB: Railway Board/Railway Contract No. _____ dated _____ _____ for manufacture & supply of _____ SGCI inserts to Drg. No. RDSO/T _____ Alt.	No. _____ Date: _____ (Address of Inspection Agency) Dear Sirs, SUB: Railway Board/Railway Contract No. _____ dated _____ _____ for manufacture & supply of _____ SGCI inserts to Drg. No. RDSO/T _____ Alt.		No comme nts	-	No. _____ Date: _____ (Address of Inspection Agency) Dear Sirs, SUB: Railway Board/Railway Contract No. _____ dated _____ _____ for manufacture & supply of _____ SGCI inserts to Drg. No. RDSO/T _____ Alt.																																																																																							

	<p>SGCI inserts as per the following details are offered for inspection. The inserts have been internally checked as per</p> <p>Drawing No. Alt._____and IRS/T-46- 2023 and found satisfactory.</p> <ol style="list-style-type: none"> 1. Installment No. 2. Qty. on Order 3. Qty. previously inspected & passed 4. Qty. offered for inspection 5. Rate 6. Delivery period 7. Marking on inserts 8. Packing 9. Consignee <p>Heatwise details of the inserts offered for inspection are as per Annexure.</p> <p>Inspection of the inserts may please be carried out.</p> <p>Thanking you,</p> <p>Encl: One annexure</p> <p>Yours faithfully,</p> <p>(Signature with Date) Name_____ Designation_____</p>	<p>SGCI inserts as per the following details are offered for inspection. The inserts have been internally checked as per</p> <p>Drawing No. Alt._____and IRS/T-46- 2023 2024 and found satisfactory.</p> <ol style="list-style-type: none"> 1. Installment No. 2. Qty. on Order 3. Qty. previously inspected & passed 4. Qty. offered for inspection 5. Rate 6. Delivery period 7. Marking on inserts 8. Packing 9. Consignee <p>Heatwise details of the inserts offered for inspection are as per Annexure.</p> <p>Inspection of the inserts may please be carried out.</p> <p>Thanking you,</p> <p>Encl: One annexure</p> <p>Yours faithfully,</p> <p>(Signature with Date) Name_____ Designation_____</p>				<p>SGCI inserts as per the following details are offered for inspection. The inserts have been internally checked as per Drawing No. Alt._____and IRS/T-46- 2023 2025 and found satisfactory.</p> <ol style="list-style-type: none"> 1. Installment No. 2. Qty. on Order 3. Qty. previously inspected & passed 4. Qty. offered for inspection 5. Rate 6. Delivery period 7. Marking on inserts 8. Packing 9. Consignee <p>Heatwise details of the inserts offered for inspection are as per Annexure.</p> <p>Inspection of the inserts may please be carried out.</p> <p>Thanking you,</p> <p>Encl: One annexure</p> <p>Yours faithfully,</p> <p>(Signature with Date) Name_____ Designation_____</p>
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